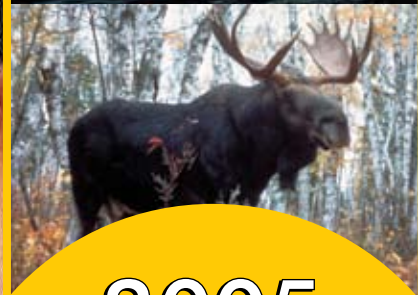


Great Lakes Binational Toxics Strategy



2005
Annual
Progress
Report





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GREAT LAKES BINATIONAL TOXICS STRATEGY

2005 Progress Report



Common Spiderwort
Photograph courtesy of the USEPA



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Cercropia Moth
Photo by David Jude,
courtesy of the Center for Great Lakes and Aquatic Sciences



INTRODUCTION

Over the past thirty years, the governments of Canada and the United States have joined together with industries, citizen groups, and other stakeholders in a concerted effort to identify and eliminate threats to the health of the Great Lakes ecosystem resulting from the use and release of persistent toxic substances. The Great Lakes comprise an invaluable ecosystem which holds over 20 percent of all fresh surface water worldwide and over 90 percent in North America. A major step in this process was the enactment of the Revised Great Lakes Water Quality Agreement (GLWQA) of 1978, which embraced, for the first time, a philosophy of “virtual elimination” of persistent toxic substances from the Great Lakes.

In 1987, the GLWQA was amended, establishing Lakewide Management Plans (LaMPs) as a mechanism for identifying and eliminating any and all “critical pollutants” that pose risks to humans and aquatic life. In 1994, the International Joint Commission’s Seventh Biennial Report under the GLWQA called for a coordinated binational strategy to “stop the input of persistent toxic substances into the Great Lakes environment.”

This led to the signing of the Great Lakes Binational Toxics Strategy (GLBTS, or Strategy) in 1997. The Strategy specifies Level 1 substances, each targeted for virtual elimination and each with its own specific challenge goals, along with Level 2 substances targeted for pollution prevention. The substances were selected on the basis of their previous nomination to lists relevant to the pollution of the Great Lakes Basin, and the final list was the result of agreement on the nomination from the two countries.

This past year saw the continued use and emissions reductions of key Level 1 persistent toxic substances under the auspices of the GLBTS. Of the 17 reduction goals set forth for the 12 Level 1 persistent toxic substances in April 1997, 10 have been met, three will be met by the target timeline date of 2006, and the remaining four will be well advanced toward meeting their targets by 2006.

About This Report

This report presents a comprehensive summary of activities and accomplishments under the GLBTS for

the year 2005. Chapters 1 through 4 present highlights of the active substance workgroups for mercury, polychlorinated biphenyls (PCBs), dioxins and furans, and hexachlorobenzene (HCB) and benzo(a)pyrene (B(a)P), respectively. These highlights include a review of major projects, and progress in source reductions toward each of the interim challenge goals on both sides of the border. Chapter 5 provides a synopsis of four Integration Workgroup meetings and the two semi-annual Stakeholder Forums, including a summary of presentations, policy discussions, and key decisions. Chapter 6 details the sediment remediation projects undertaken to date, including an estimate of sediment volumes remediated or capped and the remaining volumes of contaminated sediments in specific Areas of Concern (AOCs) in the Basin. Chapter 7 presents a synopsis of the work being done in the field of long-range transport. A summary of highlights in each chapter is provided below.

Mercury

The U.S. has met its national mercury use reduction goal of 50 percent, and currently stands at over 50 percent (from a 1995 baseline). With regard to progress toward the national mercury emissions reduction goal of 50 percent (1990 baseline), the U.S. National Emissions Inventory for 2002 will be complete in early 2006, and likely will show achievement of roughly 50 percent reductions in total mercury emissions since 1990. Canadian progress toward a 90 percent (1988 baseline) reduction of releases into the Great Lakes Basin is well advanced and currently stands at 84 percent.

PCBs

As of December 2004, Canada reported that 89 percent of high-level PCB waste had been destroyed versus a reduction target of 90 percent (from a 1993 baseline). According to annual reports submitted to the United States Environmental Protection Agency (US EPA) by PCB disposers, about 110,000 PCB transformers and 166,000 PCB capacitors were disposed of between the 1994 baseline and the end of 2003. Data gaps in the PCB inventory currently make it difficult to accurately quantify reduction rates. US EPA is currently compiling PCB disposal information for 2004 and updating the PCB



transformer registrations, after which data gaps will be re-evaluated.

Dioxins & Furans

The U.S. and Canada have made significant progress toward reaching their respective emission reduction goals of 75 percent and 90 percent. Canada has made significant progress toward meeting the goal of a 90 percent reduction in releases of dioxins and furans, achieving an 87 percent reduction (227 grams) of total releases within the Great Lakes Basin, relative to the 1988 Canadian baseline. US EPA currently is working on a 2000 Dioxin Inventory, the most comprehensive dioxin inventory to date. This inventory indicates that major reductions have been achieved through implementation of the Maximum Available Control Technology (MACT) program. Once the Dioxin Reassessment is final, the U.S. will be able to formally confirm achievement of the GLBTS challenge goal.

HCB & B(a)P

Canadian reductions in HCB and B(a)P emissions are well advanced at 68 percent and 45 percent, respectively, against a 90 percent challenge goal (1988 baseline). U.S. emissions reductions for B(a)P are well advanced against an unspecified reduction goal, with a 77 percent reduction in B(a)P releases. With respect to HCB reductions in the U.S., due to inconsistencies in the 1990 and the 1999 emission inventories and source categories, they cannot be used to establish a specific reduction in HCB emissions since 1990.

Integration Workgroup Meetings/ Stakeholder Forums

The Integration Workgroup met four times in 2005: once in Windsor (March 23), once in Toronto (May 18), and twice in Chicago (September 15 and December 7). The Integration Workgroup focused its activities this year on finishing the management assessments of GLBTS Level 1 substances. Draft assessment reports were developed for all Level 1 substances. There was also a focus this year on pollution prevention in the municipal sector, on the recommendations of the U.S. Great Lakes Regional Collaboration regarding persistent toxic substances, and on the future role of the GLBTS beyond 2006.

The two Stakeholder Forums held in 2005 were highlighted by keynote addresses from Jim Abraham, Acting Regional Director General of Environment Canada (EC), who presented EC's competitiveness and environmental sustainability framework, and by

Clive Davies, Chief of the Design for the Environment (DfE) Branch in US EPA's Office of Pollution Prevention and Toxics.

Sediment Challenge

In 2004, over 345,000 cubic yards of sediment were remediated from eight U.S. sites and one Canadian site in the Great Lakes Basin. Six sites initiated work for the first time in 2004; two of those sites were the beginnings of large-scale cleanups that will have significant positive impacts on the Great Lakes Basin. Three sites completed their remedial actions in 2004; Dow Chemical Canada's three-year cleanup was completed at the end of the year. The Moss-American and Pine River projects continued with their remedial actions. The Black Lagoon site was the first sediment remediation project funded under the Great Lakes Legacy Act.

Under the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA), a commitment was made to develop a risk-based, decision-making framework for contaminated sediments. The framework has been completed, and internal agency reviews are ongoing with finalization and release scheduled for late 2005. Ongoing sediment assessments in AOCs (i.e., Thunder Bay, Peninsula Harbour, St. Marys River, Detroit River, St. Clair River, Niagara River, and Bay of Quinte) currently are utilizing the COA framework to evaluate the need for management actions.

Long-Range Transport Challenge

Updates on the work being done in Canada and the U.S. to improve the understanding of the atmospheric science of toxic pollutant transport include a summary of research entitled "Toxaphene Residues in the United States Soils – What is Their Impact on the Great Lakes Basin?", by J. Ma, Meteorological Service of Canada; and the results of three modeling studies: 1) "Global and Regional Atmospheric Heavy Metals Model (GRAHM)" by A. Dastoor, Meteorological Service of Canada; 2) "Modeling Transport and Deposition of Level 1 Substances to the Great Lakes" by T. Nettesheim, US EPA Great Lakes National Program Office, and M. MacLeod, W. Riley, and T. McKone, Lawrence Berkeley National Laboratory; and 3) "North American Mercury Model Intercomparison Study (NAMMIS), by R. Bullock, US EPA.



Looking Ahead

This past year, 2005, was very busy for the GLBTS. A full program review of the Level 1 substances was conducted, which concluded that the presence of Level 1 substances in the Great Lakes environment continues to pose threats to human health and wildlife. This review also concluded that there continues to be many opportunities to effect further reductions in the Level 1 substances.

Also in 2005, many GLBTS members participated in the U.S. Great Lakes Regional Collaboration, a multi-stakeholder effort to design a restoration strategy for the Great Lakes. Through this process, the GLBTS was identified as a key component of the overall effort to reduce and eliminate toxic threats to the Great Lakes. All in all, these efforts affirmed an important continuing role for the GLBTS.

In 2006, the United States and Canada will commence a comprehensive review of the GLWQA. GLBTS stakeholders will play an important role in the review of the GLWQA. As always, the role the GLBTS will play in the future will depend on the continued commitment, diligence, and creativity of all concerned. Working with stakeholders, as well as with national and international fora, the GLBTS program looks forward to continuing its mission well into the future.



Rough Blazing Star
Photo courtesy of the USEPA



**Fowler's Toad
Indiana Dunes National Lakeshore
courtesy of the National Park Service**



1.0 MERCURY

Canadian Workgroup co-chair: Robert Krauel

U.S. Workgroup co-chair: Alexis Cain

Progress Toward Challenge Goals

U.S. Challenge: Seek by 2006, a 50 percent reduction nationally in the deliberate use of mercury and a 50 percent reduction in the release of mercury from sources resulting from human activity.

Canadian Challenge: Seek by 2000, a 90 percent reduction in the release of mercury, or where warranted the use of mercury, from polluting sources resulting from human activity in the Great Lakes Basin.

Canada and the U.S. have both achieved reductions of mercury from sources resulting from human activity, and continue to pursue their challenge goals outlined in the Strategy. A description of the progress made by each country is provided below. The Mercury Workgroup has been very active this past year; numerous mercury reduction activities are occurring in Canada to meet the goal of reducing releases of mercury in the Great Lakes Basin, and in the U.S. to meet the goal of reducing the deliberate use of mercury and releases of mercury nationwide.

Ontario: Progress Toward the GLBTS Challenge

In Ontario, releases of mercury have been reduced by approximately 84 percent between the 1988 baseline and 2003. Figure 1-1 illustrates the progress made toward the Canadian 90 percent reduction target.¹ This figure shows that releases in Ontario have been cut by more than 11,900 kg since 1988, based on Environment Canada's 2003 mercury inventory. Note that some sources listed in the legend of Figure 1-1 (e.g., paint, pesticides, pulp and paper) refer to the baseline year of emissions and are no longer current sources. Figure 1-2 illustrates the 2003 sources of

mercury releases in Ontario. This figure shows that the primary sources of releases are electric power generation, iron and steel, municipal (primarily land application of biosolids), cement and lime, and incineration.

United States: Progress Toward the GLBTS Challenge

Because of the potential for mercury releases to air to be transported to the Great Lakes, the Mercury Workgroup has focused on nationwide atmospheric mercury emissions in the U.S. The U.S. release challenge applies to the aggregate of air releases nationwide and of releases to water within the Great Lakes Basin.²

According to the most recent estimates from the National Emissions Inventory (NEI), U.S. mercury emissions decreased approximately 45 percent between 1990 and 1999 (see Figure 1 3).³ These reductions have been driven by the implementation of Maximum Achievable Control Technology (MACT) standards enacted under the Clean Air Act (CAA), especially for incinerators. Additional reductions have occurred since 1999, particularly in emissions from gold mines, medical waste incinerators, and chlor-alkali plants. The NEI for 2002 will be complete in early 2006, and likely will show achievement of roughly 50 percent reductions in total mercury emissions since 1990.

Although it is clear that mercury use has decreased since 1995, the trend is difficult to quantify because the U.S. Geological Survey (USGS) stopped reporting estimated U.S. mercury consumption after 1997. However, on the basis of data reported by the chlor-alkali, lamp, and dental industries, it appears that total mercury use declined more than 50 percent between 1995 and 2003, assuming that mercury use by other sectors has remained constant since 1997

¹ This target is considered as an interim reduction target and, in consultation with stakeholders in the Great Lakes Basin, will be revised if warranted, following completion of the 1997 COA review of mercury use, generation, and release from Ontario sources.

² This target is considered as an interim reduction target and, in consultation with stakeholders, will be revised if warranted, following completion of the Mercury Study Report to Congress.

³ Note that there is uncertainty associated with all emissions inventories. For more discussion, see Murray and Holmes (2004).

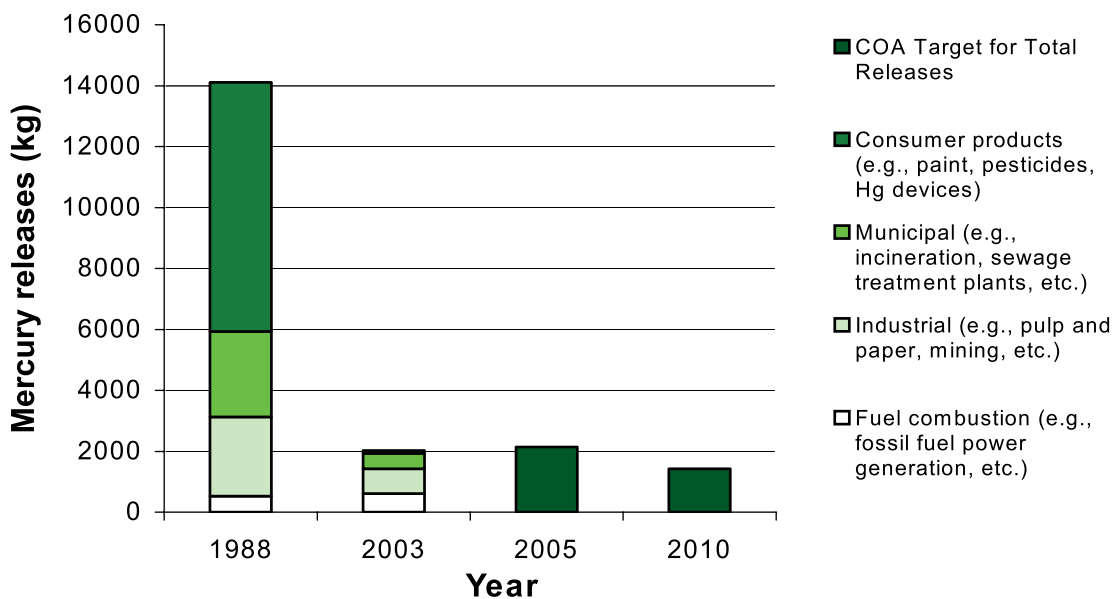


Figure 1-1. Reductions in Mercury Releases in Ontario from 1988 to 2003, by Sector.
Source: Environment Canada, Ontario Region (2005)

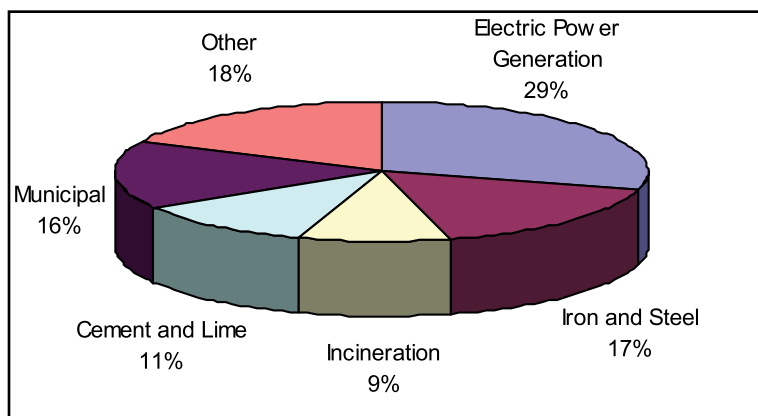


Figure 1-2. Sources of Mercury Releases in Ontario (2003).
Source: Environment Canada, Ontario Region (2005)

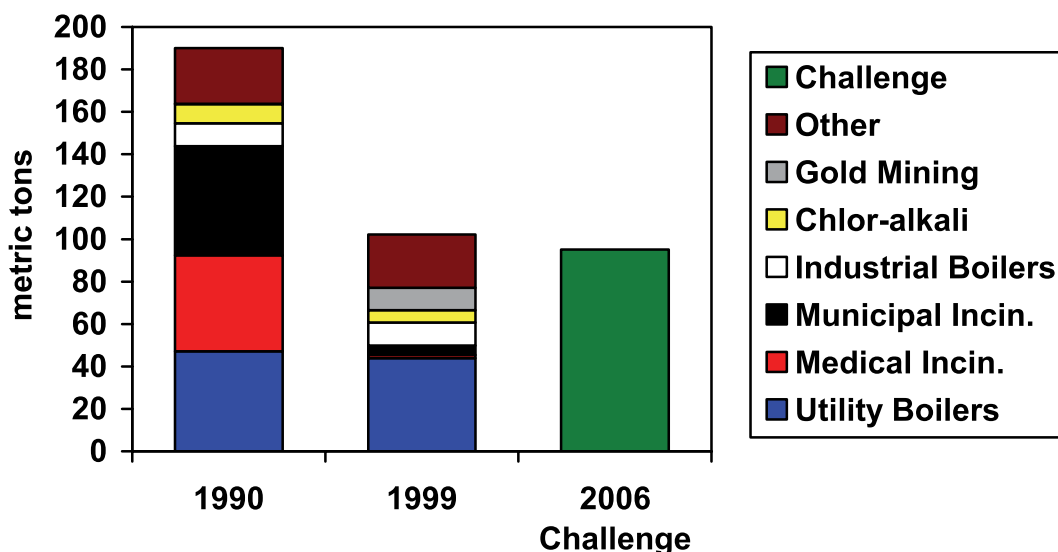


Figure 1-3. U.S. Mercury Emissions: 2006 Challenge, 1990 Baseline.
Source: US EPA, Office of Air Quality Planning and Standards, National Emissions Inventory



Table 1-1. U.S. Mercury Use (tons).

