Great Lakes Binational Toxics Strategy

December 2008 Status Report

EPA

Canada

Indiana Dunes National Lakeshore,
Lake Michigan, Indiana
Photo courtesy of National Park Service, Indiana Dunes National Lakeshore

Executive Summary

As the Great Lakes Binational Toxics Strategy (GLBTS) broadens its scope from a focus on the Level 1 substances to encompass substances of emerging concern, the governments and stakeholders have acknowledged the need to modify the way they both operate and report on progress.

In light of the evolving mandate of the GLBTS, the Parties have also agreed to institute reporting and operational changes in order to ensure the continued effectiveness and success of the Strategy:

To improve the tracking of progress in reducing legacy and emerging substances, the Parties have agreed to prepare a Status Report once every two years, with a more robust formal GLBTS Progress Report in alternate years. This change takes effect now, with this 2008 GLBTS Status Report replacing the 2008 annual progress report. The 2009 GLBTS Biennial Progress Report will be available in 2010.

To improve the efficiency and ensure the continued effectiveness of the Strategy, the frequency of Workgroup and Stakeholder Forum meetings and the means by which they meet have been changed.

The GLBTS and its stakeholders have accomplished much over the past decade to continually improve the health of the Great Lakes. As it adapts to a broadened scope, the GLBTS will remain an open and transparent process, building on its tradition of continuous multi-stakeholder engagement, and continue to pursue the systematic sharing of information that empowers both voluntary and regulatory activities.

Cat. Number	En161-1/1-2008E	Cat. Number	En161-1/1-2008E-PDF
ISBN	978-1-100-12475-9 (Print)	ISBN	978-1-100-12476-6 (PDF)

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Introduction

Signed in 1997 by Environment Canada (EC) and the United States Environmental Protection Agency (US EPA), the Great Lakes Binational Toxics Strategy (GLBTS, or Strategy) established U.S. and Canadian challenge goals for 12 Level 1 persistent toxic substances, and targeted a list of Level 2 substances for pollution prevention measures. Over the past 11 years, the governments of Canada and the United States, along with stakeholders from industry, academia, state/provincial and local governments, Tribes, First Nations, and environmental and community groups have worked together to achieve these goals. Thirteen of the original seventeen challenge goals have been met, and significant progress has been made toward the remaining four. Under the Strategy, EC and US EPA also agreed to consider additional substances that may present threats to the Great Lakes ecosystem. This status report describes recent progress and recognizes that the challenge ahead for the GLBTS is to identify and address potential new chemical threats to the Great Lakes Basin.

The Level 1 substances consist of: mercury, polychlorinated biphenyls (PCBs), dioxins and furans, hexachlorobenzene (HCB), benzo(a)pyrene (B(a)P), octachlorostyrene (OCS), alkyl-lead, and five pesticides: chlordane, aldrin/dieldrin, DDT, mirex, and toxaphene.

A Changing GLBTS

EC and US EPA recognize the accomplishments of the GLBTS to reduce and eliminate Level 1 substances in the Great Lakes. While Level 1 substances have declined in the Great Lakes over the past several years (Table 1), a variety of new substances of emerging concern have been detected, including brominated flame retardants and perflurochemical compounds (GLBTS 2006 Annual Progress Report, Chapter 8, Environmental Indicators of Progress). In light of these detections, in 2008, the GLBTS Integration Workgroup decided to shift the focus of the GLBTS to substances of emerging concern. In addition, the Integration Workgroup decided to reduce the frequency of face-to-face meetings, to consider making greater use of electronic means of communications such as teleconferences and webinars, and to modify the way it reports on progress.

The GLBTS is a voluntary forum in which a variety of stakeholders collaborate to share information and devise mitigation strategies to address persistent toxic substances which impact the Great Lakes Basin. As the GLBTS moves forward to address substances of emerging concern, EC and US EPA seek to retain its key attributes: an open and transparent process, continued multi-stakeholder engagement, and the systematic sharing of information to empower both voluntary and regulatory actions.

GLBTS Annual Reports

As the GLBTS transitions from a focus on the Level 1 substances to substances of emerging concern, EC and US EPA have decided, with concurrence from stakeholders, to change the reporting mechanisms for the GLBTS. To lessen the burden of publishing the traditional GLBTS progress report annually, the governments will now prepare a formal progress report once every two years and a less formal status report in alternate years. This change takes effect now, with this 2008 GLBTS Status Report replacing the 2008 annual progress report. The 2009 GLBTS Biennial Report will be available in 2010.

