

# PROGRESS AND PROMISE

21 STORIES THAT SHOWCASE SUCCESSFUL GREAT LAKES RESTORATION PROJECTS



# Progress and Promise: 21 Stories that Showcase Successful Great Lakes Restoration Projects

Prepared for the Healing Our Waters®–Great Lakes Coalition  
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*Cover photos: (Clockwise from top left) Kayakers enjoying a paddle along French Creek. Kids play in the Shiawassee River section of a river heritage trail maintained by community volunteers. Chicago anglers.*

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# FOREWORD

The Great Lakes are a wonder of the world. More than 30 million people rely on the Lakes for their drinking water, and millions more benefit from the commerce and businesses that depend on the Great Lakes. The waters known as the Sweetwater Seas have helped shape the identity of the region, from the cities and businesses that grew up along its coasts to the people who now call the region home.

Today, however, the Great Lakes face many serious threats. Old sewers spew billions of gallons of sewage and storm water into the Lakes annually, closing beaches and threatening the health of people and wildlife. Aquatic invasive species continue to enter the Great Lakes, costing people, businesses and communities more than \$200 million per year in damages and control costs. A legacy of toxic pollution remains, leading to drinking water restrictions, beach closures, fish consumption advisories and depressed home values. The loss of habitat and wetlands continues, harming wildlife, damaging water quality and undermining the foundation of the region's outdoor recreational economy.

These problems are well-documented and well-known.

But there is another side to the story: Communities around the region are rolling up their sleeves and getting to work to restore the Great Lakes. Step by step, project by project people are removing dams to beautify their waterfronts, allow for fish passage and increase tourism. People are converting old farms to wetland habitat to help purify water, attract wildlife and provide recreational opportunities. People are restoring river and lake shorelines to experience the wonder of an urban wildlife refuge.

With each successful project, people and communities are experiencing the power of Great Lakes

restoration — in the form of thriving fish populations that are returning after a decades-long absence; in the form of recreational kayakers who are returning to a river now clean and free of debris; and in the form of friends and families who are returning to special places to enjoy the outdoors and time together.

This report documents 21 such Great Lakes restoration success stories. The stories exemplify the kind of work, vision, collaboration, innovation, partnerships and long-term commitment that will be needed to restore the Lakes. This is not an

exhaustive list. The Healing Our Waters-Great Lakes Coalition chose the stories based on five geographic priorities that the coalition and its scientific advisors have identified as in great need of restoration—yet also showing promise for being successfully restored. The majority of projects come from these priority areas; the others come from locations around the region.

The stories represent a fraction of successful restoration projects. Our goal in telling these stories is to highlight the excellent work being done around the region. Our hope is that in the coming years these kinds of successes will be replicated many times over in towns, cities, and communities across the region. As this report shows, we have manageable solutions to the problems facing the Lakes—and people, cities, businesses and nonprofit organizations across the region are embracing these solutions. The result: The Great Lakes are starting to make a comeback.

The progress the region is making to restore the Lakes has fueled hope among the millions of people who depend on the Great Lakes for their jobs and way of life that the nation will continue to take the steps necessary to restore this national icon.

U.S. public officials have taken notice and taken action.

President Barack Obama and the U.S. Congress have made Great Lakes restoration a national priority—putting the full weight of the federal government behind the restoration of the largest source of surface fresh water in the world and investing \$475 million to restore the Lakes as part of the Great Lakes Restoration Initiative. The initiative funds solutions to the most serious problems facing the Lakes—including projects similar to those profiled in this report.

It's imperative that the nation continue to support local on-the-ground restoration projects and not waiver in its commitment to restore the Lakes. The health of the Great Lakes is inextricably linked to the health of the regional economy. Investments in restoration create jobs and lay the foundation for long-term prosperity—providing \$2 in economic benefit for every \$1 investment in restoration. Conversely, inaction will allow the problems to get worse and the solutions to get more costly.

The Healing Our Waters-Great Lakes Coalition's No. 1 goal is to make sure that Great Lakes restoration succeeds. This report underscores that we have solutions to restore the Great Lakes, safeguard public health, create jobs and protect our way of life. It's time to use them so that we can protect this great resource now and for generations to come.

*Lake Superior shoreline in Duluth*



# INTRODUCTION

“That’s just the way it was.”

That’s the refrain you hear again and again from people who grew up on the Great Lakes and their tributaries in decades past, accustomed to oil slicks, algal blooms, dead fish and even raw sewage fouling the waters, beaches and communities.

Some of them, at the behest of parents, stayed away from the water completely. Others screwed up their noses or giggled at the filth, and played in it anyway. As they got old enough to think about it, they saw this pollution as the price to pay for the thriving industry that kept the region’s economy strong and proud.

Now much of that industry is gone—steel mills and paper mills closed, foundries cool and quiet or dismantled altogether, grain elevators empty. And with the crumbling of industry so too many of the towns and cities of the Great Lakes region have suffered—majestic buildings falling into disrepair, weeds sprouting through cracked sidewalks, vacant lots spreading like a cancer.

But at the same time the Great Lakes and their streams, creeks, lagoons and bays have started to stage a comeback, thanks to the dedicated efforts of community members and public officials and the amazing resilience of nature. As the health of the waters have slowly improved, rising like a sparkling blue phoenix, so too have many of the creatures that call them home—the primeval lake sturgeon, the mournful loon, the humble Blandings’ turtle, the lascivious Lake Erie Watersnake. Not to mention the native plant species that are sprouting and flourishing, their seeds having lain patiently dormant for decades, waiting for the moment conditions would once again allow them to grow.

While many ecological challenges and impediments remain in the Great Lakes, the improvement over 30 or 40 years is truly remarkable.

This turnaround can be attributed to a confluence of factors and processes including pro-active federal, state and local policy; dedicated and passionate volunteers and activists; committed non-profit groups and impressive cooperation between these entities often playing out over many years. The Clean Water Act set things in motion, and the ban on phosphorus in detergents along with a growing awareness of nutrient pollution from farm and city run-off did much to reduce algal blooms and eutrophication.

The Great Lakes Water Quality Agreement in 1987 led the U.S. and Canadian governments to designate 43 seriously degraded “Areas of Concern” in the Great Lakes—some of the most polluted waterways in the region that are responsible for drinking water restrictions, fish consumption advisories and beach closures due to the threat posed to people and wildlife. The Areas of Concern program, including the development of remedial action plans and the formation of public advisory committees for each area of concern, has fostered grassroots leadership and cooperation with government agencies.

While the passage of landmark environmental laws and a renewed effort at the local and state levels to restore the Great Lakes has led to many significant





*Construction on Chesaning weirs*

improvements in the health of the Lakes, challenges remain and new ones continue to arise.

Overflows from aging sewers continue to spill billions of gallons of sewage and storm water into the Great Lakes and their tributaries every year. Animal waste and fertilizer run-off from farming remains a threat and has led to a return of harmful algal blooms—most noticeably in western Lake Erie. The destruction of habitat and wetlands remain a problem, as is increased run-off and pollution from development. Invasive species are an ever-pressing problem—the steady advance of the non-native Asian carp the most recent and urgent threat.

The recent attention by President Obama and the U.S. Congress has helped advance the restoration of these magnificent Lakes. The American Recovery and Reinvestment Act invested more than \$1.4 billion to upgrade the region's sewers. Restoration efforts received a shot in the arm from the \$475 million Great Lakes Restoration Initiative that funds solutions to some of the most vexing problems facing the Lakes. Funds have started to be awarded, already yielding some concrete and impressive results, including some stories detailed in this report.

Peter Annin, author of *Great Lakes Water Wars*, notes that bulldozers used to plow piles of rotting dead alewives off beaches, a sign of ecological imbalance since invasive sea lamprey had wiped out their predator fish and allowed an unsustainable alewife population explosion. The lakefront was so unpleasant in those days that people would avoid it at all costs. Given that history, he feels we've come a long way today.

"Yes, the lakes are still struggling," Annin says. "But if you go back and look at the burning Cuyahoga River, Lake Erie being declared biologically 'dead' and people just not wanting to spend time around the lakes, things have improved markedly since then. Now the lakes are cleaner, more inviting and

people have returned to enjoy them more than they have in generations. As people have returned to the lakes, they've embraced them and fallen in love. They are a stronger voice fighting for the lakes and raising the bar of expectations ever higher."

People in many Great Lakes communities, indeed, have set their sights on a new economic and social future—with the rejuvenated Great Lakes central to that future: an economy based on tourism, fishing, hiking, canoeing, hunting, clean energy and green jobs. The Great Lakes environment is itself the driver of economic development.

Witness the children who play in and around the Great Lakes.

The toddler who races up a Wisconsin beach delightedly exclaiming, "Ma, those fish have EYES!"

Or the young Vietnamese boy who earnestly fishes with his father on a Chicago pier, a cultural tradition from their homeland passing from one generation to the next.

Or the teenagers leaning against a lighthouse in Erie, Pa., gossiping and laughing on a warm night as they gaze at the lake.

Or the girls in traditional Arabic dress chasing geese on a beautiful afternoon on Belle Isle in the Detroit River.

This generation never saw the worst era of pollution in the Great Lakes. Though ample challenges still remain, the dedication of communities, individuals, legislators and organizations in past decades mean young people can grow up enjoying the Great Lakes without worry—running, swimming, playing, discovering the natural world in all its mystery. Not thinking too much about it, because that's just the way it is.

# ST. LOUIS RIVER AND ST. LOUIS BAY

## WINNING THE WASTEWATER WAR

### DULUTH, MINNESOTA

Growing up on the St. Louis River in Duluth in the 1950s and 1960s, young Will Munger would sometimes disobey his father's orders not to play in the water. His father was Williard Munger, the state legislator legendary for his environmental advocacy. He encouraged his son's love of the outdoors. But as the river was filled with solid and liquid waste, it was hardly a healthy playground.

At the time local sewage was treated by settling out the solids, and everything else was sent into the river, joining the effluent from a myriad industries. Will Munger remembers seeing raw sewage floating down the river.

*Marc Hershfield of the Minnesota Pollution Control Agency along the St. Louis River*



"For 50 years you had steel-making, coking, rug-making, slaughterhouses, piles of coal, all sending things into the river," says Minnesota Pollution Control Agency staffer Brian Fredrickson, during a lively gathering in May at the Munger Inn, the slightly rustic establishment Will Munger has run since his father's death in 1999.

Black sludge backed up behind dams. Fish suffocated due to low oxygen levels caused by excess nutrient inputs and the decomposition of woody waste from paper mills. Walleye that did survive were largely inedible, with yellowed flesh and a distinctive smell. Fish had pectoral mutations likely because of dioxins. And the water itself stank.

The May gathering at the inn is a throwback to Williard Munger's days, when constituents were invited to break bread with him and voice their concerns about the environment or even help draft environmental legislation.

In 1971 the elder Munger pushed through state legislation creating the Western Lake Superior Sanitary District with the mandate of cleaning up the lower St. Louis River. That, combined with the passage of the Clean Water Act soon after, paved the way for the river's rebirth as a place where locals and tourists fish, kayak, wade and swim—without worrying about disgusting objects floating by.

In 1974 further legislation gave the sanitary district responsibility for dealing with solid waste. The facility actually began operating in 1978. Starting in 1985 the paper mills and other industry pumped their wastewater to the plant, after pre-treating it.

Residents noticed a difference in the river within days of the sanitary district's launch.

The nitrogen and phosphorus nutrient load decreased to healthier levels, meaning dissolved oxygen quickly increased. "The river was no longer red and yellow and filled with foam," says Fredrickson.



Once the most dangerous and ecologically harmful compounds were removed from the wastewater emptied into the river, the sanitary district could turn its attention to new concerns like monitoring pharmaceutical traces and dealing with surface water infiltration into aging pipes.

“You have the luxury now of looking at endocrine disruptors and other things that might still be in the water, because the fish are not just dead like before,” says Gina Temple-Rhodes, a professional story-teller compiling an oral history of the sanitary district.

Today about 48 million gallons of wastewater from a 530-square-mile area go through the system’s 75-mile network of pipes each day. The facility includes a state-of-the-art bio-solids plant, completed in 2001, wherein solid waste is disinfected by heat and microbial activity, then dewatered and turned into nutrient-rich fertilizer which is distributed free to farmers growing livestock feed. It is also used for iron mine reclamation projects.

The sanitary district includes an organic composting facility and a Material Recovery Center, where citizens can pick up discarded reusable goods like bicycles and furniture; and a sorting center lets people separate and dispose of old electronics, mattresses, tires and other hard-to-dispose-of items.

Local leaders originally hoped to make the sanitary district a bi-state operation, treating wastewater from Superior, Wis. Though that didn’t work out, in the 1990s an innovative arrangement was made wherein the town of Oliver, Wis., was connected to the sanitary district treatment plant via a pipeline under the St. Louis River. Before that, the small town had been dumping sewage into Lake Superior.

“We broke all the rules, going out of the state, out of the district,” says Western Lake Superior Sanitary District planning and technical services director Jack Ezell.

Environmentalists at the Munger Inn hail the sanitary district as a great success and achievement. The district is considered an innovator nationally. Those involved credit an ongoing strong collaboration between private industry and local, state and federal government agencies.

Ezell is proud to have been a part of it. “I’ve been lucky,” he says, “To have a position where I could do something I believe in.”

Will Munger, for his part, carries on his father’s legacy by operating the inn, and housing the guests who come to fish, hike and swim in areas where it would not have been safe or enjoyable four decades ago. He notes that property values have climbed sharply since the river improved, with half-million-dollar homes on the banks.

“This area has spiritual and recreational value,” says canoe guide and naturalist Mike Anderson, a regular at the Inn. He notes that the National Oceanic and Atmospheric Administration recently designated the Great Lakes’ second National Estuary Research Reserve just upstream on the St. Louis River.

