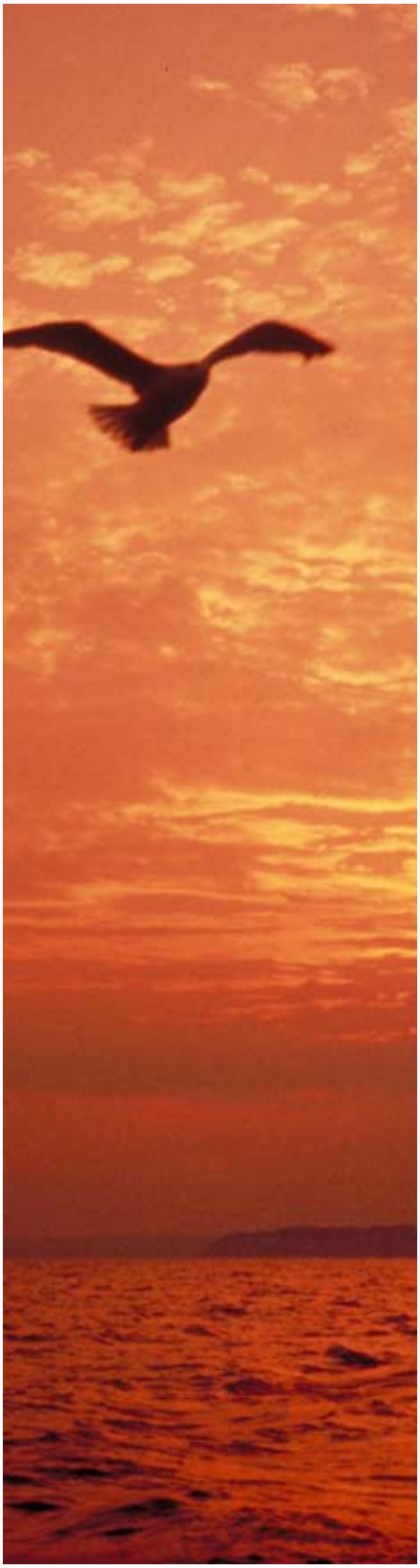
Great Lakes Blueprint:

A Canadian Vision for Protecting and Restoring the Great Lakes and St. Lawrence River Ecosystem.

September 2007



Source: Randall McCune (Michigan Travel Bureau)

BACKGROUND

The Great Lakes and St. Lawrence River have been the backbone of a thriving ecosystem for millennia, fostering a healthy, diverse, dynamic and complex ecosystem since retreating glaciers created them 14,000 years ago. For centuries, these waterways have been essential for the growth and survival of the communities along its shores. The last couple of centuries, however, have seen a steady decline in the environmental quality of the Great Lakes and St. Lawrence River. The economic and social prosperity that this ecosystem supplies has been taken for granted, and the lakes have suffered.

The lakes are now under threat. Tragically, the treasured biological system and source of drinking water to 40 million[1] has been polluted by industrial and commercial waste, municipal sewage, and surface runoff from cities and rural areas. The once thriving and diverse ecosystem has had much of its habitat destroyed or degraded and many of its species lost or displaced.

The indicators are all too evident. Populations of native plant and animal species are on the decline and the health of both wildlife and people is threatened by an increase in the number and quantity of toxic chemicals in fish.[2] Over 90 per cent of the pre-settlement wetlands have been lost along the Lake Huron/Lake Erie corridor because of agricultural and urban development. Water levels are dropping across the Great Lakes and St. Lawrence River, resulting in further loss of wetlands and exposure of contaminated sites on the lake bed.[3]

Invasive species arrive into our Great Lakes and St. Lawrence River ecosystem at a rate of about one every eight months.[4] At least 180 invasive species have become established in the lakes.[5] Since the opening of the St. Lawrence Seaway, most of these species arrived in ballast water releases from large ships. The most recent known invasive species in Lake Ontario is the deadly fish virus Viral Hemorrhagic Septicemia (VHS). Native fish such as lake trout and deepwater ciscoes have been extirpated or are suffering substantial declines in major parts of the Great Lakes.[6]

The causes of the crisis in the Great Lakes are clear. Consider:

- Twenty Great Lakes cities, representing just 30 per cent of the region's population, dump more than 90 billion litres of untreated sewage into the Great Lakes and St. Lawrence River each year. Some of the worst offenders are the Canadian cities of Toronto, Hamilton, and Windsor.[7]

