The Great Lakes

Green Book

Summary of
A Citizens'
Action Agenda
for Restoring
the Great Lakes –
St. Lawrence River
Ecosystem

Coordinated by Great Lakes United
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An Agenda for Action

The Great Lakes Green Book summarizes a grassroots restoration agenda for the Great Lakes-St. Lawrence River ecosystem that is as comprehensive in scope as it is specific in its recommendations. *The Green Book* is a summary of a more detailed *Citizens' Action Agenda for Restoring the Great Lakes – St. Lawrence River Ecosystem*, which includes background, precedents and sources for all the recommendations. The full document can be found at www.glu.org.

The problem. For thirty years the Great Lakes region has implemented partial solutions to water, air, wildlife, habitat and environmentally related human health problems. Yet today, in many communities across the basin, the fish are not edible, the waters are not swimmable, the wildlife habitats are more fragmented, and the environmental impacts on human health are more profound than ever.

Something stronger needs to be done.

The opportunity. Basin government leaders are finally considering a major investment in Great Lakes restoration, but have not yet put forth a specific plan. Accordingly, Great Lakes environmental, conservation, and labor groups have developed an action agenda to help guide those efforts from a citizen point of view. Citizens need to be at the table early and often, working with government parties to see through the development and implementation of a sound Great Lakes action plan.

Aiming high. As the world's largest freshwater ecosystem, the Great Lakes-St. Lawrence River basin is too important and too fragile at this point in its history for "business as usual" to continue. That is why we have set the goals, standards and timelines for restoration as high and as near-term as possible. All basin citizens can use the recommended actions in the Green Book to measure the

performance of governmental institutions around the lakes and to make further recommendations, where necessary, for changes in governance that better serve restoration needs. We can also use them to help synchronize and strengthen our collective efforts on behalf of a healthy Great Lakes ecosystem.

Directed to governments. Although the recommendations in *The Great Lakes Green Book* are mainly directed to governments, individuals also have an important role to play. Through the lifestyle choices we make there is a great deal we can do to reduce our negative impacts on this ecosystem. However, our options and effectiveness as individuals are limited and even blocked until our governments provide a basic framework for progress towards sustainability.

With that framework in place, the wealth of expertise that is harbored in the cities, universities, industries, labor groups, non-government organizations and Indigenous communities who make their home in the Great Lakes – St. Lawrence River basin, can finally be fully mobilized.

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

PRINCIPLE 15 OF THE RIO DECLARATION,
UN CONFERENCE ON ENVIRONMENT AND DEVELOPMENT, 1992

Challenges Facing the Great Lakes Today

As we enter a century where the number of people around the world suffering from a scarcity of clean water is projected to grow to five billion in the next two decades, the 40 million people living around the Great Lakes continue to share a seemingly limitless supply.

The Great Lakes-St. Lawrence River ecosystem is the single largest freshwater ecosystem on earth, representing almost 20 percent of the world's available fresh surface water. Its waters are inextricably linked to the growth and prosperity of the Great Lakes region, and of the United States and Canada as a whole. The quality and quantity of these waters play a major role in determining the health and welfare of the people, and the diversity of wildlife living in and around their shores.

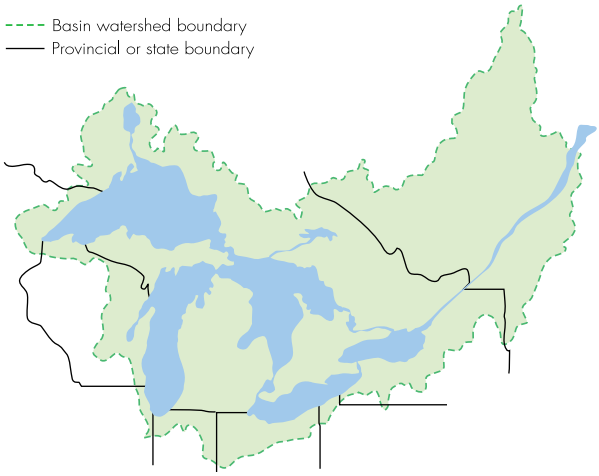
In spite of winning some scattered battles, my unwilling judgement is that we are losing the war and the basin ecosystem is degrading further.

DR. HENRY REGIER

Yet despite the economic and life-sustaining value of this resource both regionally and globally, and despite some success in curbing the inflow of pollutants in the 1970s and 1980s, the Great Lakes ecosystem is once again under siege. It is now being assaulted in ways few, if any, Great Lakes observers would have predicted 30 years ago. The influx of invasive species from halfway around the world and the rapidly growing demand for fresh water both in and outside the basin are among the emerging problems poised to do serious and possibly irreversible damage to the system. Just as disturbingly, the system is being assaulted once again by rising tides of toxic substances and by a "dead zone" of de-oxygenated water covering much of Lake Erie – two scourges many Great Lakes residents hoped, as we entered this new century, would be behind us.

Symptoms of these assaults increasingly visible to people living around the lakes include record numbers of beach

closings from untreated sewage or farm runoff; tens of thousands of loons, ducks and other fish-eating birds washed up on the shores of Lake Erie in a continuing epidemic of avian botulism, and the collapse of native fish populations like walleye and perch.



In a 2002 "State of the Great Lakes Ecosystem" report, U.S. and Canadian scientists ranked a full 70 percent of lake health indicators as "mixed," "mixed-deteriorating" or "poor." They warned of a "dramatic decline" in key animal species and of a proliferation of non-native species throughout the Great Lakes system. Toxic substances continue to accumulate in high enough concentrations in Great Lakes fish to trigger, in the U.S. basin alone, more than 1,500 advisories against eating them – this despite repeated calls on governments and industries to "virtually eliminate" these toxics in the lake.

Recent studies of older adults who consumed Lake Michigan sport fish found high body burdens of PCBs and associated impairments in memory and learning, consistent

with previous research showing an association between fetal PCB exposure and impairments of memory in children of Lake Michigan fish-eaters. On the Ontario side of the Detroit River, identified as one of 43 toxic hotspots in the Great Lakes, health scientists have concluded that between 1986 and 1992, pollution may have been responsible for more than 1,000 excess deaths and 40,000 excess hospitalizations. The rate of hospitalizations for females under 25 with thyroid gland disorders was a startling 208 percent higher in the Windsor area than for the province as a whole.

Reports from the U.S. General Accounting Office, the Canadian Auditor General's Office and the International Joint Commission cite budget cutbacks, staff reductions, lack of monitoring and lack of a long-term plan as reasons for the general lack of progress made towards Great Lakes restoration. "Important matters are adrift," they say.

We are going in the wrong direction. The challenges facing the Great Lakes-St. Lawrence River ecosystem today require coordinated actions on multiple fronts *now* to turn the tide.

