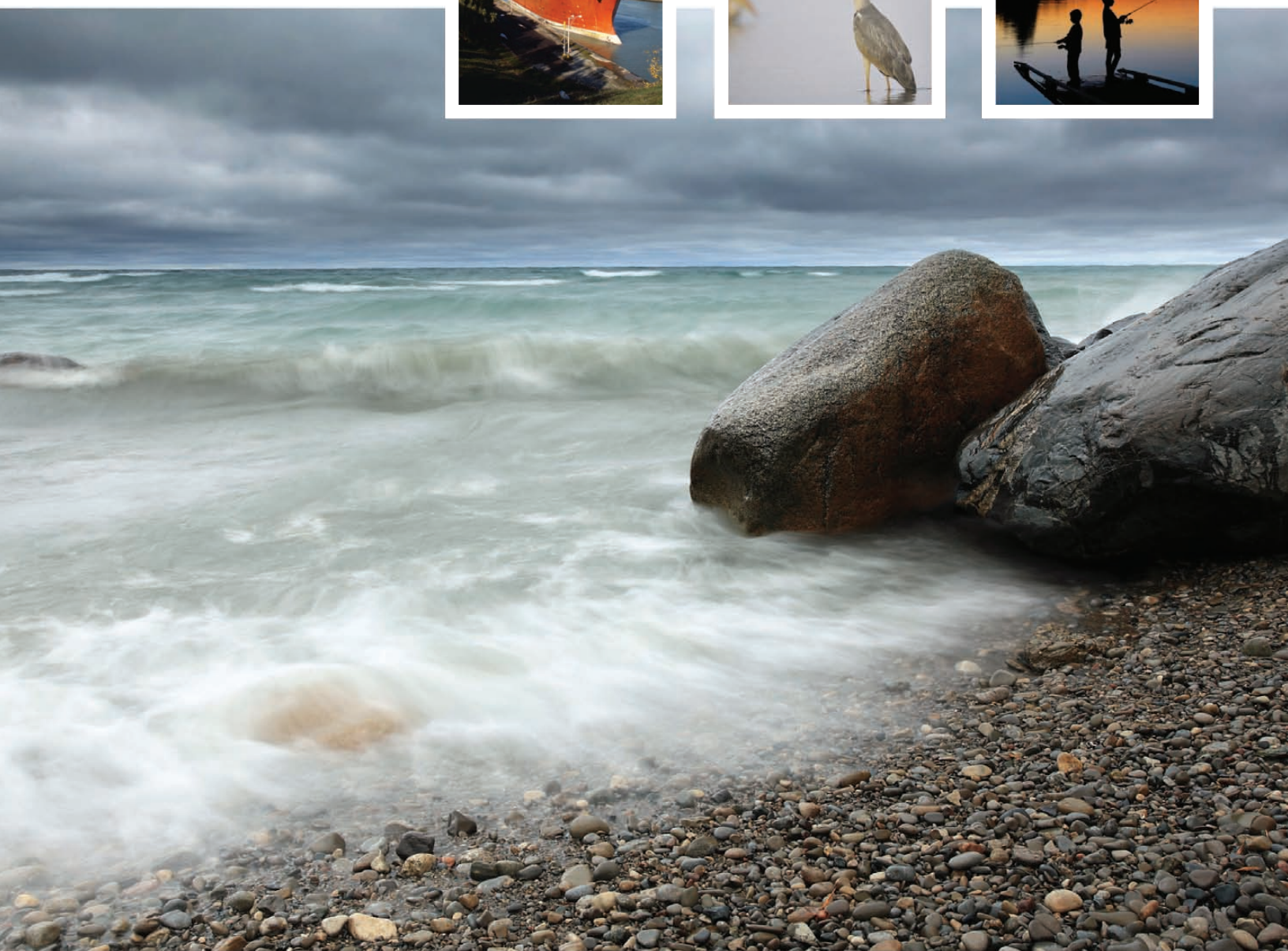
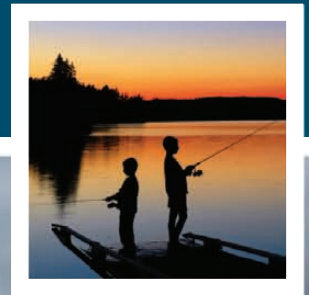
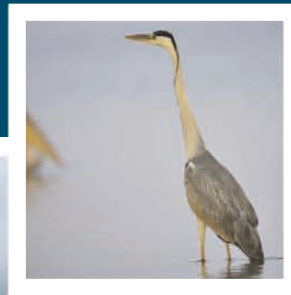


Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem

2007–2010 Progress Report



Canada

 Ontario

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Executive Summary

This interim progress report was prepared by the federal and provincial agencies that are party to the 2007-2011 *Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem* (COA), to document accomplishments and challenges to March 31, 2010. The report demonstrates that the COA party agencies are on track to complete 11 of 13 goals, 35 of 37 results, and 178 of 183 commitments under this COA. The agencies are working diligently to complete work on all commitments by the end of the Agreement. The COA is the mechanism by which Canada delivers on its obligations under the *Canada–United States Great Lakes Water Quality Agreement* (GLWQA).

The purpose of the COA is:

“To restore, protect and conserve the Great Lakes Basin Ecosystem in order to assist in achieving the vision of a healthy, prosperous and sustainable Basin Ecosystem for present and future generations.”

Canada and Ontario are proud of their individual and collaborative efforts to restore, protect and conserve the Great Lakes. However, despite the substantial progress that has taken place, both governments realize that there is a significant amount of work to be done. Currently, 14 of the original 17 Canadian Areas of Concern (AOCs) are still to be delisted; sediment-related issues remain in a number of hotspots; financial commitments to required infrastructure upgrades are competing with other pressures for public funding; the implementation of plans and strategies generated through COA efforts (e.g. fish management plans) and information management are ongoing challenges. Given the breadth and complexity of the work carried out on the Great Lakes, partnership is key to the success of the COA. Governments, signatory agencies, delivery partners, the general Great Lakes community, and the public have all played an essential role in the success achieved, and are needed to ensure further progress in the future. The list of COA delivery partners is extensive and impressive and includes municipal governments, landowners, Aboriginal peoples, conservation authorities, industry, academia, non-governmental organizations, our American neighbouring partners, and many other individuals across the Great Lakes Basin.

This progress report is a snapshot in time, taking stock of progress to March 31, 2010, while the COA agencies continue their work as stewards of the national treasure that is our Great Lakes.

Under the 2007–2011 COA, the current work plan encompasses over 850 projects led by 11 federal and provincial agencies. These projects include:

- Operation of AOCs and lakewide management offices
- Fish and habitat management plans
- Aquatic and terrestrial habitat restoration/rehabilitation
- Infrastructure prioritization and implementation
- Sediment analysis and management
- Biodiversity planning and implementation
- Fishery work
- Aquatic invasive species
- Environmental Farm Plans (EFPs) and best management practices
- Parks and park management
- Public education and outreach
- Great Lakes awareness and social change

Introduction

Canada and Ontario have worked together on Great Lakes issues since the first *Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem* (COA) was signed in 1971. Since that time, there have been six agreements focused on addressing issues in the Great Lakes Basin and meeting Canada’s commitments under the *Canada–United States Great Lakes Water Quality Agreement* (GLWQA). With each successive COA, the focus, complexity, and breadth of issues have grown.

The current COA provides a framework of 13 goals, 37 results, and 183 commitments. To meet these responsibilities, the governments, in combination with partners, have developed a detailed inter-agency work plan to achieve and track progress. This progress report is based on an assessment of the current work plan.

The assessment of COA achievements in this progress report is based on the following grading system:

-  **On track** – The projects underway to address the goal, result or commitment are “on track” to be completed during the 2007–2011 COA;
-  **Off track, but redeemable** – The projects underway to address the goal, result or commitment are “off track” and efforts are being focused to ensure completion during the 2007–2011 COA;
-  **Off track** – The projects underway to address the goal, result or commitment are “off track” and will not be met during the term of this COA.

With over 850 projects in the 2007–2011 COA work plan, it is difficult to cover the true breadth of the accomplishments of the COA agencies and their partners in a short summary report. Implementation, research, monitoring and reporting are all key deliverables of the COA. The following list provides examples of some of the work carried out by the agencies:

- Coordinate and deliver work plans in the remaining 14 Canadian AOCs
- Reduce harmful pollutants
- Develop and implement lake-specific management plans for each Great Lake
- Coordinate monitoring, research and information sharing
- Encourage stewardship actions to improve aquatic habitats and water quality
- Protect and restore habitat
- Rehabilitate aquatic native species in each Great Lake
- Control, monitor and assess the impacts of aquatic invasive species
- Encourage environmentally sound farming practices
- Conduct sediment assessments and remedial work in known hotspots
- Develop management plans for chemical substances in the Great Lakes Basin
- Assess the potential effects of climate change on the Great Lakes
- Assess and protect the Great Lakes as a source of drinking water
- Foster awareness and appreciation of the Great Lakes

Canada and Ontario look forward to continuing this important work to help restore, protect, and conserve the Great Lakes Basin Ecosystem throughout the term of this Agreement and beyond.

ANNEX 1

Areas of Concern



Photo: Ontario Ministry of Natural Resources - 2007 COA

I Preamble

Areas of Concern (AOCs) are locations identified in the 1987 amendment to the GLWQA where environmental quality is significantly degraded. To achieve the COA's vision of a healthy, prosperous, and sustainable Great Lakes Basin Ecosystem, it is necessary to restore environmental quality in these areas. Under the current COA, a concerted effort is being made by the governments, in partnership with local community organizations and citizens, to continue work to improve environmental conditions in all 14 remaining Canadian AOCs, and complete priority actions for delisting in three.

Agencies Leading Annex 1 Projects

AOC projects are led federally by Environment Canada (EC), Fisheries and Oceans Canada (DFO), Infrastructure Canada (INFC), and provincially by the Ontario Ministry of the Environment (MOE) and Ministry of Natural Resources (MNR).