“This shows how restoring an area can be beneficial economically as well as socially and environmentally,” Munger says. “My dad would never be totally satisfied. But he would be pleased to see how things are happening here.”

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## RIFFLES IN THE RIVER: SUPPORTING LAKE STURGEON

### DULUTH, MINNESOTA

On a brisk May day, Duluth environmentalists joked that they would soon hold a baby shower at the base of the Fon du Lac dam, where the waters of the St. Louis River cascade over the 78-foot drop on their journey to Lake Superior 19 miles downstream.

The shower would be for baby lake sturgeon—the prehistoric, endangered species which is slowly but surely making a comeback in the Great Lakes thanks in part to efforts like the construction of spawning grounds below the dam.

Restoring and protecting native species like the sturgeon is key to nurturing the overall health of the Great Lakes. And since many fish spend a portion of their lives—including the all-important spawning period—in rivers that run into the Great Lakes, restoring and protecting habitat in tributaries is often a crucial part of improving the Lakes’ health and also bolstering the Lakes’ recreational fishery, worth an estimated \$7 billion.

In the summer of 2009, Minnesota Department of Natural Resources Lake Sturgeon Coordinator John



*Minnesota Department of Natural Resources Lake Sturgeon coordinator John Lindgren at the Fon du Lac dam, where new spawning habitat is reviving sturgeon populations in the St. Louis River.*

Lindgren and his colleagues constructed three “riffles,” or rows of boulders organized into circular cells, stretching across the St. Louis River to recreate desirable spawning habitat for lake sturgeon as well as walleye, suckers and other fish.

The river was once so polluted by effluent from paper mills, steel mills, sewage systems and other sources that hardly any fish survived. The Minnesota Department of Natural Resources started introducing baby sturgeon in 1983, with a total of 150,000 fingerlings introduced by 2001. Since sturgeon take almost 20 years or more to reach reproductive age, it is only recently that one would expect to find young sturgeon. On a chilly, drizzly May afternoon early in the sturgeons’ 2010 spawning season, Lindgren points out a three-foot-long, slender dark sturgeon splashing in the shallow, tannin-stained water. He guesses it is a male, waiting for females who will soon come to spawn.

“They’re just milling around, waiting for the chicks to get here,” Lindgren jokes. He is hopeful of finding young sturgeon in coming weeks. Scientists likely won’t detect larvae from this year’s spawning, but rather year-old fingerlings or young fish from other recent spawning seasons.

This would be a victory not only for the lake sturgeon, which has changed little genetically since the age of dinosaurs, but for the river and the western part of Lake Superior as a whole, since lake sturgeon are a sentinel species whose health symbolizes overall ecological conditions.

The riffle construction, a joint project of The Nature Conservancy and the Minnesota Department of Natural Resources, involved hauling glacial boulders down a narrow forest road in 40 dump truck loads. The land beside this stretch of river is owned by Minnesota Power, which also runs the dam and has been very supportive of the sturgeon project. The utility opens the dam’s multiple gates in a staggered pattern to keep a relatively constant sturgeon-friendly flow across the river.

Researchers think the area below the dam was an historical sturgeon spawning spot. The riffles’ loose circles of boulders give sturgeon a place to settle in the rapidly-moving tongue of water behind a rock. The downstream rim of the circle calms the water down just enough to allow the female sturgeon to broadcast her eggs, which will be quickly fertilized by males. Once fertilized, the eggs secrete a sticky substance that lets them anchor to smaller pebbles on the shallow river bottom.

Walleye and suckers, who spawn earlier than sturgeon, have already made good use of the riffles. That makes anglers happy. Fishing of endangered lake sturgeon is strictly regulated, though one day they may recover enough to be a popular sport fish and food source for humans and bears. Meanwhile their recovery increases the economic and ecological value of the lakes and rivers in general, since many people revere the ancient fish.

This was not always the case. Lake sturgeon were once thrown in piles and burned by locals who considered them a “trash fish.” Now, scientists and policy-makers understand that educating people about the sturgeon’s ecological importance and unique biology is key to ensuring its future survival.

Enter Mary Pensak, volunteer coordinator for Duluth’s Great Lakes Aquarium. On this day, she is speaking to several hundred sixth graders on the educational River Vista boat cruise. She cradles an adorable five-foot-long plush sturgeon she sewed by hand, complete with soulful dark eyes and pipe cleaner whiskers. She’s talking to the students about the history and importance of the prehistoric fish.

The event is part of the annual educational cruise in Duluth harbor, where students can learn about Great Lakes ecology, health and safety. The program illustrates how preservation and restoration can start

*Adele Yorde and students on the River Vista cruise*



with the youngest generation; how youth can identify with the fish and see that bringing the lakes back to health is good for sturgeon and human alike.

The students listen eagerly as Pensak tells the sturgeon’s life story. They gasp at the female’s life span of up to 150 years, compared to 80 years for males. “Why do females live so much longer?” asks one boy. “Because we’re better,” answers a girl. “Duh.”

## ON THE FRONT LINE AGAINST INVASIVE SPECIES

### DULUTH, MINNESOTA

“Did you see ‘Finding Nemo?’” Douglas Jensen asks a crowd of sixth graders aboard the annual St. Louis River Quest, an educational boat tour in Duluth Harbor.

The question provokes a ripple of affirmations and giggles.

“It was a great movie, I loved it too,” he says of the tale of the lost clownfish. “But it sends the wrong message. Nemo could have had a disease or parasite,” that he could have spread to other ocean-dwellers.

Now that he has the kids’ attention, Jensen, the aquatic invasive species program coordinator for the Minnesota Sea Grant College Program, shows off jars of pickled Asian carp, round goby and other invasive species.

Aquatic invasive species are a major problem in the Great Lakes. Non-native creatures like the zebra mussel and round goby cost people, businesses and communities more than \$200 million in damages and control costs. More than 185 non-native species have been discovered in the Great Lakes, with a new non-native organism discovered, on average, every 7 months.

Since the opening of the Great Lakes-St. Lawrence Seaway in the 1959, nearly two-thirds of aquatic invasive species have entered through ballast water discharge from foreign ships. Once harmful invaders are in regional waterways, they can be inadvertently transferred from lake to lake, and water body to water body, by small boats and fishing equipment—allowing species to colonize new habitats. They can



also be inadvertently released by people disposing of aquarium fish.

Children on the River Quest harbor tour, sponsored by the Duluth Seaway Port Authority and other organizations, learn not to throw aquarium or fish bowl pets—dead or alive—into streams or flush them down toilets. Jensen notes that science teachers are often unknowingly guilty of transporting invasive species, when they throw class specimens into lakes or rivers. The invasive rusty crayfish is a particular culprit since it looks much like a native crayfish and is often used as a class specimen.

Students also practice loading a plexi-glass Lake Carrier ship with iron ore pellets and filling the ship's ballast compartments with water, learning how ballast keeps a ship "in trim."

Education efforts to curb the introduction and spread of invasive species does not end with programs for children. In recent years citizens across the Great Lakes region—and particularly around the St. Louis Bay in Duluth and Superior, Wis.—have been well-schooled on the threat of aquatic invasive species and how to curb their spread. The campaigns "Stop Aquatic Hitchhikers" and "Habitatitude"—publicized with stickers, billboards and signs—have made the vast majority of local residents very aware of their role in the fight against invasive species, according to Jensen.

A 2006 study in Wisconsin, Minnesota and Iowa showed that more than 97 percent of citizens understood the threat of invasive species. Though it is impossible to count how many species are NOT introduced thanks to responsible measures, experts say there is no doubt people are now cleaning their boats and equipment between water bodies and refraining from releasing non-native species.

"People really value the lakes and rivers," says Jensen, "and are willing to take action to protect them."

Meanwhile several miles away, an intricate composition of pipes and tanks sits next to a grain elevator and railroad tracks abutting the harbor. This is the Great Ships Initiative, an inconspicuous but potentially ground-breaking laboratory for ballast treatment systems.

It is widely agreed that the only way to slam the door on invasive species is to mandate foreign ships to treat their ballast water. In recent years, advocates,

city, state and business leaders have held out hope that federal legislative or executive action would set a ballast water standard requiring ships to develop and install technology to kill harmful non-native organisms.

While the nation waits for the U.S. government to set a strong ballast water standard, it's important that the technology to effectively kill invasive species in ballast tanks move forward. Though a perfect solution has not yet been found, the research underway is a success story in itself.

The Great Ships Initiative is a project of the non-profit Washington, D.C.-based Northeast-Midwest Institute in collaboration with the University of Wisconsin Lake Superior Research Institute, the University of Minnesota Natural Resources Research Institute and other research entities. It offers free testing of promising ballast treatment systems, from "bench testing for a gadget someone put together in their garage," in the words of Lake Superior Research Institute Associate Researcher Matt TenEyck, to large-scale commercial technologies. Companies set up their systems in the initiative's cavernous corrugated shelter, sometimes using a crane to move in large equipment. Then the systems are tested on pumped-in Lake Superior water that can be injected with a diverse range of micro-organisms and viruses.

TenEyck notes that people are often fixated on testing the system on existing invasive species like zebra mussel larva. "But it's the unknown we're worried about," he says, meaning it makes more sense to test systems on a range of common organisms, bacteria and viruses that are biologically similar to many of their brethren.

Ballast treatment systems tested at the facility range from cavitation—tiny bubbles that kill organisms as they rupture—to sound waves to deoxygenation to chemicals. Companies get an unbiased report about their technology's performance, which is made public on the Great Ships Initiative Web site.

Even though they have seen many promising technologies falter, TenEyck is confident an effective and efficient system will be fine-tuned in the near future—setting off a wave of successive improvements in technology that will protect the Great Lakes from harmful invaders. "Ultimately we want to put ourselves out of business," he says. "It's like computers, there will always be something new coming out."



*Wisconsin DNR staff assist in a fish rescue during the remediation of Hog Island Inlet.*

## HOG ISLAND: INDUSTRY AND ECOLOGY IN BALANCE

### SUPERIOR, WISCONSIN

A family of Canada geese glide through water reflecting the steely gray sky around Hog Island in St. Louis Bay. The shores are laced with invasive phragmites and cat tails. Locomotives chug by on multiple tracks to the myriad factories and commodity stockpiles throughout the harbor area.

Hog Island appears as calm and pristine as a place can in such surroundings, a swath of lush marshy vegetation seemingly untouched by the industrial infrastructure. But up until recently, Hog Island was exceedingly contaminated with carcinogenic pollutants and heavy metals including lead and mercury. The island sits within one of the most polluted waterways in the region, listed as one of the 43 “Areas of Concern” in the Great Lakes, so-called toxic hot-spots that pose risks to people and wildlife. The program’s standard list of impairments didn’t even include areas judged unsafe for human contact; a new category was inspired by Hog Island. State officials posted signs warning people not to fish or swim.

“It was very obviously impacting the health of the community—the ecological community and public health,” says Megan O’Shea of the Wisconsin Department of Natural Resources.

Thanks to the EPA’s Great Lakes National Program Office, the Wisconsin Department of Natural Resources and citizens who attended countless planning meetings, Hog Island became one of the first sites cleaned up under the Great Lakes Legacy Act, which provides federal funding to remove

contaminated sediment. Sediment removal started in July 2005 and was completed in November of that year. Ultimately more than 55,000 tons of contaminated petroleum-based sediments were dredged. The Legacy Act covered \$4.1 million of the \$6.3 million price tag, and the Wisconsin Department of Natural Resources paid for the remaining \$2.2 million. The next year, reseeding and replanting began. A pre-treatment system installed at the nearby Murphy Oil refinery also helped reduce pollution.

Now Hog Island is being monitored to check for any new or resurging contaminants. The monitoring team includes some unexpected partners—tree swallows that live in bird houses on the island. Swallows eat aquatic bugs, and scientists can collect and analyze their eggs to get clues about contaminants that are still in the area, bio-accumulating—or moving up the food web—from the sediments to bugs to swallows to their young chicks.

Hog Island exemplifies a relatively new conservation strategy embraced by regulators and planners: “remediation to restoration,” in which agencies prioritize which projects to remediate and how to do the work based on the potential for successfully restoring high-quality habitat. Natural resources officials are creating data-linked maps to pinpoint areas that exhibit both valuable habitat and contaminated hot-spots. Where the two overlap might be a top remediation priority.

The Hog Island remediation began before the Remediation to Restoration idea was so in vogue, but now restoring habitat at Hog Island is a key priority.

“Cleaning up the contamination was a good first step—but we wanted to do the rest of the habitat rehabilitation and restoration after that,” says O’Shea. “We want the good woody debris and the good bugs.”

## STRYKER BAY SUPERFUND SUCCESS

### DULUTH, MINNESOTA

From the late 1800s through the mid-20th century, Stryker Bay off the St. Louis River suffered an onslaught of abuses from gas, coking and tar-production facilities. Coal tar was regularly dumped

in the bay for decades—“that’s what people did then,” says Minnesota Pollution Control Agency project leader Susan Johnson.

The last operation, Interlake Iron, shut down in 1961. But the contamination remained. In 1979 state officials found high levels of carcinogenic pollutants in the sediment. In 1983 the bay along with a former U.S. Steel site several miles upstream were named to the Superfund National Priorities List.

In the past, gas bubbles forming naturally in the sediment would carry balloons of tar to the surface, where they’d burst into “oil blooms.” “If you were canoeing you’d put your paddle in and bring up a ball of oil,” says Johnson. “It was pretty gross.”

Nearby residents complained of noxious smells.