The federal government is uniquely positioned to take a basin-wide perspective, but so far it has not . . . The quality of existing data sets is deteriorating; the federal capacity is going in the wrong direction.

CANADIAN AUDITOR GENERAL'S REPORT TO PARLIAMENT, OCTOBER 2001

1 Toxic Cleanup

The aquatic systems of the Great Lakes and St. Lawrence River basin continue to show the effects of long-lived toxic substances like PCBs and mercury, which have accumulated for decades in the underlying sediments and adjacent soils. These substances work their way up the food chain, contaminating animals at higher and higher levels. In turn, they cause cancer, reproductive impacts and immunological abnormalities, among other health problems for people who eat contaminated fish and wildlife.

We are starting to consider the RAP process a failure. We urge the governments of the United States and Canada to prove us wrong.

CARL HUJET, GREAT LAKES CITIZEN HEARINGS, GREEN BAY, 1998

Toxic hotspots around the Great Lakes also compromise efforts to spur economic growth and urban waterfront renewal. Contaminated fish have caused commercial and charter boat fisheries to close their doors, putting people out of work. Taxpayers in states and provinces bordering the Great Lakes and St. Lawrence River pay three to five times more in dredging costs than if there were no contaminants in the sediments of their ports, just to keep those ports open. Waterfront redevelopment efforts are stalled in many communities due to the need for costly cleanups.

We do not have to live with this toxic legacy. We have the tools and the knowledge to clean up these toxic sites, and we need to put them to work to get the job done.

Actions

✔ Provide adequate funding for cleanup

Funding cuts to existing programs for remediation, monitoring and research have slowed Great Lakes cleanup efforts. In 2002 both Canada and the United States

published five-year restoration plans for the Great Lakes, but did not clearly define funding needs, priorities or accountability for toxic cleanup. Of the 42 Areas of Concern

EPA RESEARCH VESSEL, US EPA

designated for Remedial Action Plans in 1985, only two have been delisted.

Federal, state, provincial

- Federal agencies must work with states, provinces and municipalities to rank contaminated sediment sites in terms of priority and provide cost estimates and benchmarks for completing all remediation activities by 2015
- Provide adequate funding for complete remediation of the AOCs and ensure this is designated for agencies and programs with toxic cleanup responsibility and demonstrated public accountability. Funding should include restarting research and development programs for the most effective and environmentally safe dredging, disposal and destruction options and for continued water quality monitoring and research
- In order to restart cleanup efforts immediately, the U.S. should fully fund the Great Lakes Legacy Act of 2002 (committing $54 million per year for five years) and Canada should increase its current allocations for AOC cleanup

✔ Build and engage healthy communities

Effective cleanup of contaminated sediments, toxic waste sites and groundwater, and prevention of future contamination will require every affected community to be part of the solution over the long term. Communities need information on the health risks associated with toxic contaminants, the economic benefits of cleanup, and the alternatives for making informed decisions along the way.

Federal, state, provincial

- Renew and fully fund Health Canada's Great Lakes Health Effects Program and the U.S. Agency for Toxic Substance and Disease Registry's Great Lakes Human Health Effects Research Program. Ensure funding is available for impacted communities to be involved in research and monitoring, prioritizing needs in environmental justice communities
- Consolidate studies of the economic and environmental benefits of cleanup
- Dedicate a minimum of 5 percent of cleanup funds to public outreach on contamination problems and cleanup alternatives. Ensure a plan is in place for building the local leadership network necessary at each site for achieving long-term goals

✔ Coordinate toxic cleanup efforts

It is often necessary to pressure agencies to make effective use of the powers they have to force cleanup efforts and to coordinate among the parties involved.

All levels of government

- Ensure strong and consistent de-listing criteria for AOCs. No AOC should be officially delisted until all beneficial uses have been restored
- Require public accountability – environmental actions, timelines and penalties for delays – from authorities with cleanup responsibility such as the U.S. Army Corps of Engineers

- Institute cooperative agreements with all agencies involved in cleanups, ensuring the cooperative use of authorities, use of the polluter pays principle, and a clear process for community input

✔ Treating contaminants

Aquatic landfills, including shoreline confined disposal facilities (CDFs) and in situ containment (capping sediments in place), are likely to be the toxic hotspots of

CDF, WISCONSIN

the future, yet many AOC cleanup plans rely on them. Incineration and landfilling of contaminants may also result in recontamination of air, soil or water.

Federal, state, provincial

- Fund the continued research and demonstration of non-incineration destruction technologies and demonstrate such technologies in actual cleanups
- Phase out the use of aquatic landfills
- Design landfills so they can be monitored and so that toxic contaminants are recoverable as alternative destruction technologies come on line

✔ Contaminated land and groundwater sites

Pollution prevention, such as recycling rather than landfilling wastes, is the only way to protect groundwater.

Cleanup is difficult and expensive. While a number of remediation technologies have been successful on small scale projects, there is currently little incentive for polluters to pay for implementing them at large sites.

Federal, state, provincial

- Refinance federal and state Superfunds for toxic cleanup. Canada should develop an equivalent "polluter pay" fund for cleaning up toxic hotspots
- For brownfields, or contaminated sites not on any Superfund list, provide incentives for cleanup and sustainable reuse. Ensure community input and health-protective cleanup standards
- Develop effective methods for remediating contaminated groundwater, supported by increased fines and "polluter pay" penalties
- Establish public registries of contaminated land sites and municipal groundwater supplies
- Increase funding to local communities for well testing, groundwater monitoring and wellhead protection programs

EPA is not effectively fulfilling the nation's responsibility under the Great Lakes Water Quality Agreement of 1978 to ensure that Remedial Action Plans are developed and implemented in the contaminated areas . . . The agency reduced its support for RAPs under the assumption that the states would continue to fund the RAP efforts. Instead the states followed EPA's lead and reduced their support as well.

U.S. General Accounting Office
report to Congress, May 2002

For full Action Agenda text and sources see www.glu.org

2 Clean Production

Despite government commitments to reduce toxic discharges, industrial releases into U.S. and Canadian waters actually rose 26 percent between 1995 and 1999, according to national toxic release inventories. Five of the nations' six top state and provincial polluters are in the Great Lakes region.

Moreover, new chemical dangers are emerging. For example, scientists have discovered high levels of flame retardants known as polybrominated diphenylethers (PBDEs) in Great Lakes salmon and in human breast milk. Some PBDE compounds share the same characteristics as banned chemicals like PCBs in that they are long-lasting and bioaccumulate in higher and higher concentrations in living creatures as they move up the food chain. They are also thought to be potent disruptors of thyroid activity, meaning they could interfere with normal development of humans and other living creatures exposed to them.

PCBs have been found to interfere with what we call the thyroid economy. You do not have to eat the fish to get these effects.