Industry/Product Category	1995*	1997*	2003*
Chlor-alkali Production**	160	116	38
Wiring Devices and Switches	92	63	63
Measurement and Control Devices	47	26	26
Dental***	35	44	35
Lighting****	33	32	6
Other	102	40	40
Total	469	321	208

*Source for 1995 and 1997 (except chlor-alkali data): U.S. Geological Survey, Minerals Yearbook, 1995 and 1997 – converted to short tons. For 2003, assume that use has not changed, except in chlor-alkali, lighting, and dental categories.

**Chlorine Institute, Seventh Annual Report to US EPA, July 22, 2004. Mercury “used” rather than mercury “purchased.” Under this definition of “use,” mercury purchased and placed in inventory or added to cells to increase working stock of mercury does not count as “use.”

*** Vandeven J, McGinnis SL. An Assessment of Mercury in the Form of Amalgam in Dental Wastewater in the United States. Water, Air and Soil Pollution 2005; 164:349-366.

**** Source of 2003 estimate: E-mail from Ric Erdheim, National Electrical Manufacturers Association, May 27, 2004.

(see Figure 1-4). The chlor-alkali industry accounted for an estimated 35 percent of mercury use in 1995, and its total mercury use decreased 76 percent between 1995 and 2003 (including the impact of plant closures), and a total of 92 percent between 1995 and 2004. The fluorescent lamp industry has reported that mercury use in 2003 was six tons, compared with 32 tons estimated by the USGS for 1997 (see Table 1-1). These reductions are the result of reductions in the mercury content of lamps sold in the U.S., as well as an increase in lamp imports and a decline in U.S. fluorescent lamp production. Including lamp imports, an estimated seven tons of mercury was contained in lamps sold in the U.S. in 2003, representing a decrease of two tons since 2001 and 20 tons since 1990. Lamp manufacturers use mercury both in lamps and in the production process. (Minerals Yearbook, 1995, 1997; Chlorine Institute Annual Report to US EPA, 2004; National Electrical Manufacturer’s Association, direct communication, 2004)

It is likely that mercury use has declined even more than portrayed in Figure 1-4, because mercury use in other categories also has decreased. For

instance, evidence suggests that use of mercury in measurement and control devices and switches and relays has decreased. These reductions cannot be quantified and are not visible in Figure 1-4.

Workgroup Activities

Workgroup Meetings

On November 30, 2004, the Mercury Workgroup held a meeting that focused on reducing mercury in auto switches, and on potential state regulation of mercury emissions from electric utility boilers. In addition, the workgroup addressed mercury use by the chlor-alkali industry, management of mercury-containing thermostats, implementation of the North American Mercury Action Plan, coal-blending for mercury emissions reduction, mercury use reduction, and mercury emissions inventories.

At its May 17, 2005, meeting, the Mercury Workgroup focused on gaining a better understanding of mercury in the environment, with presentations on mercury transport, mercury effects on wildlife, the Mercury Experiment to Assess Atmospheric Loading in Canada and the U.S. (METAALICUS), mercury trends in Canadian wildlife, and sport fish consumption advisories in Ontario. The workgroup also heard presentations on the Canada-wide Standards (CWS) for mercury emissions from coal-fired power plants, the costs and benefits of the Clean Air Mercury Rule (CAMR) in the U.S., and on mercury use by the chlor-alkali industry. The workgroup also discussed the draft Management Assessment for Mercury.

Management Assessment for Mercury Drafted

The workgroup co-chairs completed a draft Management Assessment for Mercury and accepted comments from workgroup members. The draft Management Assessment for Mercury concludes that mercury should remain in Level 1 status with periodic reassessment by the GLBTS. It also finds that the Mercury Workgroup should: (1) disseminate information about removal of mercury devices in auto scrap, appliances, and industrial equipment, and on assisting state, provincial, and local governments identify cost-effective reduction approaches for mercury releases from dental offices, and (2) participate in national and international mercury reduction programs.

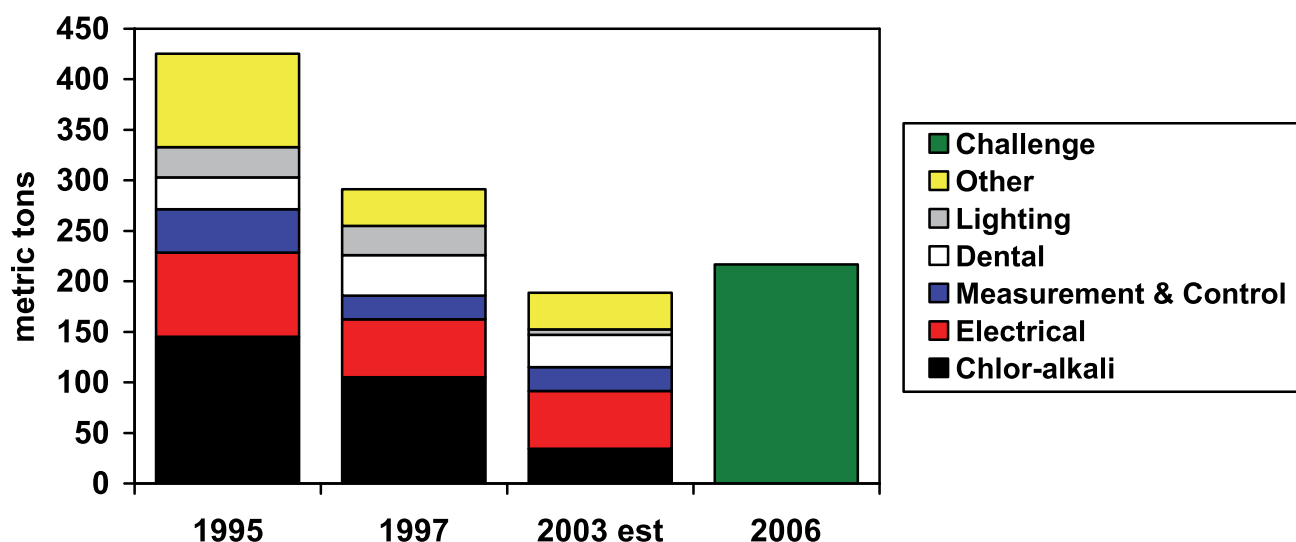


Figure 1-4. U.S. Mercury Use: 2006 Challenge, 1995 Baseline. Source: USGS,

U.S. Reduction Activities

NEMA Improves Success of Thermostat and Lamp Recycling

In 2004-2005, member companies of the National Electrical Manufacturers Association (NEMA) continued progress in reducing the contribution of electrical products to mercury in the environment. Two areas of progress are mercury-containing thermostats and fluorescent lamps, both of which can be recycled nationwide through industry-sponsored programs.

Thermostat manufacturers use mercury to achieve more precise temperature control and to ensure ease of use and retrofitability. In response to environmental concerns, the industry funds the Thermostat Recycling Corporation (TRC) to limit the disposal of mercury-containing thermostats in solid waste landfills, incinerators, mixed waste composting systems, and other methods of solid waste disposal. The TRC enables wholesalers and contractors across the country to collect and ship mercury thermostats without charge to an industry facility for disassembly and recycling. In 2004, the TRC recovered more than 80,000 thermostats, thereby removing 730 pounds of mercury from the solid waste stream. Thermostat collections for 2004 exceeded those collections in 2003 by 23 percent, while the overall mercury removed from the solid waste stream for 2004 exceeded the reduction numbers in 2003 by 17 percent. Figures for the first half of 2005 indicate similar growth for this year. However, most mercury thermostats are still not collected at the end of their lives. The TRC,

in conjunction with heating, ventilation and air conditioning contractors and state governments, are working with the Product Stewardship Institute to try to improve participation in the program.

Meanwhile, households and businesses seeking to dispose of mercury-containing fluorescent lamps can go to www.lamprecycle.org for assistance. This website is funded by the lamp industry and is maintained by NEMA and the Association of Lighting and Mercury Recyclers (ALMR). It functions as a guide to a comprehensive service network throughout North America that provides assistance with collection, processing, recycling and recovery of spent mercury lamps and lighting accessories. In 2004, households and business owners recycled 156 million lamps through the ALMR network. Meanwhile, the ALMR and NEMA are collaborating with the US EPA on outreach activities aimed at spreading awareness of lamp recycling facilities and increasing the rate of collection. In 2004, ALMR estimated that 71 percent of lamps used by businesses, and 98 percent of lamps used in homes are not being recycled.

US EPA Regulates Mercury Air Emissions

On March 15, 2005, US EPA finalized a rule controlling mercury emissions from coal-fired electric utilities. The Clean Air Mercury Rule (CAMR) requires states to submit plans that will, in aggregate, reduce mercury emissions by 21 percent by 2010 and 69 percent by 2018. States may choose to participate in a national emissions trading program or to reduce emissions deeper than federal requirements.



2005 Compendium of State Mercury Activities

States were very active in 2005, both in implementing mercury reduction programs and passing new legislation dealing with mercury in products, wastes, and emissions. The Environmental Council of the States and the National Wildlife Federation have compiled a compendium of state activities on mercury, which is available at http://www.ecos.org/section/2005_mercury_compendium.

Hospitals for a Healthy Environment Program Enlists New Partners

The Hospitals for a Healthy Environment (H2E), a joint project of the American Hospital Association, Health Care Without Harm, the American Nurses Association, and the US EPA, is a voluntary program with 1,078 partners representing 5,169 facilities: 1,188 hospitals, 2,620 clinics, 497 nursing homes, and 864 other types of facilities. These partners are health care facilities that have pledged to eliminate mercury and reduce waste, consistent with the overall goals of H2E. This program is continuing to grow and has enlisted 165 new partners in the last year.

Chlorine Industry Continues Voluntary Mercury Reduction Commitment

The Chlorine Institute released its Eighth Annual Report to EPA, showing an 88 percent capacity-adjusted reduction in mercury consumption by the U.S. chlor-alkali industry between 1995 and 2004, exceeding this sector's commitment to reduce mercury use by 50 percent by 2005. Including shutdowns of mercury cell factories, mercury use has decreased by 92 percent. The report also describes the industry's efforts to meet its commitments to enhance cell room air monitoring and to fully account for mercury inventory. The industry could not account for 30 tons of mercury in 2003; this amount was reduced to seven tons in 2004.

National Estimates of Mercury Releases from Products

US EPA Region 5, in conjunction with the Wisconsin Department of Natural Resources (WDNR), Dane County, Wisconsin, and Barr Engineering, has developed estimates of nationwide mercury releases from products. These estimates are derived from a mercury product flow model that combines data on the amount of mercury in products produced or sold with distribution factors that indicate what happens to mercury through the product life-cycle. This technique yields estimates of the distribution of mercury-containing products, including what

percentage are landfilled, versus incinerated or melted in a steelmaking furnace. These estimates then can be combined with release factors to calculate the amount of mercury released to air, water, and land. This approach results in an improved estimate of mercury releases and can also be used to predict the impacts of options that would decrease mercury use or improve management of mercury-containing wastes. Preliminary results of this project were presented at the December 6, 2005, Mercury Workgroup meeting (the presentation is posted at <http://www.epa.gov/bns/reports/stakesdec2005/mercury/Cain.pdf>).

Canadian Reduction Activities

Municipal Actions to Reduce Mercury

In February 2005, the Association of Municipal Recycling Coordinators (AMRC) hosted a workshop on actions that municipalities can take to reduce mercury. Approximately 135 participants representing municipalities from across Ontario attended the session. The workshop built upon experience in both Canada (e.g., Region of Niagara, EcoSuperior) and the U.S. (e.g., Delta Institute).

Following the workshop, a Canada-Ontario guidance document was prepared on how to develop and implement municipal actions to reduce mercury. This guide has been distributed to municipalities in Ontario.

Ontario Dentists Reduce Mercury Releases

Ontario Regulation 196/03 required all dental clinics that place, repair, or remove amalgam to install a dental amalgam device that meets or exceeds the ISO standard for dental amalgam separators. The Royal College of Dental Surgeons of Ontario, the regulatory body for the dental profession, has indicated that approximately 99 percent of dentists appear to be in compliance. Ontario is compiling data on mercury concentrations in biosolids from various municipalities in Ontario as a performance indicator of mercury reductions in this sector.

A Best Management Practices (BMP) Guide for the Dental Community, produced by EC, the Ontario Ministry of the Environment (MOE), the Ontario Dental Association (ODA) and other dental stakeholders was distributed to more than 8,000 dentists in Ontario by the ODA.



Auto “Switch Out” Program Participation Increases

The “Switch Out” program was launched in 2001 to recover mercury switches from end-of-life vehicles. The Clean Air Foundation manages the program and works with automobile recyclers from across Canada. As of July 1, 2005, more than 450 automobile recyclers were participating in the program and close to 80,000 switches had been collected.

Promoting Reductions in the Healthcare Sector

In February 2005, the Ontario Hospital Association (OHA) hosted a “Greening Health Care” workshop in Toronto. This was the latest in a series of successful workshops promoting mercury reductions and pollution prevention. The workshops were organized by the OHA and other organizations over the past several years.

In September 2003, EC and Natural Resources Canada hosted a “Greening Health Care” workshop that was facilitated by the Canadian Centre for Pollution Prevention: “Green Health Care: Purchasing Choices that Will Help Reduce Your Energy Costs & Environmental Impact”. As a follow up to that workshop, information pamphlets concerning two case studies were prepared and distributed to stakeholders in this sector:

- “Replacing Histological Reagents Containing Mercury in Hospital Laboratories”
- “Replacing Cleaners Containing Nonylphenol (NP) and Its Ethoxylates (NPEs) in Health Care Facilities”.

Canada-Wide Standard (CWS) for Lamps is Achieved

In October 2004, the Electro-Federation Canada reported that the average mercury content of all mercury-containing lamps sold in 2003 was 11.4 mg per lamp. This represents a 73.5 percent reduction from the 1990 CWS baseline and exceeds the CWS target of 70 percent reduction by 2005. The CWS also requires an 80 percent reduction by 2010.

Canada-wide Standard for Coal-Fired Electric Power Generation Plants

In June 2005, the Canadian Council of Ministers of the Environment (CCME) accepted in principle a draft CWS that would significantly reduce mercury emissions from the coal-fired electric power generation sector. Final endorsement of the CWS by ministers is expected in early 2006.

This CWS consists of two sets of targets:

- Provincial caps on mercury emissions from existing coal-fired electric power generation plants, with the 2010 provincial caps representing a 65 percent national capture of mercury from coal burned, or 70 percent including recognition for early action. The Ontario 2010 cap reported as kilograms per year (kg/yr) is zero.
- Capture rates or emission limits for new plants, based on best available control technology, are effective immediately. Capture rates and emission rates are based on coal type. A 75 percent capture rate has been established for sub-bituminous coal and lignite, and an 85 percent capture rate has been established for bituminous coal and blends.

Based on reports on progress, the CWS may be reviewed by 2012 to explore the capture of 80 percent or more of mercury from coal burned for 2018 and beyond.

Next Steps

The Mercury Workgroup will complete the Management Assessment for Mercury, and continue to focus on sharing information about cost-effective reduction opportunities, tracking progress toward meeting reduction goals, and publicizing voluntary achievements in mercury reduction. The workgroup will provide a forum for discussion of cost-effective approaches for removing mercury from metal scrap and reducing mercury releases from dental offices. In addition, the workgroup will begin to focus more on exploring ways to impact global releases of mercury.

In addition, the workgroup will continue to try to improve quantification of mercury emissions sources, including global emissions sources. The December 6, 2005, workgroup meeting focused on quantifying sources, including atmospheric emissions in China, emissions from global mining and smelting of metals, and U.S. emissions caused by use and disposal of mercury-containing products.

References

Murray, M.; Holmes, S.A. (2004) Assessment of mercury emissions inventories for the Great Lakes states. *Environ. Res.* 95:282-297.



2.0 POLYCHLORINATED BIPHENYLS (PCBs)

Canadian Workgroup co-chair: Ken De
U.S. Workgroup co-chair: Tony Martig

Progress Toward Challenge Goals

U.S. Challenge: Seek by 2006, a 90 percent reduction nationally of high-level PCBs (>500 ppm) used in electrical equipment. Ensure that all PCBs retired from use are properly managed and disposed of to prevent accidental releases within or to the Great Lakes Basin.

Canadian Challenge: Seek by 2000, a 90 percent reduction of high-level PCBs (>1 percent PCB) that were once, or are currently, in service and accelerate destruction of stored high-level PCB wastes which have the potential to enter the Great Lakes Basin, consistent with the 1994 COA.

The U.S. and Canada have both made progress toward reaching the PCB challenge goals outlined in the Strategy. However, as described below, some data gaps exist regarding the amount of PCBs in remaining equipment and storage. Information continues to be gathered and assessed by US EPA and EC to determine whether the U.S. and Canadian PCB challenge goals have been met in their entirety. While the U.S. has made progress in reducing the amount of equipment in service containing >500 ppm PCBs, they are lacking sufficient data to determine with accuracy the status of progress toward the goal. As described below, it appears that Canada is likely to achieve a 90 percent reduction of high-level PCBs in storage (thus meeting the non-quantitative challenge goal of accelerated destruction), but unlikely to meet the 90 percent reduction goal for PCBs that are still in service.