- Canadian Great Lakes facilities emitted more than 1 billion kilograms of pollutants to the air in 2002 that are linked to smog, acid rain, respiratory illnesses and damage to children's development.[8] While air releases of pollutants from facilities in the United States have decreased between 1998 and 2002, emissions from facilities in Canada increased 3 per cent during that same time.[9] Facilities in the Great Lakes basin released over 5 million kilograms of pollutants directly into the water.[10]

- Unsuitable urban development spreads across coastal areas and inland, destroying habitat and dramatically adding to environmental stresses in the Great Lakes and St. Lawrence River ecosystem.

- Projections are that 3 million more people will live in the Lake Ontario's basin by 2030, most of whom will be at the western end of the basin.[11]

- Decreasing water levels in the Great Lakes are an increasing cause for concern. Water levels in Lakes Huron, Michigan, and Superior are well below normal, and Superior has surpassed the record low set in 1926.[12,13] While year-to-year water levels in the Great Lakes are the result of a delicate balance between inflows and outflows to rivers, evaporation to the air, and withdrawals for various human uses, we are ignoring this balance, forgetting that the Lakes are relics of the last ice age that cannot be replaced. Pressure to increase water withdrawals on the U.S. side of the Great Lakes would exacerbate this already serious situation.

Source: Great Lakes Fishery Commission

Historically, governments have on occasion worked together to make progress protecting the Great Lakes and St. Lawrence River ecosystem: addressing phosphorus loading in Lake Erie, for example, and reducing mercury releases throughout the ecosystem.The progress, however, is showing signs of backsliding, and previous accomplishments are fading (nitrogen loads are dangerously increasing and mercury deposition from air emissions continue to wreak havoc on ecosystems). Despite the multitude of threats to our Great Lakes and St. Lawrence River ecosystem, there lacks a strong commitment by Canadian governments at the federal, provincial and municipal levels to protect the basin. In the United States, there is a growing momentum by the federal government through initiatives such as the Great Lakes Regional Collaboration, which has resulted in federal bills that would earmark funding of US $20 billion from the federal government for Great Lakes clean up efforts. Canada's roughly $60 million dollar commitment in the 2007 Canada-Ontario Agreement shows little growth from previous commitments and falls far short of the ramped-up U.S. allocations for Great Lakes clean-up and protection.

One of the essential characteristics of policy-making regarding the Great Lakes and St. Lawrence River has historically been the bi-national collaborative efforts made by Canada and the United States. Unfortunately, in recent years, the United States has proceeded on its own to set the agenda for the Great Lakes. This is very much because Canada and Ontario have become weak partners, lacking a strong commitment and strong initiatives.[14] Jurisdictional squabbling and fragmentation of responsibilities have allowed governments in Canada to avoid action and pass the buck to other levels of government. Further delay will result in far more serious damage to the health of the Great Lakes ecosystem, and greatly increase the cost of addressing these issues in the future. We all have a personal responsibility to act now in order to leave the Great Lakes and St. Lawrence River in good healthy condition for our children.

Source: Michigan Travel Bureau

INTRODUCTION

The Great Lakes are a source of tremendous wealth, both environmental and economic. But we are learning that their resilience has its limits. Decades of neglect and constant threats have placed the environmental integrity of the lakes at the tipping point, and we must take action before it's too late.

This *Great Lakes Blueprint* details eight key priorities for protecting the Great Lakes and St. Lawrence River as a significant natural, cultural and economic entity. These priorities include recommendations on how all levels of government in Canada can restore and protect the Great Lakes, identifying needed improvements to policy and planning. The priorities fall under the following categories:

1. Improve Governance
2. Enable Effective Public Participation
3. Connect Water Quality and Quantity
4. Practice Ecosystem-based Stewardship
5. Eliminate Pollution
6. Upgrade Sewage Infrastructure
7. Halt Aquatic Invasive Species
8. Protect Water Levels and Flows

This blueprint has been created by the following organizations: Ecojustice, Environmental Defence, Canadian Environmental Law Association, Great Lakes United, Canadian Institute for Environmental Law and Policy and Sierra Club of Canada. The blueprint includes recommendations that have been made in numerous other documents and by many other groups.[15]