THEODORA COLBORN, GREAT LAKES CITIZEN HEARINGS, BUFFALO, 1998

Eliminating long-lived, bioaccumulative toxics from the Great Lakes ecosystem requires a strong regulatory and monitoring framework. The most effective and ultimately the safest way to achieve this goal is to avoid using or producing these substances at any stage of a product's life cycle, and to design for maximum product recyclability or "cradle to cradle" use of environmentally benign materials.

Actions

✔ Product design

Design is the first and most important stage in the life cycle of a manufactured product. For example, basic choices of materials can greatly impact the costs, liabilities and environmental damages involved in manufacturing and disposing of products. These costs are most economically eliminated at the front end of the process – in product design.

Federal, state, provincial

- Adopt "extended producer responsibility" (EPR) legislation for mercury in existing products, requiring manufacturers to be 100 percent responsible for recovery and safe disposal. Following the lead of the European Union, adopt similar EPR legislation for products that generate high-risk, high-volume waste such as automotive, electronics and packaging products

MICHIGAN TRAVEL BUREAU

- Enact and fund research such as the U.S. Environmental Health Research Act for screening new chemicals for human health effects including hormone disruptors. Under the Canadian Environmental Protection Act, Health Canada and Environment Canada should ensure that the process to categorize and screen chemicals of concern includes criteria for the effects of hormone disruptors on human and wildlife health, and that the process is completed by 2006
- Amend new substance permitting laws to use the *precautionary principle* (take protective action before absolute proof of harm) and *reverse onus* (the proponent of a substance must prove it is not harmful) as the basis for decision-making

- Phase out the manufacture and use of long-lived toxic chemicals like PBDEs that are measurably accumulating in Great Lakes animal and human populations

✔ Mining

Federal

- Identify all abandoned mine sites in the basin, evaluate impacts and report remediation plans to the International Joint Commission and to the public

State, provincial, tribal

- Require all mine operating approvals to include pollution prevention measures in connection with the planning, operation and closing of a mine, and financial guarantees that all environmental obligations will be met

✔ Manufacturing

Federal, state, provincial

- Ensure that "toxics use reduction" laws are in place in Great Lakes states and provinces
- Support development of clean production assistance centers in every Great Lakes state and province. Require firms reporting toxic releases to have a yearly clean production audit and workplan by such a center
- Require pollution prevention plans for all industrial dischargers to wastewater treatment plants on the principle that industries should treat their toxic wastes on site

✔ Construction

Municipal, regional

- Adopt building code standards for energy and water efficiency and for eliminating potentially toxic materials such as formaldehyde and polyvinyl chloride (PVC)

MINNESOTA EXTENSION SERVICE

✔ Agriculture

Federal, state, provincial

- Foster programs to develop "bio-intensive integrated pest management" (IPM) as an alternative to chemical pesticides. Develop baseline information to assess IPM adoption and pesticide use, then target 50 percent of Great Lakes farms to meet bio-intensive production standards by 2010
- Eliminate tax incentives and increase environmental oversight for factory farms. Provide small business incentives to family farmers and others who commit to environmental and animal welfare goals.
- Following Canada's lead, the United States should restrict the pesticide atrazine immediately to emergency use only

Municipal

- Every Great Lakes city should adopt by-laws to phase out the cosmetic use of chemical pesticides on lawns and gardens by 2005

✔ Right to know

Federal, state, provincial, municipal

- Improve toxic release reporting by ensuring worst case scenarios are known to the public
- Require labeling of all toxic ingredients in products

- Ensure workers are trained and health and safety programs are in place concerning potential toxic exposures in the workplace
- Canada should immediately eliminate exemptions for pesticides under the Workplace Hazardous Materials Information System and other workplace legislation

✔ Waste management

All levels of government

- Ban new municipal waste incinerators and phase out existing incinerators by 2010
- Provide local alternatives to backyard trash burning and burn barrels
- Work together to achieve a minimum rate of 60 per cent recycling/diversion per capita by 2010; 70 per cent by 2015

Zero discharge means just that: halting all inputs from all human sources and pathways to prevent any opportunity for persistent toxic substances to enter the environment . . . To prevent such releases completely, their manufacture, use, transport and disposal must stop.

International Joint Commission, Sixth Biennial Report on Great Lakes Water Quality, 1992

For full Action Agenda text and sources see www.glu.org

3 Green Energy

The generation, distribution and use of energy heavily impacts the Great Lakes ecosystem. Coal-burning power plants poison the region's fish with mercury, contribute to the acid rain that make inland lakes unable to support life, and pose significant health threats to basin residents. In Ontario alone, an estimated 1,900 people per year die prematurely from exposure to smog-related pollutants from fuel burning and vehicle exhaust, and an estimated $9.9 billion is spent each year on smog-related health bills.

Uranium 238 has a half-life of about four billion years. We consider this pollution in Lake Ontario [from the Port Hope uranium refinery] as permanent.

PAT LAWSON, GREAT LAKES CITIZEN HEARINGS, TORONTO, 1998

Approximately sixty nuclear reactors on the shores of the Great Lakes and immediately upwind in Illinois and Minnesota perpetuate the region's unsolved problem of radioactive waste and threaten catastrophe if a major malfunction at any one facility occurs.

A sustainable energy future lies with a system of decentralized and locally controlled energy services, a diversified base of renewable power sources, use of alternative fuels and vehicle technologies, and maximized efficiencies and conservation.

Actions

✔ General

All levels of government

- A sustainable energy system by 2030

✔ Energy efficiency and conservation

Using less is better than making more. Through energy efficiency and making the best energy choices, services such as transportation, lighting, heating and cooling can be provided using much less energy. Already available off-the-shelf technologies can provide substantial energy savings in the home and workplace. Energy policies should target dramatic decreases in per-capita energy consumption based on the many energy efficiency and conservation options available in each sector.

Federal

- Require average fuel efficiency standards for vehicles of at least 40 miles per gallon by 2012; 55 mpg by 2020

State, provincial

- Fund conservation and research and development for renewable energy and improved efficiency technologies through a "public benefits charge" of at least 0.2 cents per kilowatt hour
- Provide incentives for purchasing fuel-efficient vehicles such as sales tax exemptions, income tax credits and government procurement policies

✔ Renewable energy

Renewable energy sources – wind, solar, sustainable biomass and small hydro – are on track to replace polluting sources such as nuclear and coal. Already, on a global scale, more electricity is produced by renewable sources than by nuclear, and throughout the 1990s global nuclear capacity rose by only 1 percent compared to 17 percent for solar, and 24 percent for wind power.

On the transportation side, current technology allows an immediate shift to alternative fuels, including natural gas, propane, electricity, ethanol and biodiesel.