Substance/Sector Group

In September 2007, EC and US EPA commenced the GLBTS Substance and Sector Groups. Recognizing the mutual interests of the Substance and Sector Groups, the two workgroups were subsequently combined into one Substance/Sector workgroup to more effectively undertake the exploration of substances of emerging concern, which may present threats to the Great Lakes ecosystem, and to explore mitigation strategies and other management options that GLBTS stakeholders might pursue to address these substances.

Rationale

Consistent with the objectives of the Great Lakes Water Quality Agreement (GLWQA), and the Strategy, the objective of the Substance/Sector Group is to protect and ensure the health and integrity of the Great Lakes ecosystem through the identification and prevention of the release of toxic substances into the Great Lakes. Under the Strategy, EC and US EPA are directed to consider substances of emerging concern that may pose threats to the Great Lakes Basin ecosystem, and to explore mitigation strategies, where warranted. The Strategy also challenges the Parties to consider "whether new substances which present threats to the Great Lakes ecosystem should be considered for inclusion on the Level 1 or 2 lists."

Activities

Terms of reference for the Substance/Sector Group have been outlined in a draft *Guide to the Substance and Sector Groups*. The group has developed a *Binational Framework for Identifying Substances of Potential Threat to the Great Lakes Basin*. In consultation with stakeholders, several substances profiles are being developed to evaluate this Framework. The Substance/Sector Group meets on a quarterly basis.

The following Substance/Sector Group meetings were held in the past year:

- November 30, 2007 teleconference
- June 2-3, 2008 meeting, Burlington, Ontario
- August 7, 2008 teleconference
- September 25, 2008 meeting, Chicago, Illinois
- December 2-3, 2008 meeting, Chicago, Illinois

In addition, the Substance/Sector Group reported its progress and discussed future directions at GLBTS Integration Group Meetings.

Next Steps

The Substance/Sector Group currently meets on a quarterly basis. In conjunction with Canadian and U.S. national programs, the Parties plan to select a number of candidate substances to evaluate through the Framework and, in consultation with stakeholders, consider potential management options, as warranted. In the future, the group intends to develop management actions to address substances of emerging concern that may be undertaken by the Parties and stakeholders within the GLBTS.

Future efforts of the Substance/Sector Group are expected to align with work being undertaken by other existing Great Lakes programs, such as ongoing monitoring and surveillance efforts, and the GLWQA, which is currently under review with amendments on the horizon. The Substance/Sector Group's work will also help inform a renewed 2010 *Canada–Ontario Agreement Respecting the Great Lakes Basin Ecosystem* (COA).

Waterfall on the Cypress River, Ontario. Photo courtesy of Tim Leblanc, Ontario Ministry of Natural Resources