GOAL 1:

Complete priority actions for delisting in four AOCs: Nipigon Bay, Jackfish Bay, Wheatley Harbour, and St. Lawrence River (Cornwall) AOCs.

Two of the AOCs targeted for delisting in this COA will meet that goal: Jackfish Bay and Wheatley Harbour.

Jackfish Bay is on track to complete priority actions by the end of this COA. The long-term monitoring plan for Jackfish Bay is being drafted, the Area in Recovery (AIR) Status Report is being prepared, and the local community has been involved in the process since 2008.

All priority actions have been completed in the Wheatley Harbour AOC. The Stage 3 Remedial Action Plan (RAP) Report determined that all of the beneficial use impairments (BUIs) were restored. The draft Stage 3 Report was issued for public review in spring 2009. The document was subsequently submitted to the International Joint Commission (IJC) for review and comment pursuant to Annex 2, Section 4(d)(iii) of the GLWQA. In its response, the IJC concluded “to the extent the RAP can have influence over local conditions, beneficial uses have been restored and Wheatley should no longer be considered an AOC.” The delisting of Wheatley Harbour as an AOC was announced on April 16, 2010.

Although the COA agencies have made progress in the Nipigon Bay, and St. Lawrence River (at Cornwall) AOCs, the goal of completing priority actions for their delisting will not be met.

The 2007 COA commitment for the Nipigon Bay AOC identified that Nipigon had one remaining remedial action to be implemented before this AOC could be delisted. The primary sewage treatment plant (STP) in the Township of Nipigon needed to be upgraded from a primary to a secondary treatment. The Township had successfully applied to the Canada-Ontario Municipal Infrastructure Fund in 2006 to proceed with the upgrade of their STP. Although the grant from the federal and provincial governments covered 90% of the estimated project cost, the tenders came back well above the expected costs. For this reason, the Township submitted an application to the new federal-provincial Building Canada Fund in November 2008. The application was successful, with funding secured in the summer of 2009, and construction on the upgrade of the STP initiated in April 2010. However, community input to the process has shown that the community considers there to be at least two other priority actions for delisting: 1) the upgrade of the nearby Red Rock primary STP and 2) the restoration of former Brook Trout habitat in Kama Creek. Red Rock has also been awarded federal and provincial funding to upgrade its STP, and is investigating its best option with respect to a new STP. MNR and EC have been working with local partners to identify and secure funding for the Kama Creek project. It is planned that MNR and EC will each contribute about one-third of the total cost to implement the restoration, with the other third to come from local groups. The Nipigon Bay AOC will not be delisted until all the actions described above have been completed and monitoring indicates that the delisting criteria have been achieved.

In the St. Lawrence (Cornwall) AOC, all priority actions for delisting have been implemented. The Stage 3 Report is being prepared on the results of monitoring efforts to determine whether the environmental challenges have been addressed successfully through the remedial actions.

◀ Goal 1 (cont'd)

Although all actions have been completed, there are still three beneficial uses that are considered impaired, as follows:

- **Consumption of fish:** Fish within the AOC still contain mercury levels that are moderately higher than levels in fish from upstream St. Lawrence River locations. All direct discharge sources of mercury to the AOC have ceased and the levels of mercury in fish are trending downwards.
- **Fish and wildlife habitat:** Fish and wildlife habitat goals have been difficult to achieve within this AOC because much of the land within the AOC is privately owned and considered high quality agricultural land.
- **Eutrophication or undesirable algae:** While the delisting criteria for this impairment is met within the off-shore main channel of the St. Lawrence River within the AOC, nearshore and AOC tributaries and tributary mouths are considered impaired due to excessive phosphorus levels. Considerable work has been completed and levels within the tributaries have been declining.

For these reasons, a decision has not yet been made on whether to recommend delisting, AIR status or continuation of RAP efforts to restore these remaining BUIs. Consultations with stakeholder organizations and groups and the public are on-going, following which a decision will be made.



RESULT 1.1 - Reduce microbial and other contaminants and excessive nutrients from industrial or municipal wastewater to achieve delisting targets in Nipigon Bay and St. Lawrence River (Cornwall) AOCs.

In 2009, Canada and Ontario committed infrastructure funds through the Building Canada Fund to upgrade the Cornwall wastewater treatment plant in the St. Lawrence AOC, and to upgrade the Nipigon and Red Rock wastewater treatment plants in the Nipigon Bay AOC. The upgraded plant in Nipigon is expected to come into service in 2011, while an in-service date has not yet been determined for the upgraded Red Rock plant. The upgraded secondary STP in Cornwall is expected to be completed and operational in 2014.



RESULT 1.2 - Reduce microbial and other contaminants and excessive nutrients from rural non-point sources to meet delisting criteria in the St. Lawrence River (Cornwall) AOC.

Continued work with COA partners in the St. Lawrence River AOC has addressed this priority action. Two initiatives have been undertaken to address non-point sources:

- Implementation of a Lake St. Francis/St. Lawrence River Tributary Restoration project (a multi-party project)
- Development and implementation of a septic re-inspection program and communal sewage evaluation program to address priority septic concerns in the AOC.



RESULT 1.3 - Contaminated sediment management strategies developed for the Wheatley Harbour AOC and implemented in the St. Lawrence River (Cornwall) AOC.

In both the Wheatley Harbour and St. Lawrence River AOCs, assessment and management of contaminated sediment sites has occurred. The following projects were implemented to address sediment issues in both communities:

- **Wheatley Harbour:** Investigations concluded that there are no active sources of polychlorinated biphenyls (PCBs) within the AOC, in the upstream watershed, or that enter the harbour from Lake Erie. It was determined that the historical sources of PCBs were from fish offal waste from the processing plants in the harbour, and that these sources have now been eliminated. Studies concluded that no active remediation of PCB contaminated sediments is required, as the PCBs are no longer bioavailable as a result of on-going natural sedimentation processes within the harbour, which have effectively covered any residual PCBs. The Stage 3 Report recommended that periodic monitoring be undertaken.
- **St. Lawrence River:** In 2005, EC and MOE, along with 14 partner agencies, finalized the Cornwall Sediment Strategy—a long-term management plan for historically contaminated sediments. The Strategy calls for continued natural recovery, administrative controls and long-term environmental monitoring. The Strategy's administrative controls protocol continues to be implemented collaboratively by EC, DFO, MOE, MNR, the Mohawk Council of Akwesasne, the Raisin Region Conservation Authority, and the City of Cornwall.



RESULT 1.4 - Plans in place and being implemented to rehabilitate fish and wildlife habitats and populations to meet delisting targets in the Wheatley Harbour and St. Lawrence River (Cornwall) AOCs.

Fish and wildlife habitat and population priority actions have been implemented in both AOCs.

Wheatley Harbour: Rural non-point source loading reductions, habitat stewardship projects, and priority wetland enhancements were successful in rehabilitating fish and wildlife habitats. Fish and wildlife populations within the AOC have recovered and are no longer impaired.

St. Lawrence River: Implementation of the Natural Heritage Strategy and Fisheries Management Plan for the AOC, key fish (Walleye) and wildlife (Osprey) monitoring programs, rehabilitation of habitat (Cooper Marsh), and overall fishery monitoring in both the St. Lawrence River and downstream Lake St. Francis has been undertaken and has resulted in increases in Osprey in the AOC.



RESULT 1.5 - Informed, effective collaboration amongst government, communities and individuals to prioritize and complete actions required for delisting and confirming environmental recovery in Nipigon Bay, Jackfish Bay, Wheatley Harbour, and St. Lawrence River (Cornwall) AOCs.

In each of the four Goal 1 AOCs, the COA agencies participate and consult with the local community to coordinate key RAP activities, develop and implement work plans, conduct assessments or studies, and provide outreach to the broader community. All efforts are focused on completing priority actions for delisting and confirming environmental recovery in each AOC.



RESULT 1.6 - Environmental monitoring and reporting to document improvements and track environmental recovery.

In each of the four Goal 1 AOCs, the federal and provincial governments, together with partners, have initiated monitoring programs and prepared documentation to show progress on the priority actions and restoration of the BUIs. The Wheatley Harbour Stage 3 Report was completed, reviewed by the public and the IJC, and finalized. The Jackfish Bay Stage 3/Area in Recovery (AIR) Report was issued for public review and comment in spring 2010. The St. Lawrence Stage 3/AIR Report is expected to be completed and issued for public review in winter 2011. The Nipigon Bay Stage 3 Report has been pushed back to 2012 owing to delays in the implementation of the upgrade to the Nipigon Bay STP.



GOAL 2:

Make significant progress towards Remedial Action Plan (RAP) implementation, environmental recovery and restoration of beneficial uses in the remaining eleven AOCs.

Significant progress on the remaining 11 AOCs has been made. The COA agencies and various local partners have worked together to restore BUIs in each AOC. The progress made through this COA, has built on years of progress made in previous agreements. Examples of priority actions completed include:

- Monitoring of fish health effects in AOCs
- Contaminated sediment remediation work in the Detroit River, Bay of Quinte, and Niagara River AOCs
- Stormwater Management/Pollution Prevention and Control Plan for Bay of Quinte municipalities

More details on progress made in the 11 Goal 2 AOCs are listed below.



RESULT 2.1 - Reduce microbial and other contaminants from municipal sewage treatment plants, combined sewer overflows, urban stormwater and industrial wastewater towards delisting targets in St. Marys River, St. Clair River, Detroit River, Niagara River, Hamilton Harbour, Toronto and Region, and Bay of Quinte AOCs.

The COA agencies, working with their partners in these AOCs, achieved considerable progress through supporting projects such as the Sugar Island Monitoring Workgroup; the development of pollution prevention and control planning; environmental assessments for sewage treatment plant upgrades; combined sewer overflow (CSO) and stormwater pilot projects; and science-based studies on enhanced wastewater technology and optimization techniques. There are currently 28 projects under the work plan started, or planned to deliver, on the reduction of microbial and other contaminants. The agencies with a primary role overseeing these projects are EC, INFC and MOE.