Federal, state, provincial, municipal

- Each jurisdiction should adopt "renewable portfolio standards" for the amount of their electricity mix that must come from new, clean, low impact, renewable sources of 5 percent by 2005, 10 percent by 2010, and 20 percent by 2020
- Provide subsidies to stimulate a 50-fold increase in solar power's contribution to electricity needs by 2030
- Target at least 5.75 percent of transportation fuel to be obtained from renewable sources by 2010
- All the region's governments should adopt green power purchasing policies by 2005
- All jurisdictions should provide "net metering" – the ability of consumers to return energy to the central power system – by 2005

✔ Competition and deregulation

Many jurisdictions are facing dramatic shifts in the energy sector as a result of deregulation and market opening. In either a competitive market or a publicly owned system there should be a clear set of rules that are applied consistently to demand fair rates and sound environmental performance.

Federal, state, provincial, municipal

- Require energy producers to use full cost accounting to internalize the environmental and societal costs of non-renewable energy production
- Prohibit construction of utility pipelines across any of the Great Lakes

✔ Non-renewables

Fossil fuel combustion is a leading contributor to climate change, as well as a key source of pollutants affecting human and ecosystem health. Nuclear power is heavily

polluting in every step of the nuclear chain: uranium mining, refining, power production and storage of radioactive waste

Federal

- Establish mandatory caps on the four major pollutants from coal-fired power stations with the goal of phasing them out. By 2009 reduce mercury emissions by 90 percent, sulphur dioxide emissions by 75 percent, and nitrogen oxide emissions by 75 percent from 1999 levels. Reduce carbon dioxide emissions to 10 percent below 1990 levels by 2009

INDIANA DUNES, NATIONAL PARK SERVICE

- Phase out nuclear power plants in the Great Lakes region by 2020 beginning with the oldest and dirtiest stations; permit no relicensing or new construction of nuclear reactors

✔ Jobs

A green energy future is worker-friendly. The shift to renewable energy will create jobs in manufacturing, research and development, system design, installation and maintenance, education and training, auditing, management and consulting.

- Require worker job transition strategies as a license condition for all generating stations by 2005

We call upon the U.S. government to conduct a study on the use of fossil fuels, large-scale hydropower, and nuclear energy industries that would externalize their true costs and impacts upon the health and cultural integrity of our tribal nations, locally impacted communities and the natural environment

INDIGENOUS PEOPLES CAUCUS, SECOND PEOPLE OF COLOR SUMMIT, OCTOBER 2000

For full Action Agenda text and sources see www.glu.org

4 Sustaining and Restoring Water Quantities and Flows

The growing scarcity of fresh water in many regions of the world has some experts predicting that water will replace oil as the most sought-after resource of the 21st century. At the same time, transnational corporations are vying to tap into this precious resource for the purpose of selling it to thirsty regions. Current wasteful water consumption rates and the lack of environmental standards for withdrawing water in the Great Lakes basin provide poor moral and legal ground for turning down possible future requests to export or divert basin water.

Ninety-nine percent of the water in the Great Lakes was deposited here by the glaciers 20,000 years ago. It's essentially a closed system, which makes it very fragile.

WALLY BOCK, GREAT LAKES CITIZEN HEARINGS, CHICAGO 1998

Actions

✔ General/conservation

All levels of government

- Develop a plan by 2005 to reduce basin water loss (averaging 4,750 gallons per capita per year) by 50 percent – to levels consistent with the lowest consumption rates found among the world's economically developed countries
- Support infrastructure and conservation programs for basin public water supply systems that will assure that no more than 10 percent of water withdrawn from basin lakes, rivers, streams and the ground is lost through leakage, evaporation or other means

✔ Water withdrawal reform ("Annex 2001")

All levels of government

- Remove government subsidies for water pipelines and expanded water services infrastructure that encourage urban sprawl

Federal

- Ensure a federal backup plan for protecting the basin water system if the states and provinces fail to cooperatively reach agreement by 2005

State, provincial, tribal

- Complete and implement a binding water withdrawal reform agreement such as that proposed by principles in the "Great Lakes Charter Annex," also known as "Annex 2001." The agreement should base water withdrawal decisions on ecosystem protection and restoration and cover all basin waters: streams, rivers, lakes, and all the groundwater that contributes to them. Ensure inclusion of First Nations and Tribes in this discussion and any final agreement

CHICAGO WATER INTAKE
© JOHN AND ANN MAHAN

- Ban water diversions between watersheds in the Great Lakes basin and out of the basin. "Watersheds" should be defined as major river watersheds or smaller
- Ensure the right of the public to 1) have access to all government water withdrawal and use information, 2) assess and officially comment on all government decisions to grant water withdrawal permits, and 3) challenge all permitting decisions once they are finalized on the basis of their consistency with local law and regional agreements

✔ Alteration of flows

Federal

- Reassess navigational dredging depths prescribed by international agreement, with the aim of minimizing environmental impacts. Until the reassessment is completed, evaluate environmental impacts before deciding to dredge to agreed depths, prohibit dredging beyond agreed depths, mitigate the environmental effects of past excess dredging, and consult with the public when making dredging decisions
- Study the environmental benefits and economic feasibility of restricting oceangoing ships to the upper reaches of the St. Lawrence River (see also Section 5)

State, provincial, tribal

- Where feasible, restore free-flowing waters in basin tributaries through the strategic removal of obsolete or unsafe dams

Municipal, regional

- Include protecting local natural surface water and groundwater systems as a core goal of municipal and regional master plans

✔ Restoration plan

Federal

- Submit a reference to the International Joint Commission to assess, every four years, regional progress toward protecting and restoring the flows and other hydrological characteristics of the basin water system

Federal, state, provincial, tribal

- Develop by 2005 and implement by 2015 a plan for restoring natural water flows and other ecosystem functions of the basin water system.

✔ Information needs

Federal, provincial, state, tribal

- Expedite a program to map groundwater and source waters for each basin watershed. Include assessment of water quality, quantity, original flow rates, environmental values and cultural values

State, provincial

- Develop a uniform information collection system for determining human water withdrawals from major watersheds within the basin
- Develop a uniform, biennially updated reporting system to track: 1) basin water conservation practices, 2) world's best water conservation practices, 3) ecosystem impacts of basin water withdrawals and system alterations, and 4) efforts to restore damage caused by water withdrawals and water system alterations

NIAGARA FALLS

✔ Climate change

Federal, tribal, state, provincial

- Support an expedited international research program that, by 2007, allows scientists to be more specific about the predicted effects that climate change will have on the Great Lakes basin water system through the end of the century
- Create long-term water management plans that address the full range of climate change scenarios offered by climate change scientists for the region

- Adopt initiatives that go significantly beyond the goals of the Kyoto Protocol

✔ International agreements

Federal

- Exclude water-related services from amended or new international trade agreements to which Canada or the United States are or will be signatories
- Support amendments to existing or future international trade agreements that would specifically exempt: 1) water in its natural state and 2) multijurisdictional agreements to manage water withdrawals on the basis of protecting ecosystem functioning

The governments of the Great Lakes states and Ontario and Québec, in collaboration with local authorities, should develop and launch a coordinated basin-wide water conservation initiative, with quantified consumption reduction targets, specific target dates, and monitoring of the achievement of targets, to protect the integrity of the Great Lakes basin ecosystem.