Table 1: Status of the Level 1 Substances

Substance	Challenge Goals	Challenge Goal Met?	Workgroup Status	Future Activities
Alkyl-lead	Canada: By 2000, reduce by 90% the use, generation, or release of alkyl-lead.	Goal met: Over 98% reduction in sources, uses, and releases from 1988 to 1997 in Ontario.	Inactive	No plans to reconvene the workgroup.
	U.S.: Confirm by 1998 that there is no longer use of alkyl-lead in automotive gasoline.	Goal met: In 2000, EPA confirmed no use of alkyl-lead in automotive gasoline. NASCAR has agreed to phase-out the use of alkyl-lead in high octane fuel by 2008.		
Dioxins and Furans	Canadian releases: By 2000, reduce releases in the Great Lakes Basin by 90%.	Goal met: 89% reduction (228 grams) in total releases in the Great Lakes Basin since 1988.	Inactive	Continue to track sources and releases. Burn Barrel Subgroup reports to HCB/B(a)P Workgroup.
	U.S. releases: By 2006, reduce releases (to air nationwide and to waters of the Great Lakes) by 75%.	Goal met: 89% reduction achieved since 1987.		
HCB and B(a)P	Canadian releases: By 2000, reduce releases to the Great Lakes Basin by 90%.	B(a)P: 52% reduction in Ontario since 1988. HCB: 74% reduction in Ontario since 1988.	Active	Continue activities to achieve Canada's 90% reduction goal and to further reduce U.S. releases. Hold annual face-to-face meetings with interim tele-conferences, as needed.
	U.S. releases: By 2006, reduce releases to the Great Lakes Basin.	Goal met: 77% reduction in B(a)P releases in Great Lakes states, 1996 to 2001. HCB emissions reduced from 8,519 lbs (3,872 kg) in 1990 to 2,911 lbs (1,323 kg) in 1999.* Additional 28% reduction from 1999 to 2002.		
Level 1 Pesticides	Canada: Report by 1997 that there is no longer use, generation, or release of the five Level 1 pesticides.	Goals met: EPA and EC confirmed that all uses of the Level 1 pesticides have been cancelled, and production facilities have been closed.	Inactive	No plans to reconvene the workgroup.
	U.S.: Confirm by 1998 that there is no longer use or release of the five Level 1 pesticides in the Great Lakes Basin.			
Mercury	Canadian releases: By 2000, reduce releases by 90% in the Great Lakes Basin.	Goal met: 90% reduction between 1988 and 2006.	Less active information-sharing group	Share information and meet periodically, in collaboration with other mercury-related efforts.
	U.S. releases: By 2006, reduce releases (to air nationwide and to Great Lakes waters) by 50%.	Goal met: Estimated reduction of more than 50% since 1990.		
	U.S. use: By 2006, reduce by 50%.	Goal met: Estimated reduction of more than 50% between 1995 and 2003.		
OCS	Canada: Report by 1997 that there is no longer use, generation, or release of OCS.	Goal met: In 2000, EC concluded that there were no documented releases in Ontario in 2000.	Inactive	No plans to reconvene the workgroup.
	U.S.: Confirm by 1998 that there is no longer use or release of OCS in the Great Lakes Basin.	Goal met: EPA has concluded that the challenge goal has been met.		
PCBs	Canada: By 2000, reduce by 90% high-level PCBs (>1% PCBs) that were once, or are currently, in service. Accelerate destruction of stored high-level PCB wastes.	Goal met: In Ontario, achieved 90% reduction of high-level PCBs *in storage* compared to 1993. Goal not met: In Ontario, achieved an estimated 70% reduction in high-level PCBs *in service* since 1989, instead of the targeted 90% reduction.	Active	Continue activities to reduce high-level PCBs in service. Hold annual face-to-face meetings with interim teleconferences, as needed.
	U.S.: By 2006, reduce by 90% nationally high-level PCBs (>500 ppm PCBs) used in electrical equipment.	Goal likely met for high-level PCBs in transformers, but it is uncertain whether the goal has been met for capacitors due to a lack of data.		

** Reductions cannot be used to establish a specific reduction in HCB emissions since 1990 due to inconsistencies in the 1990 and the 1999 emission inventories and source categories.*

Changes to the Integration Workgroup and Stakeholder Forum

The Integration Workgroup will reduce its schedule of quarterly face-to-face meetings to semi-annual meetings, and a Stakeholder Forum will be convened annually in conjunction with an Integration Workgroup meeting. Greater use of telecommunications will be considered by both.

Progress of the Level 1 Workgroups

Level 1 workgroups will continue to interact on an as-needed basis, through the use of video conferences and webinars. Progress toward the Level 1 challenge goals is presented in the table on page 3. Additional activities undertaken by the Level 1 workgroups in the past year are described below.

Mercury Workgroup

The Mercury Workgroup contributed to the development of a *Great Lakes Mercury in Products Phase-Down Strategy* sponsored by the Great Lakes Regional Collaboration (GLRC). Implementation of the strategy has begun in the Great Lakes states ("Great Lakes Mercury in Products Phase-Down Strategy" 19 June 2008 <*http://www.glrc.us/documents/MercuryPhaseDownStrategy06-19-2008.pdf*>). In addition, a new GLRC-sponsored strategy has been initiated, the *Great Lakes Mercury Emission Reduction Strategy*. Input for this Strategy will be solicited from stakeholders on an ongoing basis through the Mercury Workgroup. Mercury Workgroup activities have decreased in the past year as both Canada and the United States have met their challenge goals. In place of regular workgroup meetings, the Mercury Workgroup plans to periodically organize and/or sponsor larger science and policy conferences. It will continue to share information on efforts related to reducing and tracking mercury releases in the environment, in addition to focusing increased attention on global releases.