Canadian Environmental Law Association
L'Association canadienne du droit de l'environnement

Canadian Institute for Environmental Law and Policy
L'Institut canadien du droit et de la politique de l'environnement

ecojustice
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Great Lakes United

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1. IMPROVED GOVERNANCE

Weak governance by bi-national institutions, poor coordination among levels of government and lack of financial support from every level of government are major obstacles to improved stewardship of the Great Lakes and St. Lawrence River ecosystem. The following measures would address these problems:

Re-establish Government Leadership

While leadership must come from every level of government, it must come first from the Prime Minister and President by signing a renewed *Great Lakes Water Quality Agreement* (GLWQA). Such an agreement must include a new mechanism to register citizens' complaints, a citizen-initiated review process, and membership in advisory committees to bi-national institutions. A strong, independent voice for Great Lakes and St. Lawrence River stewardship must be established through a re-invigorated International Joint Commission (IJC). Finally, as the first peoples of this continent, the First Nations of the Great Lakes and St. Lawrence River region need to be involved in all aspects of Great Lakes governance, planning and management, including integration of traditional knowledge and practices into contemporary strategies.

Coordinate Government Efforts

Bi-national institutions must be provided with the resources and policies needed to enhance interaction among stakeholders and governments (e.g., Bi-national Executive Committee, Bi-national Toxics Strategy, State of the Lakes Ecosystem Conferences), strengthen commitments and improve public awareness. Specific commitments from the GLWQA and bi-national programs must be incorporated into domestic legislation and programmes (e.g., Canada-Ontario Agreement, St. Lawrence Action Plan, *Canadian Environmental Protection Act, Fisheries Act*, provincial Source Water Protection legislation, *Ontario Water Resources Act*, etc). In the absence of a federal commitment, provinces must develop strategies for dealing directly with states to respond to current and emerging threats, as was done, for example, in the Great Lakes Charter on water diversions and use.

Increase and Sustain Funding

Detailed estimates of the costs required to carry out the actions needed to restore and protect the Great Lakes and St. Lawrence River ecosystem must be compiled. Two billion dollars annually, split equally between the federal and Ontario governments, is required immediately as a baseline to ensure progress is made to protect and restore the Great Lakes, with the understanding that this funding will have to be increased as funded research initiatives elaborate on costs for specific measures.

Source: Karen Rodriguez (U.S. Environmental Protection Agency)

Source: Robert F. Beltran (U.S. Environmental Protection Agency)

2. ENABLE EFFECTIVE PUBLIC PARTICIPATION

The public has both a right and a responsibility to be part of the solution to the Great Lakes crisis. Strong public support and outreach is therefore key to restoration and protection of the ecosystem. Programs and plans must follow these three principles as they relate to public engagement:

Increase Transparency

The public needs to have access in a timely manner to all information pertaining to the health of the Great Lakes and efforts to restore and protect the ecosystem. Scientific data must be translated into information that is readily accessible and understood by decision-makers and local watershed groups. Transparency and accessibility must also be key features in the decision-making process. A Great Lakes office or government information service must make information readily accessible to the public.

Encourage Participation

Bi-national institutions must actively engage the public in decision-making and encourage government accountability. Measures to promote accountability must include a new mechanism for citizen complaints, a request for review process and public interest enforcement ability. Remediation and conservation efforts need to engage the public in the planning process. As a preliminary measure, support must be restored for many of the Public Advisory Committees (PACs) for the Remedial Action Plans (RAPs) in the Areas of Concern (AOCs).

Improve Education

Many of the programs to restore and conserve the Great Lakes require suitable public education as part of their implementation. Public attitudes toward the Great Lakes and St. Lawrence River and how people view the lakes within their daily lives will impact on how readily they will change their behaviour. Public education and outreach must be central components of every plan.