But in 2010, a five-year-long remediation of Stryker Bay will be complete. State and federal officials call it a prime example of how an extremely polluted area inhospitable to wildlife and unsafe for human recreation can—in a relatively short amount of time—be transformed into a safe and attractive habitat for fish, birds and people. And it was done with intensive citizen involvement, spearheaded by the St. Louis River Alliance.

Approximately 13 acres of soon-to-be green space were created by capping two heavily contaminated former industrial boat slips. This will provide badly needed habitat for migratory birds and endangered piping plovers.

On a cold May afternoon, bulldozers distribute mud laced with seeds for native trees and plants around the new land. This “clean” mud was dredged nearby, re-establishing 23 acres of shallow sheltered bay habitat around Tallas Island that had been clogged by sediment run-off from the creeks descending adjacent hillsides, especially from the Spirit Mountain ski area. The small new bay has already attracted sunfish, panfish and muskies.

In all almost 200,000 cubic yards of contaminated sediment were dredged from Stryker Bay and the Federal Navigation Channel in the St. Louis River. “It smelled like mothballs” from the naphthalene in treated lumber, notes Johnson. (Naphthalene, according to the EPA poses a health threat to people.)

One boat slip was separated from the bay with a rock dike, and transformed into a contained aquatic disposal facility where contaminated sediment can be safely stored.



*Stryker Bay remediation made formerly toxic site safe for boating and fishing.*

“It exceeded the expectations for a success,” says Tom McGann, senior construction manager of Hard Hat Services, the Illinois-based contractor overseeing the site.

A diverse set of stakeholders agree that the site is exponentially cleaner and much more ecologically and economically valuable than before. And the remediation shows how the Superfund program can dovetail with other efforts to clean up Areas of Concern. In a Superfund project like Stryker Bay where companies or industries responsible for the pollution are known and able to pay for remediation and restoration, this can provide a significant funding source. At Stryker Bay, three companies—XIK (the successor of Interlake), Honeywell Inc. and Domtar Inc.—funded most of the \$80 million cleanup. The Superfund label also helps rally public and political awareness and motivation to take action.

On that cold May day, workers hunker down next to a large pile of sand, filling sand bags to weigh down the activated carbon mats soon to be rolled out below the water in the disposal facility. The activated carbon mat is a safety measure to absorb any pollution that might escape from the capped sediment below. With the activated carbon mat and a four-foot sand cap in place, the slip will be safe for small watercraft and fishing.

Residents have been overwhelmingly supportive of the remediation in and around the small bay, where they have docks, canoes and motor boats. Almost



1,000 people live within a half mile of the site, and its remediation will surely be a boost to the burgeoning fishing, hiking and boating activities in the area.

The U.S. Steel property upriver is not complete, with areas unsafe for human contact. The two sites have been treated separately by the state Superfund program and for investigation and clean-up purposes, and federal and state officials hope progress on the Stryker Bay site will inspire action and funding for the U.S. Steel site.

“This was a standard success story of how people came together and agreed on solutions,” says Suzanne Hanson, regional manager of the Minnesota Pollution Control Agency-Duluth. “With something like Stryker Bay, you get a group of people involved and they are going to meetings for 10 years or more. The community involvement has been huge and it has made a difference.”

Hanson notes that federal funding from the Great Lakes Restoration Initiative that calls for matched funding can be obtained from Superfund responsible parties through the Natural Resource Damage Assessment program. For the St. Louis River, that could mean the difference between completing four projects or 12 with the same amount of local funding.

“The Great Lakes Restoration Initiative funding is piquing the interest of groups who hadn’t been interested before and re-energizing the St. Louis River Alliance,” she says. “We’ve been working with local partners on both sides of the river for over 20 years and have fantastic technical plans. Now we can actually implement those plans. People here are energized by the prospect of having their dreams turn into a reality. It’s exciting.”

## A GREEN FUTURE AT GRASSY POINT

### DULUTH, MINNESOTA

Minnesota Department of Natural Resources coastal program manager Pat Collins pauses to watch a few ducks paddle happily as he leads colleagues along a wooden boardwalk over the lush, marshy terrain of Grassy Point near the Stryker Bay Superfund site.

Though it is tucked between various puffing and spewing industries on the St. Louis River, Grassy Point is an enclave of peace and natural beauty where blue-wing teal ducks glide between reeds, blackbirds perch on trees and turtles swim under logs. A century ago, this bayside land was home to several saw mills, churning out lumber culled from the hillsides surrounding the bay and beyond. The mills themselves were actually just off-shore, so that logs could be floated up and then processed wood was loaded on railroad spurs raised above the water.

In the infamous 1918 Cloquet fire, the mills burned down. One can still see their remnants poking above the water. This was near the end of the big lumber era, and the mills were never rebuilt. But they left the surrounding marsh and parts of the bay choked with timber, from old wood caked many feet deep on the bottom to loose logs floating on top.

Collins and other natural resources staff wanted to recreate healthy deep channels and marshes, with open water for fish and birds. So they used backhoes to remove up to eight feet of soggy lumber. They reseeded aquatic plants by tossing bags of rocks laced with seeds to sink to the bottom. They planted cedars and white pine. They built a boardwalk and a viewing platform for birders.

A \$175,000 grant from the US EPA’s Great Lakes National Program Office is largely to thank for the Grassy Point restoration, with matching state funds and lots of dedicated staff effort thrown into the mix.

“The objective was to have restoration and make it a catalyst for other things,” says Collins. “It’s this piece of green wedged into an industrial area.”

“We want to keep this momentum going all along the river,” notes Marc Hershfield of the Minnesota Pollution Control Agency. “This is just the beginning.”

*Pat Collins on the St. Louis River*



# WESTERN LAKE ERIE

## THE DETROIT RIVER: A MOTOR CITY MIRACLE

### DETROIT, MICHIGAN

Growing up on the Detroit River in the 1960s and 1970s, Robert Burns and his friends knew to watch out for FOGs while walking on the beach or swimming in the river. That stands for “fat, oil and grease”—household waste from local residents, dumped freely in the river and accumulating in unsightly brown clumps that would float on the water’s surface or squish between toes on the beach. Burns remembers a photo of beachgoers barbecuing in shorts—and galoshes, because of the gunk on the sand.

And the invisible pollution was far worse than the FOGs—a myriad of petroleum, chemical, sewage, heavy metal and other compounds dumped from the shipyards, pulp mills, steel mills, coal-burning power plants, wastewater outflows, chlorine plants, chemical manufacturers and other heavy industry that lined the wide river which is part of the system connecting Lake St. Clair with Lake Erie.

“Much of the wealth of this country was built right here, especially during World War II, this is what helped us win the war,” says Burns proudly as he pilots his boat through choppy waves on a sunny but cool April day. During World War II, Detroit served as the manufacturing workhorse to supply the country’s military, earning it the moniker, “arsenal of democracy.” Steel used to fight both World Wars was forged right here, and this is where the famous Edmund Fitzgerald ship was built.

But the productivity came at a price—a river so polluted that many of the fish, birds and other life were killed off. In 1948, 11,000 ducks died after landing on the river, which suffered 6 million gallons of oil spilled that year. In one of the nation’s earliest environmental protests, angry duck hunters lugged the dead oil-soaked birds to the state capitol and demanded something be done.

Today it is a far different story. The river has transformed from a noxious liability to an asset, an economic and cultural bright spot in a city trying to redefine and rebuild itself—and a symbol that seemingly impossible recovery really is possible when political support, funding and civic involvement converge.

Though Detroit has lost much industry along its shores, the Detroit River is still very much a working river. Zug Island hosts a steel mill and separate plants producing the coke and iron needed to make steel. Cement plants, chemical plants, grain silos and coal-burning power plants still line the banks. But such point sources of pollution are now largely controlled through better technology and practice, thanks to requirements under the Clean Water Act and the Canada-U.S. Great Lakes Water Quality Agreement; and action by the federal and state government, municipalities and industry.

The water quality has improved substantially, so that it is often a sparkling blue. Native fish including white fish and lake sturgeon are coming back. Ducks, terns, swans and other birds are everywhere. The area is part of the Mississippi migratory flyway, with up to 10 million birds passing through each year. Between the 1940s and 1960s the federal government reported a 97 percent reduction in oil spills on the river. Oil spills do happen periodically, though the severity of the spills has been greatly reduced.

John Hartig calls the improvement of the Detroit River “the single most dramatic ecological recovery story in North America.”

Hartig is manager of the Detroit River International Wildlife Refuge Large Lakes Research Station. The refuge is a prominent success story in itself, 48 miles of protected shoreline on both sides of the border. Residents say the designation of the refuge alone has motivated companies upstream to take better care of the river.

“We now have bald eagles nesting in seven locations in the watershed, we have peregrine falcons in

downtown Detroit, we have osprey nesting in a cell phone tower, the first time since the 1890s that osprey have fledged young in Wayne County,” Hartig enthuses. “Whitefish are reproducing in the river for first time since 1916. Lake sturgeon are back for the first time in 30 years.”

Mayflies—their larva once suffocated by the water’s low oxygen content—have rebounded, and so have the yellow perch who feast on them. Even wild celery has bounced back.

The last four decades have seen a 90 percent decrease in phosphorus discharges into the river, a 4,600 tons per day decrease in chloride discharges, a 65 percent reduction in untreated waste from combined sewer overflow discharges, an 85 percent reduction of mercury in fish and a 90 percent reduction in PCBs in herring gull eggs.

About \$154 million has been spent removing contaminated sediment. The inlet known as Black Lagoon was the first location officially cleaned up under the Great Lakes Legacy Act, with almost half a million pounds of contaminants removed in 2004 and 2005. Contaminated material was put in a high-tech, fully lined confined disposal facility, as opposed to the old days when it was just dumped in the lake—literally. Several of the contaminated sites along the river have been isolated and contained in situ, covered with grass to form green space and even a golf course.

With pollution coming under control, local conservationists can turn their attention to the structural and biological challenges. Once relatively shallow, the Detroit River was heavily channelized and dredged to allow navigation by lake carrier ships up to 700 feet long, needing as much as 26 feet of draft. The dredging scooped out most of the natural rocky bottom in the center of the river that fish need for spawning.

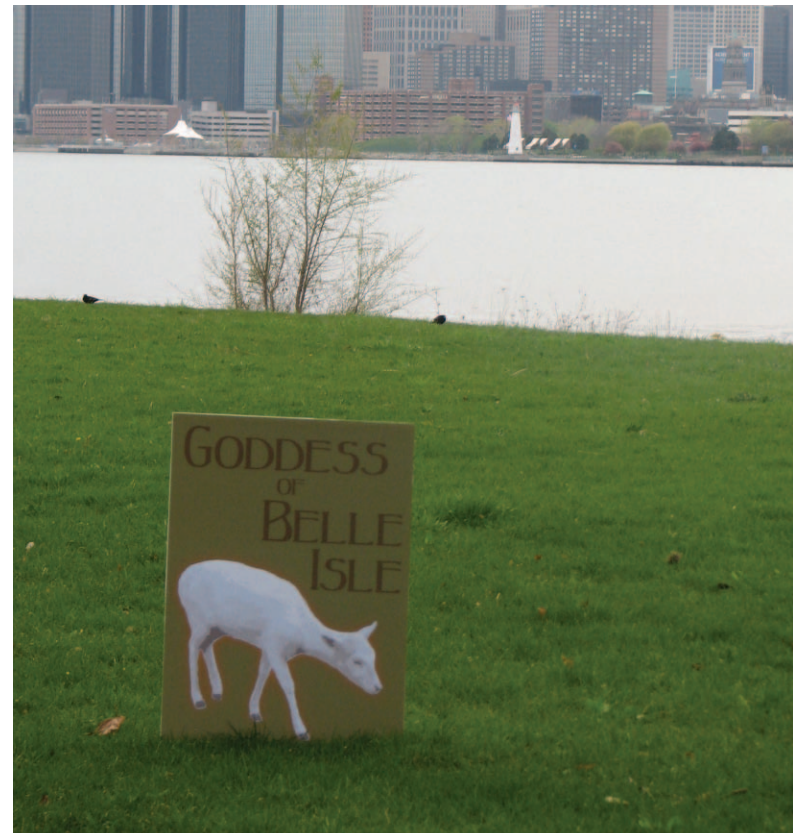
The great majority of the river’s coastline was also “hardened,” lined by unforgiving concrete or metal walls. Vast expanses of wetlands along the banks and marshy islands in the middle of the river were filled in with material from dredging, including contaminated sediment. Indeed, 97 percent of the Detroit River’s coastal wetlands have been lost to development. Those wetlands used to be prime fish nursery habitat. Slowly but surely, it is being restored.

To date, 38 soft shoreline engineering projects have been completed in the watershed. Friends of the

Detroit River, U.S. Fish and Wildlife Service, and many other organizations have been working on shoreline restoration, and they are now stepping up plans with private landowners and community volunteers. They have “softened” some of the shoreline, creating inlets and small tracts of wetlands along the banks, removing the concrete or steel walls. Friends of the Detroit River was key to the preservation of Humbug Marsh, a keystone of the international wildlife refuge. The marsh, home to 51 species of fish, 37 species of dragonflies and seven species of reptile, was Michigan’s first Wetland of International Importance recognized under the Ramsar Convention, signed in Iran in 1971. River advocates fought off a plan to turn Humbug Marsh into a marina and residential development. Now instead it will host a visitor’s center and nature trails.

While Detroit has been a national poster child of economic suffering during the current economic crisis, the new Detroit RiverWalk is one of the largest urban waterfront redevelopment projects in the nation. On Belle Isle on a breezy April evening, a young boy chases geese, a tiny girl in a pink sweater gazes solemnly into the eyes of a large swan, photographers train their lenses on the Ambassador Bridge to the south and a local graphic design student sets up signs celebrating the Native American legend of White Deer.