Mercury Collection Programs

In Canada, the Clean Air Foundation operates two voluntary mercury collection programs: Switch Out and Switch the 'Stat. Since 2001, as a result of participation by more than 600 automotive recyclers across Canada, the Switch Out program has collected more than 200,000 mercury-containing switches from end-of-life vehicles (~170 kg of mercury). The Switch Out program recovered approximately 31 kg of mercury from more than 36,500 switches in the past year. The Switch the 'Stat program has collected more than 17,100 mercury-containing switches from thermostats since its launch in April 2006, 72% of which were recovered in the past year (~31 kg of mercury).

In the United States, Bowling Green State University (BGSU) in Ohio has operated an Elemental Mercury Collection and Reclamation Program since 1998. The free program collects and recycles uncontaminated elemental mercury that is present in a variety of devices, including thermometers, thermostats, and mercury switches, as well as bulk mercury. To date, the program has collected over 23,000 lbs of elemental mercury for recycling.

PCB Workgroup

In September 2008, EC published new PCB regulations in *Canada Gazette II* that are expected to help Canada meet its challenge goal of a 90% reduction of high-level PCBs in service. Regulation requires that equipment containing high-level PCBs and low-level PCBs in sensitive locations be phased out by December 2009. Equipment containing low-level PCBs in all other locations must be phased out by December 2025. The rule also limits the maximum duration of storage of PCBs by generators to 1 year, 1 year at an authorized transfer station, and 2 years at disposal facilities.

The PCB Workgroup will continue to seek commitments to reduce PCBs through PCB reduction commitment letters and other PCB phase-out efforts, and to publicize voluntary achievements in PCB reduction. The workgroup has developed a software tool to assist companies in evaluating the costs and benefits of PCB use, storage, phase-out and elimination programs. The tool is expected to be freely available to the public. US EPA is considering ways to more broadly communicate its availability.

To prioritize remaining opportunities for PCB source reductions, the PCB Workgroup has begun to collect and assess information on sources of PCBs other than PCB-containing transformers and capacitors. The workgroup is also investigating the status of facilities that purchased PCBs from Monsanto in the 1970s, in an effort to determine the fate of the PCBs and to identify sites that may warrant investigation or may be in need of clean-up (e.g., abandoned sites with PCB contamination or equipment).

Due to the progress achieved, the PCB Workgroup has reduced its number of face-to-face meetings from two to one per year. With the new Canadian PCB regulation in place, the workgroup believes that it would be valuable for Canada to share their PCB phase out knowledge and experience at this meeting.

Dioxin/Furan Workgroup

In December 2007, the Dioxin/Furan Workgroup decided to move to inactive status. Both Canada and the United States have met their goals for dioxins/furans, reducing releases by approximately 90% to 28 g TEQ in Ontario and 1,422 g TEQ nationwide in the United States. Through a Decision Tree exercise, the workgroup identified ten of the top twelve sources as low priorities for the GLBTS to address. Most sources are being managed by existing programs. Recognizing that historical sources of dioxins/furans remain in the environment and that they can continue to be released from small sources, the Dioxin/Furan Workgroup co-chairs will continue to track progress on dioxins/furans through release inventories and environmental monitoring data. The co-chairs may reactivate the workgroup, if warranted, as new issues arise. The co-chairs will also investigate potential opportunities to reduce agricultural waste burning and other poorly characterized sources of dioxins/furans. The largest source of quantified dioxin releases remaining in both countries is household garbage burning. The Burn Barrel Subgroup continues to address the use of burn barrels and other open burning issues, but now reports to the HCB/B(a)P Workgroup.

HCB/B(a)P Workgroup

US EPA and Environment Canada support several programs that help reduce releases of HCB and B(a)P from diesel engines, residential wood stoves and fireplaces, scrap tire piles, steel mills, and other sources. The workgroup is evaluating the use of coal tar sealants as a source of B(a)P in the United States, and will begin to review the use of coal tar sealants in Ontario. The workgroup has also updated release inventories for sources of HCB and B(a)P. The most recent inventory of HCB sources in Ontario totals 13 kg (29 lbs) of releases, a relatively low level of release, but another 8 kg (18 lbs) must be reduced to meet Canada's HCB challenge goal. Approximately 60,000 lbs of B(a)P are released to the Great Lakes region annually. Major sources of B(a)P in Ontario include residential wood combustion, use of creosote-treated railway ties, and cokemaking in the steel manufacturing sector (although release estimates for this sector are under review). The workgroup will continue its efforts to improve the accuracy of the United States and Canadian HCB and B(a)P emission inventories to ensure that all significant emission sources have been identified and integrated, including a study of emissions from certified wood stoves and new studies to measure the impacts of wood smoke and other air pollutants. The workgroup will continue to pursue emission reduction activities from significant B(a)P source sectors. The workgroup will also continue to support actions that impact HCB releases to the Great Lakes Basin, such as full life-cycle management of PCP-treated wood products, modeling of HCB to the Great Lakes from North American sources, solicitation of voluntary HCB reductions from chemical companies, and the efforts of the Burn Barrel Subgroup. The HCB/B(a)P Workgroup has also reduced the number of face-to-face meetings from two to one per year.