RESULT 2.2 - Reduce microbial and other contaminants and excessive nutrients from rural non-point sources towards achieving RAP delisting criteria in St. Clair River, Detroit River, Niagara River, Hamilton Harbour, and Toronto and Region AOCs.

There are both basinwide and AOC-specific projects in the COA work plan to address non-point source pollution in these AOCs. Rural clean water programs, non-point source education and stewardship initiatives, habitat restoration work, and the Canada-Ontario Environmental Farm Plan (EFP) are all examples of initiatives that are in place to address this important result under the COA.



RESULT 2.3 - Progress made in developing sediment management strategies to reduce ecological and human health risk from contaminated sediments in Thunder Bay, Peninsula Harbour, St. Marys River, St. Clair River, Detroit River, Niagara River, Hamilton Harbour, Port Hope and Bay of Quinte AOCs.

The governments have focused significant efforts on the study, monitoring, planning, assessment, management and remediation of sediment projects in the identified AOCs. In each case, continued effort to make significant progress on the sediment challenges is ongoing. In some cases, like Turkey Creek in the Detroit River AOC, the contaminated sediments have been removed and the site remediated. In the Bay of Quinte and Niagara River (Lyons Creek East) AOCs, natural, monitored recovery was selected as the preferred sediment management strategy. In the Peninsula Harbour AOC, in 2008, EC and MOE selected thin-layer capping of a 20.4 hectare area as the preferred option to manage the contaminated sediment and reduce the associated environmental and human health risks. The project design specifications for Peninsula Harbour have been completed. In the Hamilton Harbour AOC, the project design has been completed and the environmental assessment for the Randle Reef project will be completed within this COA. Both the federal and provincial governments have committed \$30 million each for the implementation of the Randle Reef project and are seeking an equivalent level of support from local stakeholders.

While good progress has been made in developing contaminated sediment management plans for Peninsula Harbour, Detroit River, Niagara River and Bay of Quinte, the development of management strategies for Thunder Bay, St. Clair River, and St. Marys River have slowed. This is due to the determination that the sediment in Thunder Bay is more complex and difficult to manage than initially thought, and the contaminated sediments are likely more extensive in St. Clair River and St. Marys River. Sediment management strategies for these AOCs are not expected until 2011–2012.

As for the Port Hope AOC, the Port Hope Project has received a licence from the Canadian Nuclear Safety Commission (CNSC). Once the holdpoints in the licence are met, the Project will have regulatory approval to proceed with the construction of an engineered above-ground, long-term waste management facility, and the cleanup of low-level radioactive waste sites which include harbour sediments. The Project is expected to go before the CNSC again in mid-2011.



RESULT 2.4 - Long-term management plans being developed and priority actions for delisting being implemented for rehabilitation and protection of fish and wildlife habitats and populations in St. Marys River, St. Clair River, Detroit River, Niagara River, Hamilton Harbour, Toronto and Region, and Bay of Quinte AOCs.

The partners and agencies delivering the COA have led projects addressing both fish and wildlife habitat in each of the identified AOCs. Habitat work involves the efforts of many COA agencies, and includes projects such as:

- Fish community and habitat assessments
- Habitat mapping and survey work
- Fish barrier mitigation
- In-stream habitat rehabilitation
- Greenspace corridor evaluations
- Fish habitat management planning and wildlife restoration planning
- Habitat stewardship projects implemented to encourage public involvement in restoration activities
- Focused habitat restoration efforts for core species like sturgeon, herring and whitefish

Some examples of on-the-ground actions include:

- **Fighting Island (Detroit River) Spawning Shoal:** A 150-metre-long artificial spawning shoal off the shoreline of Fighting Island near Windsor was constructed to help the Lake Sturgeon return to the Detroit River. Partners in this project included: BASF Corporation, DTE Energy, Detroit River Canadian Cleanup, EC, DFO, MNR, Essex Region Conservation Authority, International Wildlife Refuge Alliance, Landmark Engineers Inc., Michigan Department of Natural Resources, Michigan Sea Grant, Michigan Wildlife Conservancy, National Fish and Wildlife Foundation, Ontario Great Lakes Renewal Foundation, U.S. Fish and Wildlife Service, U.S. Geological Survey, and Wildlife Habitat Council.
- **Cooper Marsh – Wetland Rehabilitation:** The creation of channels and ponds has led to increased plant, fish and wildlife diversity in Cooper Marsh. These efforts were completed in partnership with the Raisin River Conservation Authority, Ducks Unlimited Canada, DFO and MNR.
- **The Moon River Walleye and Lake Sturgeon Spawning Habitat Rehabilitation Project:** A three-year project that supports the rehabilitation of Lake Sturgeon and Walleye through the creation of spawning habitat at an important spawning location. Over 1100 tonnes of rock was added to make 1500 square metres of new spawning habitat for Walleye and Lake Sturgeon in Moon River near Parry Sound. Delivery partners include the Eastern Georgian Bay Stewardship Council, Ontario Power Generation and MNR.
- **In-stream Barriers Mitigated for Stream Habitat Rehabilitation in the Toronto AOC Project:** A three-year project that will make significant progress toward re-linking Lake Ontario to the fish habitats available in the Humber River watershed. Barrier mitigation in the lower Humber watershed for fish migration/passage includes notching weirs. Delivery partners include Ontario Streams, Toronto and Region Conservation Authority, Ontario Federation of Anglers and Hunters, EC and MNR.





RESULT 2.5 - Informed, effective collaboration amongst government, communities and individuals to prioritize and complete actions required for delisting and confirming environmental recovery in AOCs.

The agencies responsible for delivering on the COA are actively involved with the appropriate stakeholders and interest groups in the AOC process. Projects under this result include RAP committee coordination; support of public advisory councils (where applicable); direct public consultations; support of community watershed work; the engagement of First Nations; progress reporting on RAPs; and technology transfer workshops.



RESULT 2.6 - Identify monitoring needs, undertake required studies and evaluate results to assess environmental recovery and support remediation strategies in AOCs.

The agencies conduct significant monitoring and scientific study in the Canadian AOCs. Much of this work includes: monitoring programs to address specific needs; general monitoring of BUIs; refinement of BUI targets/criteria; ecosystem modelling on an AOC scale; food web studies; wildlife health assessments; delisting/progress updates; sportfish contaminant monitoring; long-term monitoring plans; and monitoring programs in key tributaries. All AOCs have some form of scientific monitoring or assessment study specifically designed to meet the needs of the remedial process within the AOC.

ANNEX 2

Harmful Pollutants



II Preamble

The Harmful Pollutants Annex addresses both past (legacy) and ongoing sources of pollution in the Great Lakes Basin through federal and provincial commitments to reduce releases to the air, land and water. This work is supported by research and technology initiatives within the Annex, which provide information on the sources, fate and impacts of harmful pollutants on human health and the environment.

Agencies Leading Annex 2 Projects

Harmful pollutant projects are led federally by Environment Canada (EC), Agriculture and Agri-Food Canada (AAFC), and Health Canada (HC), and provincially by the Ontario Ministry of the Environment (MOE) and the Ministry of Agriculture, Food and Rural Affairs (OMAFRA).



GOAL 1:

Continue progress toward virtual elimination of persistent bioaccumulative toxic substances.

Actions under this COA continue to address persistent, bioaccumulative and toxic (COA Tier 1) substances. Many of these substances have been banned, and significant progress has been achieved in the reduction of the rest towards the ultimate goal of virtual elimination. Based on current estimates, COA interim reduction targets for 2011 have been met for PCBs, mercury, dioxins and furans, hexachlorobenzene (HCB) and benzo(a)pyrene (B(a)P).



RESULT 1.1 - Reduction in releases of Tier 1 substances beyond the 2005 achievements towards the goal of virtual elimination.

The COA focuses on the virtual elimination of persistent toxic substances (Tier 1 substances) such as PCBs, mercury, dioxins and furans, HCB and (B(a)P).

The COA agencies have achieved their 90% reduction target for the destruction of high-level in-storage PCBs, and estimate that 70% of the in-service use of PCBs has been eliminated. The COA has also met the mercury target of a 90% reduction in releases compared to 1988 inventories. Dioxins and furans have been reduced by 230 grams toxic equivalent (TEQ) since 1988. This represents a 90% reduction, which is the COA 2011 reduction target. The agencies will continue to improve on and quantify dioxin and furan inventories. Releases of HCB and B(a)P have been reduced by 71% and 53%, respectively, since 1988. B(a)P levels are slightly lower than the previous reduction percentage, in that industrial release estimates have been increasing slightly due to higher measured emissions.

Key projects in the current COA include diversion of mercury-containing products from the waste stream (including thermostats and fluorescent lights); promotion of the new federal PCB regulations; and work with stakeholders on best management practices for reducing releases. For example, B(a)P releases from wood stoves were addressed through workshops conducted for municipal leaders and fire departments on the Model Municipal By-Law for Regulating Wood-burning Appliances. The workshops provided information and ideas on developing by-laws to address constituents' concerns related to the emission of harmful pollutants. Additionally, a study was conducted to review emissions factors from U.S. EPA certified wood stoves.

**GOAL 2:****Reduce other harmful pollutants and initiate a program for managing chemical substances for the Great Lakes Basin.**

The reduction of other harmful pollutants (e.g. Tier 2 substances and substances of emerging concern) is a significant task. For this COA, the agencies have coordinated their Great Lakes initiatives with the broader programs of the federal and provincial governments that are addressing substances of concern in air, surface water and wastewater. For example, the agencies are reviewing substances prioritized through the federal Chemicals Management Plan (CMP) for potential action within the basin; and Ontario's Toxics Reduction Strategy includes elements of toxics reduction planning, public reporting and education that reflect the commitments within the COA for the sound management of chemicals. Although considerable efforts have been made under these programs to reduce harmful pollutants, Canada and Ontario agree that more focused collaborative effort is required to inform and respond to issues specific to the Great Lakes.