The PCB Workgroup is active and continues to pursue reduction opportunities and outreach activities. Potential amendments of PCB regulations mandating phase-out dates are being pursued and assessed by EC. The U.S. is evaluating opportunities to comply with the Stockholm Convention, which includes goals to phase out PCBs.

Ontario: Progress Toward the GLBTS Challenge

According to EC's latest PCB Inventory reports, as of December 2004, about 89 percent of previously stored high-level PCB wastes had been destroyed (compared to 1993), and the number of PCB storage sites had been reduced to 420 from 1,529 in 1993 (see Table 2-1 and Figure 2-1). However, as described below, some data gaps exist regarding PCBs in remaining equipment that is still in service. In Canada, as of December 2004, there were still approximately 3,086 tonnes (in net tonnes) (6.8 million pounds) of high-level PCBs in use/service that need to be targeted for phase out. This is a reduction of approximately 36 percent compared to the 1993 inventory and a reduction of approximately 63 percent since 1989 (see Figure 2-2).

The figures reported for EC are based on historical data recorded in EC's database and should be accurate with a possible time lag, based on the timing and updating of the received data in the database. EC continues to update its inventory information annually and will be able to accurately state the percentage reductions achieved by 2006.

The lack of progress in reducing in-service PCB equipment is due to economic issues facing PCB equipment owners. The average cost to replace and destroy an Askarel transformer is estimated to be \$62,000 (CAD) (Headwater Environmental Services Corp., 2005. "Economic Analysis of

Table 2-1. PCB Storage Sites Remaining in Ontario
Source: Environment Canada

	Dec. 1994	April 2003	April 2004	Dec. 2004
Federal Sites	109	25	26	21
Non-federal Sites	1429	530	407	399
Total Sites Remaining	1538	555	433	420

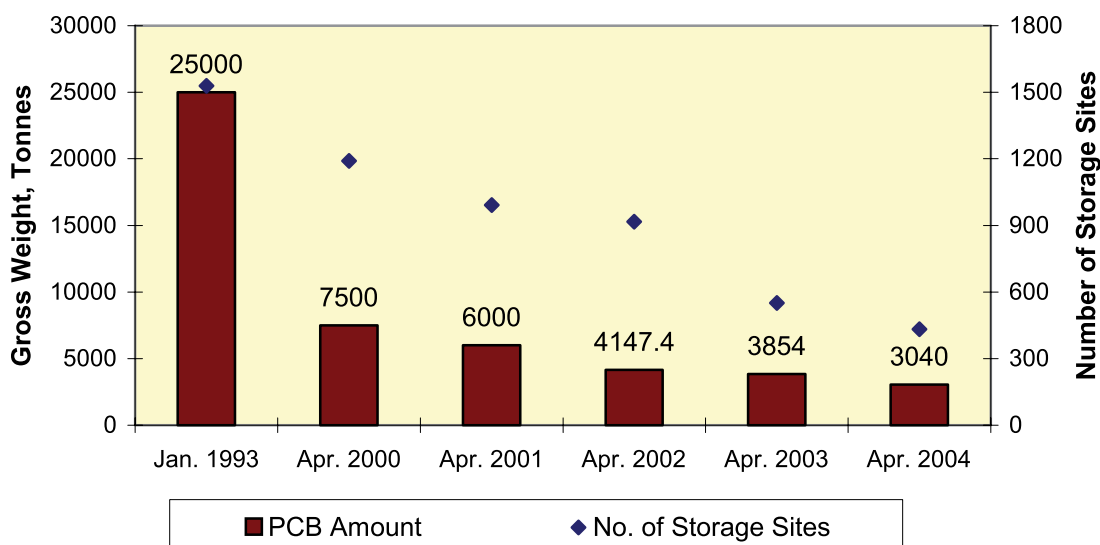


Figure 2-1. High-Level PCBs (Gross Tonnes) in Storage in Ontario.
Source: Environment Canada, Ontario MOE PCB Database

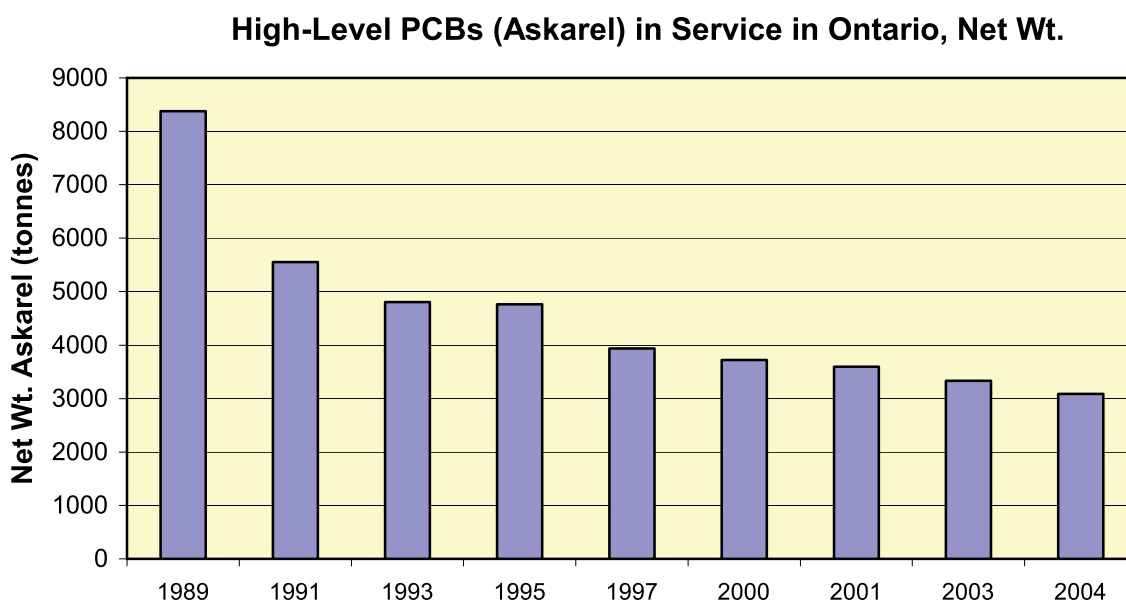


Figure 2-2. Trends in High-Level (Askarel) PCBs (Net Tonnes) in Service in Ontario.
Source: Environment Canada

Proposed Revisions to the Chlorobiphenyl and PCB Storage Regulations”), and a large transformer can cost \$250,000 (CAD) or more. For most small- to medium-sized industries, this is a staggering cost, especially when the owner considers that the existing transformer is functioning well. For larger businesses with many transformers or several very large transformers, the cost must be spread over many years.

The PCB Workgroup continues to raise awareness of the need to reduce PCBs through outreach and the PCB Phase-Out Awards Program (in Canada).

United States: Progress Toward the GLBTS Challenge

An estimated 113,000 PCB transformers and 1,330,000 large PCB capacitors remained in use at the end of 2003. According to annual reports submitted to US EPA by PCB disposers, about 110,000 PCB transformers and 166,000 large PCB capacitors were disposed of between the 1994 baseline and the end of 2003. The estimates for the amount of equipment remaining in use in 2003 were obtained by abstracting the annual disposal data from the 1994



estimated baseline. However, the US EPA expects the amount of PCB equipment remaining in use to be much less because the disposal of every PCB transformer or capacitor may not be accounted for in the annual reports. Supporting this expectation is that, in 2000, 20,000 PCB transformers were registered with US EPA. US EPA currently is compiling PCB disposal information for 2004 and updating the PCB transformer registrations. Upon completion of the registration update, US EPA will re-evaluate the data gaps in the inventory.

Workgroup Activities

Workgroup Meetings

The PCB Workgroup met on March 23, 2005, and on May 17, 2005. Both meetings focused on the draft Management Assessment for PCBs.

During the meeting on March 23, in Windsor, the workgroup discussed the revised draft of the Management Assessment for PCBs (March 15, 2005 draft) that had been updated during the month of February, with a focus on revising the summary of the report to be presented to the Integration Workgroup. Key issues discussed included data quality, interpretation and characterization of the data, which data to include, who should participate in the data review (e.g., more input may be needed from EC/US EPA environmental media experts), how to handle the issue of coplanar PCBs (e.g., defer to the Dioxin Workgroup), and whether the original challenge goals are appropriate given more recent information on sources.

Workgroup discussions at the March 23 meeting concluded with the following recommendations for management outcomes:

- Continue progress toward the current challenge goals
- Continue existing programs (e.g., U.S. national PCB program, Canadian regulations)
- Support and help to coordinate information-gathering efforts to prioritize the remaining PCB sources and determine trends
- Possibly set new challenge goals.

At the conclusion of the March 23 meeting the proposed final management outcome for PCBs was

to maintain active Level 1 status with a priority on collecting information on PCB sources.

During the May 17 meeting, in Toronto, the workgroup reviewed the revised draft Management Assessment for PCBs that was updated in April, based on outcomes of the March meeting and written comments from workgroup participants received during the month of April. There was a discussion and exchange of information and ideas regarding the management assessment. The proposed final management outcomes for PCBs at the conclusion of the May 17 meeting were:

- Continue active Level 1 status
- Continue existing programs
- Coordinate information gathering and assessment to prioritize sources and determine trends.

The PCB Workgroup co-chairs extended the opportunity to comment on the draft Management Assessment for PCBs, and there was further discussion at the December 6, 2005, PCB Workgroup meeting. The Management Assessment for PCBs is undergoing finalization. Completing the management assessment is a workgroup goal for 2006.

The proposed final management outcomes for PCBs at the conclusion of the December 6, 2005, meeting were:

- Continue active Level 1 status because the PCB Workgroup believes that work remains to be done
- Continue existing programs, including potential coordinated work with the Dioxin Workgroup on co-planar PCBs
- Coordinate information gathering and assessment to prioritize sources and determine trends.

Reduction Activities

U.S. PCB Phasedown Program

In an effort to clarify information in US EPA's PCB Transformer Registration Database, the US EPA contacted up to 2,400 entities that registered PCB transformers with the US EPA. During that effort, many entities indicated that they had already removed their PCB transformers since registering them in 2000. US EPA currently is compiling the



clarification information, which should be available in early 2006, and will then update the database.

In addition, US EPA has begun to develop a nationwide effort to seek the voluntary phase-out of PCB electrical equipment. The finalization and actual implementation of a national US EPA program is expected in early 2006, dependant upon programmatic resources.

U.S. Stakeholders PCB Phase-out Efforts

The Utility Solid Waste Activities Group (USWAG) is committed to promoting, among its members and other users of PCB-containing equipment, voluntary efforts to identify and retire PCB-containing equipment from service. Many companies have voluntarily removed all known categories of PCBs (e.g., ≥ 500 ppm) from their systems. Other efforts include procedures to ensure that equipment containing PCBs in concentrations ≥ 50 ppm that is removed from the field is either disposed of and not returned to service, or is retrofilled with non-PCB mineral oil before being returned to service. USWAG shares information regarding the potential locations of PCB-containing equipment in service. USWAG is also committed to promoting strategies for members to work with their industrial and commercial customers to provide technical assistance for removing PCBs from service. These commitments and achievements help to demonstrate that the U.S. is fulfilling the goals set out in the Stockholm Convention on Persistent Organic Pollutants.

Canadian Stakeholders PCB Phase-out Efforts

Commencing in 1999, PCB reduction commitment letters were mailed to priority industry sectors, including school boards and other sensitive sites (food, beverage, hospitals, care facilities, and water treatment industries). Follow-up phone calls were made and additional letters were sent in 2003 and 2004. Over 1,000 letters sent out for inventory updates during the months August to November 2005 have received a good response so far. Over 400 completed commitment forms have been returned to EC. The return letters have also been extremely useful in updating the federal PCB inventory information. A number of companies in the iron and steel, utilities, pulp and paper, and metals and mining sectors have voluntarily undertaken initiatives to eliminate (particularly) high-level PCBs in use and/or storage. Additional companies are being identified as "PCB Free," and these will be used to update the

inventory of "PCB Free" companies during the 2005-2006 fiscal year.

PCB Phase-out Awards Program (Canada)

The Canadian workgroup has developed a plan of outreach and recognition to try to increase awareness and the rate of PCB phase-out (see Table 2-2). The main elements of the plan are to:

- Award a plaque to each eligible company that becomes PCB free or reaches a major PCB target (90 percent reduction and above).
- Take a photograph of the award presentation and develop a case study (success story).
- Post the photograph and case study or success story on the website and make copies available for distribution.
- List the names of award winners in GLBTS, International Joint Commission (IJC), government and trade association publications. An event report on the May 2005 PCB Award Ceremony has been published under the title: "Ontario companies recognized for PCB phase-out" page 8, Canadian HazMat Magazine, June/July 2005, which is accessible at www.hazmatmag.com.
- Make presentations at trade association meetings and conferences.

In May 2005, two awards were presented at the GLBTS Stakeholder Forum meeting in Toronto. The awards were presented to General Motors - St. Catharines Powertrain Plant and Ontario Power Generation – Nanticoke Generating Station for their achievements in PCB elimination.

Canadian Case Studies

Case studies for all of the award recipients listed in Table 2-2 have been completed and printed in hardcopy. Copies may be requested from Ken De, the Canadian PCB Workgroup co-chair, by e-mail at ken.de@ec.gc.ca or by phone at (416) 739-5870. The case studies also will be posted on the GLBTS PCB website when the revisions to the website are completed. The goal of the case studies is to promote the removal of PCBs by companies that have not yet done so by providing examples of beneficial factors considered when companies decided to remove their PCBs.

Canadian GLBTS PCB Newsletter

The second edition of the EC GLBTS PCB Newsletter was published in the June/July 2005 issue of Canadian



HazMat Magazine and can be downloaded from www.hazmatmag.com, or may be obtained from Ken De, EC (see above for contact information). The PCB Newsletter will be used to promote the workgroup's PCB elimination and award programs. The purpose of the PCB Newsletter is to summarize information about the GLBTS, PCBs as an environmental hazard, the PCB Phase-Out Awards Program, and other issues in an eye-catching, simplified format. The main target audience is PCB-owning industries, in particular industrial environmental managers.

Canadian Regulatory Activities

EC's PCB regulations are being amended and targeted for Canada Gazette publication in 2006. These regulations are:

- 1) The Chlorobiphenyl Regulations (1977)
- 2) The Storage of PCB Material Regulations (1992)
- 3) Export of PCB Regulations (1996)
- 4) Federal PCB Destruction Regulations (1989).

The most significant proposed revisions to the regulations are the imposition of strict phase-out dates for certain categories of PCBs. The most important phase-out targets proposed are:

- Phase-out of all in-service high-level PCBs (>500 ppm PCB) by 2009 (except for pole-top transformers and equipment at electrical generation, transmission, and distribution facilities).
- Phase-out of all PCB storage sites by 2009.
- Phase-out of all "pad-mounted" (anything that is not pole-mounted) equipment with 50-500 ppm PCB by 2014.
- Phase-out of all pole-mounted transformers and all equipment at electrical generation, transmission, and distribution facilities by 2025.
- Re-use of transformer oils with 2-50 ppm PCB prohibited (this equipment will not have to be destroyed by any specific date, but removed from service, the oil must be decontaminated to below 2 ppm PCB).

Proposed revisions to the federal PCB destruction regulations would see the strengthening of emissions release provisions to bring the federal regulations in line with existing provincial requirements. More

information and updates can be found on the EC website at <http://www.ec.gc.ca/pcb/>.

Source Profiles and Emissions Quantitation of PCB to Ambient Air from Transformers

Samples of ambient air around operating PCB Askarel transformers were collected in January and October 2004. The samples were collected as part of the US EPA Great Lakes National Program Office (GLNPO)-funded project to study emissions of PCBs from in-service PCB transformers. The study, entitled Source Profiles and Emissions Quantitation of PCB to Ambient Air from Transformers, is being conducted by Dr. William J. Mills of the University of Illinois. US EPA is awaiting the final report.

Canadian PCB Strategy Document

A draft strategy document is being prepared with the purpose of examining the activities of EC and overall GLBTS management objectives and proposing new or revised initiatives that may be more effective in promoting PCB phase-out. Once this report is finalized, a new PCB Workplan will be developed for implementation in 2006.

Next Steps

The workgroup and agencies plan to continue their core activities noted above as well as continuing the following activities.

PCB Reduction Commitments

The PCB Workgroup will continue seeking commitments to reduce PCBs through PCB reduction commitment letters and other PCB phase-out efforts, and to publicize voluntary achievements in PCB reduction.

PCB Reassessment

The PCB Workgroup will complete the Management Assessment for PCBs and finalize the management outcomes. Because the workgroup has determined that several data issues exist (e.g., data quality and comparability issues) regarding PCB sources, levels, and trends in the environment, future workgroup activities will include further evaluation of the available data before final conclusions are made.

At this time, the workgroup recommends that PCBs should continue in active Level 1 status, with an initial priority of collecting and assessing a more complete set of data on PCB sources and environmental levels. The primary goals of this exercise will be to: (1) prioritize the remaining PCB sources (better defining



relative source contributions); (2) elucidate PCB trends and impacts on the environment; and (3) assess the ability of the GLBTS to effect further reductions. The Canadian Workgroup co-chair is planning to hold an expert's meeting to determine the state of science, from a Canadian point of view, on PCB sources and relative contributions to the Great Lakes. It is hoped that this meeting will highlight data gaps and lead the way for further recommendations on future research and data-gathering activities.