Burn Barrel Subgroup

The Burn Barrel Subgroup continued efforts to reduce emissions from open garbage burning. Consultation with Great Lakes states, tribes, and Province of Ontario indicated that there was value in continuing to address the burn barrel issue and to consider broadening the scope of the subgroup's efforts to include other pollutants and related uncontrolled combustion issues. The subgroup held three teleconferences during 2008 and developed a scoping document that identifies objectives and activities to implement under the expanded scope of the subgroup. The subgroup will continue to hold regular conference calls to share information and identify issues for further action.

Photo courtesy of Patrick Atagi, American Chemistry Council

Progress Toward the Long-Range Transport Challenge

Under the Strategy, EC and US EPA committed to assessing atmospheric inputs of Strategy substances to the Great Lakes by evaluating and reporting on the contribution and significance of long-range transport of Strategy substances from worldwide sources. An example of research efforts conducted in support of this challenge is EC's *Emission Inventory and Multiple Pathways Modeling of HCB to the Great Lakes from North American Sources*, which used an atmospheric transport model and emission inventories. The major findings of this study are summarized below.

(1) Given that HCB strongly persists in the environment, and that North American industrial emissions (reported by US EPA and EC and in the literature) accounted for a lower HCB level in the atmosphere than the air concentrations measured throughout the 2000s, the main source of HCB emissions in North America can be attributed to the past use of HCB as a fungicide in agriculture.

(2) Given the very long half life of HCB in air and the long period that has elapsed since its ban for agricultural use, air concentrations of HCB across North America have become fairly uniform and stable, and may be a significant source of HCB to the Great Lakes environment.

(3) On an annual basis, the Midwest United States (specifically states adjacent to the Great Lakes) and Ontario sources have been the leading contributors to atmospheric and Great Lakes basinwide HCB levels. Sources in the Northwest United States were the second major source of HCB over the Great Lakes, followed by sources in the Canadian Prairies and the Southwest United States.

(4) Computation of the HCB soil/air fugacity ratio indicated that strong volatilization took place from the spring to autumn in most regions of the United States, whereas Canada (except for southern Ontario) remained a receptor of HCB deposition.

(5) In 2000, Lake Michigan received the largest dry deposition of HCB, followed by Lakes Superior, Huron, Erie, and Ontario. For the same year, Lake Michigan also received the greatest wet deposition, followed by Lakes Erie, Huron, Superior, and Ontario (Figure 1). Both dry and wet deposition to the lakes, in 2001, were considerably lower than those in 2000, but followed almost the same deposition sequence of lakes as those in 2000.

(6) The highest HCB loading due to the net gas (water/air) exchange in 2000 was found over Lake Superior, followed by Lakes Erie, Michigan, Huron, and Ontario. For 2001, the largest gas exchange flux was found in Lake Erie (Figure 2). Overall, the results clearly indicate that the Great Lakes had become sources of HCB in the 2000s, where volatilization dominates the net gas exchange.

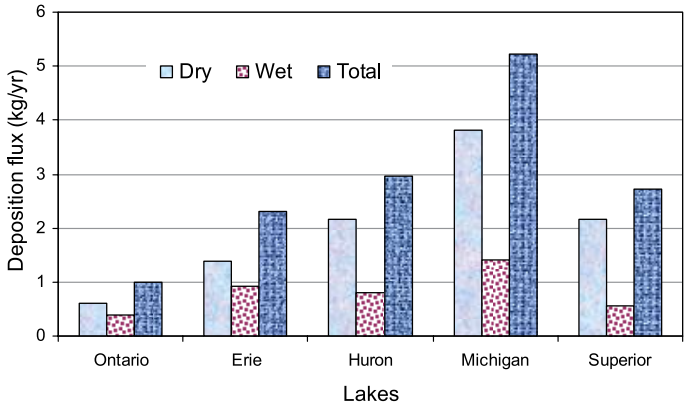


Figure 1. Modeled annual HCB loadings (kg yr^{-1}) to the Great Lakes in 2000 due to dry, wet, and total (dry + wet) deposition.
Source: Jianmin Ma, Environment Canada