*Belle Isle in the Detroit River*





The attractive, safe public space with various recreational uses provided by the river obviously offers an economic boost to Detroit. Walleye fishing on the river brings in a million dollars a year. “Hawkfest” and the Pointe Mouillee Waterfowl Festival each attract thousands of visitors. The Detroit Heritage River Water Trail offers kayaking and canoeing around 23 islands and through many marshes. Bikers can pedal along the riverbank Greenway Trail.

“Going way back, we’ve had tremendous citizen organizations that carried the flag and advocated for pollution prevention, pollution control, cleanup, habitat rehabilitation,” says Hartig. “The saving of Humbug Marsh would never ever have happened unless citizens spoke out. That’s the phenomenal part of the story.”

## THEY’RE BACK! LAKE STURGEON IN THE DETROIT RIVER

### DETROIT, MICHIGAN

When Bruce Manny approaches the tank of year-old lake sturgeon at the United States Geological Survey Great Lakes Research Station in Ann Arbor, Mich., the odd little fish with whiskers like handlebar mustaches swim toward him like excited kittens. A century ago lake sturgeon young of the year would be a common sight in the Detroit River. But over-harvesting, pollution and the dredging of deep shipping channels decimated their population to almost nil by mid-century.

“The Detroit River has basically been gauged out—50 miles of shipping lanes, 600 to 800 feet wide in places, a giant trough,” says Manny. “The habitat fish would ordinarily have used for spawning in the late 1800s was all destroyed and hauled away. A lot of it was used to build the cities of Detroit and Windsor. You’re looking at a highly degraded yet still productive riverine ecosystem.”

Over the past few decades Manny has seen the river go from “chocolate brown or a greenish yucky color... to what is in many areas clean blue water coming down from Lake Huron.”



*Year-old sturgeon from artificial spawning reefs in the Detroit River. The fish are raised by researchers until old enough to be released back into the river.*

Today the endangered fish are prized as a majestic symbol of the mystery and history of the Great Lakes. Their survival in the Great Lakes and tributaries like the Detroit River where they need to spawn shows that the Lakes are getting healthier. And if they recover enough in the distant future to be fishable, they will certainly augment the \$7 billion Great Lakes recreational fishery.

Once the water got clean enough for sturgeon to survive in the Great Lakes and tributaries, they just needed a place to spawn. So Manny and colleagues are depositing gravel on the river bottom to create habitat for sturgeon to deposit their eggs. Researchers have constructed two “artificial reefs” off Detroit’s Belle Isle and Fighting Island on the Canadian side of the river. Belle Isle is in its sixth year, Fighting Island’s reef was constructed in 2008. More are in the works.

Manny and his colleagues drop fibrous “egg mats” onto the reefs to pick up eggs. They bring the eggs back to the lab, let them hatch and then raise the young sturgeon until they are old enough to release back into the river. The spawning reefs have also proven popular with white fish, walleye and the northern mad tom, a rare little catfish.

“We found white fish spawning in the river for the first time in 90 years,” says Manny. “Everybody is excited and thrilled with the fish finding these new substrates and using them promptly. The fact that we’re enhancing a few endangered species is like icing on the cake.”

## RESPECT THE SNAKE!

### SOUTH BASS ISLAND, OHIO

In years past, residents of the Ohio Islands in Lake Erie did not consider Lake Erie Watersnakes to be good neighbors. The chubby, grayish snakes up to four feet long have a penchant for lounging lethargically on limestone rip rap shorelines—often next to someone’s dock—and in mating season they twist together into “snake balls” that some find threatening or repulsive.

People have long been known to shoot the snakes, run them over with cars, beat them with shovels or otherwise kill and abuse them. One resident remembered fishing with his uncles, and when they got bored, “we set off after snakes, smacking them with our oars. trying to get rid of the little buggers.” By 1999 human persecution along with habitat loss drove the snakes onto the federal threatened species list and the state endangered species list.

But things have changed since the Snake Lady came to town.

That would be Kristin Stanford, a Northern Illinois University Ph.D student who since 2001 has been based at Ohio State University’s Stone Laboratory on South Bass Island, studying Lake Erie watersnakes and cheerfully but persistently inoculating locals with her message: Respect the Snake.

Her Web site [www.respectthesnake.com](http://www.respectthesnake.com) showcases video and photos of people learning about and happily interacting with the nonpoisonous snakes. She writes articles for local and regional newspapers and produces “LEWS News” (for Lake Erie Watersnake), a fun but fact-filled newspaper detailing the watersnakes’ trials and tribulations.

Stanford’s efforts are part of a campaign spearheaded by the U.S. Fish and Wildlife Service and Ohio Division of Wildlife to help the snake recover. Since launching the program, snake population have doubled in the last decade, from a rough estimate of several thousand on the Ohio Islands in 1999 to about 5,000 in 2001 to more than 12,000 today. The U.S. Fish and Wildlife Service has protected 313 acres of habitat within 69 feet of the shore—including 11.2 miles of shoreline—through conservation easements, deed restrictions and other measures to prevent development or threats to the snake.

The crown jewel is the eastern tip of South Bass Island, where 8.6 acres provide prime habitat for the snakes while also providing a haven for migratory birds and other animals, and adding an ecotourism angle to the area’s famous watering hole scene.

Successful restoration and species recovery often hinges on local residents adopting a given cause, creature or parcel of land, and in the watersnakes’ case that has happened quite literally. Stanford and her colleagues have distributed more than 200 proudly displayed yard signs proclaiming “Save Our Snakes” and “Water Snakes Welcome.” Now when they do their annual surveys, instead of complaining about the snakes people update researchers on their lives and whereabouts.

“People have really gotten interested in it, they are proud of the snake and the fact that we are studying what’s on their land,” says U.S. Fish and Wildlife Service Wildlife Biologist Megan Seymour. “They will tell us ‘their snakes’ are in the same place every day.”

A resident named Jacquie wrote a letter to Stanford describing the evolution of divisions between “snake-lovers” and “snake-haters.” “It wasn’t really ‘in’ to be in their corner, yet,” she said of the early snake-lovers. But Stanford’s work, including a stint on a popular reality TV show, helped change all that.

*Lake Erie watersnake researcher Kristin Stanford*







*Agricultural fields transformed into natural wetland between Detroit and Toledo.*

“When you then appeared on [the television show] ‘Dirty Jobs,’ you became a real celebrity and taking care of our snakes suddenly became an island mission,” mused the resident. “It seemed to me that everyone young and old alike began to think it was cool that we had the snakes and that we were trying to protect them.”

Not to say that everyone was won over. “There will always be some people who will never like snakes—they are afraid of them, they hate them, period,” Seymour says.

The recovery of the Lake Erie watersnake has led to another benefit: control of the invasive round goby, the snakes’ favorite food. Round gobies are an aggressive non-native species which has had impacts on the region’s recreational fishery.

Along with nine Ohio Islands, Lake Erie watersnakes are found on a few stretches of the mainland U.S. coast. While the state “endangered” designation applies to Lake Erie watersnakes everywhere, the federal “threatened” designation only applies to the island dwellers more than one mile from the mainland shoreline, since the coastal snakes interbreed with common northern water snakes.

The island habitat is unique due to the limestone formations of the bedrock and shorelines. Unlike

mainland coastal relatives, the island snakes have evolved to blend in with that limestone color.

The U.S. Fish and Wildlife Service has proposed to remove the Lake Erie watersnake from the endangered species list. If the snake is delisted, people will not have to make official requests for development that might impact snake habitat. But the agency would be mandated to monitor the snake’s well-being for five years after delisting. And residents’ newfound affection for the snakes will live on. As Jacquie said in her letter to Stanford, “you made us feel okay about having snakes all around us!”

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## FROM FARMLAND BACK TO WETLAND

### NEWPORT, MICHIGAN

On a blustery late spring day, there is a wild feel to narrow, muddy Brancheau Road, hugging the coast of western Lake Erie past cottages and a small yacht club, dead-ending near the water, the twin cooling towers of a nuclear power plant in view just across an inlet. A ditch and levee separate the road from



lush wetlands rich with native grasses and waterfowl. Until last year, these 67 acres were agricultural fields of the type that have helped contribute to the destruction of 90 percent of the coastal wetlands around western Lake Erie. Statewide, Michigan has lost more than half its natural wetlands and 98 percent of its natural prairie, depriving migratory birds and other creatures of valuable habitat and degrading water quality in Lake Erie. Agricultural run-off causes nutrient and chemical pollution; and wetland loss means sediment, nutrients and contaminants won't be filtered, absorbed or metabolized like they would in a healthy system.

Now these marshes and prairies are being restored piece by piece, leading to ecological and economic benefits. Birds and animals are returning. Farm run-off is being reduced. And, land is available for new recreation opportunities, including hunting, canoeing, hiking and biking.

Located between Detroit and Toledo, the Brancheau wetland is among acres of natural land being restored as part of the Detroit International Wildlife Refuge.

"We're going back in there and reversing drainage patterns, putting in structures that allow water to emulate what had happened historically," says Ducks Unlimited public policy director Gildo Tori. He notes that such shallow emergent marsh is especially crucial for birds migrating in spring and fall and also breeding in the summer.

Once water flows back into historic wetlands, a magical thing happens. Plants that have lain dormant for decades suddenly spring back to life, their seeds having been stored in the rich "hydric soils." Tori says native perennials like bull rush are already growing, as are annuals like millets, smartweed and nut sedge. More perennials are likely to return as time goes on.

"They're all there," says Tori. "When the water levels are right and the hydrology is right they'll come through. We just have to manage the hydrology correctly to spur them on."

Decades of farming has drastically altered the landscape. A vast system of tile irrigation systems and ditches has changed the hydrology. Restoring the natural water cycles necessary to bring a wetland back to life is no easy task.

Restoration efforts included the installation of a 2,500-gallon-per-minute electric pump and other

water control structures to move water into and out of the Brancheau wetland to ensure its health. Managing water levels can also be important for effective removal of invasive species like phragmites—and to emulate natural conditions to keep the wetlands productive

"It's a unique system in terms of capability and flexibility," says Tori.

Dikes that surround the wetland to prevent flooding onto adjacent private property are perfect for hikers and birdwatchers to stroll along. Ducks Unlimited is working on improving recreational access to the area, and in the future limited waterfowl hunting may be allowed.

The Brancheau wetland was restored with corporate, private non-profit and federal money, including 22 acres funded by a North American Wetlands Conservation Act grant. Ducks Unlimited won a bid to carry out the survey, design, construction management and oversight of the restoration process, in cooperation with the U.S. Fish and Wildlife Service. It was completed in six months, between June and October 2009. As part of the international wildlife refuge, it will be overseen by the U.S. Fish and Wildlife Service.

Tori notes that the Brancheau wetland exemplifies the type of project that can be funded by the new federal Great Lakes Restoration Initiative—which funds projects to, among other things, restore habitat and wetlands. In fact two similar projects involving Ducks Unlimited have already secured funding—the 68-acre Pointe Aux Peaux wetland off Brest Bay and the 91-acre Dusseau off Maumee Bay, both along western Lake Erie. There wetland and lake plain prairie will be restored to provide invaluable habitat for birds and animals, while also improving the water quality of the bays.

"Improving Lake Erie and the surrounding watershed takes place one acre, one project at a time," says Tori. "The Brancheau, Pointe Aux Peaux and Dusseau projects will yield perpetual benefits to the watershed, wildlife and people who frequent western Lake Erie. And the [Great Lakes Restoration Initiative] will help all of us greatly expand our collective efforts in securing a vibrant healthy Great Lakes ecosystem."

# 3 THE CHICAGO AREA

## THE DAYLIGHTING OF DUNES CREEK

### CHESTERTON, INDIANA

A wide expanse of beach flanked by steep dunes and lush woods 50 miles from Chicago, the Indiana Dunes State Park draws thousands of visitors any hot summer day—more than a million a year. And until recently, the ecologically sensitive park also had a vast swath of asphalt parking lot to accommodate these visitors. Now, nearly half the space that was a parking lot five years ago has been restored to natural marshland, including the “daylighting” of Dunes Creek, where waters from a 7,000-acre watershed once again meander freely to Lake Michigan.

*A parking lot was removed to let this creek through the Indiana Dunes see the light of day.*



For decades, the last 1,500 feet of Dunes Creek had been funneled into a metal pipe laying under two different parking lots. “Lots of pavement, lots of people,” says property manager Brandt Baughman. The pipe emptied the water into Lake Michigan on the beach which on clear days offers a stunning view of Chicago rising up like some magical island across the lake.

During heavy rains the water would often become dark brown from tannins and sediment. Though it wasn’t usually polluted with microbes, visitors would take one look at the brown liquid flowing out of the pipe and assume it was raw sewage. The confined pipe did mean lower water quality—including higher levels of E. coli since bacteria load from non-human sources in the watershed wasn’t able to disperse and break down naturally. It also made it virtually impossible for local fish including steelheads, salmon and brook trout to travel up into Dunes Creek.

In 2005 the Indiana Department of Natural Resources began tearing up a parking lot to remove the 7-foot-diameter pipe, liberate the creek and restore a meandering stream bed lined with native plants. It was no easy task, especially since the pipe was sealed in its bed with heavy cement. But within a year it was done and staff were planting native flora on the new streambed.

Then in September 2008, heavy rains undermined a section of another parking lot, causing a large chunk of it to cave in. State officials took the opportunity to remove a large section of that lot as phase two of the daylighting project. They secured a \$1.4 million grant under the American Recovery and Reinvestment Act, administered through the National Oceanic and Atmospheric Association. The state picked up the rest of the \$2 million cost for the project.