3. CONNECT WATER QUALITY AND QUANTITY

Water quality and quantity are fundamentally connected to one another and cannot be examined or managed in isolation from each other. For this reason, it is important that water management decision-making processes include the following objectives:

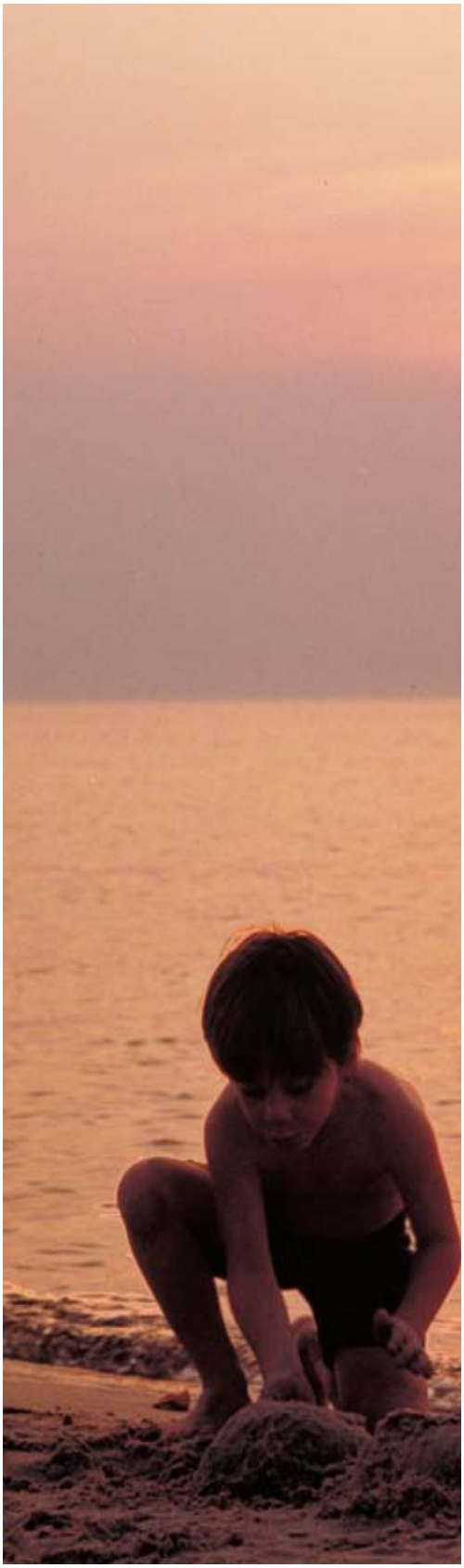
Conserve Water

Water conservation is critical to the long-term security and prosperity of the region, and contributes economic benefits to municipal water systems, water infrastructure and directly to the users. Further, water conservation can directly reduce the energy required to treat and transport water. Conservation now can buy time by increasing the resilience of the ecosystem long into the future. The 2005 *Great Lakes St. Lawrence River Basin Sustainable Water Resources Agreement* commits the provinces to creating conservation plans. These plans will need tangible targets and timetables to transform Great Lakes residents from the largest global wasters of water into true stewards.

Protect Source Water

Source water protection must be viewed as a preventive method of protecting local health and reducing the costs associated with water-borne illnesses. The Great Lakes and St. Lawrence River serve as a source of drinking water to almost 10 million in Canada and over 30 million residents in the United States.[16] It is important that regional source protection efforts respect and incorporate commitments under the Great Lakes agreements, and vice versa.

Elimination of toxic substances and addressing climate change are also crucial to protecting water quality. These issues are addressed in section 5 below.



Source: David Riecks (Indiana Sea Grant)

4. PRACTICE ECOSYSTEM-BASED STEWARDSHIP

Source: Ohio Sea Grant

The Great Lakes and St. Lawrence River themselves are an essential feature of a wider regional ecosystem whose complexity must be appreciated in all decision-making. This ecosystem includes all humans, animals and plants that live within the basin, as well as the soil, air and water that travels through the ecosystem's many natural cycles. Any policy or action taken within the basin must therefore:

Be Ecosystem and Basin-Wide in Scope and Must Include the St. Lawrence River

The Great Lakes are more than just the water they hold. They are directly and fundamentally linked to the surrounding watersheds and groundwater that provide the lakes with water. The watersheds themselves are complex interconnections of animals, plants, streams, groundwater, soil, topography and human land uses, all of which impact the lakes. These interactions cross political and physical boundaries and must therefore extend beyond the Great Lakes and rivers to include the basin-wide ecosystem.

In 2006, the International Joint Commission (IJC) recommended to the governments of the United States and Canada that an ecosystem approach be incorporated into the GLWQA. Similarly, the 2005 white paper "Prescription for Great Lakes Ecosystem Protection and Restoration," drafted by experts from both the United States and Canada to help guide Great Lakes remediation in the United States, stressed that an ecosystem conceptual model be used and that remediation efforts be basin wide.