Work targeting PCB-containing equipment in service should continue (such as outreach to industry), due to the potential for the equipment to be a source of future releases, and should be coordinated with other efforts. Work targeting other areas, such as coplanar/dioxin-like PCBs, likely will be most efficiently and effectively addressed through referral or coordination

with participation in other forums, such as the Dioxin Workgroup.

Information Resources (Canada and United States)

The website for the GLBTS PCB Workgroup has not been updated recently. Continued effort will be made in 2006 to redesign the website and add all relevant information.

Table 2-2. Canadian Companies Receiving PCB Phase-out Awards

Company	Initial High-Level PCB Inventory	Phase-out History	% Reduction of High-Level PCBs
Hydro One	1983 - 40 large Askarel transformers and 30,000 PCB capacitors (large)	All removed and destroyed by 1999	100%
Enersource Hydro Mississauga	19,500 kg Askarel oil in transformers 14,000 kg Askarel transformer solids 67,000 kg PCB capacitors and ballasts (high-level)	Removed from service by 1990. Sent for destruction in 2000.	100%
Stelco, Stelpipe	5 large Askarel transformers 65 lighting and control (small) transformers	All removed and destroyed by 1998	100%
Slater Steel	Empty transformers, Askarel liquid (transformer oil), PCB contaminated mineral oil, capacitors, debris, metal debris	Sent for destruction in 1998	100%
City of Thunder Bay	44 drums containing over 25 tonnes of high-level PCB wastes	Removed from service between 1994 and 1998. Sent for destruction in 2001.	100%
Canadian Niagara Power	2 large Askarel transformers, 95 capacitors	Removed from service between 1993 and 2003. All sent for destruction by 2003.	100%
General Motors – St. Catharines	8 Askarel transformers 221 power-factor capacitors	Removal and destruction program commenced in 1996 and completed in 2000.	100%
Ontario Power Generation – Nanticoke	9 large with gross weight 43 tonnes each 61 medium size with average gross weight 4.6 tonnes 56 small with average gross weight 0.25 tonnes	Removal and destruction program commenced in 1998 and completed in 2004.	100%



3.0 DIOXINS/FURANS

Canadian Workgroup co-chair: Anita Wong
U.S. Workgroup co-chair: Erin Newman

Progress Toward Challenge Goals

U.S. Challenge: Seek by 2006, a 75 percent reduction in total releases of dioxins and furans (2,3,7,8-TCDD toxicity equivalents) from sources resulting from human activity. This challenge will apply to the aggregate of releases to the air nationwide and of releases to the water within the Great Lakes Basin.

Canadian Challenge: Seek by 2000, a 90 percent reduction in releases of dioxins and furans from sources resulting from human activity in the Great Lakes Basin, consistent with the 1994 COA.

According to the most recent dioxin release data available, the U.S. and Canada have both made significant progress toward reaching the dioxin/furan reduction goals outlined in the GLBTS.

Ontario: Progress Toward the GLBTS Challenge

Canada has made significant progress toward meeting the goal of a 90 percent reduction in releases of dioxins and furans, achieving an 87 percent reduction (227 grams) of total releases within the Great Lakes Basin, relative to the 1988 Canadian baseline. This reduction is based on the 2004 release inventory update for Ontario sources⁴, which estimates a total annual dioxin/furan release of 35 grams. Much of the reductions achieved are attributable to the pulp and paper sector after federal regulations were impending or imposed, closure of hospital waste incinerators by the Ontario government (in anticipation of Ontario Regulation 323/02), and closure of an iron sinter plant and a municipal waste incinerator. Figure 3-1 illustrates reductions in the top Canadian (Ontario) dioxin/furan emission sources for 1997 and 2001. The figure also includes a forecast for 2005.

The renewed Canada-Ontario Agreement (COA) with Respect to the Great Lakes Basin Ecosystem

commits to a 90 percent reduction in the release of dioxins/furans by the year 2005, from a baseline of 1988. Based on current initiatives under way or proposed for dioxins/furans, such as CWS for waste incineration, iron sinter and electric arc furnaces, it is expected that Canada will continue to work toward this commitment within the Great Lakes Basin.

United States: Progress Toward the GLBTS Challenge

Significant reductions have been achieved in the U.S., primarily from the use of MACT standards enacted under the CAA. For example, MACT standards are expected to achieve thousands of grams of reductions from large and medium size municipal waste incinerators; upon full implementation, the standards are estimated to reduce releases from this source category to approximately 12 grams TEQ. Other source categories with significant reductions resulting from the enactment of MACT standards include Medical Waste Incinerators (MWIs), hazardous waste-burning cement kilns, and secondary copper smelting. These reductions result from a combination of change in processes and equipment to comply with standards, pre-existing actions in the design and retrofitting of facilities, and facility closures.

The U.S. also is investigating numerous dioxin sources that have not as yet been added to the inventory. While the U.S. challenge goal for dioxin was met under the GLBTS, US EPA remains concerned about unquantified sources. Many of these sources are difficult to inventory, such as forest fires and other uncontrolled combustion sources. Acquiring data to characterize these sources remains a priority and long-term goal of the US EPA.

US EPA currently is working on a 2000 Dioxin Inventory, the most comprehensive dioxin inventory to date. This inventory indicates that major reductions have been achieved through implementation of the MACT program. Once the

⁴ Point sources are mostly based on 2003 NPRI data. Availability of final NPRI data is normally two years after the reporting year.



Dioxin Reassessment is final, the U.S. will be able to formally confirm achievement of the GLBTS challenge goal. This inventory also will be used by the workgroup to investigate sources directly within the Great Lakes Basin.

Figure 3-2 illustrates the top U.S. inventoried dioxin emission sources from 1995. The figure also includes projected estimates for 2002/04.

Workgroup Activities

Workgroup Meetings

In the past year, the Dioxin/Furan Workgroup has made the following progress in the 4-step process:

- The workgroup continues to follow the Dioxin/Furan Workplan formally adopted in December of 2003.
- The workgroup held a call on February 15, 2005, to address comments on four issue papers on uncontrolled combustion sources: agricultural burning, wildfires and prescribed burning, tire fires, and structural fires.
- The workgroup has developed a Management Assessment for Dioxins and Furans using the General Framework to Assess Management of GLBTS Level 1 Substances.
- The draft Management Assessment for Dioxins and Furans was presented to the Integration Workgroup on March 23, 2005.
- The workgroup held a call on May 3, 2005, to discuss the status of the Management Assessment report.
- The workgroup finalized the four issue papers on uncontrolled combustion sources.
- The workgroup met on May 17, 2005, at the GLBTS Stakeholder Forum in Toronto, Ontario. The workgroup discussed updates on burn barrel reduction efforts, finalized the uncontrolled combustion issue papers, and reviewed the latest version of the Management Assessment for Dioxins and Furans.
- The workgroup held a call on August 4, 2005, to address outstanding comments on the Management Assessment report.
- The Burn Barrel Subgroup met by teleconference five times in 2005: on January 18, March 8, May 10, September 13, and November 8. Topics related to reducing the practice of open burning were discussed, including: input to workshops; burning of waste pesticide containers; community health agencies and cancer control plans; discussion of the Northeast States' Joint Resolution Promoting Interstate Cooperation to Reduce Air Pollution from Open Burning of Solid Waste; and sharing of activities by the various agencies represented on the subgroup (e.g., WDNR, Minnesota Pollution Control Agency (MPCA), Illinois Environmental Protection Agency, Michigan Department of Environmental Quality (MDEQ), Ontario MOE, Bad River Band of Lake Superior Chippewa Indians, Leech Lake Band of Ojibwe, Chiefs of Ontario, Western Lake Superior Sanitary District (WLSSD), Northwest Michigan Council of Governments, Chlorine Chemistry Council, Council of Great Lakes Industries (CGLI), Cancer Action New York, Johnson Depp & Quisenberry, New York Academy of Sciences, US EPA, and EC).

Reduction Activities

Burn Barrels and Household Garbage Burning

Burn barrels and other household garbage burning methods remain a high reduction priority for the workgroup. Household garbage burning is estimated to emerge as the largest source of dioxin emissions after air emissions standards for industrial sources are in place. The practice of household garbage burning typically is carried out in old barrels, open pits, woodstoves, or outdoor boilers. The Burn Barrel Subgroup, led by Bruce Gillies of EC, is addressing this issue. The subgroup maintains a website for information sharing at www.openburning.org.

The following workshops on options for reducing burning were offered to local officials in the Lake Superior region:

- Open Garbage Burning: Preventable Pollution - A Workshop for Local Officials, March 4, 2005, Duluth, Minnesota. The workshop was hosted by the WLSSD and sponsored by the US EPA GLNPO. The workshop was well attended, with approximately 100 participants.
- Landfill Sites in Northwestern Ontario: Issues and Opportunities, March 2, 2005, Thunder Bay, Ontario. The workshop was hosted by EcoSuperior Environmental Programs and Ontario First

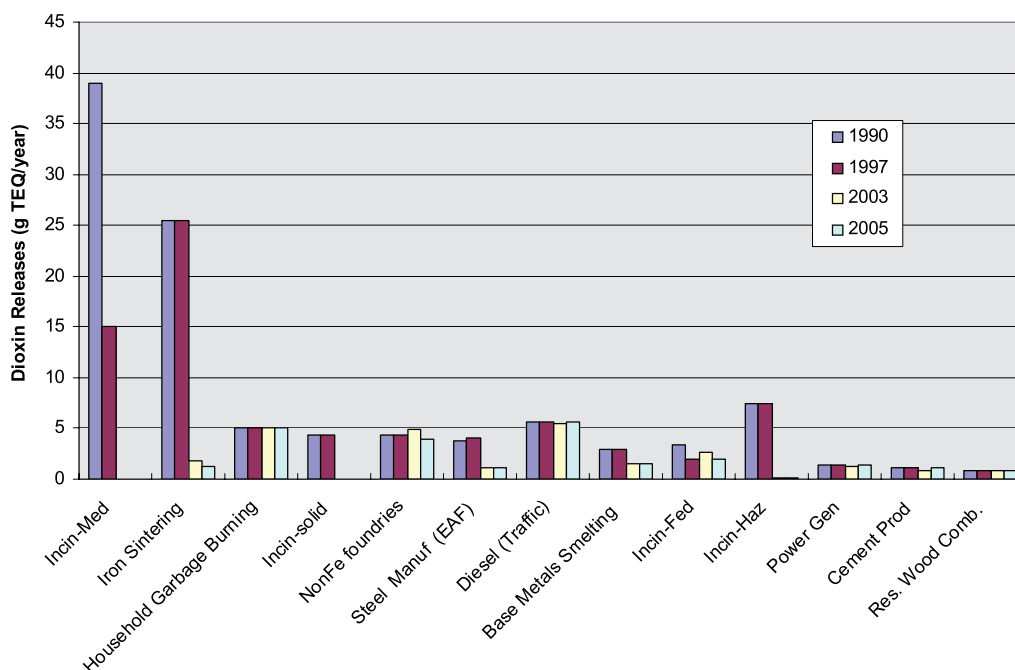


Figure 3-1. Top Canadian (Ontario Region) Dioxin/Furan Emission Sources.
Source: Environment Canada, Ontario Region⁵

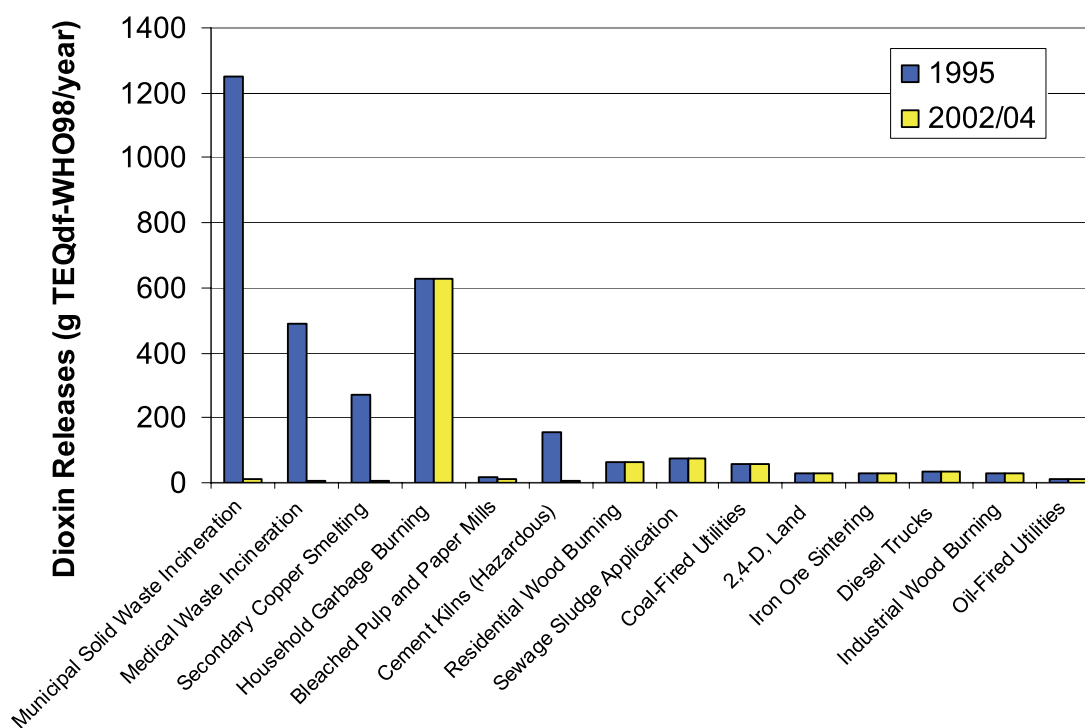


Figure 3-2. Top U.S. Inventoried Dioxin Emissions with Projected Estimates for 2002/04.
Source: Inventory of Sources of Dioxin in the U.S., US EPA, March 2000, External Review Draft

⁵ For air releases, numbers for the baseline year of 1988 are the same as for 1990. Pulp and paper releases are not shown, as this source contributed 146 grams in the base year and would have masked all other sectors on the graph. Also note, data for 2005 are forecasted.



Nations Technical Services Corp., and sponsored by EC.

More information about these workshops, including presentations and other materials, is available at www.c2p2online.com/main.php3?session=§ion=144&doc_id=293.

An updated guide “Clearing the Air: Tools for Reducing Residential Garbage Burning” was compiled in 2005 by the WLSSD in partnership with the Minnesota Office of Environmental Assistance, funded through a grant from the US EPA GLNPO. This 44 page toolkit includes information and resources to help local officials, community educators, and concerned citizens stop the hazardous practice of garbage burning in their communities. The toolkit focuses on public education, waste disposal infrastructure, and establishing and enforcing local ordinances.

Twenty-two U.S. burn barrel case studies were compiled by Battelle for the US EPA. These efforts include alternatives to burning in seven counties, six Tribes, four States, three cities, and two solid waste districts across the U.S. In many cases, community demographics are provided, such as population and per capita income, to help state, local, and Tribal officials determine whether an approach that worked for one community might work in their own community. The case studies are being finalized, but a draft is available at www.openburning.org.

US EPA continues to maintain a website of burn barrel information at www.epa.gov/msw/backyard.

Great Lakes States (including Illinois, Indiana, Minnesota, New York, Michigan, and Wisconsin) are continuing activities, consistent with the Burn Barrel Subgroup’s Household Garbage Burning Reduction Strategy, to educate and influence behavioral change, supported by infrastructure and the institution of local by-laws.

Inventory Improvements

US EPA maintains and annually updates the Toxics Release Inventory (TRI), a publicly available database that contains information on toxic chemical releases and other waste management activities. Due to the high toxicity of dioxins and furans to humans, as of 2000, US EPA requires facilities to report these compounds to the TRI; 129,571 grams of total releases of dioxin and dioxin-like compounds were reported

in the 2003 TRI. More information is available on the TRI website at www.epa.gov/tri.

In addition to the TRI, the eight Great Lakes States and the Province of Ontario maintain a regional emissions inventory for hazardous air pollutants, including dioxins and furans. US EPA also continues to update the National Dioxin Emissions Inventory, which indicates that more than 90 percent of all dioxin releases in the U.S. are from air sources. US EPA is separately tracking emission reductions from the MACT program requirements for MWCs and MWIs.

Beginning with the reporting year 2000, polychlorinated dibenzo-para-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF), as a group, are included in the list of substances required to be reported under EC’s National Pollutant Release Inventory (NPRI). The reported information is available to the public on an annual basis through the EC website at www.ec.gc.ca/pdb/npri. EC will use the NPRI data to update the point source information in the Ontario Dioxin/Furan Release Inventory. In 2003, 12.4 grams and 89.2 grams of total releases of dioxin and furans releases were reported in Ontario and Canada, respectively.

Through the Canadian Voluntary Stack Testing Program initiated in the spring of 2000, EC has conducted stack tests for dioxins and furans and many other substances of concern at nine volunteer facilities in Ontario. Between 2000 and 2002, a nickel-base metal smelter, two MWIs, a steel foundry, a Kraft boiler, and a crematorium were tested. In 2003, an additional Kraft boiler located in Marathon and two animal carcass incinerators (Ecowaste and Burneasy) were tested. In 2004, the Newmount Gold Mill in Marathon, Ontario, was tested with mercury as the principal pollutant of concern; however, dioxins and furans were tested in the carbon kiln exhaust. Results were reported at the December 6, 2005, Dioxin Workgroup meeting. The information gathered through this program will help improve release inventories for dioxins and furans as well as other GLBTS substances.