The daylighting created a significant number of jobs, and many of the park’s workers come largely from the Young Hoosier Conservation Corps, a program putting low-income, unemployed and younger Indiana workers to work.

In June as the beach season got underway, the final daylighting was nearly complete. An 800-foot-long pipe remains to hold overflow from the stream during storms, and Dunes Creek has been redirected into a stream bed with gentle curves leading into Lake Michigan. Members of the Hoosier Corps and other workers will continue to remove cat tails, phragmites and other invasive species trying to get a hold along the creek. Already, steelhead and other fish have been exploring the stream.

And most remarkably, the significant reduction in parking spaces has meant a significant increase in park revenue, as people apparently appreciate the restored creek and smaller crowds enough to bolster week-day attendance to more than compensate for the reduced weekend attendance. In fact gross revenue has nearly doubled, compared to past years, even though there are just over half as many parking spots. In 2005 the park brought in 68 cents for every dollar invested. Last year that soared to \$1.20, according to Baughman.

The project has won significant awards from the Association of Conservation Engineers, the U.S. EPA and the Governor's Awards for Environmental Excellence.

"This most certainly has contributed to the area economy," says Baughman. "And it's good for the fish, turtles, birds and the visitors. There are no negatives, it's a real success story."

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## FROM TOXICS TO TREASURES

### CHICAGO, ILLINOIS

On a gorgeous breezy June day in Chicago, golf carts buzz between the gently rolling, lush green mounds of the Harborside International Golf Center as red-winged blackbirds fly overhead and an array of waterfowl splash in the blue-gray waters of Lake Calumet.

Golfers leisurely tee up and swing toward the grain elevators or smokestacks in the distance, the last vestiges of the industrial infrastructure that once defined this swath of Chicago's far south side. The grain elevators have been empty for decades, and the steel mills and coke plants have been abandoned and mostly scrapped save for a few scraggly towers.



*Tom Shepherd leads Toxics to Treasures tours.*

Lake Calumet is also mostly silent except for the shrieks of seagulls. It is no longer plied by the ships and barges that once filed in to pick up grain, steel and other commodities.

During and after the industrial heyday, this area was also home to a hazardous waste incinerator, a U.S. Drum toxic waste and petroleum recovery facility and various legal and illegal dumps, where countless hazardous and toxic substances were discharged before there was any regulation of such material. Slag and dredging material from the steel industry filled up streams and lakes.

Today, much legacy contamination remains, but the area is improving. Remediation has occurred in hot spots throughout the marsh and political, environmental and civic leaders have committed to protecting the marshes and prairies.

The golf course, opened in 1995 and owned and run by the Illinois International Port District, sits on a landfill capped with three feet of sand, clay and dirt. The surrounding marsh and prairie appear almost idyllic, in a still quasi-natural state since the industry and pollution meant residential and commercial development never happened.

A nature center in Hegewisch Marsh is in the works, funded in part by Ford Motor Co., which has a plant nearby, and designed through a high profile competition won by sustainable pioneers Studio Gang Architects. Dubbed "The Bird's Nest," the plan features a glass box enclosed in a shell of recycled steel and salvaged metal from the region, mimicking



the way birds find local materials to make their nests. Geothermal heating and cooling and other green systems will earn it a platinum rating from the U.S. Green Building Council.

Hiking, biking, fishing, kayaking and even hunting are popular pursuits for the more adventurous here.

Trails and bird-viewing boxes are planned to make the area more accessible, though funding and private property issues have delayed locals' proposals and plans. The Chicago Audubon Society considers the area one of the state's top birding spots, with the marshes home to threatened and endangered species including snowy egrets, little blue herons and common terns. The area is also an important breeding habitat for black-crowned night herons. The Illinois Sierra Club noted that Calumet's "abundant wildlife, including vibrant wildflowers and rare and endangered bird species, are indicators of nature's capacity to endure."

Standing on the balcony of the spacious clubhouse above the golf course, Tom Shepherd remembers "getting muddy" in this area as a kid, playing, fishing and exploring to his heart's content. A retired real estate investor and government employee, Shepherd was among a feisty group of local residents who began organizing in the 1980s against landfill expansion, a waste incinerator and other sources of pollution. Today, he is an active member of the Southeast Environmental Task Force and leads labor history and environmental tours.

Shepherd is hardly satisfied with the state of Lake Calumet and its surroundings today. He would like to see greater public access to the lands around the golf course and the completion of the nature center and more hiking trails. But there is no doubt the golf course, increased public access and plans for future restoration represent a real victory for such an environmentally besieged urban parcel, and a source of income for the budget-strapped state government.

The golf course shows it is possible to reclaim heavily compromised land, and restore it to a safe, beneficial and economically rewarding use. The clay cap isn't conducive to trees, but golf aficionados note the contoured course with lush grass and rolling hills evoke golf's origins on windblown seaside bluffs in the United Kingdom. The golf course attracts visitors from around the region and hosted the Champions Tour in 2002. During that tournament, former Masters Champion Tom Crenshaw compared it to the Muirfield course in Scotland.

The city's last steel mill is slated to move from the north side to the south side not far from Lake Calumet, and a large retail complex is proposed for the historic Pullman neighborhood just west of Lake Calumet. Residents welcome the promise of development and jobs in the economically distressed region. But more pavement and industry makes a natural oasis like the Lake Calumet area especially valuable, even moreso since it has been reclaimed from—as Shepherd's tours are dubbed—"Toxics to Treasures."

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## FROM QUARRY TO LANDFILL TO PARK AND PRAIRIE

### CHICAGO, ILLINOIS

A runner breathes heavily tackling one of the few hills Chicago has to offer, the humid summer air pungent with the smell of native prairie plants and the buzz of insects. She breathes a sigh of relief at the hilltop, then jogs loosely down the other side, toward a dramatic stone-walled, water-filled quarry fed by a stream filtering over cascading rock ledges. She traverses the boardwalks over adjacent wetlands, admiring this unusual view in the heart of Chicago's near south side Bridgeport neighborhood.

This is Stearns Park, opened in 2009 on the site of a former quarry and landfill that accepted construction debris and ash from a north side waste incinerator. The transformation, just a few miles west of Lake Michigan, offers sorely needed green space and a taste of the region's native geology and flora, in one of the more industrial and pavement-covered stretches of the city. In the winter, the hill will be used for sledding. The pond is stocked with fish, and the restored prairie is interrupted by several athletic fields. The park district offers a self-guided audio tour of what it calls the city's "newest and most unusual park," complete with ancient aquatic fossils on display.

From about 1830 to 1969 this site was a limestone quarry reaching 350 feet deep. Later it was used to store construction debris and ash from the Northwest Incinerator, a facility that opened in 1971 and was shuttered in 1996 in the face of pressure from community environmental and public health groups. The incinerator reduced the amount of trash destined for over-burdened landfills, but also created air-borne lead and other pollution.



*A limestone quarry and landfill for incinerator ash and construction waste is now billed as Chicago's most unusual park.*

About 40,000 cubic feet of topsoil was used to cap the landfill. Recycled plastic and wood were used to construct board walks and a storm water recycling system treats water before funneling it into the quarry pond. An underground pump removes leachate from the incinerator ash.

The city bought the site for \$9 million, and revamped it with funding partly by an Open Space Lands Acquisition and Development grant. It is hard to quantify the economic benefit of the project, but it is likely to increase property values in the surrounding up-and-coming neighborhood and boost the city's reputation as a national leader in green spaces and native plant restoration— including the replacement of a small airport on the shores of Lake Michigan just off downtown Chicago with a lovely swath of native prairie.

Under construction and surrounded by tall fencing for years, the newly unveiled park site had captured the curiosity and imagination of locals. A reviewer

on a local blog called it “surreal” and enthused, “Can I reiterate that there’s a ‘lake’ surrounded by ‘cliffs’ in the middle of Chicago???” Local city councilman James Balcer, whose German immigrant great-grandfather died of heat exhaustion while working in that same quarry a half-century ago, has said the park is “like having the Grand Canyon in Chicago.”

While the park may be a small victory in a city plagued with many lingering environmental problems, local residents and officials see it as a shining example of how discarded and distressed land can be reclaimed as a home for native plants and migratory birds, while also bolstering the public's appreciation for nature and the unique geology, biology and ecology that once defined this piece of the Great Lakes region.



# SAGINAW BAY WATERSHED

## SUCCESS IN SHOWBOAT CITY

### CHESANING, MICHIGAN

Chesaning, Michigan is known as Showboat City.

Six decades ago, a proud paddlewheel showboat filled with vaudeville entertainers docked along the Shiawassee River to amuse crowds in the thriving logging town. Today, the slightly bedraggled but still attractive Chesaning Showboat sits in a slip awaiting the week each summer when it cruises the river. Casinos and other flashier forms of entertainment have cut into the showboat's audience. But still it is a rich piece of Chesaning heritage—and the centerpiece of the town's popular Chesaning Showboat Music Festival, which brings people from around the Midwest to a nearly 7,000-seat riverside amphitheater.

A dam built in downtown Chesaning in the mid-1800s provided hydropower for a grist mill and provided a deep stretch of river that later proved perfect for the showboat, which funneled a total of a million dollars into the town's economy.

The dam weakened over the years, and partially collapsed in spring 2005 after heavy rains and ice. Standard ecological wisdom would have dictated the structure be removed completely, restoring the river to its natural state. That would allow walleye and other fish coming from Saginaw Bay passage to 37

miles of upstream spawning habitat which the dam had blocked.

But without an impoundment creating enough depth, Chesaning's showboat would be no more. So civic leaders and federal officials reached a compromise which is now considered a win-win situation studied by visitors from around the region. They removed the jumbled concrete and metal remnants of the dam and replaced it with a system of eight gracefully arching rock weirs, creating one-foot-high steps that ultimately equal the former dam's height but allow for fish passage. The steps are also a draw for experienced kayakers and canoers who can navigate the newly-formed rapids.

The \$1.6 million project was completed in just four months, between July and October 2009.

Environmentalists, government officials and locals agree the dam replacement was a multi-faceted success story wherein a Great Lakes tributary was restored to a more natural state, with important benefits for the lake's sport fishery, while a source of income and pride for the community was also preserved.

Funding sources included \$142,000 from the American Recovery and Reinvestment Act, \$900,000 from the state and almost \$100,000 in private donations, including support from the Saginaw Bay Watershed Initiative Network. When funds came up a little short, the cash-strapped village volunteered

*American Recovery and Reinvestment Act funds helped construct eight weirs to replace a dam in the Shiawassee River.*







*Construction of Chesaning weirs*

the remaining funds enough to make sure the project happened. “It was worth it,” says Village President Joe Sedlar Jr.

The project is a model for other dams on the Shiawassee River. The towns of Frankenmuth and Corunna have similar plans in the works. Opening the river to spawning will be a boon for the million-dollar walleye fishery in Saginaw Bay. It will also help regional recovery efforts to bring back the lake sturgeon, which will benefit from the improved habitat in the river.

Saginaw Bay Watershed Initiative Network coordinator Mike Kelly says the dam removals are among the most important ecological steps for the whole watershed. “It’s been a century since (Saginaw Bay) fish saw the other side of that dam,” he says.

U.S. Fish and Wildlife Service biologist Andrea Ania says walleye, white suckers and other fish have already been found above the weirs that replaced the dam. Walleye even spawned right in the weirs, which will become more attractive spawning habitat over time as silt and sand fill in between the rocks.

The project architect personally supervised the placement of each rock—limestone boulders from the renowned Alpena quarry in northern Michigan, chosen for their smooth edges. Local farmers donated \$350,000 worth of smaller stones.

Sedlar says the rock weirs were strategically aligned like a Roman arch, so that they become even stronger when put under pressure by floodwaters or ice floes. They are designed to funnel water to the center of the river, scouring out a beneficial deep

channel where once there was a sandbar. Four “rock veins” angling diagonally upstream from the banks below also help prevent erosion by spitting water to the center.

Sedlar has seen a marked increase in kayaking, fishing and people playing in the water since the project was completed. He couldn’t be happier.

“It enhances the area, it stabilizes the river level, it creates a nice recreation area, it allows fish passage,” he says. “Even the sound is just tranquil.”

## TRAIL TO A CLEANER RIVER

### HOLLY VILLAGE, MICHIGAN

Susan Julian glides along the Shiawassee River in her yellow roughed-up “swamp kayak,” deftly negotiating the twists through lush vegetation decorated with dragon flies. She points out clam shells which a raccoon has arranged neatly on the muddy bank after feasting. A muskrat dives below the water, joining pike, rock bass and other fish. As the sun slips down, small turtles crawl onto logs which volunteers have neatly sawed off—to keep the river navigable while still preserving habitat.

This stretch of the Shiawassee, which flows west then north more than 100 miles to Saginaw Bay, marks the start of a Heritage Water Trail, maintained by at least four organizations and countless volunteers and informal groups. Heritage Water Trails are a national movement, celebrating the human and natural histories of navigable rivers. About 40 miles of river are officially part of the trail, cleaned and maintained by volunteers on a regular basis, with grants and donations from private companies and institutions helping to support habitat restoration, signage and other projects.

On this hot June evening Maggie Yerman meets Julian at Waterworks Park—site of an old grist mill and saw mill once powered by the river—to recount a successful work day in which 40 volunteers ate a pancake breakfast and then spent hours walking the river to remove trash and logjams. Yerman is chairperson of the grassroots group Keepers of the Shiawassee. They found plastic chairs and trash cans (perhaps blown in by recent strong winds), bottles and cans, even a plastic rocking horse. The debris

was hauled out on canoes—the rocking horse placed as a mascot on a canoe bow.