Incorporate Adaptive Management and Follow the Precautionary Principle.

Well recognized in international environmental accords, the precautionary principle states that "if an activity raises threats of harm to human health or the environment, precautionary measures must be taken even if some cause-and-effect relationships are not fully established".[17] Lack of scientific certainty cannot be an excuse to justify inaction. With respect to the Great Lakes, the precautionary principle must be applied to: assessing and managing toxic chemicals; habitat protection; restoring water levels; protection from invasive species; and impacts of climate change. Adaptive management accepts that there will always be knowledge gaps related to the inherent complexity of ecosystems. It requires an iterative, participatory approach that involves continuous monitoring and adjustment of decisions as new knowledge becomes available. Adaptive management must be incorporated with the precautionary principle. If applied appropriately, the approach would prevent decisions or policies causing irreversible harm to the Great Lakes environment and its population.

Emphasize Species' Habitat Health as Part of Ecosystem-Based Planning.

The Great Lakes and St. Lawrence River are not only a source of drinking water to millions of humans; they also provide habitat to thousands of wildlife species. The survival of these species and the maintenance of biodiversity depend directly on the health of the Great Lakes. Threats to the Great Lakes and St. Lawrence River ecosystem can lead to significant loss in species and habitats. Significant attention and resources are required to ensure that threats that lead to species and habitat decline are eliminated.

5. ELIMINATE POLLUTION

Annually, over 625 million kilograms of pollutants are being released into the air, water and land from facilities located in the Great Lakes basin.[18] Many of these pollutants are considered toxic under the *Canadian Environmental Protection Act* (CEPA) and have been linked to health effects such as cancer, respiratory illnesses, and reproductive, neurological and developmental impairments. The federal and provincial governments need to re-commit to providing increased sustainable funding for the planning and implementation of strategies for the elimination of toxic substances in the Great Lakes. These efforts must include:

- Establish a toxic use reduction and elimination policy that includes a mandatory five-year plan for the elimination of toxic substances. Action plans must include mandatory pollution prevention strategies (industry-wide and site-specific) for facilities discharging substances into the Great Lakes and St. Lawrence River ecosystem. All chemicals that are toxic, persistent, bioaccumulative, endocrine disrupting, carcinogenic or pose particular threats to children's health and other vulnerable populations should be covered by these strategies. This framework would provide: a mechanism for identifying substances requiring further action (screening process); action plans for those specific substances; and target reduction levels for years 1, 2 and 3. The action plans must include five-year timelines for elimination of substances, mandatory pollution prevention plans, consideration and implementation of safe alternatives, extended producers' responsibility and enhanced right-to-know regimes.

- Establish timelines for the clean-up and delisting of Canadian Areas of Concern (AOCs) and Zones of Priority Intervention (ZIPs). There are 15 remaining AOCs located on the Canadian side of the Great Lakes, including those shared with the United States. Only two Canadian AOCs have been de-listed to date. Timelines must be set and funds provided for cleaning up the remaining AOCs. Twenty-three ZIPs have been identified in the part of the St. Lawrence River located within Quebec. Timelines must also be set for completing all actions in the ZIPs and appropriate funds must be allocated to complete these tasks. These timelines must be legally enforceable.

Source: U.S. National Park Service

Source: U.S. National Park Service

- Implement management strategies, including drinking water source protection, for agricultural pollution. Act on recommendation 12 of the Walkerton Inquiry by introducing minimum regulatory requirements for all agricultural activities – no matter what the size – that have an impact on water sources. Such strategies must require measurable results to be verified in a regular review.

- Phase out the use of antibiotics and hormones as animal growth promoters and review the use of preventive antibiotics in animal feed and animal manure management practices.

- Regulatory limits must be set on the concentration of radio-nuclides, and radio-active spent-fuel stockpiles on the shores of the Great Lakes must be removed.

- Establish a Great Lakes Institute for research, innovation and technical assistance that supports pollution prevention and toxic use reduction strategies, including elimination of toxic substances, application of safe substitution and clean technology for toxic chemicals (modelled after the Massachusetts Toxic Use Reduction Act).