INTERNATIONAL JOINT COMMISSION, PROTECTION OF THE WATERS OF THE GREAT LAKES, MARCH 2000

For full Action Agenda text and sources see www.glu.org

5 Protecting and Restoring Species

INVASIVE SPECIES

During the last century the Great Lakes suffered an onslaught of biological invasions. According to scientific reports, 162 non-native species have become established in the Great Lakes waters since the late 1800s, with dozens of additional invasive species identified as on the way. Today this assault shows every sign of worsening. Two scourges in Lake Erie – the increasing "dead zone" and the ongoing epidemic of avian botulism that has killed thousands of loons and other fish-eating birds – are both linked with exponential increases in invasive species like the quagga mussel and round goby. In addition to aquatic invaders, the long history of commerce in the Great Lakes region has contributed to the establishment of many terrestrial invasive species, including insects, plants, and bacterial and viral pathogens.

The impact and economic loss due to aquatic nuisance species is staggering. Attention must be focused on preventing the entry and establishment of these species.

RUSSELL LABARGE, GREAT LAKES CITIZEN HEARINGS, DETROIT, 1998

Aquatic invasive species enter the Great Lakes mainly through the discharge of the ballast water from ocean-going vessels. Other paths include the Chicago Sanitary and Ship Canal, and commerce in live fish for bait, aquariums, and food. Terrestrial invasive species enter the region through live plant importation and in wooden packaging.

Actions

All levels of government

- Ensure that navigation planning for the Great Lakes considers the potential for introducing and spreading aquatic invasive species.

- Modify navigation practices that facilitate aquatic invasive species introductions. For example, allowing foreign ships continued access to the Great Lakes has resulted in 36 of the 50 new invasive species established since 1959. The environmental costs for this access may far outweigh the economic benefits.

Federal

- Support reauthorization and full funding for the U.S. National Aquatic Invasive Species Act
- Support full funding for sea lamprey control through the Great Lakes Fishery Commission and support the commission's aggressive program to reduce the use of lampricides
- Support the International Joint Commission request for a reference to harmonize U.S. and Canadian ballast water management
- Conduct studies of the costs and benefits of biological separation of the Great Lakes and Mississippi River basins

U.S. FISH AND WILDLIFE SERVICE

- Support amendment of the Lacey Act to assess all imported species for potential invasiveness and permit their importation only if they are deemed harmless. Immediately ban the possession of live species in trade, such as the Asian carp and snakehead fish, that have already been deemed invasive
- Support rapid development and implementation of the Canadian National Plan on alien invasive species

- To minimize hitchhiking by invasive insects and pathogens, require that goods be shipped using non-wood pallets and packaging, and that imported plants come from certified nurseries that comply with clean-stock standards
- Impose a moratorium on new open fresh water aquaculture facilities until a valid method for environmental assessment has been established with public input

THREATENED SPECIES

The U.S. Department of Interior lists approximately 50 species as threatened or endangered in the Great Lakes states. Canada's Species at Risk Act lists 384 species at risk of extinction across Canada, 45 of which can be found in just one Great Lakes location: Lake St. Clair. These species are mainly at risk because of disappearing, fragmenting, or degrading habitat throughout the region.

Actions

✔ National protection legislation

- Implement Canada's Species at Risk Act: assure listing of all basin at-risk species by 2005, prepare recovery strategies and action plans for all listed species by 2007, and fully fund implementation
- Prevent any weakening of the U.S. Endangered Species Act, complete recovery plans for all nominated and listed basin species by 2007, and strengthen enforcement powers to deter and punish takings of listed species

✔ Public–private partnerships

Provincial, state, tribal

- Support partnerships among municipalities, conservancies, universities, and non-profit organizations to identify ecosystems with critical biological wealth at greatest risk by 2005, and implement strategies to protect these ecosystems by 2010

- Promote increased efforts to conserve biological wealth on private lands through landowner education and recognition, technical assistance, and purchase of easements that prevent intensive development

NATIVE FISH

Historically there were two native top predator fish species and about fifteen species of forage fish in the Great Lakes. Today, there are six top predator species, five of them non-native, and only two principal forage species, both non-native. These changes have resulted in a loss of ecological stability as well as lowered resistance in the system as a whole to further invasions and other ecological disturbances. The native fish of the Great Lakes are integral parts of the natural and cultural heritage of the region, enhance the stability of the lake ecosystem, and provide significant social and economic benefits to people. Management efforts should give high priority to enhancing and restoring native fisheries.

RAINBOW DARTER, CTR FOR GL AND AQUATIC SCIENCE

Actions

Ecosystem management

✔ *Federal, state, provincial, tribal*

- Develop integrated ecosystem management plans on a watershed basis using research by western science and Native scientists who apply traditional ecological knowledge. Ensure that all governments work in partnership to implement and enforce stewardship plans

- Assure that First Nations and Tribes are part of the approval, management and enforcement process for fishery management in their traditional territories
- Fund and implement restoration plans and programs for native fish species and aquatic communities, particularly species such as lake herring, deepwater ciscoes, deepwater sculpin and other native fish that currently receive less attention or are at risk. Increase efforts to assess the lake-wide distribution and population status of native species whose status is uncertain
- Use current State of the Lakes Ecosystem Conference objectives to help guide restoration of the Great Lakes fishery forage base (insects and bottom-dwelling animals)
- Increase funding for the U.S. State Wildlife Grant Program to levels commensurate with the immense need for wildlife and fishery protection and restoration

✔ Stocking and harvest

Federal, state, provincial, tribal

- Adjust stocking policies to prioritize the rehabilitation of native fish populations and to minimize negative impacts on native fish populations from stocking non-native sport fish
- Readjust Ontario's commercial fisheries zonings to maintain fish population stability
- Reduce lake trout mortality, which is as high as 90% in most areas of the Great Lakes, by addressing sea lamprey predation, commercial gill netting, and recreational fishing practices

For full ActionAgenda text and sources see www.glu.org

6 Protecting and Restoring Habitat

AQUATIC HABITATS

The Great Lakes basin is defined by its rich water resources and aquatic habitats – biologically rich coastal marshes, blue-ribbon trout streams, sparkling inland lakes, and small, isolated bogs. Aquatic habitats protect the health of this vast ecosystem by improving water quality, supporting fisheries, providing wildlife habitat, preventing damage from floods and erosion, and improving the quality of life of Great Lakes residents and visitors.