Ambient Air Monitoring

US EPA conducts air monitoring for dioxin under the National Dioxin Air Monitoring Network (NDAMN), in order to track fluctuations in atmospheric deposition levels. NDAMN was initiated in year 1998. Results for years 1998 through 2001 currently

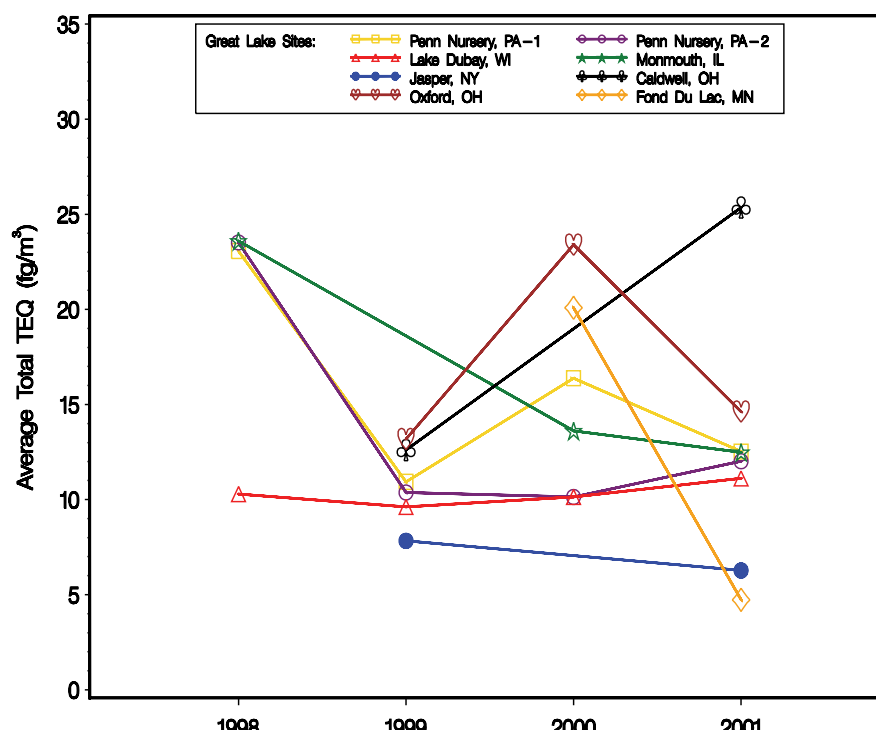


Figure 3-3. NDAMN Average Total TEQ Concentrations, including Dioxins, Furans, and Dioxin-like PCBs, for Sites in the Great Lakes Region, 1998-2001. Source: US EPA

are available (see Figure 3-3). No clear trends over time are apparent from the NDAMN data.

Ambient air monitoring of GLBTS substances has been conducted in Canada since 1996 through the National Air Pollution Surveillance Network (NAPS) (see Figure 3-4). Dioxins and furans have been monitored at 12 stations in Ontario, comprised of eight urban and four rural sites. Results show elevated levels at urban sites compared to rural sites but a decreasing trend in concentrations overall. All concentrations remain below the Ontario MOE ambient air quality criterion of 5 picograms per cubic metre (TEQ), 24-hour average.

From 1999 to 2003, the highest TEQ (765 femtograms per cubic metre) was recorded in Hamilton at the Confederation site (see Figure 3-5). The station was near the Solid Waste Area Reduction Unit (SWARU) municipal waste incinerator, which was shut down in December 2002. In August 2003, PCDD/PCDF sampling began at an Integrated Atmospheric Deposition Network (IADN) site located at Burnt Island. In addition, measurement of coplanar PCBs began in 2005.

With the exception of the Hamilton-Confederation Park site, which was highly influenced by the SWARU

incinerator, there appear to be higher levels of dioxins and furans during the winter months.

US EPA and EC have shared information on the ambient air monitoring protocols for dioxins and furans applied in NDAMN and NAPS, respectively (see Table 3-1). The NDAMN sites are located in rural and remote areas while the NAPS sites are located in urban (Toronto, Hamilton, Windsor) and rural areas. The annual values from the two networks are considered comparable.

Joint Priorities with Other GLBTS Workgroups

The Dioxin Workgroup has been coordinating efforts with the HCB/B(a)P Workgroup on issues that concern both chemical workgroups. The two workgroups held joint meetings on November 30, 2004, and December 6, 2005, to share information on common issues of concern including wood preservatives, iron and steel, uncontrolled combustion sources, and inventory gaps. The two workgroups will continue to update members with new information and identify opportunities for joint work on common sources.

The Dioxin and PCB Workgroups will continue discussions on addressing dioxin-like PCBs.

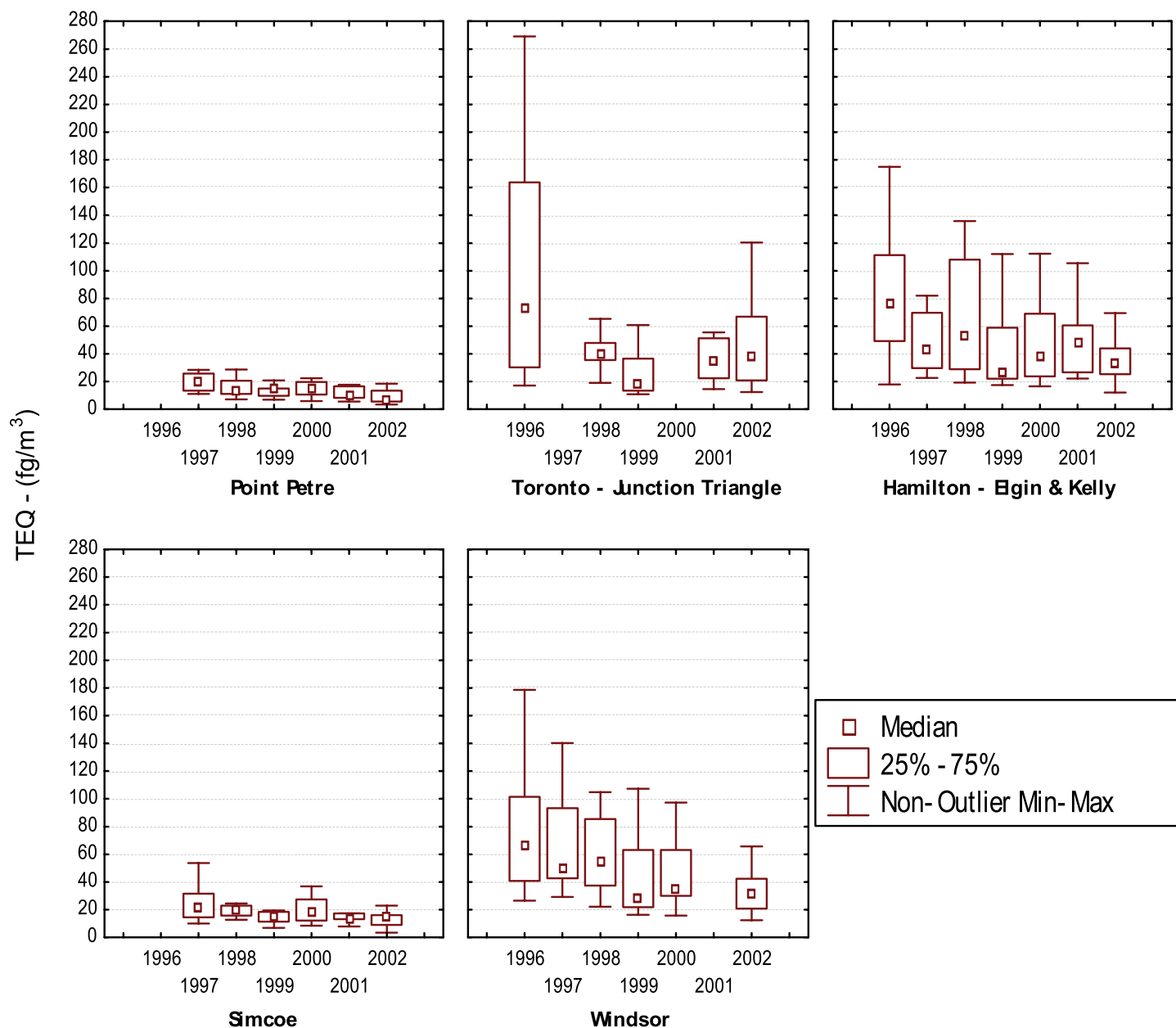


Figure 3-4. Trends in Median Annual TEQ Concentrations (TEQ fg/m³) in Ambient Air at Ontario Sites, 1996-2002.
Source: Environment Canada⁶

⁶ "Monitoring of Persistent Toxic Substances in the Ontario-Great Lakes Basin (1996-2003)", by Kristina Curren and Tom Dann, Report Series No. AAQD 2004-1, Analysis and Air Quality Division, Environmental Technology Centre, Environment Canada

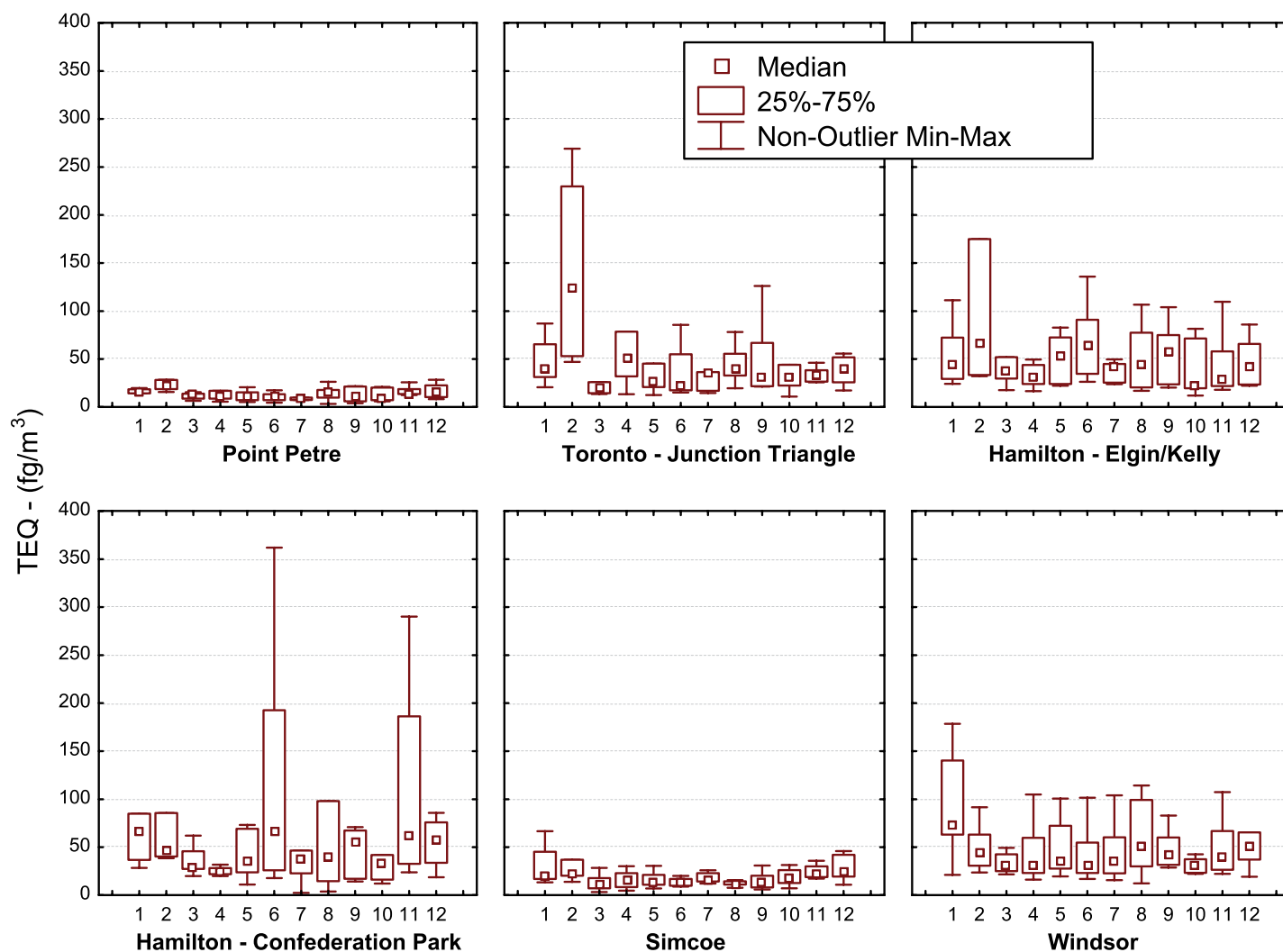


Figure 3-5. Seasonal Variations (by month) in 2,3,7,8-Tetrachlorodibenzo-p-dioxin Toxic Equivalent (TEQ) Concentrations (fg/m³) at Selected Sites, (1996-2003).
Source: Environment Canada⁷

⁷ "Monitoring of Persistent Toxic Substances in the Ontario-Great Lakes Basin (1996-2003)", by Kristina Curren and Tom Dann, Report Series No. AAQD 2004-1, Analysis and Air Quality Division, Environmental Technology Centre, Environment Canada



Table 3-1. Comparison of NDAMN and NAPS Ambient Air Monitoring Protocols.
Source: US EPA and Environment Canada

	Species	Sampling Method	Analytical Method	Detection Level	Sampling Frequency
Canada NAPS	2,3,7,8-substituted isomers	Hi-vol sampler @ 900 m ³ /24 hr Filter/PUF ¹	HRGC-HRMS ²	1-20 fg/m ³	Collected over 24 hr once every 12-24 days
United States NDAMN	2,3,7,8-substituted isomers & coplanar PCB	PSL sampler @300 m ³ /24 hr Filter/PUF ¹	HRGC-HRMS ²	Target 0.1 fg/m ³	4 sampling periods/year, each period: 24 hrs/d, 5 d/wk over 28 days

¹PUF – Polyurethane foam

²High Resolution Gas Chromatography and High Resolution Mass Spectrometry (HRGC-HRMS)

Next Steps

A dioxin/furan workplan was finalized in December 2003 to set directions for the workgroup through 2005. This workplan includes: continued reporting of national/regional programs, characterizing new sources of concern, outreach efforts to new sources, continued implementation of the Burn Barrel Strategy by the Burn Barrel Subgroup, exploring pathway intervention, pursuing potential joint work with the B(a)P/HCB and PCB Workgroups, and tracking environmental monitoring information. Throughout the two years, the workgroup has initiated most of these activities by examining new sources (uncontrolled combustion), holding joint meetings with the HCB/B(a)P and PCB Workgroups to share information on issues of common interests, and comparing Canadian and U.S. ambient air monitoring methods. The workgroup continues its efforts to engage health and agriculture/food representatives to discuss pathway intervention opportunities.

Based on the Management Assessment for Dioxins and Furans, the workgroup is expected to continue its activities to reduce dioxin and furan releases after 2005. When the report is finalized, the workgroup will review the management outcomes and establish a new plan to address outstanding issues for addressing dioxin and furan releases. The workgroup structure and level of efforts also will be examined to ensure an effective mechanism is in place.



Grand Haven Lighthouse in Storm
Photo by Carl Ter Haar,
courtesy of the Michigan Travel Bureau



4.0 HEXACHLOROBENZENE/ BENZO(a)PYRENE (HCB/B(a)P)

Canadian Workgroup co-chair: Tom Tseng
U.S. Workgroup co-chair: Steve Rosenthal

Progress Toward Challenge Goals

U.S. Challenge: Seek by 2006, reductions in releases, that are within, or have the potential to enter the Great Lakes Basin, of HCB and B(a)P from sources resulting from human activity.

Canadian Challenge: Seek by 2000, a 90 per cent reduction in releases of HCB and B(a)P from sources resulting from human activity in the Great Lakes Basin, consistent with the 1994 COA.

The U.S. and Canada have both made significant reductions in HCB/B(a)P emissions to the Great Lakes Basin.

Ontario: Progress Toward the GLBTS Challenge

From a 1988 baseline, Canada has reduced HCB emissions to the Great Lakes Basin by approximately 68 percent. Figure 4-1 shows the release estimates and progress achieved towards meeting the 90 percent reduction target.⁸ Over 80 percent of the reductions achieved to date are due to lower residual HCB levels in pesticides, with other significant reductions coming from the implementation of CWS for waste incinerators, and from process changes within Ontario's chlorinated chemical manufacturing sector. Canada's 2003 HCB releases in the basin are estimated at 37 lbs (17 kg). Non-point sources include: pesticide application, open burning, and the use of products containing trace HCB levels, which

account for about 75 percent of the HCB releases. Significant remaining point sources include steel, cement, and ferrous/nonferrous metal production facilities.

From a 1988 baseline, Canada has reduced B(a)P emissions to the Great Lakes Basin by approximately 45 percent. Figure 4-2 shows the release estimates and progress achieved toward meeting the 90 percent reduction target.⁹ Over 70 percent of the B(a)P reductions achieved to date have occurred from reduced emissions from cokemaking operations, with other significant reductions attributed to the petroleum refining sector and to the implementation of codes of practice within the wood preservation sector. Canada's 2003 B(a)P releases in the basin from anthropogenic sources are estimated at 29,000 lbs (13,200 kg). This does not include 9,020 lbs/yr (4,100 kg/yr) of B(a)P released from forest fires (wildfires).¹⁰ Non-point sources include: residential wood combustion, use of creosote-treated wood products, motor vehicle emissions and open burning (prescribed and household waste burning), which account for about 80 percent of the B(a)P releases. The major point source is coke oven emissions.