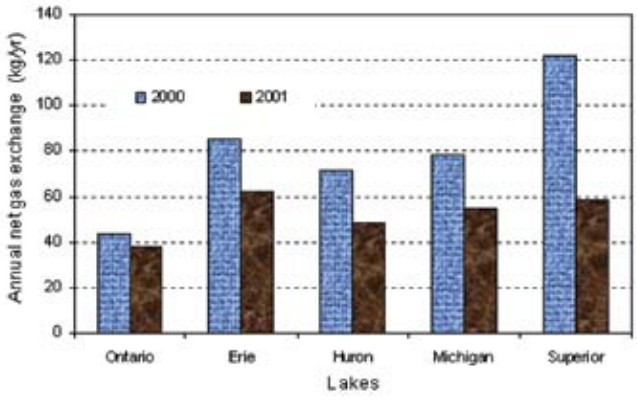


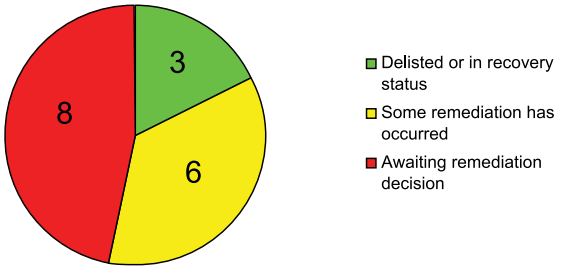
Figure 2. Annual total net gas exchange fluxes (kg yr^{-1}) of HCB in the five lakes. Positive values indicate volatilization.
Source: Jianmin Ma, Environment Canada

The sink to source reversal of HCB in the Great Lakes likely suggests that lakes have been undergoing a "self-cleaning" process since the 2000s. While this long-range transport study identified sources of HCB that could be contributing to the Great Lakes levels, it was not an attempt at identifying human or biota effects. However, decreasing depositions combined with volatilization dominating water/air exchange implies that more HCB are evaporating from lake waters, a positive trend with respect to the Great Lakes fisheries and drinking water. By contrast, the lands in the upper Great Lakes ecosystem, namely in northern Ontario where temperatures are lower, are still HCB receptors.

Progress in Remediating Contaminated Sediment

In 2007[1], approximately 960,000 yd^3 of contaminated sediment were remediated from eleven U.S. sites and one Canadian site in the Great Lakes Basin. Remedial action was initiated for the first time in 2007 at three U.S. sites and one Canadian site. Five U.S. sites completed their remedial actions in 2007. Three U.S. sites, each under a different cleanup authority, continued to make progress on their remedial actions. Highlights of sediment assessment and remediation activities undertaken in the Canadian and U.S. Great Lakes Basin are presented below.

Status of Contaminated Sediment Remedial Actions in Canadian & Binational AOCs



Source: US EPA

Canadian Update

- **Bay of Quinte (Trent River)** – As part of the ongoing monitoring work to assess sediment quality, elevated levels of dioxins and furans were found in sediment at the mouth of the Trent River in 2001. An Ecological Risk Assessment completed in 2007 predicted that there is negligible risk to piscivorous wildlife and fish exposed to the contaminated sediment. As such, monitored natural recovery was chosen as the preferred management option for this site. Source track down is continuing in the area.
- **Wheatley Harbour** – An Ecological Risk Assessment undertaken in 2007 concluded that there is negligible risk of PCB effects to piscivorous wildlife in the Muddy Creek wetland. Therefore, the Wheatley Harbour Implementation Team recommended that no further action is required prior to delisting this Area of Concern.
- **Niagara River (Lyons Creek, East & West)** – Arsenic-contaminated sediment from Lyons Creek West was excavated (300 cubic metres) in the summer of 2007 and placed in a secure landfill facility. Management options are being developed in consultation with various stakeholders to address PCB-contaminated sediments in Lyons Creek East and Lyons Creek West (the watercourse is bisected by the Welland Canal).