- Establish a policy commitment by governments to conduct assessments and develop management strategies that effectively take into account the synergistic and cumulative impacts of pollutants found in the Great Lakes. This approach must be applied to substances from both point sources and non-point sources of pollution.

- Increase federal funding for scientific research on pharmaceuticals and personal care products in relation to surveillance and monitoring, environmental risks, ecological science, and human and wildlife health.

- Ensure that pollution prevention strategies applied to toxic waste and stockpiles of certain toxic substances do not include incinerating technologies, which are a major source of toxic chemicals in and of themselves.

- Require effective, annual reporting to the public on the type of use and emission levels of toxic chemicals and other pollutants from facilities in the Great Lakes and St. Lawrence River ecosystem. Ensure these are reported as total annual loadings with no minimum threshold for industrial facilities.

Address Climate Change

Global climate change is an underlying issue that will affect the Great Lakes now and in the future. Rising temperatures and changes in precipitation will have an impact on lake levels, temperature, salinity, eutrophication, microbial pollution and species habitat. Our energy choices in the Great Lakes now will influence climate change impacts and ecosystem and economic resilience in the future. Meaningful greenhouse gas reduction strategies must be pursued by all levels of government, including industrial emission targets that reduce the absolute volume of greenhouse gas emissions.

6. UPGRADE SEWAGE INFRASTRUCTURE

Municipal sewer systems across the Great Lakes release over 90 billion litres of untreated sewage annually into the lakes and rivers of the ecosystem.[19] This toxic cocktail includes industrial chemicals, pharmaceuticals and human waste. Raw sewage discharge contributes to fish consumption advisories, odour, visual filth and beach closings every year. In addition, runoff from roads, lawns and sidewalks collects contaminants and garbage into the storm sewers, often ending up directly in our streams, rivers and eventually lakes. There are viable solutions to these problems:

- Complete the development and promotion of a federal model sewer use by-law, as well as a national minimum standard for sewage treatment.

- Regulate and enforce consistent provincial standards for sewage treatment and combined sewer systems, including updating the provincial model sewer use by-law and requiring monitoring of toxics, pharmaceuticals and personal care product contaminants in sewage sludge. In addition, disposal of biosolids/sewage sludge must be subject to enforceable limits, with respect to land application and levels of toxic substances, pharmaceuticals and personal-care product contaminants.

- Provide a multi-billion dollar federal and provincial government investment to upgrade wastewater systems (to halt combined-sewage overflows) and existing sewage treatment facilities. As an early action step, the Ontario and federal governments must ensure that Great Lakes communities and municipalities in Areas of Concern have resources to update sewage treatment facilities, including upgrading all remaining primary sewage treatment plants and providing assistance to the most serious combined sewage problems. As part of this action, the province must act on the Walkerton Inquiry recommendations and ensure proper implementation of the *Sustainable Water and Sewage Systems Act*.

- Fully enforce recommendation 84 of Part Two of the Walkerton Inquiry by providing adequate financial assistance to small water systems that have explored all options for cost savings and remain economically unviable.

- Include sewage treatment plant upgrades in *Ontario's Safe Drinking Water Act*.

- Determine priority endocrine disruptors in sewage and industrial effluents. Review licensing of pharmaceuticals and other contaminants in personal care products, as well as effluent permits in that context. Support investment in municipal water treatment technologies that are capable of removing pharmaceuticals and personal care products.

- Municipal governments must show leadership for such actions as adopting provincial standards, approaching local industry and implementing pollution prevention plans, including a stronger commitment and support for the Great Lakes St. Lawrence Cities Initiative.

- Review and tighten the Municipal Industrial Strategy for Abatement (MISA), to inventory, report and address toxic pollution in municipal sewer systems from industrial sources.

- Develop and implement mechanisms for upstream toxic substance management (i.e. industrial capture, regulation of indirect discharges, pollution prevention strategies).

- Ensure mandatory public reporting of sewage discharges (spills, plant by-passes, combined sewer overflows) and non-compliance uncovered during mandatory inspections of drinking water systems.