United States: Progress Toward the GLBTS Challenge

From a 1990 baseline, the U.S. has reduced releases of HCB from approximately 8,519 lbs in 1990 to 2,911 lbs in 1999. Figure 4-3 shows national HCB release estimates and progress achieved since 1990.¹¹ This reduction is mainly attributed to lower residual

⁸ Based on "Hexachlorobenzene Sources, Regulations and Programs for the Ontario Great Lakes Basin 1988, 1998 and 2000 Draft Report (No. 1), July 13, 2000" prepared for Environment Canada by Benazon Environmental Inc., with releases updated by Environment Canada, Ontario Region, based on NPRI facility release data, on recent sector release assessments, and on pesticide application release information received from Health Canada's Pest Management Regulatory Agency on August 29, 2005.

⁹ Based on "B(a)P/PAH Emissions Inventory for the Province of Ontario 1988, 1998 and 2000 Draft Report (No. 1), May 16, 2000" prepared for Environment Canada by Benazon Environmental Inc., with releases updated by Environment Canada, Ontario Region, based on NPRI facility release data and on recent sector release assessments.

¹⁰ Toxic Emissions from Wildfires and Prescribed Burning, Issue Paper March 31, 2004, prepared for Environment Canada by Environmental Health Strategies.

¹¹ Based on US EPA's 1990 National Toxics Inventory (with 1999 open burning estimates added) and 1999 National Emissions Inventory (updated with 1999 pesticide application emissions data).



HCB levels in pesticides, along with reduced HCB emissions from chlorinated solvent production and pesticide manufacture. These three categories combined account for roughly 5,000 lbs/yr of HCB reductions.

Differences in the 1990 and the 1999 emission inventories and source categories complicate the determination of the exact emission reductions that have occurred. The inventories represent the best emission estimates that are available and provide a useful snapshot of HCB emissions from several source categories in 1990 and 1999. However, due to inconsistencies in the sources included in the two inventories, they cannot be used to establish a specific reduction in HCB emissions since 1990.

Figure 4-4 shows B(a)P release estimates and reduction progress within the U.S. Great Lakes Basin from 1996 to 2001.¹² B(a)P emissions from the eight Great Lake states have been reduced by approximately 77 percent during that time, with annual emissions in 2001 estimated at 43,700 lbs. Since the 2001 inventory was prepared, B(a)P emissions from the petroleum refinery sector have been essentially eliminated, and emissions from primary aluminum manufacture and coke ovens substantially reduced. Residential wood combustion remains the largest B(a)P emission source in the Great Lakes.

WORKGROUP ACTIVITIES

In the past year, the HCB/B(a)P Workgroup has:

- Continued to promote existing residential wood combustion programs and initiated new projects aimed at providing consumers with information on clean and safe wood stoves over uncertified models, i.e., US EPA wood stove/fireplace initiatives, and Ontario's "Burn it Smart" program.
- Continued to promote scrap tire pile inventory development and mapping, and clean-up initiatives currently under way in the Great Lakes Region, i.e., US EPA Scrap Tire Pile Mitigation Support Project and Ontario's Tire Stewardship Plan.
- Improved HCB and B(a)P emission inventories, most notably more accurate HCB release estimates

for the application of pesticides, a critical inventory issue.

- Completed reassessments on HCB release from use of pentachlorophenol (PCP) -treated wood products, and B(a)P release from creosoted-treated wood products in Ontario.
- Continued EC's voluntary stack testing initiative to generate emissions data on poorly characterized sources of GLBTS substances. As of year 2005, twelve priority sources have been tested, including: crematoria, pulp and paper, biomedical incineration, and metal production facilities.
- Drafted the Management Assessment for HCB and the Management Assessment for B(a)P using the General Framework to Assess Management of GLBTS Level 1 Substances.

U.S. Reduction Activities

Wood Stove/Fireplace Initiatives in Progress

- A wood stove/fireplace website is being developed to provide consumers with information on the health effects of wood smoke, benefits of using US EPA-certified stoves, and how to burn efficiently and safely.
- A wood stove/fireplace fact sheet and background directed toward state, local, and tribal agencies interested in developing wood stove/fireplace emission reduction programs are being drafted to provide information on clean burning, fuel use, and safety.
- One to three wood stove change-out pilot programs are being considered for the next few years. It is estimated that 85 to 90 percent of operating wood stoves are still uncertified with replacement costs running in the order of \$1,000 to \$2,000 for a new wood stove, and \$1,500 to \$2,500 for a gas-fired stove.
- A "Green" Stoves Labeling Program. A green stove labeling program would specifically identify the best performing wood stoves with the lowest air emissions.
- A fireplace consensus test method for testing fireplace emissions. This could lead to a fireplace emission standard and/or national building code and lower emissions.

¹² Based on the Great Lakes Regional Air Toxic Inventory for 1996 through 2001, with Ontario emissions removed and petroleum refining emissions reduced to approximately 5 lbs beginning in 1997, per revised estimates provided by the American Petroleum Institute (API, 2001).

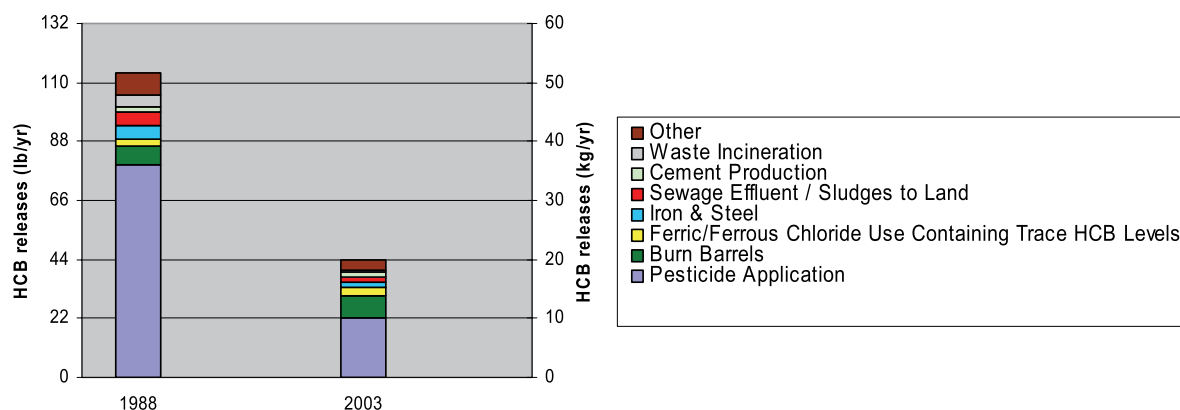


Figure 4-1. Estimated HCB Releases (to Air and Water) in Ontario by Sector, 1988 and 2003.
Source: Environment Canada (Environmental Protection Branch - Ontario Region, Toxics Prevention Division) Inventory as of October 13, 2004, with an update on releases from pesticide application received from Health Canada's Pest Management Regulatory Agency (Letter dated April 11, 2005)

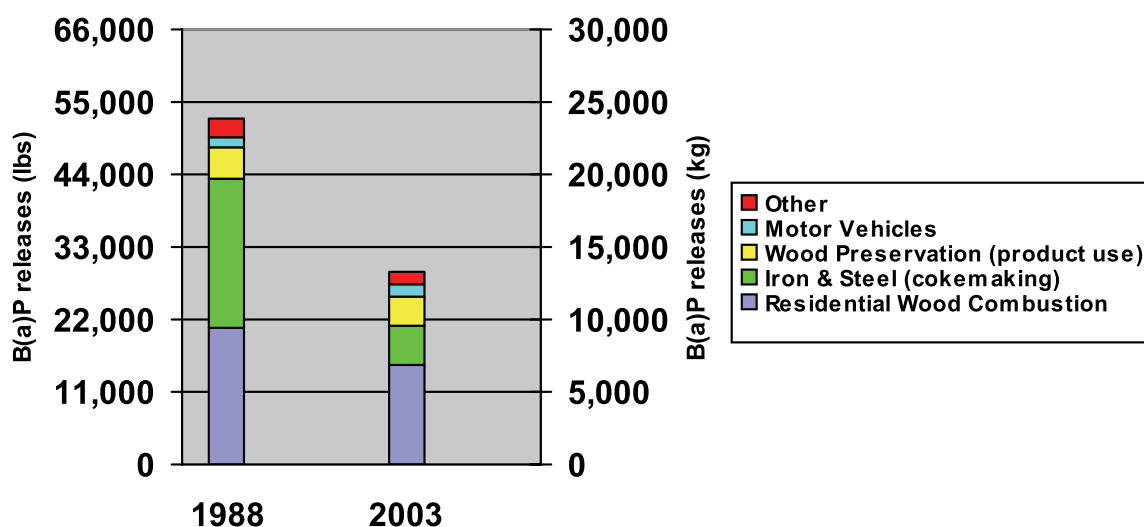


Figure 4-2. Estimated B(a)P Releases in Ontario by Sector, 1988 and 2003.
Source: Environment Canada (Environmental Protection Branch - Ontario Region, Toxics Prevention Division) Inventory as of October 13, 2004

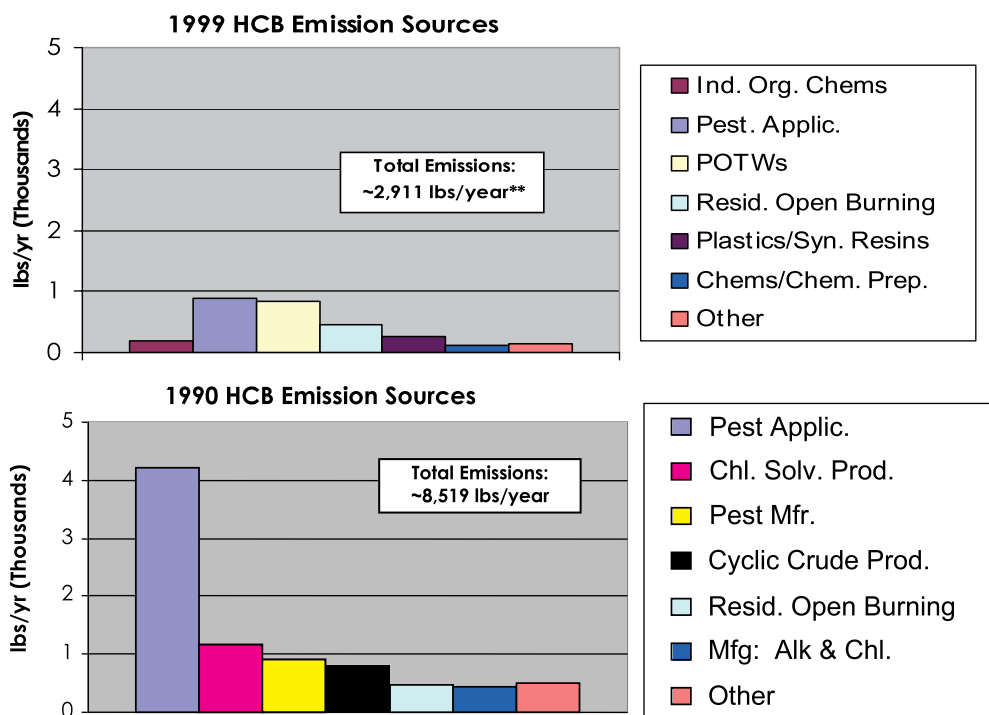


Figure 4-3 Estimated U.S. HCB Releases for 1990 and 1999 (lbs/year)
Source: US EPA 1990 National Toxics Inventory, adjusted to reflect residential open burning emissions, and 1999 National Emissions Inventory data updated with 1999 pesticide application emissions data^{13, 14, 15}

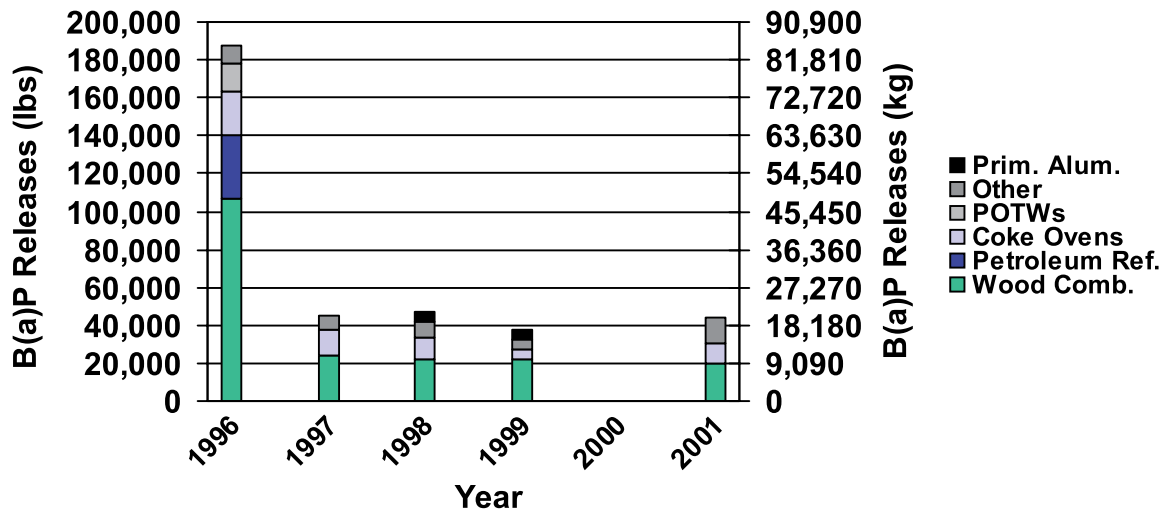


Figure 4-4. B(a)P Releases from the U.S. Great Lakes States, 1996-2001.¹⁶

¹³ **1999 NEI data excludes ~8,500 lbs of HCB emissions which could not be verified.

¹⁴ Pesticide application data assumes 100% volatilization of the HCB contaminant in pesticides.

¹⁵ 1999 emissions from POTWs could not be verified.

¹⁶ Based on the Great Lakes Regional Air Toxic Inventory for 1996 through 2001, with Ontario emissions removed and petroleum refining emissions reduced to approximately 5 lbs beginning in 1997, per revised estimates provided by the American Petroleum Institute (API, 2001).



- US EPA is testing different wax firelogs to determine fuel properties as well as air emissions, including B(a)P and polycyclic aromatic hydrocarbons (PAHs). In a study funded by GLNPO, tests to measure air pollutant emissions from five different wax/fibre firelog brands sold in the Great Lakes region of Canada and the U.S. were conducted. This study was performed because these artificial firelogs are becoming more prevalent, and applicable emission factors are not available. The tests measured air emissions of particles, carbon monoxide, nitrogen oxides, formaldehyde, PAHs (including B(a)P), volatile organic compounds, and benzene. In addition to air emissions, the wax and fibre used in each firelog brand were characterized and the burning properties were evaluated. Compared to cordwood, the commercially available wax/fibre firelogs tested were reasonably similar in their burning characteristics, air emissions, and the character of the residue left after burning, and they produced significantly lower emissions from their use in fireplaces.
- An ASTM “Task Group on Outdoor Wood-fired Hydronic Heaters” is considering developing a test standard for wood boilers.

Scrap Tire Mapping and Inventory Initiative

- Under a Scrap Tire Pile Mitigation Support Project, the US EPA continued developing a scrap tire pile inventory, along with GIS mapping of large tire piles (>500 tires); mapping is largely completed in the Great Lake states of Indiana, Michigan, Ohio, New York, and Pennsylvania.
- Ninety percent of scrap tires in the U.S. are located in 11 states, two of which (Indiana and Pennsylvania) do not have scrap tire abatement programs. The Rubber Manufacturers Association is working to promote programs in these states.
- The Rubber Manufacturers Association has given presentations on scrap tire pile abatement and fire prevention and is developing a peer-reviewed article on how to reduce a scrap tire pile.
- In 2004, scrap tire cleanup forums were held in Lansing, MI, and Chicago, IL.
- US EPA's best practices Scrap Tire Cleanup Guidebook on how to manage scrap tire piles is expected to be completed in early 2006.

US EPA Promulgates Final Rule for Coke Ovens

- Amendments to the 1993 MACT standards for coke ovens, which contain more stringent emission limits for coke oven doors, charge port lids and offtake piping on 17 percent of U.S. coke batteries, were promulgated in April 2005. This action, which addressed “residual risk,” was the first of its kind by US EPA. In April 2003, new MACT rules were promulgated for coke plant emission points, not included in the 1993 rules, for pushing, combustion stacks and quench towers. These MACT rules apply to all U.S. coke plants.
- On October 17, 2002, US EPA finalized rules on wastewater discharges from iron and steel facilities.

Canadian Reduction Activities

Approach to Reduce Residential Wood Combustion Emissions Are Working

- Health, fire safety, and wood burning experts conducted 31 Burn it Smart! public workshops in 2005, which included Wood Energy Technology Transfer (WETT) training, which promotes safe and efficient use of wood burning systems. Seven workshops were held in First Nations communities, 22 in rural Ontario, and two in U.S. border towns. Approximately 1,000 people attended the workshops.
- Two mock-up stoves of US EPA design were built for shows and displays. Aside from certified wood stoves, Ontario's residential wood combustion program also promotes alternatives such as gas-fired units.
- A plan was developed for distributing residential wood combustion educational materials: fact sheets on Good Firewood, Wood Burning in the City, and Don't Burn Garbage, and videos on wood stove operation and clean firewood.
- Home Depot was selected through a competitive process as a partner with the Government of Canada for a pilot project to promote the Burn it Smart! program at six Home Depot stores during the fourth quarter of 2005. This pilot project was designed to evaluate the effectiveness of promoting US EPA-certified wood stoves and good wood-burning practices at retail stores.