U.S. Update

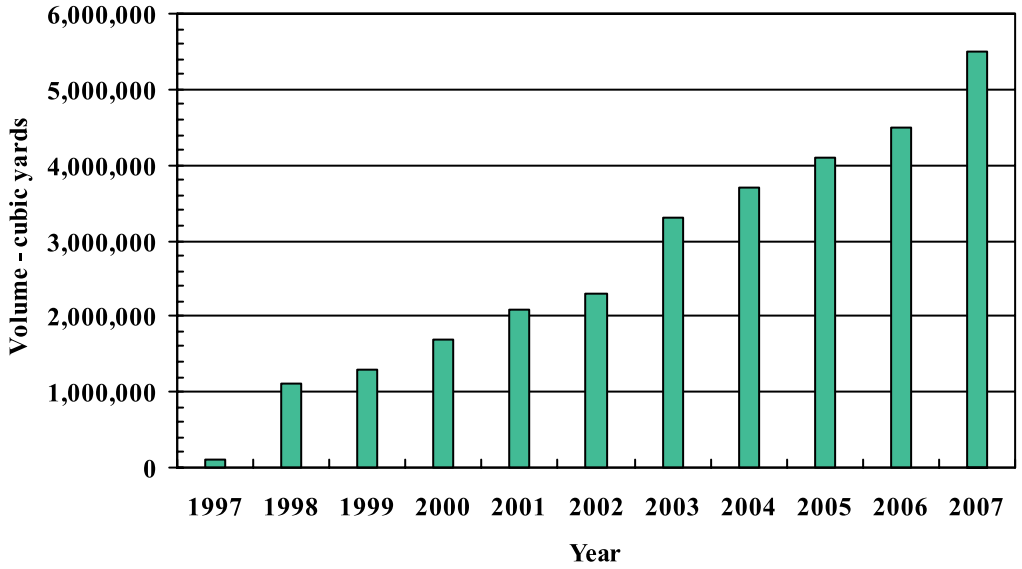
- In 2008, the US EPA's Research Vessel Mudpuppy assisted in the assessment of ten contaminated sediment sites in the Great Lakes Basin.
- **Allied Paper, Inc./Portage Creek/Kalamazoo River, Kalamazoo, Michigan** – A Time Critical Removal Action (TCRA) was implemented in April 2007 by Georgia-Pacific and Millennium Holdings contractors as a result of agreements negotiated by the two companies along with US EPA Superfund, Michigan Department of Environmental Quality, and Natural Resource Trustees. Approximately 37,000 yd^3 of PCB-contaminated sediment were dredged from the Kalamazoo River in a 1.2 mile area near Plainwell, MI. PCB-contaminated sediments were sent to a TSCA permitted disposal facility and solid waste landfills in Michigan.

[1] *Sediment remediation data for 2007 are presented because data lag a year behind in reporting (i.e., 2008 data will become available in 2009).*

- **Ashtabula River, Ashtabula, Ohio** – The Ashtabula River Great Lakes Legacy Act project was a collaborative effort between the US EPA and the Ashtabula River Partnership (represented by the Ashtabula City Port Authority). In 2007, over 435,000 yd^3 of PCB-contaminated sediment were dredged utilizing a 12-inch hydraulic cutterhead dredge. Production dredging was followed by cleanup dredging utilizing an 8-inch hydraulic dredge outfitted with the Vic Vac® suction system. Dewatered sediments remained in geotextile tubes within the TSCA permitted landfill facility constructed as part of the remediation project, and will be covered and capped in 2009.
- **Tittabawassee River, Reach D & Reach O, Midland, Michigan** – In July 2007, the US EPA and the Dow Chemical Company signed two consent orders to address elevated levels of dioxin-contaminated sediment within the Tittabawassee River. Approximately 12,000 yd^3 of soft bottom deposits were removed from Reach D using a GPS-guided hydraulic dredge system. Sediment was pumped via pipeline to a containment facility for dewatering. Reach O was segregated into five removal management units separated by sheet piling. Over 16,000 yd^3 of sediment were dry-excavated from Reach O. All sediments were disposed of at Dow's Salzburg Landfill.

The chart below presents the cumulative volume of sediment remediated in the United States since 1997. US EPA and its partners have now remediated more than 10% of the estimated volume of sediments requiring remediation in the U.S. Great Lakes Basin. The Great Lakes Legacy Reauthorization Act of 2008 was signed into law on October 8, 2008, thereby extending funding for two years at a level of $54 million per year.

Cumulative Volume of Sediment Remediated in the U.S. Great Lakes Basin



**Volumes in bar graph are quantitative estimates as reported by project managers, summed, and then rounded to the nearest one hundred thousand cubic yards. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, June 2008). Detailed project information is available upon request from project managers.*
Source: US EPA – Great Lakes National Program Office.