Mohawk people have always been water people, living by and off the St. Lawrence River. Once the Seaway pushed through, the waters became degraded, the fish disappeared. I am in a state of shock that the natural environment cannot provide us with the basics of life for us to survive on.

EVA JOHNSON, GREAT LAKES CITIZEN HEARINGS, MONTRÉAL 1998

The best estimates to date show that approximately two-thirds of the Great Lake basin's original wetlands have been lost, thousands of miles of river are impaired, and hundreds of miles of shoreline have been degraded. Immediate action is necessary to protect and restore the quality and quantity of aquatic habitats.

Actions

✔ Policy and regulations

Federal, state, provincial

- Amend existing wetland regulatory frameworks to ensure that all wetlands are protected, including isolated wetlands

- Oppose any weakening in the basic protections of the U.S. Clean Water Act, including proposed changes that would negatively affect headwater streams

State, provincial, regional, municipal

- Establish development setbacks and vegetated buffers sufficient to protect water quality and habitat from new development around all wetlands, lakes, rivers, streams, and Great Lakes shorelines
- Regulate storm water discharges to ensure that quality, quantity, and the hydrological cycle of receiving waters are not degraded

HERON © JOHN AND ANN MAHAN

✔ Restoration

All levels of government

- Increase the net wetland acreage in the Great Lakes basin by 1 million acres by the year 2025
- Restore natural hydrologic functioning by remediating unnatural runoff rates, removing dams where appropriate, managing locks and dams to restore natural water level fluctuations, removing groins and seawalls where possible, and softening hardened shorelines

✔ Research

All levels of government

- Identify priority areas for protection and restoration that will provide maximum benefits to the ecosystem, using, for example, the Nature Conservancy's "ecoregional" priority protection areas, the State of the Lakes Ecosystem Conference's "Biodiversity Investment Areas," various basin interconnected habitat initiatives (see page 41), and Indigenous community initiatives to determine priorities

- Identify improved methods of assessing the economic values of intact ecological systems

✔ Education

All levels of government

- Provide educational materials to developers and property owners explaining the value of aquatic resources in developments, ways to minimize impacts to those resources during development, and economic benefits of maintaining and featuring those resources
- Educate the general public about aquatic habitats in the Great Lakes Basin and encourage them to support protection and restoration efforts

FOREST HABITATS

Great Lakes basin forests play a special role in maintaining water quality as well as harboring much of the basin's biological diversity. Forests also play an important cultural and social role for human communities, supporting recreation, tourism, lumbering, and subsistence living. A century of regional industrialization and expanded land use has brought the forest to a point of crisis, with the last two decades drastically altering forest structure and species composition. The timber industry has been the cause of the most dramatic changes, with additional fragmentation caused by roads, utility corridors, and urban sprawl. The forests of Michigan, Wisconsin, Minnesota, Ontario and Québec are especially at risk.

Actions

✔ Public lands

Federal, state, provincial, tribal

- End commercial logging in U.S. National Forests by passing the National Forest Protection and Restoration Act

- Identify high-conservation-value forests, endangered forests, and wildlife corridors and exclude them from industrial forest use. Ensure that all land-use planning maintains conservation values
- Review and reform forest management regulations for public lands to ensure public participation, community benefits, and forest health. In Ontario an independent tribunal should publicly review the Class Environmental Assessment Approval

U.S. FOREST SERVICE

- Halt the introduction of invasive plant species and pathogens, and control existing terrestrial invaders
- Regulate and enforce limits on "all terrain vehicle" use. Limit ATVs to designated trails
- Severely limit the use of clear-cutting. Ensure timber-cutting levels are set substantially below the long-term sustainable yield of the forest. Omit inaccessible and inoperable areas, sensitive sites and protected areas from areas used to calculate annual allowable cut
- Ban the use of large-scale pesticide applications and severely restrict the use of pesticides in public forests.
- Maintain roadless areas as roadless, fund road decommissioning and monitor the effects of road decommissioning on the ecosystem
- Assess the efficacy of forest protection and restoration measures including best management practices, fisheries habitat projects, and road closures
- For provincial lands, strengthen the public role in

decision-making around timber sales, public access, and other resource issues. In the United States, maintain and strengthen public participation rights under the National Environmental Policy Act, Endangered Species Act, and other environmental laws

- Ensure that First Nations and Tribes are part of the approval, management and enforcement processes for forest plans and activities in their traditional territories

✔ Jobs and economy

Federal, state, provincial, tribal

- Create community funds to assist communities dependent on nonsustainable forestry in diversifying their economies. Emphasize profitable and sustainable private land stewardship, and low-impact recreation
- Research valuation of non-market and subsistence forest use

✔ Old growth and critical habitat protection

Federal, state, provincial, tribal

- Complete work to protect representative old growth forests in Ontario, Québec and Great Lakes states
- Link intact forest areas with connecting corridors
- Implement management practices to retain the characteristics of older-aged forest stands across the managed forest

SPRAWL

Sprawl occurs when urban development consumes land at a faster rate than the rate of population growth, resulting in more urban land being used per person and the loss of natural areas and farmlands. The Great Lakes Basin is among the most heavily urbanized ecosystems in North America. Since the end of World War II, sprawl has been the defining characteristic of urban development.

We need to use land and re-use buildings within existing urban boundaries to meet population growth needs. The solution to sprawl is integrating ecosystem-based land-use planning and sound transportation planning with the overall goal of limiting the footprint of urban development on natural and agricultural lands.

Actions

All levels of government

- Improve state/provincial land-use planning legislation to require urban growth boundaries with fixed twenty- to thirty-year terms, urban intensification through urban infill, and brown-and greyfield redevelopment. Existing urban natural areas should be protected as core areas for an expanded network of restored or recreated habitats in urban areas
- Make no investments in major new roadways or road expansions for ten years, or until each state/province completes a comprehensive smart-growth strategy, including a smart transportation network with a high priority on public transit

State, provincial, municipal

- Ensure that each Great Lakes state and province develops a package of financial anti-sprawl incentives sufficiently attractive to be taken up by municipalities, the development industry and individuals
- Direct major public investment in infrastructure and economic growth to existing urban areas
- Land use, tax, and insurance policies should support rural agricultural communities to remain in farming rather than be developed
- Assess land not in agricultural production for its usefulness as corridors for wildlife. Develop and implement a strategy to protect and enhance these corridors

HABITATS IN URBAN AREAS

Great Lakes basin urban centers owe much of their vitality to their proximity to water. Unfortunately, this water often has a legacy of contaminated sediments, altered shorelines, and unnecessary destruction of habitat. The reversal of the flow of the Chicago River, the many urban Areas of Concern, and the continued hardening of the Great Lakes shorelines illustrate the challenges facing ecological restoration in urban settings. Despite these challenges, portions of Great Lakes urban areas still function as habitat strongholds, and many more have potential for restoration and redevelopment into viable Great Lakes habitats.