7. HALT AQUATIC INVASIVE SPECIES

More than 180 invasive species are destroying the food chain, municipal and industrial infrastructure and the biological balance of the lakes. The cost of addressing damage from existing invasive species is estimated to be as much as $5 billion a year.[20] A least 65 per cent of aquatic invasive species – including the zebra muscle, round goby and the spiny water flea – have been brought in by ocean-vessels.[21] A range of actions must be taken to address this threat including:

Source: Anthony Ricciardi

- Make an immediate federal and provincial financial commitment, together with U.S. governments, to prevent the spread of Asian Carp.
- Amend the GLWQA so it becomes an additional mechanism for halting the import and spread of aquatic invasive species.
- Establish stricter federal regulations under the *Shipping Act*, to deal with Ocean-going vessel ballast water and sediment discharge from "no ballast on board" (NoBOB) ships, and apply federal pressure to U.S. state and federal governments for similar changes.
- Improve coordination and information sharing between the Great Lakes Fishery Commission and the provincial Ministry of Natural Resources to ensure that a comprehensive approach is being taken to protect the lakes against aquatic invasive species.
- Ontario must continue to press for federal leadership, but meanwhile, the province must initiate and reach agreement with Quebec and U.S. Great Lakes states on a standard for ballast water (ship) discharge and biological pollution, with the goal of preventing any inter-lake transport or introduction of non-native aquatic species by ocean-going or inter-lake vessels.
- Research Seaway trans-shipment and alternative freight options.

8. PROTECT WATER LEVELS AND FLOWS

While the Great Lakes represent 20 per cent of the world's freshwater, only 1 per cent of this water is renewed annually. This means that within the Great Lakes, 99 per cent of the water is non-renewable, a one-time gift from melting glaciers. Yet Canadians consume more water per capita than most countries in the world. Billions of litres of water are diverted from the Great Lakes every day by municipalities, industries, and agriculture, while dams and other physical barriers unsustainably manipulate the movement of water. Examples of large-scale manipulation of water flows include the dredging of the St. Clair River that has caused dramatic declines in water levels in the northern Great Lakes,[22] and the Chicago diversion, which redirects nearly 3 million litres of water per second from the Great Lakes basin to the Mississippi river.[23] Management of water levels and flows must be improved. An integrated and precautionary approach must be taken in order to protect the entire system. Conservation efforts must be stepped up, including the identification and elimination of inappropriate and nonessential uses of surface and groundwater. Areas that require action include:

- Strengthen federal government standards and support for water conservation and water soft path efforts (eg. waterless systems, greywater recycling). Financial support for municipal and agricultural infrastructure renewal must be contingent on effective water conservation and efficiency plans. Universal water metering is a fundamental component of any effort to conserve water and must be a requirement for any federal funds.

- Working with provincial governments and municipalities, the federal government must develop a national model building code with improved water conservation and reuse measures at every stage of construction for all types of buildings, including single-family and multi-unit residential, commercial, institutional and industrial. Based on the new building code, governments must develop a strategy to address water inefficiency in older buildings.

- Municipalities must initiate full-cost pricing for water supply systems to encourage more efficient water use and generate funds for effective water management, such as source protection. It is important that low-income Ontarians are protected under any pricing system. An effective municipal price structure must be based on volumetric use rather than

Source: U.S. National Parks Service

a flat rate and use an increasing block rate structure (where the per-unit rate charged increases with sequentially larger ranges of volumes used), rather than a uniform or decreasing block structure.

- Governments at every level should encourage the development of new and emerging products and services in agricultural, municipal and industrial sectors by phasing out outdated technologies (e.g., 13-litre toilets) and providing incentives for more efficient technologies. Invest in research for innovative technologies and implementation of strategies for behavioural change (community-based social marketing).

- The Ontario and Quebec governments must fully implement the Great Lakes St. Lawrence River Ecosystem Sustainable Water Resources Agreement, a bi-national agreement governing inter-basin water transfers. The two provincial governments must show leadership in the region to ensure out-of-basin diversions are prohibited with very strict exceptions.

- Governments must support and enhance the integrity and health of the headwaters to the Great Lakes and St. Lawrence River and institute strong land-use measures to protect the hydrologic integrity of the entire Great Lakes and St. Lawrence River ecosystem (e.g., the Greenbelt around Toronto) and adopt smart-growth strategies tied to hydrological carrying capacity. Nearshore areas, wetlands and tributaries under threat need to be identified, restored and protected in their natural state.

Source: U.S. Environmental Protection agency

- The federal government must improve the understanding of the hydrological systems in the Great Lakes and St. Lawrence River ecosystem and the impacts of global climate change on these systems. Appropriate government departments must closely monitor and maintain inventories of water budgets, water takings, and the characteristics of aquifers. Research resources must also be directed toward understanding climate change impacts on levels and flows, and the cumulative impacts of takings and transfers.