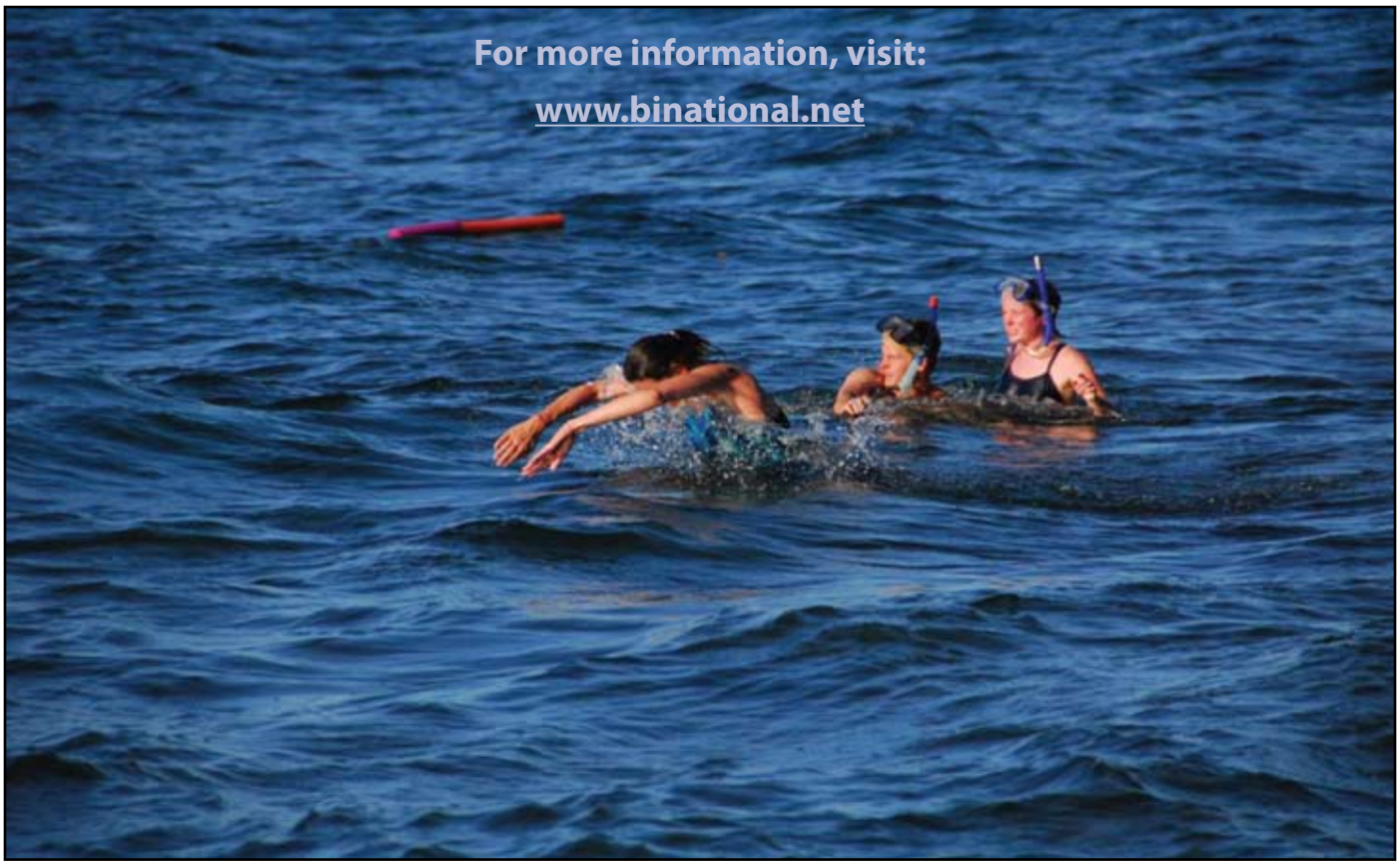


Photo courtesy of Frank Koshere, Wisconsin Department of Natural Resources

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Lake Guardian Docked
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Niagara Falls, Niagara Falls, NY
Photo courtesy of the Center for Great Lakes and Aquatic Sciences

Sandhill Crane at Rest
Photo courtesy of Thomas A. Schneider (Michigan Travel Bureau)

Stormfront
Photo courtesy of US EPA

Kayak Paddlers Inside Cave, Lake Superior Pictured Rocks National Lakeshore
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