**RESULT 2.1 - Reduction in releases of Criteria Air Pollutants.**

The COA agencies continue to work on the *Canada–U.S. Air Quality Agreement*, Ontario's air pollution reduction commitments, and the Canada-wide Standards for Particulate Matter and Ozone. Interactions with other agencies and jurisdictions on transboundary air pollution continue to address air and depositional issues in the region.

Progress on small-medium enterprise (SME) agreements is challenging and the agencies are looking to focus on this important commitment in the remainder of the COA. The federal government is continuing the pilot project on heavy diesel vehicle retrofits with different municipalities and school boards in Ontario. The Ontario government is carrying out studies on selected industrial sectors (wood and iron/steel) that provide technical support to regulatory measures to reduce toxics and inform program development on reducing smog precursors. As of 2007, estimated reductions of nitrogen oxide (NO_x) and volatile organic compounds (VOC) emissions (based on 1990 baselines) were 34% and 45%, respectively, compared to targets of 45% by 2015. It should be noted that EC continues to revise the baseline to reflect new science, and this may result in changes to our performance relative to the percentage target. Our goal of achieving a 50% reduction in sulphur dioxide (SO₂) emissions from Ontario's Countdown Acid Rain limit by 2015 has been met.

**RESULT 2.2 - Coordinated activities to reduce releases from municipal wastewater.**

Ontario and Canada have been participating in the Canadian Council of Ministers of the Environment (CCME) Canada-wide Strategy for the Management of Municipal Wastewater Effluent. The Canada-wide Strategy discussion is complete, and was endorsed by the CCME in February 2009. The COA agencies are implementing policies and programs to address wastewater

effluent commitments under the Canada-wide Strategy. Environment Canada has now published its proposed Wastewater Systems Effluent Regulations under the *Fisheries Act* in the *Canada Gazette, Part I*, March 2010, as the federal action to implement the CCME Strategy.

Federal and provincial agencies, along with their partners, are also addressing harmful pollutants present in wastewater and sewage biosolids through several scientific and technical projects. These projects include a review of industrial processes to identify pollution prevention opportunities for industries discharging to the sewer system, as well as best management practices for the application of biosolids to agricultural land. Research includes evaluating the effects of harmful pollutants in municipal wastewater on fish, freshwater invertebrates, plants and algae, and the potential endocrine disrupting activity of municipal wastewater effluent. This work has involved multiple jurisdictions, various stakeholders and academia.



RESULT 2.3 - Develop and initiate a program for the sound management of chemical substances in the Great Lakes Basin.

Through the federal CMP and the provincial Toxics Reduction Strategy, the federal and provincial governments are addressing harmful pollutants in the Great Lakes Basin and promoting principles of sound management of chemicals.

Through the CMP, the federal government continues to assess priority chemicals for potential risks to human health and the environment and is identifying chemicals within the Great Lakes Basin for priority action.

In June 2009, the Ontario government introduced the *Toxics Reduction Act*, which focuses on reducing the use and creation of toxic substances as inputs to industrial processes in manufacturing and mineral processing. The Act requires regulated facilities in Ontario to track and quantify the prescribed toxic substances they use, create and release, to develop a plan to reduce these substances and to make summaries of their plans and reports available to the public.

This new approach complements existing “end of pipe” regulations and will not only benefit the environment, but encourage new ways of doing business, and better position companies in Ontario for the green economy.

Federal and provincial chemicals management programs are linked through the COA, and support the development of binational priorities for voluntary reduction actions currently in progress under the Great Lakes Binational Toxics Strategy (GLBTS). Some Great Lakes-specific actions delivered through the GLBTS are on hold pending GLWQA negotiations and related Canada–Ontario discussions.

Other initiatives under this result focus on agricultural chemicals use, through a survey of pesticide use and a program for the collection and disposal of unwanted agricultural pesticides and pharmaceuticals in the Great Lakes Basin.





GOAL 3:

Enhance knowledge regarding harmful pollutants for the development of policies and programs to further reduce releases and mitigate risk.

The COA agencies are conducting or supporting research and monitoring of harmful pollutants in the Great Lakes Basin in order to assess their sources, fate and impacts on human and environmental health, and to support federal and provincial policies and programs. Additionally, a number of initiatives were implemented to enhance understanding of the links between human health and environmental quality.



RESULT 3.1 - Improved understanding of the sources, fate and impacts of harmful pollutants in the Great Lakes Basin.

Research and monitoring informs the development of policies and programs to address harmful pollutants in the Great Lakes Basin. Examples of studies carried out, or supported, by the federal and provincial agencies include:

- Identification of the sources, and development of an inventory of the use and disposal or emissions of Tier 1 pollutants in the Great Lakes Basin in air, water and soil
- Initiation of a hazard review of harmful pollutants monitored in Great Lakes waters, biota and/or sediments to identify candidates for Great Lakes programming under the COA
- Development, improvement, and trials of models to predict and quantify the impact of the long-range transport of toxic substances from continental and world-wide sources into the Great Lakes
- Identification of global sources of airborne substances contributing to pollution in the Great Lakes
- Development of new analytical methods for the detection and measurement of priority and emerging pollutants in water, sediment, sewage effluent, sewage sludge and biosolids
- Monitoring the presence and concentrations of emerging pollutants in water, sediment and air, for example, through a Canada-wide pilot survey of 20 STPs across Canada, which monitors the occurrence and fate of pharmaceuticals and personal care products in municipal wastewater
- Study to identify the influence of groundwater quality and quantity on harmful pollutant loadings into the Great Lakes

Examples of other COA studies can be viewed on EC's National Water Research Institute website at www.ec.gc.ca/inre-nwri/ or the Ontario Ministry of the Environment website at www.ene.gov.on.ca/en/water/greatlakes/coa/index.php.



RESULT 3.2 - Human health risks from harmful pollutants are understood and addressed in the Great Lakes Basin.

Work on the link between the environment and human health is an important part of the work plan for this COA. Development of a national health science framework is underway by HC, which will identify the critical issues, key stakeholders, and the roles played by each to achieve progress in this area.

COA provincial funds have supported a number of initiatives addressing environmental health in the Great Lakes Basin, including scoping environmental health information and service needs to collect and disseminate information linking environmental quality to human health; delivery of workshops for health care practitioners to increase understanding of environmental factors that influence children's health; and support for the Great Lakes Basin sites of the Maternal Infant Research on Environmental Chemicals study which is evaluating exposure of mothers and their babies to environmental chemicals.

The Great Lakes Public Health Network (started in the 2002–2007 COA), continues to be a credible and reliable environmental health information resource for public health practitioners at the municipal, provincial, and federal level. As well, membership has expanded to include U.S. Great Lakes Human Health Network (GLHHN) members.

A health science framework is under development to guide and facilitate health science activities undertaken by researchers and other health scientists. The framework will address health risks from Great Lakes food sources, drinking water, recreation exposures, and climate change.

EC has also convened a Great Lakes Chemical Priorities Working Group which has developed and tested a framework for identifying Canada's Great Lakes chemical priorities for action. This framework, once finalized, will be used to prioritize chemical action by the federal government.

ANNEX 3

Lake and Basin Sustainability



Photo courtesy of shutterstock.com

III Preamble

Lakewide management is an ecosystem approach to protecting the Great Lakes that addresses issues on a lake-specific basis. Federal, state, and provincial agencies in Canada and the United States work cooperatively to develop plans to restore and protect each lake, and lead the implementation of those plans with support from the Great Lakes community. Through the COA, the federal and provincial governments coordinate Canada's contribution to this binational effort. Annex 3 focuses attention on stewardship of land and aquatic resources, and encourages integration of stewardship practices into everyday activities. It includes commitments to promote sustainable lifestyles, reduce pollutants, restore and protect fish and wildlife species and habitat, and address issues of aquatic invasive species.

Annex 3 of the 2007–2011 COA contains new areas of cooperation, including protecting sources of drinking water, understanding the impacts of climate change, and encouraging sustainable use of land, water and other natural resources.

Agencies Leading Annex 3 Projects

Lake and basin sustainability projects are led federally by Environment Canada (EC), Agriculture and Agri-Food Canada (AAFC), Fisheries and Oceans Canada (DFO), Infrastructure Canada (INFC), Natural Resources Canada (NRCan), Parks Canada Agency (PCA), and Transport Canada (TC), and provincially by the Ontario Ministry of the Environment (MOE), the Ministry of Natural Resources (MNR), and the Ministry of Agriculture, Food and Rural Affairs (OMAFRA).



GOAL 1:

Encourage and enhance Great Lakes sustainability to achieve social, economic and aquatic ecosystem well-being.

The COA work plan has a number of projects and initiatives aimed at making this goal a success, including:

- The adoption of environmentally responsible farm practices through the EFP, and associated cost-share funding such as the Canada-Ontario Farm Stewardship Program
- Habitat and shoreline stewardship projects
- Implementing fisheries management plans
- Land use planning
- Wetland evaluations
- Development of an overall Great Lakes appreciation strategy
- Delivery of the State of the Lakes Ecosystem Conference
- Consulting with community partners and providing outreach and education
- Providing support for, and conducting, numerous scientific research and monitoring projects

Much of this effort is delivered through the agencies' participation in Lakewide Management Plans (LaMPs) for lakes Superior, Erie and Ontario, along with the Binational Partnership for Lake Huron.



RESULT 1.1 - Increased awareness and appreciation of the Great Lakes and their contributions to social, economic and environmental well-being.

Increasing public awareness of the value of the lakes, our dependence on them for healthy, vibrant communities, and awareness of threats to the resource, will build greater appreciation for the Great Lakes. It will also help in the promotion of practices to protect and enhance the Great Lakes Basin Ecosystem.