Though it has an industrial past like most of the region, this stretch of the Shiawassee is relatively free of pollution or human alteration. The Clean Water Act of 1972 caused Holly Village leaders to invest in a state-of-the-art wastewater treatment plant with separate sewer and stormwater conduits, eliminating the risk of combined sewer overflows. A wide swath of wetlands on either side means it was not channelized, so it can still meander and change course naturally from year to year. It has suffered from buildups of trash and debris, which is where the volunteer river-keepers come in. Clearing out trash and woody debris—in keeping with government guidelines to make sure that enough wood is left to provide habitat—is beneficial for all kinds of wildlife.

Julian and Yerman figure that if people learn to appreciate and care for this relatively pristine stretch of river, they will defend it from any future environmental threats while also advocating for restoration and preservation throughout the Saginaw Bay watershed, which has significant ecological effects on a large swath of the Great Lakes basin. Julian notes that when a downstream wastewater treatment plant released sewage into the river during a recent storm, agency officials heard about it immediately from a slew of local paddlers.

Julian is president of the all-volunteer, non-profit group Headwaters Trails Inc., which has worked with funders and landowners to protect shoreline and wetlands including collaboration with North Oakland Headwaters Land Conservancy to place conservation easements on land along the riverbanks.

“We find we have lots of support from people living along the river, which might not be true everywhere,” notes Julian. “They are happy to see the river being cleaned up and wildlife returning. Families and children are returning to play and fish along the Shiawassee.”

A grant from the Kodak American Greenways Program helped them build an attractive footbridge emblazoned with cattail stencils, and an REI store in Troy, Mich. contributed money for a canoe/kayak access point and other improvements. The Saginaw Bay Watershed Initiative Network has also helped with funds for trail signage and interpretive messages. And money could be available from the Natural Resources Trust Fund, paid into by the state’s oil and gas industries.



*Top: Sue Julian kayaking on the Shiawassee River.  
Bottom: Father and daughter catch rock bass in the healthy upper reaches of the Shiawassee River.*

They hope to raise enough money to build a permanent canoe landing with parking midway down the river. In recent years locals have seen an increasing interest in canoeing and kayaking the river trail, a potential economic boost for small towns along the way, and part of a larger goal of raising environmental awareness and stewardship throughout the Saginaw Bay watershed.

“We are installing the ethic of ‘leave no trace,’ protect these areas and keep the water clean,” says Julian. “We figure if the headwaters up here are kept clean, all of Michigan can work toward clean water all the way down the river.”



# EASTERN LAKE ONTARIO

## THE FRENCH CREEK EXAMPLE

### CLAYTON, NEW YORK

If you stand on the metal weir across French Creek and look upstream, you'll see a variety of native plants, fish, and other small critters in the water and along the banks. You might even see a muskrat rooting around. If you look downstream, you'll see a thick mat of invasive cattails and little else.

That's because the weir controls the creek's flow to mimic natural water levels before the area was hydrologically altered by damming a half century ago.

French Creek tumbles into French Bay, off the main stem of the St. Lawrence River in the Thousand Island area on the northeast side of Lake Ontario by the U.S.-Canada border. Starting in 1958, water levels throughout the Lake Ontario and St. Lawrence River system were drastically altered by the Moses-Saunders hydropower dam. "It was built in a time when environmental effects weren't part of the puzzle," says Save The River/ St. Lawrence Riverkeeper executive director Jennifer Caddick.

*French Creek*

The natural cyclical flows that are crucial to a river ecosystem allow native plants to thrive in a delicate and ever-shifting balance, fostering a diversity of animal life. But the dam ruined these natural cycles. Instead, Lake Ontario and the upper St. Lawrence River have been treated as a reservoir. Water is released in fall and the lake kept at low levels during the winter, so it is ready to fill with spring rains.

Native plants, fish and animals are choked out by this standardized, unnatural flux. Muskrats key to healthy wetlands—since their foraging aerates soil, spreads seeds and breaks up cattail mats—are driven away by the extremely low water levels in tributaries in the winter. Fish are prevented from reaching crucial spawning habitat, and overall biodiversity is reduced.

For at least a decade, environmentalists and some policymakers have been pushing for meaningful reforms of the water level regulation system. The International Joint Commission took up the issue, but its 2007 plan was met with scorn by advocates who considered it "business as usual," and the process has stalled.

Meanwhile a coalition of researchers, environmentalists, state officials and others have moved





forward with the experiments on French Creek and a similar project in nearby Delaney Bay on Grindstone Island, showing what can happen when water levels are returned to a more natural cycle.

The weir, similar to a metal culvert with a sliding panel, is strategically adjusted to simulate historic cycles and allow for fish passage. Upstream from the weir, quasi-natural water levels have allowed the wetlands to heal, and native seeds lying dormant for many years have burst forth. Bulldozers were used to break up “walls of cattails,” in Caddick’s words. Fish were stocked and native flora planted. Then muskrats returned to help things along. Delaney Bay is an important pike spawning area; researchers are monitoring possible population increases since the weir’s use.

Caddick notes that the relatively small French Creek and Delaney Bay projects are an important way to inspire hope and action in policymakers deadlocked over the future management of the basin. The artificial water levels of the St. Lawrence River led the conservation group American Rivers to name it one of the country’s top 10 Most Endangered Rivers in 2008, and in 2009 World Wildlife Fund-Canada featured it in the report “Rivers at Risk.”

But Caddick thinks the rapid ecosystem regeneration at French Creek and Delaney Bay shows even a sadly damaged river can return to health if the right actions are taken. The State University of New York, the U.S. Fish and Wildlife Service, Save The River,

Ducks Unlimited, Thousand Islands Land Trust and the state conservation department have all worked together on the projects.

“It’s an intersection between researchers, not-for-profit groups, and broader policy issues,” Caddick says. She envisions policy changes allowing the restoration of natural water cycles on the St. Lawrence River and Lake Ontario, and Great Lakes Restoration Initiative funds being used to jumpstart the rehabilitation of coastal areas. “It’s amazing to see these wetlands start to come back all on their own” —once the groundwork is laid. “That shows the intersection of new policies combined with GLRI dollars could mean a really powerful change.”

## THE OSWEGO RIVER’S REDEMPTION

### OSWEGO, NEW YORK

The Oswego River was once an embarrassment to the hardworking, picturesque upstate New York town on the southeastern shores of Lake Ontario. People avoided the foul water choked with algae, sediment and toxins. Fish suffocated.

Today, civic leaders call it their “crown jewel.”

*Early fall fishing on Oswego River, Oswego, New York*



The Oswego River was named one of the 43 “Areas of Concern” in the Great Lakes region, places where different types of pollution severely impact wildlife health and ecological integrity, human commerce and recreation and economic value of the waterways. In July 2006 the Oswego River became the first U.S. Area of Concern to be delisted, thanks to widespread civic engagement, the dedication of public officials and creative leveraging of various funding streams.

The Oswego River is the second largest tributary to Lake Ontario after the Niagara River, with 1.2 million people living in the drainage basin. The basin includes much agricultural land, meaning nutrient run-off and erosion cause eutrophication (extremely low oxygen levels) and sedimentation. The basin also includes the famous and popular Finger Lakes, and much heavy industry. In the past waste incinerators released dioxins into the air. Landfills, mills and other hazardous waste sites caused contaminated run-off, seepage and leachate. The use and manufacture of electrical equipment and hydraulic fluids meant widespread PCB contamination. This all led to serious fish consumption advisories and fishery population impacts.

As part of the standard process to address a designated Area of Concern, government officials and local citizens came up with a Remedial Action Plan to clean up pollution and restore the area. The Oswego River’s initial plan was developed in the 1980s, and the 1990s were spent further studying the problems, perfecting the plan and taking action. In the early 1990s fish pathology studies were undertaken, through standard Army Corps of Engineers programs augmented with special grants. A Canadian group, Bird Studies Canada, assessed local marshes. A newsletter called Watershed Watch updated residents on the process. Events like Harborfest and Fulton River Days provided perfect venues to educate the public. It all paid off.

State officials and community leaders say that their success in delisting is due partly to a very targeted focus on the lower mile and a half of the river, despite the myriad problems upriver.

“We were very specific in defining the Area of Concern itself,” says Donald Zelazny, coordinator of the the state’s Great Lakes program. “We really tried to limit it to where the worst of the worst was, so we could concentrate on solving the problems within that very limited, very specific area without getting up into all the watersheds upstream. We felt the problems in upper watersheds would be dealt with through our other water quality and land use programs.”

Highly motivated and opinionated citizens were key to the process. Independent facilitators and communication specialists were engaged to maintain a forward-moving approach and tight focus on the Area of Concern, with an outcome that “we knew would benefit everybody,” said Robert Townsend, water division environmental engineer, for the New York State Department of Environmental Conservation.

Relicensing of the Varick hydropower dam under the Federal Energy Regulatory Commission (FERC) helped stabilize water flow on the river, with licensing conditions mandating levels to sustain fish habitat. The utility company surpassed the requirements, constructing diversion and monitoring facilities for ideal habitat maintenance. “They voluntarily went beyond the call of duty to make sure it happened,” says Townsend.

As state officials had hoped, other programs and regulations did indeed mean a steep decline in hazardous waste contamination upstream. Concentrations of 18 priority toxics in the river were reduced by “several orders of magnitude,” as Townsend says. The bi-national Great Lakes Water Quality Agreement curbed phosphorus pollution, in part by restrictions on phosphorus in soap.

Salmon returned, and with them the fishermen. The city of Oswego redeveloped its riverfront for tourism, boating and fishing. The shoreline had been blocked off by rough walls and clogged with jumbled rip rap and debris from old canals, so much that people could not even get down to the water to fish. But the area was beautified, with a river walk, public access and a marina where once piles of stinking algae had sat.

“That wouldn’t have happened if the public didn’t get engaged in the planning process,” says Zelazny. “Probably the city would have just refortified the walls along the water, in a way that really didn’t provide for the public access and recreational opportunity that’s there now.”

Even though the Oswego River and Harbor are now delisted as an Area of Concern, the public advisory committee formed to oversee the process lives on.

“For 15 to 20 years this was a volunteer process, people coming to all these meetings, it is just astonishing there are people who turn out like that,” says Townsend. “It’s wonderful.”

# IN OTHER REGIONS

## BRINGING BACK THE BUFFALO AND NIAGARA RIVERS

### AMHERST, NEW YORK

The invasive water chestnut had grown so thick across Tonawanda Creek in recent years that squirrels and mice were known to “walk on water,” scurrying across the green mat that gave them safe passage but blocked the creek off to boaters, fish, diving birds and other creatures, and prevented sunlight from penetrating.

But in early August, a team of government agency staff and citizen volunteers rolled up their sleeves to remove the water chestnut from this tributary of the Niagara River. The U.S. Fish and Wildlife Service brought in a machine specially made to harvest aquatic plants, sucking loads of water chestnut out of the creek’s main channel across a six-acre area and sending it off to be composted. However the harvesting machine cannot work near the shoreline. Water

chestnut spreads rapidly when boats or animals break off the “rosettes” of seeds, letting them move elsewhere and sink to the bottom where they can lay dormant for years before sprouting new invasive colonies. So leaving the plants along the shoreline would likely have doomed the removal effort. And water chestnut flourishing in Tonawanda Creek could have spread to the Niagara River and then to Lake Ontario, posing serious ecological risks.

Luckily about 50 volunteers organized by the Buffalo Niagara Riverkeeper citizen group were ready to spend a hot August day removing the remaining water chestnut by hand, passing it up to the banks “with a sort of fire bucket line,” in Riverkeeper spokesman Larry Brooks’ words.

This is just one example of the two decades of intensive citizen stewardship which have brought the Niagara and Buffalo rivers back to life, literally, from the days they were cesspools of pollution from industry and sewage, including floating globs of oil that would sometimes catch fire, Brooks remembers. In the late 1980s residents and officials took notice

*The EPA’s MudPuppy research vessel samples sediment in the Buffalo River.*





of just how bad the rivers were, and the U.S. Environmental Protection Agency named them among the Great Lakes region's 43 designated "Areas of Concern," spots with serious pollution impairing fish and wildlife health and economic and recreational use. As is always the goal with Area of Concern cleanup, citizens were heavily involved from the start and never backed off.

In 2003 the EPA's Great Lakes National Program Office took the unprecedented step and designated Buffalo Niagara Riverkeeper as the official "Coordinator" for implementing the Remedial Action Plan typically developed for each Area of Concern. This was the first time that a non-profit organization was awarded this responsibility in the Great Lakes, a role often fulfilled by local or regional government. Since that time, Riverkeeper has set a new standard for public-private-nonprofit partnerships through its unique multi-million dollar cost share agreements with both the U.S. EPA—Great Lakes Legacy Act, and the U.S. Army Corps of Engineers. The first phase of a \$40 million Buffalo River remediation effort is underway, with contaminated sediment dredging scheduled to begin in 2011 by the Army Corps funded through the Great Lakes Restoration Initiative.

Already about \$90 million from a combination of funding sources has been spent to clean up the area, noted Brooks. That includes brownfield cleanup on shore, so contaminated run-off from old chemical and manufacturing sites doesn't just trickle into the water and negate all the hard work done to coax these water bodies back to life. "These are tremendous examples of how environmental restoration is bringing substantial money to western New York, creating jobs and being part of the economic engine that drives the regional economy," said Brooks.

Along with being an important habitat for countless flora and fauna and a prized recreational area for locals, the Niagara River has extra symbolism as the birthplace 101 years ago of the International Joint Commission, the U.S.-Canada bi-national body which is responsible for preventing and negotiating water-related disputes involving the Great Lakes and other water bodies that straddle both countries.