- All levels of government must protect costal habitats and wetlands as natural and cultural heritage systems. This must include a revival of the heritage coast strategy for Lake Superior.

- Aging water infrastructure accounts for about one third of water wastage in municipal systems. Plans to replace this infrastructure over time must be required of municipalities and implementation enabled through funding by the federal and provincial governments.

Source: iStockphoto (Great Lakes)

CONCLUSION

The Great Lakes and St. Lawrence River ecosystem provides so much for so many. Water to drink, food to eat, places to relax and play, a home for fish and other animals, beaches for swimming, open water for sailing and shipping, beautiful vistas, and a regional economy of $3.7 trillion, the third largest in the world behind the United States and Japan.[24] However, we squander this priceless resource when we use the Great Lakes as a place to put our sewage and dump our toxic waste. We waste our drinking water through inefficient and careless use. We treat the lakes as a commodity by artificially diverting water away from the basin. We open the lakes up to infiltration by physical and biological contaminants that threaten the unique character of the ecosystem. And we fail to fix the past damage we have done.

While collectively we understand the ramifications of our actions, and Canadians want to change, our governments have chosen to take only limited action. Instead they pass the buck treating the problems as if they were someone else's. Now that we have reached the tipping point, if governments don't act quickly, we are in jeopardy of losing what the lakes provide.

This document has outlined what actions the various levels of government need to take in order to start down the road to recovery. Governments must recognize the fundamental principles of proper management: strong and visionary governance; effective public participation; recognizing the interconnections between water quality and quantity; and ecosystem based management. At the same time, governments need to address a variety of priority areas, including: cleaning up and eliminating toxics while promoting clean production region-wide; addressing municipal sewage and infrastructure problems; eliminating invasive species; and improving water level and flow management.

The Great Lakes are a one-time gift from melting glaciers. If we continue down our current path and do not rectify our past mistakes, we will lose all of the great things they provide us with forever. All levels of government in Canada must take action so that our children can appreciate the resources of this true wonder of the world.

Source: iStockphoto (Great Lakes)

ACKNOWLEDGEMENTS

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PARTNERS

The Canadian Environmental Law Association (CELA) is a non-profit, public interest legal clinic established in 1970. CELA's mandate is to use existing laws to protect the environment and to advocate environmental law reforms, while giving primary recognition to the interests of low-income people and disadvantaged communities. CELA has focused on Great Lakes Issues for over three decades. Visit www.cela.ca

Since 1970, CIELAP has established itself as an independent, not-for-profit research and education organization providing leadership in the research and development of environmental law and policy, with an emphasis on emerging and neglected issues. Our work leads to policy recommendations that protect the environment and promote sustainability. Our reports are available at www.cielap.org

Ecojustice, formerly Sierra Legal, goes to court to defend the right of Canadians to a healthy environment. Our trusted voice in the courts enables citizens to expose lawbreakers and hold governments accountable. Since 1990, we have created lasting solutions to Canada's environmental problems by winning landmark victories and setting powerful precedents. For more information, please visit www.ecojustice.ca.

Environmental Defence protects the environment and human health. We research. We educate. We go to court when we have to. All in order to ensure clean air, safe food and thriving ecosystems. Nationwide. www.environmentaldefence.ca

Great Lakes United is an international coalition dedicated to preserving and restoring the Great Lakes-St. Lawrence River ecosystem. Founded in 1982, it is made up of member organizations representing environmentalists, conservationists, hunters and anglers, labour unions, community groups of the United Sates and Canada, and First Nations and Tribes. Together, we develop and promote effective policy initiatives, carry out education campaigns, and promote citizen action and grassroots leadership to ensure the health of the Great Lakes and St. Lawrence River for future generations. www.glu.org

Since 1963, the Sierra Club of Canada has played a leading role in environmental advocacy. Sierra Club of Canada is a national non-profit, volunteer organisation, with about 10,000 members, supporters and youth members all across Canada with 5 chapters in Ontario, British Columbia, the Prairie Provinces, Quebec, and Atlantic Canada. The protection of our freshwater resources has been a high priority of Sierra Club for over forty years. www.sierraclub.org

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