The COA agencies and partners continue to deliver conferences, monitoring programs, reports, web-presence and communications activities to help improve knowledge and appreciation of the Great Lakes. In October 2008, Environment Canada, in cooperation with the U.S. Environmental Protection Agency, hosted the eighth State of the Lakes Ecosystem Conference. The conference, and accompanying *State of the Lakes Ecosystem Report*, provide an assessment of trends in Great Lakes water quality and the health of the aquatic ecosystem based on a series of environmental indicators, and the most recent environmental monitoring and surveillance information. The State of the Lakes reports support the identification of emerging issues and assess the effectiveness of current programming.

Below are examples of projects undertaken to address this result:

- The COA parties have been engaged in the development of a Great Lakes Phosphorus Management Community-Based Social Marketing Project. The goal of this project is to develop a strategy to encourage individuals in the Great Lakes community to adopt behaviours that will help reduce the release of excessive amounts of phosphorus from urban and rural residential residences and farms. Final reports, toolkits and communication products have been produced to help guide the implementation of community-based social marketing projects aimed at reducing the release of phosphorus within the Great Lakes Basin.
- To foster sustainable water use and conservation, a Water Efficiency Market Research and Marketing Strategy has been created to help municipalities better market water-efficient technologies and practices. Promoting the use of water efficient products and practices has the potential to substantially reduce potable water use in the Great Lakes Basin at a time when the entire region is under stress from excessive water use, population growth, climate change, and other environmental risk factors.
- Through the Canadian Lake Huron-Georgian Bay Framework for Community Action, agencies, organizations and local community leaders made great strides on community projects in Eastern Georgian Bay's Littoral Biosphere Reserve, Nottawasaga Valley and the North Bayfield Gullies. In the fall of 2009, a Youth Summit brought together high school students from Sarnia to Sault Ste. Marie to discuss and promote local community action. Over 100 Aboriginal elders also met at the French River to celebrate the fall equinox and discuss changes in Lake Huron and how they can help. To learn more visit: www.lakehuroncommunityaction.ca.





RESULT 1.2 - Increased stewardship actions that work towards a balance between human well-being and prosperity, and healthy aquatic ecosystems.

In this COA, there is an increased emphasis on stewardship initiatives with landowners, community groups and environmental organizations. Seven of the COA agencies, and more than 70 partners, are actively working on over 42 stewardship projects that are improving local water quality and enhancing fish and wildlife habitat along hundreds of streams and rivers in the basins of lakes Ontario, Erie and Huron. Project activities include planting native trees, shrubs and grasses along shorelines; installation of fencing and alternative water systems to keep livestock out of streams; creation and enhancement of wetlands; improving spawning habitats; barrier mitigation; workshops; and publication of education and outreach materials.

From April 1, 2007 to March 2010, the federal government, with support from the province, invested \$53.8 million (at cost-share rates between 30 and 50%), through cost-share programs associated with the Canada-Ontario EFP in just over 13 500 agricultural best management practices projects that were implemented on Ontario farms. Farmers invested in excess of \$70 million of their own funds to undertake these voluntary environmental improvement projects.

To achieve environmental objectives, the Ontario government and private foundations within Ontario, contributed an additional \$5 million toward 1700 of the 13 500 projects completed across the province, through enhanced cost-share programs associated with the Canada-Ontario EFP.

The Manitoulin Streams project is an excellent example of a community driven stewardship project that has brought together more than 25 partners to rehabilitate and enhance coldwater streams on Manitoulin Island. The partners include landowners, fish and game clubs, businesses, academia, stewardship rangers, EC, DFO, MNR and OMAFRA.



RESULT 1.3 - Sustainable use of land, water and other natural resources to provide benefits from the Great Lakes now and in the future.

Projects include sustainable agricultural practice improvements, watercourse management, LaMPs and the Huron Partnership participation, wetland evaluation, and selected enforcement action where needed.

Below are examples of projects undertaken to address this result:

- The Ministry of Municipal Affairs and Housing completed development of policy support materials, including a handbook, to help municipalities understand and use recently enacted planning tools for integrated sustainable development practices in their communities. The handbook (see: www.mah.gov.on.ca/Page6819.aspx) describes the range and scope of sustainable development applications currently feasible in Ontario, with case studies to illustrate their use. Through the handbook and a series of fact sheets, tools are highlighted which municipalities can use to implement practices that preserve and conserve water resources, and mitigate potentially harmful impacts associated with development. Development of the handbook and fact sheets was completed in 2008, and municipal workshops and other events were rolled out in 2009.

- More than 160 coastal wetlands in lakes Ontario and Erie, and in eastern Georgian Bay have been evaluated. The results of these evaluations were made available to municipalities to help protect significant habitats for provincially or regionally significant species of native plants, fish and wildlife. In addition, a series of fact sheets and a booklet entitled *Working Around Wetlands* were developed to promote wetland conservation among landowners and municipal staff.



RESULT 1.4 - Enhanced knowledge about beneficial and harmful impacts of human activities on Great Lakes aquatic ecosystems and resources.

Progress on this result is based on COA agencies and partners working together to undertake and support research and monitoring activities to enhance knowledge of the impacts of human activities on the Great Lakes aquatic ecosystems and resources. Projects that have been undertaken to address this result include: sediment program support; binational coordinated science; groundwater remediation studies; forestry management impacts; research on food web changes; adaptive management decision support models; detailed (intensive) lake modelling; algae monitoring; and watershed planning tools.

Below are examples of projects undertaken to address this result:

- In 2009, COA agencies conducted intensive fieldwork and data collection on Lake Erie under the binational Cooperative Science and Monitoring Initiative (CSMI).
- In 2008, COA agencies conducted detailed studies on water quality, benthic organisms, zooplankton and fish populations in Lake Ontario. A major focus of these efforts was to understand how nutrients are transported from watersheds into nearshore waters and the open lake. Invasive Zebra and Quagga mussels appear to have interrupted the flow of nutrients from the nearshore waters to the open lake, resulting in an apparent increase in nearshore eutrophication problems. Some initial findings were presented at the International Association of Great Lakes Research conference in May 2010.
- In 2007, Environment Canada led the development and implementation of binational cooperative science and monitoring in Lake Huron. Canadian and U.S. researchers from federal, state, and provincial natural resource agencies partnered with universities to investigate population dynamics, growth and conditions of fish, plankton, and bottom-dwelling organisms throughout the lake. Many of these research findings were presented at the 52nd Annual Conference on Great Lakes Research in May 2009, and will be incorporated into the next Lake Huron Action Plan document in the spring of 2011.
- Amphibians and reptiles are important indicators of ecosystem health in the Great Lakes. Researchers from Canada and the U.S. recently worked together to test various methods for monitoring reptiles and amphibians within the Lake Superior basin. These findings will be used to design and implement an effective amphibian and reptile monitoring program for Lake Superior, to better understand the status and condition of these important indicators of ecosystem health.
- Decision support models were developed for Lake Erie Walleye and Yellow Perch to support Ontario and U.S. state fisheries management decisions for these two economically and socially important fish species.





GOAL 2:

Improve water quality in each Great Lake by making progress on virtual elimination of persistent bioaccumulative toxic substances and the reduction of other pollutants.

The COA agencies are involved in a number of initiatives to identify sources of pollutants, including the identification of priority watersheds, and continued efforts to eliminate harmful pollutants and excessive nutrients from entering the lakes. These efforts target industrial, urban and rural sources of pollutants and are further explained in the discussions below.

2007-2011 COA work plan actions under this goal include sediment work in non-AOC locations and infrastructure assessment work for municipalities, as well as broader contaminant-reduction plans such as the Lake Erie Nutrient Management Strategy. Supporting this strategy are the *Status of Nutrients in the Lake Erie Basin Report* (which describes the status of nutrients, identifies potential sources and transport mechanisms, and defines the role of nutrients in increased algal growth), and draft phosphorus targets (which aim to reduce phosphorus concentrations in surface water in an attempt to decrease problem algal blooms in the lake). Achievements under this goal include a significant number of research and monitoring projects aimed at evaluating and tracking reductions in both contaminants and trends in the lakes caused by contaminants.

An example of the type of work carried out under this result is the Lake Ontario LaMP, through which partners are involved in PCB trackdown efforts on both sides of the lake in an effort to help virtually eliminate the presence of persistent toxic chemicals in the environment. The most recent success has been the identification of historical PCB contamination in Beaverdams Creek near Thorold, Ontario. MOE identified an area of the Creek that was highly contaminated from the past release of PCBs. The PCB contamination dates back to the 1960s, when a local paper recycling company recycled carbonless copy paper containing the once-ubiquitous chemical compounds. The company responsible for the contamination voluntarily cleaned up 350 metres of the Creek from July to November 2008. As part of the cleanup effort, more than 2610 cubic metres of sediment was removed. In fall 2010, another 6000 cubic metres of sediment was removed from a 700-metre section of the Creek's channel. The area of the PCB contamination is in the Twelve Mile Creek watershed, a western Lake Ontario tributary. Work is continuing to address the other sources of PCBs and persistent contaminants within the Twelve Mile Creek watershed.



RESULT 2.1 - Reduce microbial and other contaminants and excessive nutrients from industrial and municipal wastewater, combined sewer overflows and urban stormwater sources consistent with actions specified in binational Lakewide Management Plans (LaMPs) and binational lake action plans.

The COA agencies are making progress with this result through ongoing work including inspections, voluntary cooperative work, compliance measures and the application of current policies and procedures. The COA agencies have supported the study of wastewater infrastructure improvements in non-AOC locations such as the environmental assessment of the Owen Sound STP upgrade, one of the remaining primary wastewater treatment plants in the Great Lakes Basin.

Over the past three years, unprecedented levels of federal-provincial-municipal funding have been directed toward sewage infrastructure improvements in Great Lakes municipalities. These improvements have included upgrades to sewage treatment processes and collection systems for the prevention of raw sewage release. For example, in 2009 and 2010, over \$529 million was committed toward nine wastewater projects in the Great Lakes Basin under the Green Infrastructure Fund and the Major Infrastructure Component of the Building Canada Fund. These projects are located in Red Rock, Owen Sound, South Dundas, Cornwall, Nipigon, Kirkland Lake, Hamilton, the Halton Region, and the regions of York and Durham.