Actions

✔ Urban shoreline management

Federal

- Ensure full financial support for the Great Lakes Coastal GAP analysis project, which will gather critical information on the distribution of Great Lakes nearshore habitats
- Reform U.S. Army Corps of Engineers' shoreline protection cost-benefit criteria to include substantial input from all affected communities and to account for the long-term ecological and economic effects of habitat disturbance and shoreline hardening

✔ Interjurisdictional coordination

Federal, state, provincial, municipal

- Provide agency support for community-led restoration planning initiatives for local resources on the model of initiatives such as Chicago Wilderness, a coalition of agencies, academic institutions and grassroots groups ensuring that municipal planning in Wisconsin, Illinois and Indiana incorporates habitat protection and restoration
- Expand U.S. EPA's American Heritage Rivers initiative and other programs that support local input on waterway planning and management

- Expand the U.S. Fish and Wildlife Service's Urban Conservation Treaty for Migratory Birds program to include more Great Lakes cities and increase habitat restoration and public involvement activities
- Support urban forestry programs such as Chicago's Treekeepers and Toronto's Backyard Tree Planting Program

✔ Remedial Action Plans

Federal

- Build on models like the U.S. Great Lakes Legacy Act to provide long-term federal funding for habitat-related improvement actions in Great Lakes Areas of Concern and St. Lawrence River Zones d'Intervention Prioritaire

State, provincial, municipal

- Arrange for long-term support for Public Advisory Committees or other community Remedial Action Plan networks to continue habitat recovery projects after cleanup has occurred

INTERCONNECTING HABITATS

Conservation initiatives must work at a geographic scale large enough to address the habitat needs of all native flora and fauna, including wide-ranging species such as large carnivores. There is an emerging scientific basis for defining the required spatial scale for long-term conservation and restoration efforts. In the context of global climate change, it is particularly important to maintain north-south connectivity for wildlife across the Great Lakes – St Lawrence River barrier. Both public and private lands have an important role to play. While public land typically encompasses the largest remaining patches of natural habitat, private land accounts for the majority of the land base.

There are at least eight major landscape conservation-connectivity initiatives in the Great Lakes basin, including the Algonquin to Adirondacks (involving Ontario and New York), Heart of the Continent (Michigan, Wisconsin,

Ontario, and Manitoba) and the Great Lakes Heritage Coast (Ontario) projects.

Actions

Federal, provincial, state, tribal

- Systematically review all existing and previous (discontinued) incentive and funding support programs for private land stewardship to determine which government interventions should be continued, discontinued, reinstated, created, or modified. NGOs, private land owners and other stakeholders must actively participate in such reviews

All levels of government and private funding community

- Develop strategies to sustain adequate long-term funding to landscape conservation initiatives. Individual funding needs are outlined in the profiles of each initiative in the full *Citizen's Action Agenda*.

State, provincial, municipal

- Provide adequate resources to ensure the proper identification of significant wetlands, woodlands, valleylands, fish and wildlife habitats and areas of natural and scientific interest, for the purposes of local and regional land use planning
- In Ontario revise the Planning Act to ensure that municipal land use decisions are bound by provincial policy and prohibit development in wetlands on the Canadian Shield south of the 45th parallel

The economic value of water coming off national forest land is much higher than the value of board feet of lumber that could be harvested from that land.

MICHAEL DOMBECK, FORMER CHIEF OF THE U.S. FOREST SERVICE, JUNE 2002

For full Action Agenda text and sources see www.glu.org

7 Water and Air Quality Standards

The Canada Water Act (1970), U.S. Clean Water Act (1972), the U.S. – Canada Great Lakes Water Quality Agreement (1972) and the banning of PCBs, DDT, and other pollutants all had profoundly positive effects on the Great Lakes. For example, levels of DDT in Great Lakes fish fell by more than 90 percent from the late 1960s to the 1990s, while phosphorus levels in Lake Erie declined by nearly the same percentage in the 1970s alone. As levels of bioaccumulative chemicals declined, populations of wildlife sensitive to them recovered.

Minnesota has 743 lakes with fish consumption advisories due to mercury pollution. That is 94 percent of the lakes tested.

DIANA MCKEOWN, GREAT LAKES CITIZEN HEARINGS, DULUTH, 1998

But these laws require constant monitoring, enforcement, upgrading of standards and expansion to other substances for permit limits to work the way they were supposed to – to yield us fishable and swimmable Great Lakes waters.

Actions

✔ International Agreements

Federal, state, provincial

- Fulfill the zero discharge commitments of the Great Lakes Water Quality Agreement for releases of persistent toxic substances. Add radionuclides like tritium and carbon-14 to the list of persistent toxic substances
- The U.S. should ratify and both countries implement the phase out timelines set out by the 2001 Stockholm Convention for twelve persistent organic pollutants (POPs)
- Fulfill requirements for reductions in transboundary

pollutants such as sulphur dioxide, ozone and fine particles under the U.S.-Canada Air Quality Agreement

- The U.S. should adopt the Kyoto Protocol and both countries take actions to meet and exceed the specific goals

✔ Toxic releases

Federal, state, provincial

- Develop and implement timetables for phasing out uses and releases of persistent toxic substances including highly toxic metals such as mercury, and radionuclides such as tritium and carbon-14. For mercury, mandate a phaseout of human-caused sources by 2020, and a reduction of those sources by 90 percent by 2010

WALPOLE ISLAND PROTESTS CHEMICAL DISCHARGES

- Strengthen the Clean Air Act to include mandatory caps on all (old and new) coal-fired power plant emissions of carbon dioxide, sulphur dioxide, nitrogen oxides and mercury (see Section 3)
- Revise industry toxic reporting requirements to include "use" as well as "release" of toxic substances, to lower reporting thresholds for highly toxic micro-pollutants, and to include facilities not currently required to report

✔ Standards

Federal, state, provincial, tribal

- Revise water and air quality standards to protect the most vulnerable, and to account for the cumulative and synergistic impacts of toxics in the environment

- Adopt strong, consistent sediment and groundwater quality standards that will prevent future contamination and protect fish, wildlife and people from the bioaccumulation of contaminants, including radionuclides

LAKE MICHIGAN FEDERATION

- Amend new substance permitting laws to use the precautionary principle and reverse onus (the proponent must prove a substance is not harmful) as the basis for decision making
- Adopt air emission standards to protect lakes and streams from air pollution that falls into water

✔ Monitoring and oversight

Federal, state, provincial

- Increase funding for monitoring toxic substances in the ecosystem and maintain monitoring programs over the long term for trends analysis
- Ensure that the Clean Water Act protects all waters of the United States as originally mandated, including isolated wetlands, headwater streams and groundwater.