- In 2001, a multi-government program entitled the Georgian Bay Woodstove Changeout and Education program was developed. Workshops were conducted during the program. During the first quarter of 2005, a follow-up telephone survey was conducted with 135 participants who attended the workshops in 2001. Preliminary results of the impact of wood stove change-out programs show that more than 50 percent of the respondents had improved their wood-burning practices. Thirty four percent of respondents had updated their appliances.
- EC is developing a brochure that focuses on improving First Nations education on wood-burning practices. This brochure is expected to be completed by April 2006.
- EC has entered into a partnership with Puget Sound Clean Air Agency to evaluate emissions of dioxins and furans and other substances from wax firelogs and regular cord wood. This will provide more information on the burning characteristics from these wax firelogs. This further supports the work being conducted by US EPA on wax firelogs.

Ontario Tire Stewardship (OTS) Program

- On December 17, 2004, a proposed Scrap Tire Diversion Program was posted on the Ontario MOE's website for public comment. If approved, the program is expected to promote scrap tire collection and diversion within the province, eliminate illegal dumping of scrap tires through implementation of a registration and manifest tracking system, and clean up existing stockpiles - estimated at 5-6 million scrap tires - within five years. More information on this initiative can be found on the Waste Diversion Ontario Website at <http://www.wdo.ca>.

Cokemaking Operations on Track

- Ontario's four integrated steel mills are on track to meet coke oven PAH targets set out in environmental codes of practice, with reductions being achieved through rigorous coke oven battery maintenance and by implementation of innovative battery operating practices and procedures. From a 1988 base year, the sector has reduced B(a)P emissions by approximately 73 percent.

Ontario B(a)P Mapping Project

- Commenced an Ontario B(a)P mapping exercise to highlight priority source areas.

NEXT STEPS

The workgroup will continue ongoing efforts to improve the accuracy of the U.S. and Canadian HCB and B(a)P emission inventories to ensure that all significant emission sources have been identified and included. The focus of the workgroup's inventory efforts include the following source sectors: application of pesticides, use of creosote-treated wood products, use of PCP-treated wood products, residential wood combustion, wastewater releases from sewage treatment plants, and motor vehicles.

The workgroup will continue to pursue emission reduction activities from significant B(a)P source sectors, namely:

- Residential Wood Combustion - Burn it Smart! initiative, wood stove change-out programs, testing wax firelogs, and begin to address wood boilers
- Scrap Tires - OTS Program, US EPA Best Practices Guidebook, scrap tire pile mapping, and inventory initiatives.

The workgroup also will support other actions that impact HCB releases to the Great Lakes Basin, including:

- Household Garbage Burning Strategy (Burn Barrel Subgroup)
- Full life-cycle management of PCP-treated wood products
- Collection of data on HCB levels in the environment
- Emission inventory and multiple pathways modeling of HCB to the Great Lakes from North American sources. Aside from providing a basic understanding of HCB releases from various sources and pathways, the proposed study also will be helpful in assessing the relative importance of out-of-basin sources and emissions that impact the Great Lakes.

The workgroup will consider expanding its scope to include substances closely associated with HCB and B(a)P, namely, chlorobenzenes and PAHs.



5.0 INTEGRATION WORKGROUP

Integration Workgroup Highlights 2005

Level 1 Substance Reviews

The GLBTS focuses on persistent toxic substances (PTS) in the Great Lakes ecosystem, in particular those chemicals which bioaccumulate up the food chain. The GLBTS sets forth 17 interim reduction goals for 12 Level 1 PTSs over a 10-year time-frame, which ends in 2006. In anticipation of this important milestone, in 2004, the Parties, working with many stakeholders from industry, non-governmental organizations, Provinces, States, Tribes, cities and academia, commenced an overall program review of each of the Level 1 substances, to review progress made to date in reducing these substances and to explore future directions for the continued management of these substances. Two non-substance-specific goals in the GLBTS also were addressed: to assess atmospheric inputs of Level 1 substances from world-wide sources, and to complete or be well advanced in remediation of priority sites with contaminated bottom sediments in the Great Lakes Basin by 2006.

The substance reviews include an overall environmental assessment of Level 1 substances in the Great Lakes environment, including a review of current levels in Great Lakes media and biota, an evaluation of these levels against available health and risk based criteria, historical trends and projected trends looking forward, and a source reduction assessment that looks at use and emission reductions accomplished to date under the GLBTS against the original targets, as well as an analysis of the remaining source sectors, and further opportunities for the GLBTS and others to continue to effect reductions toward our ultimate goal of virtual elimination. Finally, these reviews provide recommendations to the Parties for the future management of each Level 1 substance. A summary of these reviews is available at www.binational.net.

Brief summaries of the Integration Workgroup meetings held over the past year are presented below.

Integration Workgroup Meeting – March 23, 2005, Windsor

The first Integration Workgroup meeting was held on March 23 and focused on the Level 1 substance reviews to determine recommendations for the path forward. The Integration Workgroup was given an overview of the General Framework to Assess Management of GLBTS Level 1 Substances (appendix B), which was developed by the Integration Workgroup last year. The framework begins by considering the status of progress toward the challenge goals. This is followed by an environmental analysis that reviews available data and criteria to assess the impact of a substance on the Great Lakes environment. The environmental analysis leads to a GLBTS management assessment in the second half of the framework. The management assessment considers the ability of the GLBTS to effect further reductions and results in one of two outcomes: active Level 1 status or suspension of workgroup activities. Following the overview, co-chairs for the substance workgroups presented updates for HCB, B(a)P, PCBs, alkyl-lead, pesticides, mercury, and dioxin that were prepared using the general framework.

Presentations at this meeting included:

- General Framework to Assess Management of GLBTS Level 1 Substances – Introduction – Ted Smith, US EPA
 - HCB Assessment - Tom Tseng, EC
 - B(a)P Assessment - Steve Rosenthal, US EPA
 - PCB Assessment - Tony Martig, US EPA
 - Alkyl-lead Assessment - Edwina Lopes, EC
 - Pesticides Assessment - Dave Macarus, US EPA
 - Mercury Assessment - Alexis Cain, US EPA
 - Dioxin Assessment - Anita Wong, EC

¹⁷ Mercury, PCBs, dioxins and furans, hexachlorobenzene (HCB), benzo(a)pyrene (B(a)P), octachlorostyrene (OCS), alkyl lead, mirex, aldrin/dieldrin, toxaphene, DDT, chlordane.



Integration Workgroup Meeting – May 18, 2005, Toronto

The second Integration Workgroup meeting was held in Toronto on May 18. The focus of this meeting was on the Level 1 substance reviews and ongoing application of the General Framework to Assess Management of GLBTS Level 1 Substances. A discussion of management outcomes for each workgroup was presented. In addition, several presentations were made regarding substance emission inventories. US EPA presented information on the 2002 NEI, the Great Lakes Commission presented information on the Great Lakes Regional Air Toxics Emission Inventory, and EC shared information on how inventory data are being used to compute loads of critical pollutants. Finally, presentations were made on two Ontario communities' activities to reduce the use and release of GLBTS Level 1 substances.

Presentations at this meeting included:

- Substance Updates - General Framework to Assess Management of GLBTS Level 1 Substances – Management Outcomes
 - Mercury – Alexis Cain, US EPA
 - HCB & B(a)P - Steve Rosenthal, US EPA
 - PCBs – Ken De, EC
 - Dioxin & Furans - Erin Newman, US EPA
- Substance Emission Inventories
 - National Emissions Inventory - Anne Pope, US EPA
 - Great Lakes Regional Air Toxics Emission Inventory - Jon Dettling, Great Lakes Commission
 - Emissions Inventory Uses - Scott Painter and Chris Marvin, EC
- Municipal Sector – City of Thunder Bay and Severn Sound
 - City of Thunder Bay - Darrell Matson, City of Thunder Bay
 - City of Thunder Bay - Jim Bailey, Eco Superior
 - Severn Sound - Keith Sherman, Severn Sound Environmental Association

Integration Workgroup Meeting – September 15, 2005, Chicago

The third Integration Workgroup meeting was held in Chicago on September 15, 2005, where the future focus of the GLBTS was discussed. A presentation summarizing the GLBTS management assessment reports for the Level 1 substances was made to inform GLBTS stakeholders of the Parties' intended recommendations to the Binational Executive Committee (BEC). Another presentation shared the results of a long range transport modeling activity for toxaphene, conducted by EC and the Meteorological Service of Canada. The majority of the meeting included informational presentations by EC and US EPA on a number of new initiatives that may impact the future of the GLBTS. These were followed by a facilitated discussion among stakeholders to offer suggestions to the Parties on the future direction of the Strategy.

Presentations at this meeting included:

- Reporting to BEC on Management Outcomes from the General Framework to Assess Management of Level 1 Substances – Alan Waffle, EC
- Update of Long-Range Transport Activities – S. Venkatesh, EC
- Future Focus of the GLBTS
 - History of the GLBTS – Alan Waffle, EC
 - Chemicals of Emerging Concern – Derek Muir, EC
 - National Chemical Screening and Assessment Programs – Ted Smith, US EPA
 - EC Sectors Program – Jim Smith, EC
 - GLWQA Review – Mark Elster, US EPA
 - US Regional Collaboration – Ted Smith, US EPA

Integration Workgroup Meeting – December 7, 2005, Chicago

The final meeting of the year for the Integration Workgroup was held in Chicago on December 7, 2005. The Integration Workgroup continued a discussion of the future focus of the GLBTS, which began at the September meeting. A four-page discussion paper was distributed by US EPA and EC prior to the meeting, and the Integration Workgroup provided comments in response to it. The meeting



also featured a Great Lakes municipal sector panel comprised of David Ullrich, who discussed the Great Lakes and St. Lawrence Cities Initiative, and Milena Avramovic, who described the activities of the Association of Municipalities of Ontario. The meeting included updates from the co-chairs of the active substance workgroups (mercury, dioxin, PCBs, HCB/B(a)P) on the previous day's workgroup meetings.

Presentations at this meeting included:

- Substance Workgroup Reports
 - PCBs – Tony Martig, US EPA
 - Mercury – Alexis Cain, US EPA
 - HCB & B(a)P - Steve Rosenthal, US EPA
 - Dioxin & Furans – Anita Wong, EC
- Great Lakes Municipal Sector Panel
 - Great Lakes Cities Initiative – Dave Ullrich, Great Lakes and St. Lawrence Cities Initiative
 - Canadian Great Lakes Municipalities – Milena Avramovic, Association of Municipalities of Ontario
- Future Focus of the GLBTS – A Co-chairs' Perspective – Ted Smith, US EPA
- Future Focus of the GLBTS – Response from Stakeholders – Facilitated discussion led by James McKenzie, facilitator

Outlook for 2006

In 2006, the Integration Workgroup will continue efforts to virtually eliminate the Level 1 substances from the Great Lakes Basin and will continue to focus on next steps for the GLBTS.

Stakeholder Forum Highlights 2005

Stakeholder Forum

A GLBTS Stakeholder Forum is convened biannually with the purpose of highlighting issues and initiatives of relevance to the Strategy, and to allow the workgroups to meet. The following GLBTS Stakeholder Forum meetings were convened in 2005:

- May 17, 2005, Toronto
- December 6, 2005, Chicago.

In addition to the Stakeholder Forum meetings, a separate substance workgroup meeting was held on March 22, 2005, in Windsor.

Substance Workgroup Meeting – March 22, 2005, Windsor

The purpose of this day was for workgroups to break out into their respective groups to discuss their progress under the General Framework to Assess Management of GLBTS Level 1 Substances – specifically the draft environmental analyses and possible draft management outcomes. The PCB Workgroup met to discuss the revised draft of the Management Assessment for PCBs and the HCB/B(a)P Workgroup met to discuss the draft of the Management Assessment for HCB and the Management Assessment for B(a)P. Results and issues were reported at the Integration Workgroup meeting on March 23, 2005.

Stakeholder Forum Meeting – May 17, 2005, Toronto

At the first Stakeholder Forum meeting on May 17, 2005, in Toronto, Jim Abraham, Acting Regional Director General, Ontario Region, EC, provided the keynote address. Mr. Abraham presented EC's competitiveness and environmental sustainability framework and gave examples of instances where environmental sustainability is growing. A number of departments across the government have formed committees, along with industry, to help develop the framework. Mr. Abraham commented that the Great Lakes are a classic example of how the issues of the environment and the economy tie together. He praised the GLBTS for its partnerships, beyond-compliance efforts, and positive outcomes. The workgroup leaders also reported on progress toward the Strategy challenges and updates on the substance assessments for mercury, dioxins and furans, PCBs, and HCB/B(a)P.

As part of the PCB Workgroup's PCB Reduction Recognition Award Program, Ken De (EC) presented an award to GM Canada. Bryan Swift of GM Canada, St. Catharines Powertrain Plant, accepted the award. Gary Gulezian (US EPA) presented an award to Robert Lyng of Ontario Power Generation, Nanticoke. The PCB Reduction Recognition Program recognizes organizations that have reduced high-level PCBs and have voluntarily met or exceeded the GLBTS challenge goal for PCBs. The plenary session was followed by workgroup break-out sessions for mercury, PCBs, dioxins and furans, and HCB/B(a)P.



Stakeholder Forum – December 6, 2005, Chicago

The second Stakeholder Forum meeting of 2005 featured a keynote address by Clive Davies of the US EPA's Design for the Environment Program. DfE projects assess alternatives, encourage formulation of industrial and consumer products with safer chemicals, and encourage best practices to reduce exposure when alternatives are not available. Mr. Davies explained that, as an incentive to industry participation, DfE provides the opportunity for recognition as well as access to US EPA technical tools and expertise. DfE projects are driven by industry's desire to work with US EPA. Mr. Davies described a few DfE projects, including: 1) Lead-free Solder

Partnership with the U.S. electronics industry, 2) Furniture Flame Retardancy Partnership, and 3) Safer Detergents Stewardship Initiative.

The workgroup leaders also reported on progress toward the Strategy challenges for mercury, dioxins and furans, PCBs, and HCB/B(a)P. The forum was followed by substance workgroup break-out sessions for mercury, PCBs, dioxins and furans, and HCB/B(a)P.



Prairie Phlox
Photo courtesy of the USEPA



6.0 SEDIMENTS CHALLENGE

Under the Great Lakes Binational Toxics Strategy, EC and US EPA committed to:
“Complete or be well-advanced in remediation of priority sites with contaminated bottom sediments in the Great Lakes Basin by 2006.”

Highlights of sediment assessment and remediation activities undertaken in the U.S. and Canada are described below.

2005 Sediment Assessments with US EPA’s Research Vessel Mudpuppy

Contaminated sediments are a significant concern in the Great Lakes Basin. Although toxic discharges have been reduced over the past 30 years, high concentrations of contaminants still remain in the sediments of many rivers and harbors. These sediments are of potential risk to the health of aquatic organisms, wildlife, and humans.

To assist in determining the nature and extent of sediment contamination at these polluted sites, US EPA’s GLNPO provides the Research Vessel (R/V) Mudpuppy. The R/V Mudpuppy is a 32-foot-long, flat-bottom boat that is specifically designed for sampling sediment deposits in shallow rivers and harbors. The boat is able to sample at water depths between two and 50 feet. Using a vibrocoring unit, the R/V Mudpuppy can take sediment core samples of up to 15 feet in depth.

To adequately characterize a site, GLNPO uses an integrated sediment assessment approach. This involves collecting data for sediment chemistry, toxicity, and the benthic community at a specific site, and then using the results to determine the extent of contamination that could be impacting the aquatic ecosystem.

Since 1993, the R/V Mudpuppy has conducted surveys at 39 locations, including 27 of the 31 Great Lakes Areas of Concern (AOCs). In 2005, the following surveys have been conducted with the assistance of the R/V Mudpuppy:

- Ottawa River, Toledo, Ohio – collected samples with support from Ohio EPA to further refine remedial boundaries.
- Indiana Harbor, East Chicago, Indiana – assisted the U.S. Army Corps of Engineers with collection of samples to support a volatile emissions evaluation.
- Saginaw River, Saginaw, Michigan – assisted the MDEQ with collection of samples to determine the distribution and concentrations of dioxin and polychlorinated naphthalene.
- Traverse City Lakes, Traverse City, Michigan – assisted MDNR with collection of samples to assess impacts of dam removal on sediments.
- Ryerson Creek, Muskegon, Michigan – assisted MDEQ with collection of samples to determine nature and extent of contamination as part of the Ryerson Creek Great Lakes Legacy Act sediment assessment project.
- Buffalo River, Buffalo, New York – assisted the NY Department of Environmental Conservation and the U. S. Army Corps of Engineers with collection of samples within and outside of the navigation channel to support a feasibility study of the river.
- Presque Isle Bay, Erie, Pennsylvania – assisted the PA Department of Environmental Protection with field support to determine if delisting criteria can be met that are currently being developed as part of a long-term monitoring plan.
- Division Street Outfall, Muskegon, Michigan – assisted MDEQ with collection of sediment cores and ponars to determine nature and extent of contamination as part of the Ryerson Creek Great Lakes Legacy Act sediment assessment project.
- Trenton Channel, Trenton/Riverview, Michigan – conducted a post-remediation survey at the Black Lagoon Great Lakes Legacy Act sediment remediation site, and collected samples in the Trenton Channel to further define the nature and extent of contamination.
- Saginaw River and Flint River, Saginaw/Flint, Michigan – assisted MDEQ with collection of samples to more fully delineate a dioxin hot spot.