RESULT 2.2 - Reduce microbial and other contaminants and excessive nutrients from rural sources by undertaking actions specified in the binational Lakewide Management Plans and binational lake action plans.

The COA agencies are collaborating with the Ontario farm community on a number of projects to reduce contaminants from rural sources. Projects will identify agricultural priorities for Great Lakes watersheds at a range of scales; develop spatially referenced agricultural resource inventory (ARI) databases for cropping and tillage systems; and obtain Light Detection and Ranging (LiDAR) data to create high-resolution digital elevation models to aid in soil erosion and nutrient transport mitigation modelling and on-the-ground actions. Studies are conducted at scales ranging from lake-basinwide to sub-watersheds within those basins. In addition to this work, the intensive monitoring of lakes Ontario, Erie and Huron scheduled under this COA will identify priority watersheds where further actions will be taken.

Below are examples of federal-provincial efforts to deliver on this result:

- Canada and Ontario, in conjunction with partners from health units and conservation authorities, have developed and are implementing recommendations and actions to deal with the problem of poor water quality in the Lake Huron Southeast Shoreline, an area that runs from Sarnia to Sauble Beach, while continuing to study the situation to identify further work. For more information, see: www.lakehuroncommunityaction.ca.

The LaMP Committee, working with the binational CSML, conducted detailed studies on water quality, benthic organisms, zooplankton and fish populations in 2008 as part of the five-year Cooperative Monitoring Year cycle to better understand the Lake Ontario ecosystem. These extensive investigations were made possible through the collaboration of federal, state, provincial and local governments as well as academic experts. A major focus of these efforts was to understand how nutrients are transported from watersheds into nearshore waters and the open lake. Invasive Zebra and Quagga mussels appear to have interrupted the flow of nutrients from the nearshore waters to the open lake, resulting in an apparent increase in nearshore eutrophication problems. Some initial findings were presented at the International Association of Great Lakes Research conference in May 2010.



RESULT 2.3 - Identification of contaminated sediment and development of sediment management plans to reduce the release and impact of sediment-bound contaminants on the Great Lakes Basin Ecosystem.

Two non-AOC locations—Whitby Harbour and Kingston Inner Harbour—have been identified as areas where assessment of contaminated sediment is needed under the Lake Ontario Lakewide Management Plan Program. Sediment studies in both communities are currently underway to

identify the ecological and human health risk posed by the contaminants, and to form the basis for the selection of an appropriate sediment management option.



RESULT 2.4 - Enhanced knowledge about beneficial and harmful impacts of human activities on Great Lakes water quality.

The COA agencies have worked on, and will complete, more than 47 planned projects aimed at assessing the impacts of human activities in the Great Lakes. Most of these studies deal with multiple species or multiple contaminants, and focus on how human influences are affecting native species or the environment. There are also some species-specific studies (e.g. PCBs in turtles, Bald Eagle health, and Herring Gull egg monitoring) that provide detailed analysis of individual native species in the Great Lakes environment.



GOAL 3:

Conserve and protect aquatic ecosystems, species and genetic diversity of the Great Lakes Basin.

Excellent progress has been made toward meeting this goal, through working in concert with our partners. The COA work plan has many basinwide and lake-specific projects under this result, including:

- Land securement
- Establishing protected areas
- Habitat and species modelling
- Native species rehabilitation, research and monitoring (e.g. Bald Eagle, Atlantic Salmon, American Eel, Lake Sturgeon)
- Biodiversity conservation planning
- Shoreline and key tributary restoration projects
- Marine conservation area assessments
- Development of guidelines, tools and techniques to enhance knowledge of aquatic ecosystems



RESULT 3.1 - Great Lakes aquatic ecosystems and habitats are protected, restored and sustained consistent with binational Great Lakes planning.

Projects are underway to address this result in all four Canadian Great Lakes. The projects fall into four primary categories: 1) habitat planning and restoration, 2) biodiversity conservation planning, 3) securement of priority habitat, and 4) inventory and assessment of aquatic ecosystems and habitats. The COA agencies and several partners delivered more than 50 habitat protection and restoration projects across the Great Lakes Basin, including the protection and enhancement of more than 4000 hectares of Great Lakes coastal wetland and riverine habitat, which was achieved in partnership with Ducks Unlimited Canada, the Nature Conservancy of Canada, and other Eastern Habitat Joint Venture partners.



Aquatic ecosystem ecological assessments have been conducted in the Rondeau and Long Point coastal wetlands in Lake Erie to identify priorities for protection and rehabilitation actions. Habitat restoration activities have also been conducted involving COA agencies and many partners in the watersheds and nearshore areas of Rondeau Bay, based on the priorities identified in the aquatic ecosystem assessment.

The Lake Ontario binational Biodiversity Conservation Strategy has been completed. The Nature Conservancy and the Nature Conservancy of Canada, in consultation with 150 experts from over 50 agencies, universities and organizations, identified recommendations for priority actions to protect 24 significant coastal shorelines and watersheds across Lake Ontario. These shorelines and watersheds are the crown jewels of Lake Ontario's biodiversity and have the greatest value to the lake's ecosystem. For a copy of the report, see: www.epa.gov/greatlakes/lakeont/reports/lo_biodiversity.pdf.

The Lake Huron Binational Partnership agencies and other Lake Huron stakeholders are responding to biodiversity conservation challenges by developing the Lake Huron Biodiversity Conservation Strategy. This initiative advances efforts to rehabilitate, maintain and protect the chemical, physical, and biological integrity of the waters of Lake Huron, and provide long-term conservation strategies for biodiversity in the watershed. The Strategy is in its final stages and has been led by representatives from government agencies, academic scientists, stakeholders, Aboriginal communities, and non-governmental conservation practitioners.



RESULT 3.2 - Progress on rehabilitation of Great Lakes native species to restore the health of aquatic ecosystems, consistent with binational Great Lakes planning

The COA agencies are making good progress toward the rehabilitation of native Great Lakes fish and wildlife species, with more than 30 native species rehabilitation projects underway across the Great Lakes. Below are examples of projects undertaken to address this result:

- Improved tributary habitat and stocking of more than 1.5 million young hatchery-reared Atlantic Salmon in three Lake Ontario coldwater streams to help Ontario's only native salmon make a comeback.
- Partnering with international interests to pinpoint areas with suitable nesting habitat and building nesting platforms to encourage the Bald Eagle (absent from southern Ontario since the 1950s) to re-establish along the Canadian shores of Lake Ontario.
- Located quality spawning and nursery habitat in the eastern basin of Lake Erie suitable for use by naturally reproducing populations of Lake Trout.
- A habitat rehabilitation project on the Moon River in the Lake Huron basin has created 1500 square metres of new spawning habitat for Walleye and Lake Sturgeon.
- Radio-tagging of more than 1000 Coaster Brook Trout, Walleye and Lake Sturgeon to study fish movements, the condition of spawning areas, and the health of fish populations in five Lake Superior basin rivers.



RESULT 3.3 - Enhanced knowledge about beneficial and harmful impacts of human activities on Great Lakes aquatic ecosystems, habitats and species.

More than 20 science-based studies and projects are underway in the COA work plan. The project areas include research associated with native species rehabilitation (e.g. Lake Sturgeon, Walleye, Atlantic Salmon and American Eel), lower trophic level monitoring and modelling, and the development of techniques and tools (fish passage assessments, sedimentation studies, and wetland evaluation) to support assessment of aquatic ecosystems. This work is important because overall lakewide and basinwide progress will ultimately depend on the ability to evaluate and reduce negative impacts on the habitats and species in the Great Lakes Basin.

Below are examples of projects undertaken to address this result:

- A stock assessment model to estimate the biomass and understand the population dynamics of the American Eel (a native species in the Lake Ontario and St. Lawrence River system) was developed for use by international committees brought together to address American Eel rehabilitation.
- Genetic monitoring of Atlantic Salmon stocks of more than 2000 samples and determination of the genetic source of adult returns to the Credit River were completed, along with a research study to investigate the suitability of strains and stocking strategies.
- A geographic description of the genetic range of Lake Sturgeon populations and their genetic diversity was developed, to better understand the importance of the existing populations in meeting biodiversity conservation goals for this valued and culturally significant species.



GOAL 4:

Reduce the threat of aquatic invasive species to Great Lakes aquatic ecosystems and species.

This COA has provided an excellent opportunity to continue the much needed work associated with the threat of aquatic invasive species (AIS) to the Great Lakes. AIS are one of the world's most serious environmental problems and the leading cause of biodiversity loss in lake ecosystems. The estimated rate of invasion in the Great Lakes is one species every six to nine months, adding to the more than 180 non-native aquatic species that have already been introduced.

Three COA signatories, DFO, TC, MNR, and many non-government partners are working cooperatively to implement the Canada Action Plan to Address the Threat of Aquatic Invasive Species in the Great Lakes region. The COA work plan includes the delivery of AIS monitoring, risk assessment, control, research, outreach initiatives and actions to prevent further introductions and spread of AIS.



RESULT 4.1 - Implementation of the “Canada Action Plan to Address the Threat of Aquatic Invasive Species” in the Great Lakes.

AIS issues are primarily addressed by three of the COA agencies: DFO, MNR and TC. There are over 20 projects underway in support of this result. The initiatives under this COA include projects to develop and implement an Ontario AIS action plan; create inventories of AIS; create AIS detection and outreach materials; provide AIS training and identification for target audiences; develop a response plan for AIS; implement the Sea Lamprey program; address barrier issues; and implement ballast water monitoring and compliance. AIS continue to present significant challenges to the Great Lakes, but COA agencies are confident that work completed in this COA will result in significant progress.

In 2008, more than 2000 copies of the *Field Guide to Aquatic Invasive Species*, authored by MNR, with input from DFO, were distributed to partners and agency field staff. This guide is a tool to enhance participation and knowledge in the identification and early detection of AIS. The ability to respond sooner to new invaders will help reduce the threat of AIS to Great Lakes aquatic ecosystems and species.