✔ Sewage treatment

In many Great Lakes communities, sanitary sewer overflows and combined sewer overflows are a common occurrence, causing a danger to public health not only from bacteria exposure, but also from industrial and household chemicals that are released to public sewer systems. Provinces and states require municipalities to monitor and reduce the frequency at which sewer overflows occur, leaving municipalities to find the necessary funding for costly changes to wastewater treatment infrastructure.

Federal, provincial, state

- Increase funding to municipalities to eliminate untreated sewage overflows into Great Lakes waters by 2010
- Increase public outreach on the linkages between storm events, combined and sanitary sewer overflows and beach closings including mandatory notification of daily bacteria counts in all sewer overflow areas. Use prediction models to determine beach closures
- Create incentives for land use decisions that minimize storm water runoff, and impose disincentives for land uses that increase storm water runoff

Municipal

- Make proper maintenance of septic systems mandatory. Require property owners to obtain a septic system compliance certificate before property is sold
- Revise sewer use regulations on the principle that industries should treat their wastes on site, not through municipal sewage treatment plants which are not equipped to deal with many industrial wastes
- Develop consistent health-protective standards to limit land applications of sewage sludge

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

PRINCIPLE 15 OF THE RIO DECLARATION,
UN CONFERENCE ON ENVIRONMENT AND DEVELOPMENT, 1992

For full Action Agenda text and sources see www.glu.org

About the Writers

The Canadian Auto Workers is the largest private sector union in Canada, with a quarter of a million members working in most sectors of the economy. The CAW works to improve the core workplace issues of its members but increasingly bargains also in terms of their needs as members of families, communities, and the broader society. Accordingly, CAW has made environmental issues a bargaining priority and has made it mandatory for each local union to have an environment committee.

The Canadian Environmental Law Association is a non-profit, public interest organization established in 1970 to use existing laws to protect the environment and to advocate environmental law reforms. It is also a free legal advisory clinic for the public, and will act at hearings and in courts on behalf of citizens or citizens' groups who are otherwise unable to afford legal assistance.

The Canadian Parks and Wilderness Society is Canada's grassroots voice for wilderness. Founded in 1963, they have helped protect over 40 million hectares of Canada's most treasured wild places. CPAWS has eleven chapters and 20,000 active members across Canada.

Citizens for Renewable Energy is dedicated to accelerating the introduction and use of clean, renewable energy, thereby speeding up the phase-out of polluting fossil and nuclear energy production.

Clean Wisconsin is dedicated to protecting the environment and preserving the quality of life in Wisconsin through the enactment of progressive public policies, the enforcement of laws and the active participation of people.

Environmental Advocates of New York is the voice of New York State's environmental community —devoted to the protection of our magnificent state's wildlife, land and people. Environment Hamilton is a not-for-profit organization whose central mandate is to facilitate community environmental capacity building in the City of Hamilton. This mandate includes helping citizens to monitor the health of local ecosystems like Hamilton Harbour and its tributaries, and to take action to protect them.

The Federation of Ontario Naturalists champions Ontario's woodlands, wetlands and wildlife through research, education, and conservation action, and preserves essential habitat through its own system of nature reserves. FON is a charitable organization representing 25,000 members and supporters and 125 member groups across Ontario.

Great Lakes United is an international coalition of U.S., Canadian, and First Nations and tribal environmental, sport, union, and community groups dedicated to protecting and restoring the Great Lakes–St. Lawrence River ecosystem.

The Lake Michigan Federation, the oldest citizens' Great Lakes organization in North America, works to restore fish and wildlife habitat, conserve land and water, and eliminate toxics in the watershed of America's largest lake through education, research, law, science, economics, and strategic partnerships.

The Michigan Environmental Council provides a collective voice for the environment at the local, state and federal levels. Working with member groups and their collective membership of nearly 200,000 residents, MEC addresses the primary assaults on Michigan's environment, promotes alternatives to urban blight and suburban sprawl, advocates for a

sustainable environment and economy, protects Michigan's water legacy, promotes cleaner energy, and works to diminish environmental impacts on children's health.

The Michigan Land Use Institute works to help Michigan avoid patterns of suburban sprawl and over-development that cause traffic congestion, pollution, loss of community, rising costs to individuals and governments, and a deteriorating quality of life. The institute promotes an approach to economic development that strengthens communities and local economic self-reliance, protects the state's unmatched natural resources, and endeavors to look well beyond the "jobs vs. environment" debate.

The National Wildlife Federation Great Lakes field office works to protect the lakes from toxic pollution, out-of-control development and wasteful water use. They also provide people from all walks of life opportunities to enjoy this world-class resource.

Northwatch is the regional coalition of environmental and citizen organizations and individual members in northeastern Ontario. Northwatch is currently working to improve forest management, promote community involvement in mine monitoring and management, and prevent northeastern Ontario from becoming the receiving ground for foreign wastes, including Toronto's garbage, Ontario's biomedical waste, Canada's nuclear reactor fuel waste, and PCBs from around the world.

Northwoods Wilderness Recovery is a diverse consortium of concerned citizens throughout Michigan, Wisconsin, and Minnesota working to address the root causes of forest decline in the unique bioregion of the northern Great Lakes known as the Northwoods.

The Preservation of Agricultural Lands Society, founded in 1976, is devoted to protecting Ontario farmland from urban sprawl. They have won many victories in restraining urban boundaries with an emphasis on the unique fruitlands of the Niagara region.

The Sierra Club is the nation's oldest grassroots conservation group dedicated to protecting America's environment, for our families and for our future. The Sierra Club's Great Lakes Ecoregion Program works to turn back specific threats to the region. Based in Madison, Wisconsin, the Program has coordinated efforts for more than 20 years to protect the Great Lakes ecosystem from air, water and land pollution.

The Sierra Club of Canada works on environmental issues ranging from climate change and energy to toxic chemical contamination and loss of biodiversity. Active in Canada since 1969, they specifically address public policy and environmental awareness.

Tip of the Mitt Watershed Council is the lead organization for water resources protection in northern Michigan's Antrim, Charlevoix, Cheboygan, and Emmet Counties. A coalition of citizens, lake associations, businesses, and resorters, the Watershed Council works to maintain the environmental integrity and economic and aesthetic values of lakes, streams, wetlands, and ground water.

Trout Unlimited is a volunteer-driven, member-based conservation organization dedicated to educating the public on the importance of preventing the degradation of habitat and restoring and maintaining the natural flow of clean, fresh water. TU works with government agencies to put policies in place that benefit coldwater resources and ensure wise use of fresh water so that it will be enjoyed for generations to come.