An invasive species infestation in humble Tonawanda Creek might not seem like an issue of great ecological importance to Lakes Ontario and Erie or the whole Great Lakes basin. But such creeks are tributaries of larger rivers, which are themselves tributaries to the Great Lakes. Given these interlocked waterways in sensitive Great Lakes basin ecosystems, an unbalanced

unhealthy situation in one area can have a host of ripple effects through the region.

Local residents have long recognized this as they've strived to make improvements throughout the watershed. A key turning point came around 2005 when a half-century-old hydroelectric power plant on the Niagara River near the famous falls began the process to renew its license with the Federal Energy Regulatory Commission. Public comment was opened, and there was much concern about the ecological effect of the Robert Moses Niagara Hydroelectric Power Station. Ultimately the plant was allowed to continue operating, with the caveat that it make \$450 million available over 50 years for projects in the watershed. Some of that money is going toward creating the Niagara Greenway, an already-in-the-works corridor of parks and trails that will connect Lake Erie and Lake Ontario. The greenway has many ecological benefits for wildlife and plants, and also provides an invaluable recreational opportunity that should spark economic activity and increase awareness of and appreciation for the watershed's beauty and significance.

Buffalo Niagara Riverkeeper stresses stewardship in all its citizen programs. By learning about and taking ownership of the waterways, people feel personally invested in making sure they stay healthy. The group's RiverWatch program involves more than 100 volunteers taking responsibility for a specific stretch of creek or river and doing regular water sampling, plant and animal inventories and generally keeping an eye on it.

Meanwhile every spring and fall Riverkeeper holds a volunteer shore and river cleanup day. This past spring, a record 1,500 people picked up more than 60 tons of cigarettes, bottles and other debris at 40 sites across the watershed. Riverkeeper has actually "captured" the sweat equity of volunteer labor to leverage federal funds for on-the-ground projects.

They also host a RiverTours program, getting people to hike, bike and paddle along the rivers. "We want to bring 'em out and fulfill the mission of connecting people to the water, letting them learn from an experienced guide what a special place this is," Brooks explained.

Hence Brooks and the Riverkeeper team see the success story of the Buffalo and Niagara rivers as at least two-fold: the restoration work that has already been done in terms of habitat restoration, invasive species removal and cleanup, and the added benefit

of the jobs and recreational opportunities that work has created. Then there is also the unique partnerships and collaborations as well as building and nurturing of community involvement that ensures many success stories in years to come. Riverkeeper serves as a prime example of how non-profit organizations can play an integral role in the ecological and economic recovery of the Great Lakes region.

## A CANADIAN SUCCESS STORY: COLLINGWOOD HARBOR

### COLLINGWOOD, CANADA

Looking at picturesque Collingwood Harbor at the southern tip of Georgian Bay, you would never know its waters were once choked with noxious algae, its sediment contaminated, its shoreline and tributaries eroded and concrete-lined. Collingwood was named one of the 43 Areas of Concern in the Great Lakes region, spots where heavy pollution impaired ecological health, human use and economic benefit. In 1994 Collingwood became the very first Area of Concern to earn delisting, thanks to an intensive process launched in 1987. Residents of the 16,000-population town took ownership of their harbor's future, while outside government experts provided technical, scientific and policy support, along with access to innovative technologies.

Up until the early 1980s, only primary treatment was done on sewage flowing into the harbor, creating a massive algae-fueling phosphorus load. Boats were stained with ugly green rings. A century of shipbuilding at the Collingwood Shipyards—including fleets for two World Wars—left heavily contaminated sediment. The alternately hardened and eroded shoreline was inhospitable to wildlife and offered little public access. The main stream through town, Black Ash Creek, had been channelized to prevent flooding. But this meant that after fish spawned in spring, the lower reaches of the creek went dry in summer and the young of the year were stranded upstream unable to reach Georgian Bay.

In the mid-1980s, residents, business, environmentalists and government officials decided Collingwood Harbor needed a makeover. It had long been famous for its shipyards, closed in 1986, where newly minted ships were dramatically launched sideways. Locals

wanted to retain the harbor's industrial identity, while making it healthier, cleaner and more amenable for recreation. Gail Krantzberg, then the coordinator of the "remedial action plan" developed to clean up the area and now a McMaster University engineering professor, notes that an overarching plan was crucial.

"You can do a lot of tinkering, you can plant trees along the stream shores here and there, but are you replanting the future?" she says. "You can pick up garbage and make cosmetic improvements, but are you restoring ecosystem health? We understood that we needed to create a shared goal and common vision for the future, to have specific outcomes that would demonstrate success."

For eight years, a dedicated 25-member public advisory committee discussed the harbor's future. In 1993, the advisory committee was incorporated as a non-profit organization, the Environment Network of Collingwood, which still exists today.

"It was their harbor," Krantzberg says. "Our job as technical people was to give the community options to help solve various problems the harbor had. They had made the decision. It gave them a sense of very clear ownership—that was the key to the success."

Naturally conversations about other environmental issues came up—like a nearby landfill. But Krantzberg and the advisory committee chairman, Ed Houghton, encouraged the team not to be distracted by other environmental matters, and focus on the specific goal of restoring the harbor.

The contaminated sediment had to be removed, but traditional dredging would just spread the contamination. The Canadian government through its Great Lakes Sustainability Fund sought innovative dredging technology. It settled on an Italian-made system which pneumatically sucks up sediment and pumps it away without contamination. Collingwood Harbor became the first North American test site for this technology, which is now marketed across the Great Lakes region.

Krantzberg notes that Collingwood Harbor was the perfect laboratory, since there was enough contaminated sediment to offer a serious challenge but not so much that a slip-up would have been disastrous.

Upgrading to secondary sewage treatment helped address the nutrient overload, but it still wasn't enough. Planners considered their options. They could extend outflow pipes further into the harbor...



*Collingwood Harbor*

or invest \$8 million in a new treatment plant...or they could take a chance on a novel technology that just might mean big economic and ecological pay-offs.

Collingwood adopted a treatment system that had been tested in a federal lab in Ontario. The system senses the level of nutrients in the water and automatically adjusts its treatment dosing to lower the phosphorus of the outflow as needed. This ended up successfully addressing Collingwood Harbor's algae problem, to the tune of several hundred thousand dollars rather than \$8 million.

Meanwhile starting in the late 1980s the concrete channelizing Black Ash Creek was removed and the stream restored to its natural meandering path, welcoming fish to reproduce successfully. By 1992 young of the year had returned. Residents put in countless volunteer hours helping to restore the creek and surrounding habitat.

"Some people thought, 'That's a bad creek, we should shut off the mouth so fish don't go up it and die,'" says Krantzberg. "Instead, we decided to fix the creek so fish could go up it and spawn."

Though the size and scope of Collingwood's challenges were smaller than many Areas of Concern, Krantzberg says it provided many important lessons which have been studied by international planners.

"We saw lessons in human behavior, how humans make choices, what motivates them to act," she muses. "Sometimes it's simply self-interest, and that's fine. Motivations can be different. From

environmentalists who want to be birding, to the guy who wants to sell condos, the shared purpose, a clean and healthy harbor, and shared decision-making is really important. There are lessons of trust, cooperation, leadership, information-sharing. It's how society collaborates to do the right thing."

The process made residents intimately familiar with their town's water use—how their behavior impacts the harbor, where things go when they are flushed down the toilet. People realized they didn't want this dialogue to be lost once the restoration was complete. So a community-based Greening program was instituted to promote energy efficiency, recycling and waste reduction. And the revamped waterfront became home to ENVIROPARK, an educational playland with a mock farm, city, sewage plant and harbor, all connected with blue pipes representing clean water and gray pipes for dirty water. A variety of funding streams yielded \$250,000 to build the park. A mascot named Terry the Trout tells kids stories about water and their environment.

Even after the harbor was delisted as an Area of Concern, the process continued to bear fruit. When the private shipyard company wanted to turn its 16-acre brownfield into an imposing residential and commercial development with a new marina that would destroy bass spawning habitat and cause eutrophication, residents said no. They worked with the company until the controversial marina proposal was ditched, the bass habitat was preserved and artificial spawning reefs were even added. To celebrate the millennium, a grain elevator and sediment



storage facility were transformed into Harbourlands Park, with beautiful landscaping and granite plaques commemorating the spot's industrial history.

As she explained in a 2005 academic paper on sustainable towns, Krantzberg sees Collingwood as the epitome of a healthy community that works together to protect its current economic interests while also laying the groundwork for lasting prosperity based, in this case, on the harbor's natural beauty and rich history.

"It's clear to me the people in Collingwood have tremendous civic pride, and were highly motivated to be off the (Area of Concern) list first," Krantzberg says. "They're committed to not going backwards. They are proud to be a four seasons destination location, with beautiful water and wonderful recreational opportunities. And they are definitely going to maintain it."

*Spawning coaster brook trout*



## MEETING THE COASTER CHALLENGE

### REGIONAL

Controversy has long swirled around the genetic identity of the coaster brook trout, a Lake Superior native that migrates between the lake and tributaries to spawn—unlike its stream-resident brook trout brethren. But whether one considers the coaster a sub-species, a distinct species of its own or just a brook trout with wanderlust, its painstaking recovery is seen as an important and ongoing success story, and a symbolic and concrete piece in the sustenance and improvement of the Great Lakes' \$7 billion sport fishery.

The brook trout is one of only two species of native trout in the Great Lakes. Hence the fact that coaster brook trout were nearly decimated a century ago—thanks to over-fishing, logging, habitat degradation and hydrological disruption—was of great concern.

Researchers have documented 106 Lake Superior tributaries historically home to coaster brook trout. Like other brook trout, coasters need clean, cold, well-oxygenated water and clean gravel substrate to spawn. Coasters live in Lake Superior most of the year and migrate into tributaries to spawn in the fall, usually returning to their own place of birth. Some actually spawn in the lake near shore. Along with habitat loss and extensive fishing, they have had to compete with non-native stocked fish including Atlantic salmon, coho salmon, steelhead and brown trout. Now the only remaining continuous coaster populations are in the Nipigon River and Bay system in Ontario, around Isle Royale National Park in Lake Superior and in the Salmon Trout River near Marquette, Mich., which empties into Lake Superior.

For the past three decades, public and private agencies including Trout Unlimited, the Great Lakes Fishery Commission and state natural resources departments have made it a priority to protect existing coaster brook trout populations and foster new populations through stocking in streams known as historical habitat.

In the 1980s, the Great Lakes Fishery Commission adopted an ecosystem-based joint management plan for coaster brook trout, and they were experimentally stocked in Ontario, Wisconsin and Minnesota waters. The Grand Portage Band of Lake Superior Chippewa also began stocking coaster brook trout on their

tribal land. In the 1990s more coaster recovery plans were developed, and stocking of hundreds of thousands of fish began in Michigan rivers including the Gratiot and Little Carp and along the famous Pictured Rocks National Lakeshore. The fish were later found up to 44 miles from where they were introduced.

All fishing was banned during coaster spawning season on the Salmon Trout River on Michigan's Upper Peninsula, a move supported by the historic Huron Mountain Club. In the late 1990s and early 2000s Michigan, Minnesota and Wisconsin tightened their regulations on brook trout. In 2004, the annual American Fisheries Society Annual Meeting included a symposium on coaster brook trout management and preservation, building on previous bi-national meetings in Quebec and Minnesota.

As with many restoration success stories, outreach and education to the public and policymakers was key. But given coaster brook trout's contested genetic identity, its resemblance to another lake-stream hybrid known as splake and its confusion with stream-resident brook trout, publicizing the coaster's plight has not been an easy fight. A study by Trout Unlimited notes that "the fish itself might best be seen as the final chapter in a longer story that involves forest management, wetland protection and restoration, erosion control, management of stream hydrology, genetic and life history research, changes in fisheries management and all the political and economic pressures that accompany these issues."

Research has played an important role in protecting coasters. Mitochondrial and microsatellite DNA testing and other research has provided inconclusive evidence of whether coasters are indeed genetically or just behaviorally distinct from brook trout, though the debate continues. Research at Isle Royale National Park showed females should be protected up to at least 17 inches to ensure their survival through two spawning cycles. Size limits have been raised to 18 to 20 inches in some fisheries and Isle Royale has a catch and release policy. Trout Unlimited-Canada is using sophisticated modeling to better identify Lake Superior tributaries that could provide new quality habitat for coasters.

Though it is hard to quantify coasters' recovery in recent years, researchers have observed larger coasters on the whole in locations like Isle Royale National Park and the plethora of studies, regulatory changes and educational efforts undertaken mean the future prospects of the fish look promising.

But challenges remain. The Salmon Trout River population could be severely impacted if a planned nickel mine known as the Eagle Project opens right near the river's headwaters. Other metallic mines, which are known to cause acid mine drainage, are also proposed in the area. And mining and other development means increased sedimentation in rivers, due to road-building and earth-moving. Local advocates including National Wildlife Federation attorney Michelle Halley are arguing the coaster brook trout is among the reasons new metallic mines should not open in the area.

Ultimately, the coaster brook trout restoration efforts are a success story showing how private and public agencies, universities, anglers and volunteers can work together—despite sometimes competing agendas or plans—to implement regulatory changes, behavior changes, habitat restoration, scientific research, public education and other actions that converge to protect a highly valued species and by extension the rest of its ecosystem.

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## REVIVING WILD RICE

### MICHIGAN'S UPPER PENINSULA

Ojibwe legend has it that tribal members left their homes in the eastern U.S. and walked west until they came to a spot "where food grows on water." The wild rice that once flourished around the Great Lakes region is central to the establishment of Ojibwe communities in Wisconsin, Minnesota and Michigan. Called "manoomin" in the native language, it is considered a gift from the Creator, a dietary staple for Native Americans which is also popular with tourists and sold commercially around the country.