DFO developed an AIS monitoring plan outlining key species, locations and pathways in the region, including the Great Lakes. Following this plan, ongoing monitoring of lower and higher trophic levels has occurred in collaboration with MNR at locations of mutual interest.

The Invasive Species Awareness Program for Ontario, a partnership initiative of the Ontario Federation of Anglers and Hunters (OFAH) and MNR, was implemented, which encourages the public to help monitor, control and prevent the spread of invasive species in the Great Lakes Basin. The program involves more than 170 partner organizations and focuses on the invaders' entry and spread through recreational fishing and boating, the use of live bait, and the release of unwanted pets and plants into natural bodies of water from aquariums and water gardens. DFO also partners with OFAH on assessing the risk of AIS pathways of concern in the Great Lakes.

In 2009, the provincial COA agencies drafted the Ontario Invasive Species Action Plan to guide implementation in Ontario of the Canada Action Plan to Address the Threat of Aquatic Invasive Species. The plan will be finalized in 2011.

Consistent with the Canada Action Plan, the Lake Superior LaMP drafted a binational Aquatic Invasive Species Complete Prevention Plan in December 2009. The AIS Plan identifies vectors and pathways by which AIS use to enter and become established in the Lake Superior ecosystem, and outlines actions that need to be implemented in order to close them. The AIS Plan was open for public comment through February 2010. It is currently being finalized, with implementation scheduled to begin in 2011.

DFO's Centre of Expertise for Aquatic Risk Assessment (CEARA) continues to lead nationally on identifying and assessing biological risks of potential invasive species. Species of potential concern to Canada are identified and assessed. For species of concern to the Great Lakes, MNR participates in the review of the risk assessment. CEARA and MNR have collaborated in gathering data for use by CEARA to assess the risk of freshwater fish pathways, such as aquarium trade, baitfish use and water gardens.





RESULT 4.2 - Enhanced knowledge about the harmful impacts of aquatic invasive species on Great Lakes aquatic ecosystems, food webs and species.

The COA agencies have focused on a number of strategic and practical projects. These initiatives include monitoring of AIS; effects of AIS on ecosystems; planning for responding to AIS; studies on the spread of AIS; modelling of AIS in the basin; information management regarding AIS; and species-specific programs on AIS. The COA work plan shows a real focus and attention to better understanding these invaders and how they are impacting the Great Lakes Basin Ecosystem.

The COA agencies are working together with researchers at the University of Windsor to monitor and develop effective management tools for Round Goby populations in the Great Lakes. Research includes use of pheromones and acoustics to attract and trap Round Gobies, and genetic studies to monitor the progression of the invasion of this species in the Great Lakes.

The COA agencies are supporting the Canadian Aquatic Invasive Species Network (CAISN), which boasts more than 30 researchers from 21 partner universities and five federal laboratories. CAISN is tackling the problem of invasive, non-native aquatic species entering the Great Lakes. Through partnerships in CAISN, DFO has collected samples from 20 ocean-going ships over three years to trace how the invaders get in and how they establish once they arrive. The CAISN studies increase our understanding of the invasion process, identify existing invasions, and help enhance our ability to predict and prevent new AIS from harming Canada's valuable aquatic ecosystems.

Below are examples of other initiatives undertaken to address this result:

- Development of food web models to describe the change in the flow of energy and contaminants in Lake Ontario and Lake Erie food webs as a result of Round Gobies.
- Development of a rapid response framework for fish and aquatic plants. The framework will provide resource managers with the information and steps needed to quickly respond when a new species is discovered, which will lead to more efficient and effective control, management and/or eradication of the species.
- DFO and MNR monitored and documented the distribution of a recent invader, *Hemimysis anomala* (Bloody Red Shrimp), in the Canadian waters of Lake Ontario and Lake Huron. MNR evaluated their role in the Lake Ontario food chain.



GOAL 5:

Understand the impacts of climate change on the Great Lakes Basin Ecosystem.

Climate change is one of two areas of special focus in this COA. The partners are working to better understand the impacts of climate change in the Great Lakes Basin, and develop plans to adjust to these changes. The COA agencies are working with new partners (e.g. Conservation Ontario, Great Lakes St. Lawrence Cities Initiative, and academia) to help deliver on these commitments. Projects to help better understand and explain climate change include studies on the effects of severe weather on nutrient loading into streams and soil erosion; climate change modelling; assessment of Ontario water and climate; and outreach activities like webinars, expert panels, and conferences.



RESULT 5.1 - The impacts of climate change on the Great Lakes ecosystem composition, structure, and function, including biodiversity (organisms and their habitat), water quality and quantity, human health and safety (including access to clean drinking water), social well being and economic prosperity are understood by governments and the Great Lakes community.

The COA agencies are working on more than ten projects to better understand the impacts of climate change.

In 2007, the province appointed an expert panel to provide advice on adaptation strategies to address the impacts of climate change on health, the environment and infrastructure. The panel met with ministries across the provincial government to integrate climate change adaptation into policies and programs including fisheries, Great Lakes, and source water protection. The panel's report, entitled *Adapting to Climate Change in Ontario*, has been completed and was used to provide recommendations to the Ontario Minister of the Environment. For further information, see: www.ene.gov.on.ca/environment/en/resources/STD01_076568.html. The province also set up the Climate Change Secretariat in February 2008. The Secretariat works across government ministries to focus efforts and ensure the effectiveness of provincial policies and programs in relation to mitigating climate change. The province is also working with partners to provide resources and outreach activities related to climate change impacts and adaptation in Ontario. This includes funding the Ontario Centre for Climate Change Impacts and Adaptation Resources in Sudbury.

Environment Canada's Adaptation and Impacts Research Section (AIRS) has developed two networks (the Canadian Climate Change Scenarios Network and the Canadian Atmospheric Hazards Network) that assist in understanding the impacts of climate change, variability and extremes in the Great Lakes Basin in support of risk assessment, decision making, and policy development.

Through the International Joint Commission Upper Great Lakes Study, federal departments and Ontario ministries are contributing to a number of studies underway to understand the impact of climate change on the Great Lakes ecosystem. The work includes:

- Detection of trends and changes in climate and hydrologic parameters
- Development of climate change scenarios and use of these scenarios to model water resources impacts, particularly water levels and connecting channel flow
- Assessing climate change effects on ecosystems (e.g. wetland vegetation community and fish habitat response to water level changes projected under climate change scenarios)
- Exploring adaptive environmental management as a method to inform water level regulation and adaptation to climate change impacts in various sectors (e.g. coastal, shipping, environment).

Additionally, EC produced the *Guide for Assessment of Hydrologic Effects of Climate Change in Ontario*, which facilitates the "mainstreaming" of climate change assessments into water resources planning and management by the practitioner community. Based on current science, it provides a step-by-step approach to planning, setting up and conducting hydrologic and climate change impact assessments in the context of drinking water source protection and other commonly conducted water resource studies in Ontario.





GOAL 6:

Make significant progress towards the development and implementation of locally-created, science-based source protection plans to identify and mitigate risks to drinking water sources in the Great Lakes Basin.

This area of special focus is the second new addition to the COA program. The COA component of source water protection focuses on sources of drinking water in the Great Lakes Basin. Projects are aimed at building the source water protection program with special consideration of Great Lakes matters, including:

- Establishing source protection authorities and committees
- Providing regulations, rules and guidelines that include the specific needs of Great Lakes drinking water intakes
- Adding source protection to binational mechanisms to better protect Great Lakes drinking water sources
- Working with First Nations to provide opportunities for participation in the source protection program
- Maintaining the Ontario Drinking Water Stewardship Program.



RESULT 6.1 - The potential risks to Great Lakes Basin drinking water sources are identified and assessed, and early actions to address risks are undertaken.

There are currently 28 planned projects in the COA work plan to address risks to drinking water sources. Further efforts are needed to collectively pursue strengthening the Great Lakes as a source of drinking water through binational mechanisms. Agencies are committed to meeting this result by the end of this COA. In addition to the 28 planned projects, assessment reports are also being submitted under the *Clean Water Act* identifying and assessing threats to drinking water. By August 2012, policies to address these threats will be submitted to the province for approval.



RESULT 6.2 - Develop knowledge and understanding of water quality and quantity issues of concern to the Great Lakes as drinking water sources.

The COA agencies have documented 13 projects in the current work plan to make progress on this result. For example, projects supporting the commitment to provide Source Protection Committees (SPC) access to provincial data sets, include exploring the development and expansion of a GIS Web Feature Service within MOE to facilitate the distribution of new data to source protection committees. Ministry of Health sponsored bacteriological analyses of private well water systems have been provided to SPCs. Quarterly SPC Chair meetings, lake by lake source protection working groups, and the research support for the Lake Ontario Collaborative (including introducing source protection research elements into the 2008 Lake Ontario intensive monitoring year) provided opportunities for Great Lakes-wide source protection collaboration and research. Assessment

reports under the *Clean Water Act* are now coming in with additional information on threats to the Great Lakes as a source of drinking water, as well as information on existing drinking water quality problems and emerging contaminants of concern. These reports pull together a broad spectrum of knowledge, and present them with a lens on drinking water protection.



ANNEX 4

Coordination of Monitoring, Research and Information



Photo: Meredith Miller

IV Preamble

Coordination of monitoring and research, as well as the sharing of information, are necessary to track environmental change and measure progress toward COA's vision.

Agencies Leading Annex 4 Projects

Coordination of Monitoring, Research and Information projects are lead federally by Environment Canada (EC), Natural Resources Canada (NRCan), and Parks Canada Agency (PCA), and provincially by the Ontario Ministry of the Environment (MOE), the Ministry of Natural Resources (MNR), and the Ministry of Agriculture, Food and Rural Affairs (OMAFRA).



GOAL 1:

Undertake coordinated and efficient federal/provincial scientific monitoring and research.

Due to the multi-agency nature of COA, and the international border that defines the Great Lakes Basin, coordinated research and science efforts are essential. There are hundreds of projects and science-based initiatives in this COA that are proceeding with input from multiple agencies. Many of these lakewide planning and research efforts go beyond Canada's borders to involve cooperative work with our Great Lakes neighbours, the United States. Most of these efforts are listed on the Great Lakes Monitoring Exchange found at: www.binational.net.



RESULT 1.1 - Responsive and comprehensive monitoring and research programs.

The COA agencies are participating in scientific research and monitoring across the Great Lakes Basin. These research efforts have been coordinated, cooperative, inclusive and, in many cases, binational in nature. Proper measurement, study and analysis of the basin is dependent on the ability for multiple party input and agreement on the interpretation and use of the research efforts. This research is focused at various scales, from AOC-specific studies to lakewide applications and, stepping back further, to basinwide projects. These efforts are undertaken to ensure that appropriate research and monitoring is conducted where needed to address priority Great Lakes issues.



GOAL 2:

Continue to improve the discovery and sharing of data, information and trends in the Great Lakes Basin Ecosystem.

The COA agencies are committed to informative science and research on issues of significance in the Great Lakes Basin. Simply collecting this data and information is not adequate. Once collected, this goal commits the agencies to ensure that the information is available in a useful format, to allow for sharing between COA agencies, the greater Great Lakes community, and the general public.

◀ Goal 2 (cont'd)

The COA agencies have established Annex 4 with the intention of sharing the data, information and trends. For information on the science, monitoring and reporting projects under COA, please visit the websites of any of the COA agencies (available in the appendix). As a starting point, visit the Environment Canada/United States Environmental Protection Agency joint site at: www.binational.net and Ontario Ministry of the Environment Great Lakes COA site at: www.ene.gov.on.ca/environment/en/subject/great_lakes/STDPROD_077640



RESULT 2.1 - Improved reporting on environmental conditions, changes and progress.

As indicated above, the nature of reporting is dictated by the scale of monitoring and research, and by the end use of the information. Where research is focused on an AOC, the end products of reporting and analysis are focused on meeting the needs of the AOC and the RAP committee. Where lakewide information and research is compiled, the reporting and analysis products are focused on meeting the needs of an audience interested in lakewide issues (e.g. State of the Great Lakes reporting products). Where basinwide work is completed, the reporting products focus on the entire basin (e.g. reporting on harmful pollutant reductions or trends). For examples of the reports generated under COA, visit the www.binational.net site.



RESULT 2.2 - Increased sharing of data and information among governments, organizations and Basin residents.

The COA agencies have made significant progress on this result. The products of our science and research efforts are shared among governments, partners, organizations and Great Lakes Basin residents. Canada and Ontario are committed to generating accurate information and using it for the betterment of the Great Lakes. The use of COA information varies. A COA sediment assessment at a specific site may be used to determine how to best manage and remediate that site. A COA assessment of harmful pollutants in the ecosystem may be the rationale for the implementation of basinwide programs or policies. End products like fish management plans, natural heritage strategies, and the *Guide to Eating Ontario Sport Fish* are research-based products generated to help make positive changes in issues as diverse as where development should occur, to how often a family should eat locally caught fish for dinner.

This result is off track as the previously proposed Lake Views web-based platform will not be developed. However, development of a Global Earth Observation System of Systems (GEOSS) platform to host spatial data is underway. Great Lakes water levels, ice cover and beach closing data have been identified as “test beds” to be delivered.

2007 COA - Progress on Commitments



One Hundred Eighty-Three Commitments

The delivery of 183 commitments is a complex process and requires the successful completion and alignment of numerous smaller steps. At times, logistical and process challenges delay the necessary sequential alignment of steps needed to deliver a commitment within the timeframe of an agreement. At other times, new information acquired through scientific investigation or public input causes projects to be modified resulting in delays in implementation. While on other projects, negotiation of partnerships and shared funding agreements among COA agencies and others can slow the rate of progress. The parties to COA continually evaluate these steps and make the best effort to ensure the successful completion of as many commitments as possible.

COA agencies are on track to complete 11 of 13 goals and 35 of 37 results. Behind each goal and result are a number of commitments that provide a framework for federal and provincial coordination of the 2007 COA. All projects in the work plan are justified based on meeting at least one of the 183 commitments in COA.

To deliver on all 183 commitments, there are over 850 planned projects in the COA work plan. The COA management and oversight process is critical to ensure that the resources brought to bear by the agencies properly address the COA commitments and the needs of the Great Lakes.

At present, Canada and Ontario are on track for meeting 178 of the 183 commitments, and off track but still redeemable for two of the 183 commitments. Three commitments are off track and not expected to be completed by the end of this COA.

The three commitments that are off track are:

Annex I

Commitment I-1.6e)

Canada and Ontario will complete status reports (Stage 3 or Area in Recovery) for Nipigon Bay, Jackfish Bay, Wheatley Harbour and St. Lawrence River (Cornwall) AOCs and formally transmit reports to the International Joint Commission.

Commitment I-2.3b)

Canada and Ontario will complete the development of contaminated sediment management strategies for the Thunder Bay (North Harbour site), Peninsula Harbour (Peninsula Harbour site), St. Marys River (Bellevue Marine Park site), Detroit River (Turkey Creek site), Niagara River (Lyons Creek East and West sites), and Bay of Quinte (Trent River mouth site) AOCs.

Rationale: While preparation of the Stage 3 Report for Nipigon Bay is underway, the report will not be completed and sent to the IJC until after the STP upgrades are in place and monitoring results confirm that delisting criteria have been achieved. The Wheatley Harbour Stage 3 Report was finalized and Canada announced its delisting in April 2010. The Jackfish Bay Area in Recovery Report is in production and a complete draft is expected in 2010. The St. Lawrence Stage 3/Area in Recovery Report is in production and a complete draft is expected in the winter of 2011.

Contaminated sediment strategies have been developed and implemented for the Detroit River, Niagara River (Lyons Creek East) and Bay of Quinte AOCs. Contaminated sediment management strategies have been developed for Peninsula Harbour and Niagara River (Lyons Creek West), and detailed design and Canadian Environmental Assessment Agency (CEAA) screenings are underway. The development of management strategies for Thunder Bay and St. Marys River have

slowed due to the determination that the sediment in Thunder Bay is more complex than initially anticipated; and the contaminated sediments are likely more extensive in St. Clair River and St. Marys River, thus extending the schedule for assessment. Sediment management strategies for these AOCs are not expected until 2011–2012.

Annex 4

Commitment 4-2.2d)

Canada and Ontario will better utilize existing monitoring data to identify progress in environmental conditions, trends and emerging issues by reporting on indicators such as SOLEC and LaMP indicators using Lake Views.

Rationale: This commitment is off track, as the existing platform for Lake Views is obsolete, and significant resources would be required to redevelop this approach. Due to these factors, implementation of related commitments will not take place. However, COA agencies will still meet the goal and result through the better use of existing monitoring data and continued reporting on environmental conditions, trends, and emerging issues using SOLEC and LaMP indicators, and GLBTS reports.

The two commitments that are off track, but redeemable are:

Annex 4

Commitment 4-2.2a)

Canada and Ontario will implement best management practices for information management of work conducted under the Agreement and commit to follow the protocols of the Canadian Geospatial Data infrastructure and Land Information Ontario, where applicable.

Commitment 4-2.2b)

Canada and Ontario will establish internet-based mechanisms to facilitate access to and sharing of data and information through recognized standards and specifications, such as web mapping and web data services.

Rationale: Commitments related to the Lake Views platform will not be met, although development of a GEOSS platform to host spatial data is underway. Great Lakes water levels, ice cover and beach closing data have been identified as “test beds” to be delivered.

Conclusion

Canada and Ontario have made significant progress toward meeting the goals, results and commitments of the 2007 COA. This effort has been delivered to “restore, protect, and conserve the Great Lakes Basin Ecosystem in order to assist in achieving the vision of a healthy, prosperous and sustainable Basin Ecosystem for present and future generations.”

The Interim Progress Report identifies some areas where additional efforts are needed. It also identifies areas where logistics, circumstances, and unforeseen delays will result in shortfalls in meeting commitments set out in the COA. Canada and Ontario are continually learning from the challenges involved in working to protect the Great Lakes, and continue to make progress in the face of present and future challenges.

Partnership is one key to the success of COA. Our relationship with the Great Lakes community, the users and stakeholders in the health of the lakes, is built on working together and listening to

the community at large. We have received positive reinforcement from our partners on the projects implemented under COA and the means by which the overall COA program is delivered. Canada and Ontario will continue to build on the relationship with the Great Lakes community to inform the current work plan and strengthen commitment to the Great Lakes in the future.

We welcome, and greatly appreciate, the efforts and accomplishments of our partners, Great Lakes stakeholders, and the general public in caring for the lakes. We could not have made the progress we have, and report on the successes that have been collectively achieved, without their tremendous support for the COA program. Canada and Ontario remain committed to working with the Great Lakes community, and making further progress as we complete the 2007–2011 COA work plan between now and March 2011.

Appendix

Progress on attaining the goals of the *Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem* is possible through the cooperation of many partners in the governments of Canada and Ontario. For more information on these COA agencies, please visit their websites.

Government of Canada

Agriculture and Agri-Food Canada (AAFC)
www.agr.gc.ca

Environment Canada (EC)
www.ec.gc.ca

Fisheries and Oceans Canada (DFO)
www.dfo-mpo.gc.ca

Health Canada (HC)
www.hc-sc.gc.ca

Natural Resources Canada (NRCan)
www.nrcan.gc.ca

Transport Canada (TC)
www.tc.gc.ca

Government of Ontario

Ontario Ministry of the Environment (MOE)
www.ene.gov.on.ca

Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)
www.omafra.gov.on.ca

Ontario Ministry of Natural Resources (MNR)
www.mnr.gov.on.ca

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