But native wild rice paddies were decimated over the past half century in the Great Lakes region, often because wild rice was choked out when water levels rose artificially. Water level manipulation for hydropower and pulp mill operations on rivers was a major culprit, and water levels also rose from the building of roads, dams and culverts. Sedimentation and competition from invasive species also took a toll. When wild rice paddies died out, tribes were deprived not only of an important source of nutrition and income but also of a tradition—the annual late summer harvest and preparation of wild rice.





*Joe Hoagland, left, pushes a canoe through a wild rice bed in White Earth, Minn., on Aug. 30, 2006, as 14-year-old Chris Salazar learns how to harvest the rice by knocking the grain off the stalks with two sticks. The rice harvest was part of a week-long camp to re-connect young people with their American Indian culture.*

Traditionally tribal members would move to wild rice camps to spend days harvesting the ripe grain. Boats slip through the paddies as people working in pairs use special tapered sticks to draw the stalks over the boat, tapping them to release millions of grains—a boat can hold up to 200 pounds. Back on land the rice is dried, roasted and hulled according to tradition. The harvest is a time of family and community togetherness, the rice provides an important food source throughout the year, and selling wild rice provides extra income for tribes. Wild rice paddies are also valuable habitat for wildlife including trumpeter swans and black terns.

In the past decade wild rice has made a comeback, thanks largely to the efforts of individual tribes, the Great Lakes Indian Fish and Wildlife Commission and biologists. For the Lac Vieux Desert tribe near the border between Michigan's Upper Peninsula and Wisconsin, restoring wild rice meant altering hydropower operations on the Wisconsin River enough to lower water levels in wild rice bays. After a contentious legal fight, an agreement with the power company and dam owners was reached. Careful cultivation and tending of wild rice in areas

where it had been decimated has helped self-sustaining paddies come back to life.

In 2006 the Lac Vieux Desert Band of Lake Superior Chippewa hosted a conference on wild rice restoration at their reservation near Watersmeet, Mich. The importance of multi-cultural outreach and consensus-based decision-making was a major focus of the conference, which brought together more than 100 tribal members, scientists and other stakeholders.

With ecological efforts made to foster a return of wild rice, tribes have focused on the wild rice harvest as part of a broader move to revive traditions that may have fallen by the wayside. Charlotte Loonsfoot, a member of the Keweenaw Bay Indian Community on Michigan's Upper Peninsula, has recently found a renewed sense of connection with her cultural ancestry through harvesting wild rice, learning traditional ceremonies, picking berries and weaving birch baskets. Adopting these traditions also means becoming an active steward of the environment, Loonsfoot explains as she sits by a fire on the Yellow Dog Plains near Marquette, Mich.



Likewise Waabanookwe, a member of the Lac Vieux Desert tribe, harvests wild rice along with weaving, tapping maple syrup and other traditional practices that she has learned from elders and passes on to her children and grandchildren.

## MUSKEGON LAKE: FROM HAZARDOUS TO HEALTHY

### MUSKEGON, MICHIGAN

When Kathy Evans was a kid, her family would head to downtown Muskegon to go to department stores—but steer clear of Muskegon Lake, which is separated by sand dunes from Lake Michigan, with the Muskegon River flowing through. “It was unsafe, smelly dirty—it was bad,” she remembers.

Now those department stores are gone. But what the downtown has lost in luster, the lake is making up in spades.

A century ago Muskegon thrummed with saw mills, churning out lumber and filling the lake with sawdust and the discarded slabs of wood sliced from trunks to make boards. During and after World War

II, foundries and steel mills sprouted, dunes were mined for sand used in casting the molten metal and then the oily contaminated sand was dumped back in the lake. Eventually the silt and lumber debris added more than 800 acres of fill creating a new lakeshore, with paper mills, port facilities, homes and other structures built on top. Three quarters of the shoreline was hardened with sheet metal, slab wood, foundry slag, broken concrete and other material, creating fragmented and extremely inhospitable habitat.

Not surprisingly, Muskegon Lake was named one of the 43 Areas of Concern in the Great Lakes, heavily polluted areas where human use, fish and wildlife health and economic benefits are impaired.

Today, Evans is helping lead a multi-pronged effort to heal the lake and turn it into an asset for the city.

Over several decades a vibrant grassroots environmental movement has developed in Muskegon, gaining substantial government support and funding. The Muskegon River Watershed Assembly and the Muskegon Lake Watershed Partnership bring together various groups and individuals with the goal of delisting the Area of Concern and continuing environmental improvement and stewardship efforts. Evans is the program manager for the West

*Felled trees create new habitat at Muskegon Lake.*



Michigan Shoreline Regional Development Commission, a member of the partnership.

“People got fed up, they said enough is enough,” Evans explains. “The whole mindset of people changed, from ‘It’s always been this way’ to ‘We can change it.’”

Their efforts are currently fueled by a \$10 million grant under the American Recovery and Reinvestment Act to restore up to 10,000 feet of shoreline and remove 145,000 cubic yards of unnatural fill to restore 24 acres of emergent and open-water wetlands. The project will create 125 jobs and is predicted to have a short-term economic impact of \$53 million to \$89 million. On Earth Day 2010, Jane Lubchenco, administrator of the federal National Oceanic and Atmospheric Administration, visited Muskegon to celebrate the program.

Meanwhile the Great Lakes Legacy Act has helped fund the dredging of contaminated sediment. In 2006 Muskegon became the state’s second completed Legacy Act site (after Detroit’s Black Lagoon). About 80,000 cubic yards of contaminated sediment were dredged from Ruddiman Creek, whose several branches form a wide lagoon leading into Muskegon Lake.

The chair of the Ruddiman Creek Task Force, Theresa Bernhardt, raised her family near the creek. She convinced the high school football team to volunteer to remove discarded tires, and she was going to lend a hand. She was pregnant with her third child at the time. “Are you crazy?” a neighbor said. Bernhardt found it highly disturbing that she couldn’t go near the water without possibly endangering her unborn child, and it was a constant battle to keep her other young kids from playing in the creek.

Today, you would never know it is the same creek. On a damp June morning Bernhardt strolls along the bank where the only smell is of clean damp vegetation and there is not a scrap of trash in sight. She tugs playfully at an old metal sign nailed to a tree warning of hazardous contamination. The risk is gone...but the sign can’t be removed since the tree’s bark has grown around it.

“Well this is a reminder that we have to always stay vigilant,” she says.

The previous afternoon, Evans and other restoration project leaders from several organizations survey the

Grand Trunk wetland from a boardwalk built as part of the restoration. A strange sound like a loud rubber band snapping interrupts their conversation. “A green frog!” exclaims ecologist Kelly Rice, an biologist with JFNew, the firm doing bioengineering and construction management for the project. Since removing hard rip rap from shorelines, setting upturned trees in the shallows to create habitat and removing monoculture invasive species, locals have seen an upsurge of amphibians, fish and birds. Almost as soon as broken concrete and twisted metal was removed from shoreline and replaced with clean topsoil and native plants, turtles began crawling ashore to nest.

Two decades ago, the Grand Trunk wetland was a de facto dump filled with old refrigerators, car doors and other debris. Then union members from the nearby Sappi paper mill began volunteering to clean the area. It became a tradition involving students and residents, who removed invasive species, planted native species, installed a stormwater filtering system, built trails and a peace garden and other improvements. Such volunteerism and stewardship over the years have primed Muskegon to take advantage of various funding sources as they become available.

“Our planning is always going on, and then we can jump on the funding when it comes up,” Evans says. “It’s not only restoration, it’s putting people back to work.”

The restoration dovetails with an ongoing effort to revitalize the city’s downtown.

“The restoration work draws a lot of people here, and then they see that there’s more to Muskegon than foundries,” notes Great Lakes Commission project manager Heather Braun.

The NOAA grant has allowed organizations to work with landowners like Dave D’Alcorn to restore their land and place it in permanent conservation easements. D’Alcorn is thrilled with the restoration done on his lakefront property, including the removal of a broken down concrete pier his stepfather had installed years ago. Now, the shoreline features a gently sloping limestone toe, soil with native plants and neatly placed logs creating a boat ramp that is also inviting to wildlife. D’Alcorn throws rocks to scare away a family of swans swimming intently toward him, apparently planning to make a meal of the sprouting native plants.





*Tanya Cabala has spent two decades fighting for remediation in and around White Lake.*

“This is wonderful,” he says. “It’s a blessing from heaven that dropped on my lap.”

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## A WIN FOR WHITE LAKE

### WHITE LAKE TOWNSHIP, MICHIGAN

In 1987 White Lake in northern Muskegon County, Michigan was designated one of 43 Areas of Concern in the Great Lakes region due primarily to pollution from a number of chemical companies, including Hooker Chemical—infamous for its role in Love Canal, the environmental disaster that sparked the Superfund program.

Its turnaround over the next two decades, thanks largely to the persistence and volunteer work of a small but dedicated group of regular citizens, has meant both economic benefits in terms of fishing and tourism on White Lake itself; and significant ecological gains for White Lake and the swath of Lake Michigan which it connects to by a channel.

In the 1980s and early 1990s citizens would occasionally complain about environmental problems and form ad hoc groups to focus on one site or specific issue. But there was no focused long-term

approach to restoring the area’s recreational and economic focal point—White Lake.

When residents’ mindset changed from reactive to proactive, however, the seeds of success were sown. It all started about two decades ago when young teacher and mother Tanya Cabala and several other local residents decided to form an environmental club to promote recycling.

Cabala and her friends joined forces with A. Winton Dahlstrom, a fiery and controversial local environmentalist who urged the new group to tackle more challenging issues than recycling—like the proposed expansion of a nearby landfill. Cabala and the others got increasingly involved in environmental advocacy, and increasingly disturbed by legacy and ongoing contamination. Along with Hooker Chemical, the Whitehall Leather tannery that had operated since the mid-1800s left sediment laced with leather scraps, cow hide, arsenic, chromium and a substance called “purple mayonnaise.” Eutrophication (extremely low oxygen levels in the water) and erosion were also serious problems on White Lake and White River. “It was upsetting to realize how much trouble the lake was in,” says Cabala.

They found that because White Lake had been named an Area of Concern, there was a remedial action plan for the lake, developed by state officials. The plan, however, had been developed with limited



public involvement and the group felt it did not adequately describe the problems in the lake, or offer potential solutions and a concrete plan of action. So with funds provided through an advisory council for the state's Areas of Concern (the Michigan Statewide Public Advisory Council), Cabala worked with White Lake and Muskegon area residents to organize groups to advise and lobby for both lakes. Public advisory councils were formed in White Lake and Muskegon, both still operating successfully today.

The White Lake advisory council and its community allies took full advantage of the lake's designation as an Area of Concern as a vehicle for restoration. They successfully pushed for cleanups at numerous contaminated sites and a removal of 85,000 cubic yards of contaminated sediment in "Tannery Bay," the former Whitehall Leather site. Another 12,000 cubic yards of contaminated sediment at the Hooker Chemical site (also known by the name of its successor, Occidental Chemical or OxyChem) has also been addressed. In 2004, Great Lakes Basing Program funding was used to shore up and restore an erosion problem area on the White River, which was adding 248 tons of sediment to the lake each year. A blueprint for habitat restoration was also prepared to identify priorities for future projects.

In 1991 Cabala started working for the Lake Michigan Federation, the precursor to the Alliance for the Great Lakes. Now she is a city council member and consultant to various environmental groups. She is advising the Muskegon Conservation District on the transformation of a traditional lawn at the city's largest industry, Alcoa Howmet, to five acres of native prairie and oak savannah. Black-eyed Susans, pink, purple and white wildflowers and waving prairie grasses now blanket the property. Cabala believes increased corporate interest in such projects reflects the culture of environmentalism sparked by the process of cleaning up the lake.

"This is really important and great to see happen," she says, "Because we need a strong community environmental ethic to maintain the success we've achieved."

Cabala is thrilled at the turnabout in community sentiment. "The feeling had been that you couldn't do anything, that this lake would always be polluted," she says. "It was not okay to be doing what we were doing when we got started. Muskegon County was a very pro-industry, jobs-first place. But now people see it's not environment versus jobs. We have a lot of

environmental awareness in the community. And it's great to see that many of our students are going into environmental fields. We showed you CAN change things and that people CAN make a difference. A big difference."

Jeff Auch, executive director of the Muskegon Conservation District and a resident of the town of Montague near White Lake, has been involved with the restoration efforts for about a decade.

"It's surprising we've gotten as far as we have so quickly," he says. "Sometimes it seems like things take so long—there might be two years where you don't see anything happening on the lake. But that's when legwork is going on, then all of a sudden you see a jump forward. A lot of the issues have been addressed because of the public pressing for things to be taken care of that would have fallen by the wayside otherwise."

Cabala stresses the important local role that NGOs like the Lake Michigan Federation (now the Alliance for the Great Lakes) and Great Lakes United played in the early days, helping grassroots activists learn how to be influential and create positive changes in their own communities. She says locals have also learned many key lessons, including the value of patience and persistence. Most importantly, according to Cabala, the group took on the primary responsibility for cleaning up White Lake. Citizens learned to work well with government agencies and non-profits, "collaborating, but not allowing them to dictate."

In June 2010, \$2.16 million in Great Lakes Restoration Initiative funding was awarded to the White Lake public advisory council and the Muskegon Conservation District to restore more than 5,000 feet of shoreline; restore and create more than 35 acres of wetland and aquatic habitat; and connect habitat corridors at seven sites. This will include softening shoreline and habitat restoration at the OxyChem and Tannery Bay sites where sediment was previously removed—furthering the idea of "remediation to restoration."

"All the work done so far led up to this," notes Cabala. "When the request for proposals came out, we were ready. I've heard from many citizens that news of the grant award is helping to change how they view the lake—they are excited, pleased and proud to live here."

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