Great Lakes Sediment Remediation Projects - 2004¹⁸

In 2004, over 345,000 cubic yards of sediment were remediated from eight U.S. sites and one Canadian site in the Great Lakes Basin. Six sites initiated work for the first time in 2004; two of those sites were the beginnings of large-scale cleanups that will have significant positive impacts to the Great Lakes Basin. Three sites completed their remedial actions in 2004; Dow Chemical Canada's three-year cleanup was completed at the end of the year. The Moss-American and Pine River projects continued with their remedial actions. The Black Lagoon site was the first sediment remediation project funded under the Great Lakes Legacy Act.

The following is a list of details relating to remediation sites in the U.S. and Canada.

U.S. Sites

St. Louis River/Interlake/Duluth Tar – Slip 7: The St. Louis River/Interlake/Duluth Tar Superfund site is located on the north bank of the St. Louis River, approximately four river miles upstream from Lake Superior, and is a state led National Priority List (NPL) site. The MPCA has set 13.7 mg/kg total PAH as the cleanup level, as PAHs are the primary contaminant of concern (COC). Other COCs include metals (including arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc) and VOCs (including benzene, ethylbenzene, toluene, xylene). At Slip 7, approximately 69,000 cubic yards of contaminated sediment were capped using the surcharge technique, which consolidated the underlying sediment and isolated contaminants without reducing water depth and natural resource functions. Approximately 409,000 cubic yards of contaminated sediment remain.

Lower Fox River and Green Bay, Operable Unit (OU) 1: The joint Superfund and Natural Resource Damage Assessment (NRDA) OU 1 (Little Lake Butte des Morts) project is just the beginning of a much larger cleanup of the Lower Fox River and Green Bay site. From September to November 2004, approximately 17,000 cubic yards of contaminated sediment and 39.4 pounds of PCBs were removed and disposed of in a state-licensed landfill. A spud barge with swinging ladder dredge was used to remove the

sediments. Sediments were successfully dewatered using geotubes. The OU 1 project has a 1 ppm action level for PCBs and a surface weighted average concentration standard of 0.25 ppm. If these risk standards are not met, the contractor has the option of dredging more sediment or placing a sand cover over the area. A similar process took place in 2005.

Moss-American: Moss-American is a US EPA Superfund NPL site. The primary sediment COCs are PAHs from former creosote activity at the Moss-American site. Approximately five miles of the Little Menomonee River downstream of the former creosote facility were believed to have been contaminated. Stream segment 1 underwent remediation in 2002 and 2003, and stream segments 2 and 3 were remediated in 2004. Approximately 8,560 cubic yards of contaminated sediments were dredged and transported from the Moss-American site to the Peoria Disposal facility. The site-specific cleanup goal is 15 mg/kg carcinogenic PAH. Approximately 6,500 cubic yards remain in the final two site segments.

Pine River - Velsicol Chemical Superfund Site: Sediment removal from the river by US EPA Superfund has been ongoing since 1999. A total of 544,100 cubic yards of contaminated sediments have been removed and 830,000 tons have been disposed offsite at landfills, with an average of 6 percent lime used as a drying agent. An estimated 359 tons of DDT have been removed from the environment through the removal of sediments and Dense Non-Aqueous Phase Liquid (DNAPL). By the time the entire project is completed, an estimated 750,000 cubic yards of contaminated sediments will have been removed and 1,100,000 tons will have been disposed offsite. Approximately 4,000 gallons of DNAPL have been removed from the subsurface in the river, including the DNAPL directly pumped from the pool and DNAPL recovered in the collection trenches.

Detroit River, Trenton Channel, Black Lagoon: The Black Lagoon is located within the Trenton Channel of the Detroit River, part of the Detroit River AOC, and is the first project funded under the Great Lakes Legacy Act. PCB compounds, oil and grease, and heavy metals, including mercury, are present at concentrations sufficient to cause acute and/or chronic harm to benthic organisms. In 2004, approximately 55,000 cubic yards of contaminated sediment were removed. The goals for the project are to reduce

¹⁸ Sediment remediation data for 2004 are presented because data lag a year behind in reporting (i.e., 2005 data will become available in 2006).



the risks to human health, wildlife, and aquatic organisms within the Detroit River AOC; restore the aquatic habitat within the Black Lagoon; and prepare the site for recreational and economic redevelopment. The project will accomplish these goals by dredging 116,000 cubic yards, and by placing a layer of sand and gravel over the affected area. Contaminated sediment from the Black Lagoon is disposed of in the Pointe Mouille Confined Disposal Facility.

Consolidated Packaging Corporation: The Consolidated Packaging Corporation site is the area surrounding a former paper mill plant that operated from 1898 until 1978 in Monroe, Michigan. The site includes seven lagoons and a series of drainage ditches that drain the area into the River Raisin. The lagoons and drainage ditches became contaminated by PCBs through disposal of paper pulp waste from carbonless copy paper that used PCBs. MDEQ performed a series of remedial investigations that found PCB contaminated sludges present in seven lagoons and onsite drainage ditches at levels over 1,300 ppm in some places. MDEQ was concerned that much of the PCB contamination would ultimately find its way into the River Raisin and Lake Erie. State funding (Part 201) was sought and obtained for site cleanup. On-site drainage ditches were dredged, the sediment and sludges dewatered, and then 30,000 cubic yards were disposed in a sanitary landfill or TSCA landfill depending on PCB concentration. The overall ditch cleanup target of 330 ppb PCB was confirmed with post-dredge/excavation sampling.

Alma Iron and Metal/Smith Farms Property: The Alma Iron and Metal/Smith Farms Property site was used as a debris/scrap metal recycling facility from the 1950s until the 1970s. Soil and groundwater had been contaminated with regulated metals, volatile organic compounds, semi-volatile organic compounds, and pesticides. In 1989, the Potentially Responsible Party removed drums containing waste material from the site as part of the US EPA Administrative Order on Consent. MDEQ completed the cleanup after the City of St. Louis proposed this site under the Clean Michigan Initiative program in 1999 to be prepared for redevelopment into a recreational facility for the

community. In 2004, approximately 15,904 cubic yards of sediment were removed from the pond/wetland area. Waste material was handled by both removal to an off-site landfill and encapsulation on site. The remedial action objective was to have contaminants above the Residential/Commercial I Part 201 Generic Cleanup Criteria of the state. Any contaminants left on site were covered with a direct contact barrier. The site currently is ready to be redeveloped. Groundwater investigation and monitoring is ongoing.

Paw Paw River: The Aircraft Components site on the Paw Paw River in Benton Harbor, Michigan, was contaminated with chlorinated solvents and inorganics. During remedial investigation activities, inorganic contamination (i.e., lead) was identified in the river sediment and was defined as being limited to the near-shore sediments. As part of a larger excavation remedy for contamination of soils with various inorganics constituents, Superfund remediated 349 cubic yards of river sediments through excavation. A steel sheetpile cofferdam was constructed, the cofferdam was dewatered, and the sediments were excavated from the cofferdam by reaching in from the bank. Confirmatory samples were collected. Excavated material was disposed of at a landfill. Remedial action objectives for the river sediments included: cadmium, 0.6 ppm; chromium, 30 ppm; zinc, 123 ppm; nickel, 20.9 ppm; and lead, 35 ppm.

Figure 6-1 presents the cumulative volume of sediment remediated in the U.S. since 1997. Information in the bar graph includes quantitative

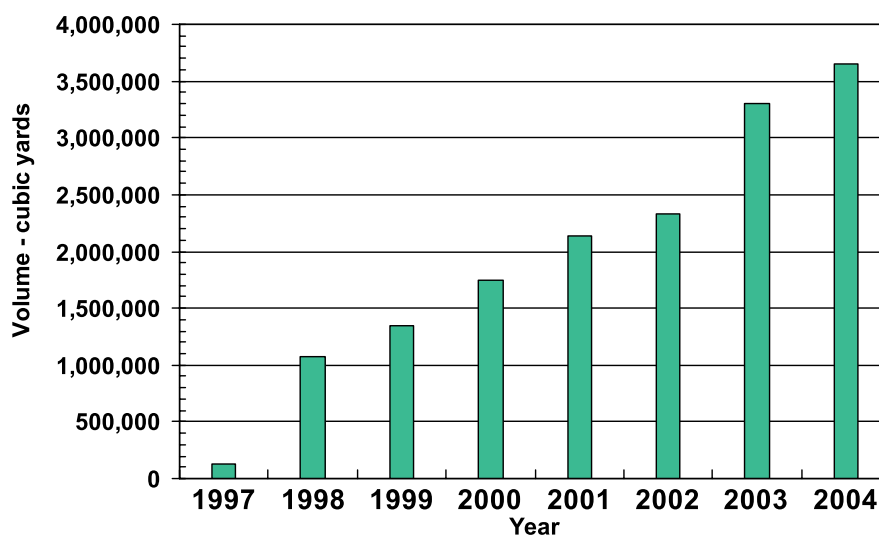


Figure 6-1. Cumulative Volume of Sediment Remediated in the U.S. Since 1997. Source: US EPA – Great Lakes National Program Office



estimates as reported by project managers. Data collection and reporting efforts are described in the Great Lakes Sediment Remediation Project Summary Support, Quality Assurance Project Plan. Detailed project information is available upon request from project managers.

Canadian Sites

Decision-Making Framework for Contaminated Sediments:

Under the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA), a commitment was made to develop a risk-based, decision-making framework for contaminated sediments. The framework has been completed, and internal agency reviews are ongoing with finalization and release scheduled for late 2005. Ongoing sediment assessments in AOCs (i.e., Thunder Bay, Peninsula Harbour, St. Marys River, Detroit River, St. Clair River, Niagara River, and Bay of Quinte) currently are utilizing the COA framework to evaluate the need for management actions.

St. Lawrence River (Cornwall): Consultation and decisions on the Cornwall Sediment Strategy have been completed. Results of investigations on contaminant levels and distribution, benthic community impairment, sediment toxicity and bioaccumulation/ biomagnification potential were employed in a Canada-Ontario risk-based, decision-making framework for contaminated sediments. It was concluded that the mercury-contaminated sediments are buried by cleaner material and pose no risk to the aquatic environment; they will be left in place and natural recovery will continue. A seven-party administrative controls protocol has been developed to ensure that the deeper sediments remain undisturbed by human activities. A public meeting and announcement of the strategy was held in June 2005.

Hamilton Harbour (Randle Reef): The proposed remedial design for PAH contaminated sediments involves a dry cap engineered containment facility about 9.5 hectares in size. This would cover in-situ about 130,000 cubic metres of sediments and contain about 500,000 cubic metres of contaminated sediments dredged from the impacted area surrounding the containment facility. Work on project feasibility and engineering is under way and should be completed in the summer of 2006.

St. Clair River: During 2004, Dow Chemical Canada Inc. completed Phase 3, the final phase of a three year sediment remediation project in the St. Clair River adjacent to its industrial plant site at Sarnia, Ontario. Approximately 4,200 cubic metres of sediment were dredged using both hydraulic and shore-based mechanical excavating equipment. Sediment was removed from an area of approximately 58,420 square feet and dewatered at an on-shore facility. Over 67 million U.S. gallons of water were treated at the facility through a series of filters (sand, microfilters, and carbon adsorption) before discharge back to the river. Sediment in the facility was layered with organic matter and encapsulated as a biological treatment cell (biocell). The total volume of sediment involved with the three year project is estimated at 13,690 cubic metres. Contaminants in the sediments include the GLBTS Level 1 substances - mercury, HCB, and OCS, and the Level 2 substance - hexachlorobutadiene.

Thunder Bay and Peninsula Harbour: Assessments of mercury bioaccumulation continued in 2004 at these two AOCs. The technical assessments are being used as the basis for consultations with local stakeholders to determine the need to assess sediment management options.

Supporting Table and Graphics

Table 6-1 reports progress on sediment remediation projects at both AOCs and non AOCs in the U.S. and Canada, from 1997 through 2004. The maps on the following pages illustrate the progress and achievements made in sediment remediation activities in the Great Lakes from 1997 through 2004. Information included in the tables and maps are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the Great Lakes Sediment Remediation Project Summary Support Quality Assurance Project Plan. Detailed project information is available upon request from project managers. On occasion, project managers may submit to GLNPO updated sediment remediation estimates on projects previously reported on. Always refer to the most current version of the GLBTS Progress Report for the most up-to-date sediment remediation estimates.

¹⁹ US EPA Great Lakes National Program Office. 2005. Quality Assurance Project Plan for "Great Lakes Sediment Remediation Project Summary Support." Unpublished. Available from Mary Beth G. Ross (ross.marybeth@epa.gov).

Table 6-1. Progress on Sediment Remediation in the Great Lakes since 1997

Site/AOC/non-AOC (*)	Cumulative Mass of Contaminant Remediated (kg)												Cumulative Volume Sediments Remediated 1997 thru 2004 (cy)	Volume Sediments Remediated 2004 (cy)	Ultimate Disposition	
	aldrin/ dieldrin	benzo(a) pyrene	chlordane	DDT (+DDE/DD)	hexachloro benzene	alkyl-lead	mercury & compounds	mirex	octachloro styrene	PCBs	Dioxins and Furans	toxaphene				
U.S. Sites																
Aircraft Components - Paw Paw River*													349	349	Landfilled	
Alma Iron and Metal/Smith Farms Property*													15,904	15,904	encapsulated on site	
Ashtabula River, OH																
Black River-S. Branch, MI*																
Black River, OH																
Black River, MI* - CR 681													25,000		Landfilled	
Buffalo River, NY																
Clinton River, MI																
Cuyahoga River, OH																
Deer Lake - Carp River, MI																
Detroit River, MI - Monguagon Creek - Black Lagoon Eighteenmile Creek, NY													80,000 25,000 55,000	55,000	Confined Disposal Facility	
Fields Brook Superfund, OH*													53,094		Landfilled	
Fox River, Green Bay, WI - Deposit 56/57 - Deposit N - OU 1										459 950 51 18			104,500 80,300 7,200 17,000	17,000	Landfilled Landfilled Landfilled	
Grand Calumet, IN - U.S. Steel/Gary Works - U.S.S. Lead							369			7,193	.03		812,200 802,200 10,000		Corrective Action Mgmt. Unit Corrective Action Mgmt. Unit	



Table 6-1. Progress on Sediment Remediation in the Great Lakes since 1997 (continued)

Site/AOC/non-AOC (*)	Cumulative Mass of Contaminant Remediated (kg)											Cumulative Volume Sediments Remediated 1997 thru 2004 (cy)	Volume Sediments Remediated 2004 (cy)	Ultimate Disposition
	aldrin/ dieldrin	benzo(a) pyrene	chlordane	DDT (+DDE/DD)	hexachloro benzene	alkyl-lead	mercury & compounds	mirex	octachloro styrene	PCBs	Dioxins and Furans	toxaphene		
Kalamazoo River, MI - Bryant Mill Pond										10,000			150,000	Landfilled
Manistee Lake, MI*														
Manistique River, MI										4,771			186,162	Landfilled
Manitowoc River, WI*										425			11,800	Landfilled
- HARP														
Maumee River, OH- Fraleigh Creek (Unnamed Tributary)										25,400			8,000	Landfilled
Menominee River, MI/WI - Ansel Eighth Street Slip													13,000	Landfilled/ awaiting further management
Milwaukee Harbor, WI - North Ave. Dam													26,560	
- Moss American													8,000	Landfilled
Muskegon Lake, MI													18,560	Landfilled
National Gypsum*														
- Alpena, MI														
Niagara River, NY - Scajaquada Creek													130,870	
- Buffalo Color - Area D													17,500	
- Gill Creek													45,000	
- Cherry Farm/River Road													14,870	
- Niagara Transformer													42,000	
Pine River, MI*													11,500	
- Velsicol Chemical SF Site				325,679									592,201	
- TPI Petroleum, Inc.													544,100	Landfilled
Presque Isle Bay, PA													48,101	



Table 6-1. Progress on Sediment Remediation in the Great Lakes since 1997 (continued)

Site/AOC/non-AOC (*)	Cumulative Mass of Contaminant Remediated (kg)											Cumulative Volume Sediments Remediated 1997 thru 2004 (cy)	Volume Sediments Remediated 2004 (cy)	Ultimate Disposition
	aldrin/ dieldrin	benzo(a)pyrene	chlordane	DDT (+DDE/DDD)	hexachloro benzene	alkyl-lead	mercury & compounds	mirex	octachloro styrene	PCBs	Dioxins and Furans	toxaphene		
River Raisin, MI - Ford Monroe Outfall - Consolidated Packaging Corporation										16,795			57,000 27,000 30,000	On site TSCA facility sanitary landfill & TSCA landfill
Rochester Embayment, NY														
Rouge River, MI - Evan's Product Ditch - Newburgh Lake										250,000 4,000 246,000			406,900 6,900 400,000	Off-site TSCA facility and landfilled
Saginaw River/Bay, MI										4,500			342,433	Off-shore Confined Disposal Facility
Sheboygan Harbor, WI														
St. Clair River, MI														
St. Lawrence River, NY- Reynolds Metals/Alcoa E.										10,000			86,000	Landfilled/ capped
St. Louis River/Bay, MN/WI - Newton Creek/Hog Island Inlet - Interlake/Duluth Tar													74,855 5,855	Landfilled
St. Marys River, MI													69,000	Capped
Ten Mile Storm Drain* - St. Clair Shores, MI													3,000	Landfilled
Torch Lake, MI													18,500	Landfilled
Waukegan Harbor, IL														
White Lake, MI														
Willow Run Creek, MI*														
Wolf Creek - Unnamed Tributary, MI*														
TOTALS				325,679	495 [†]		369			530,038 [†]	0.03		3,755,776	345,813
[†] Mass displayed is the combined total of PCBs and HCB														
Information included in the matrix are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, January 2005). Detailed project information is available upon request from project managers.														

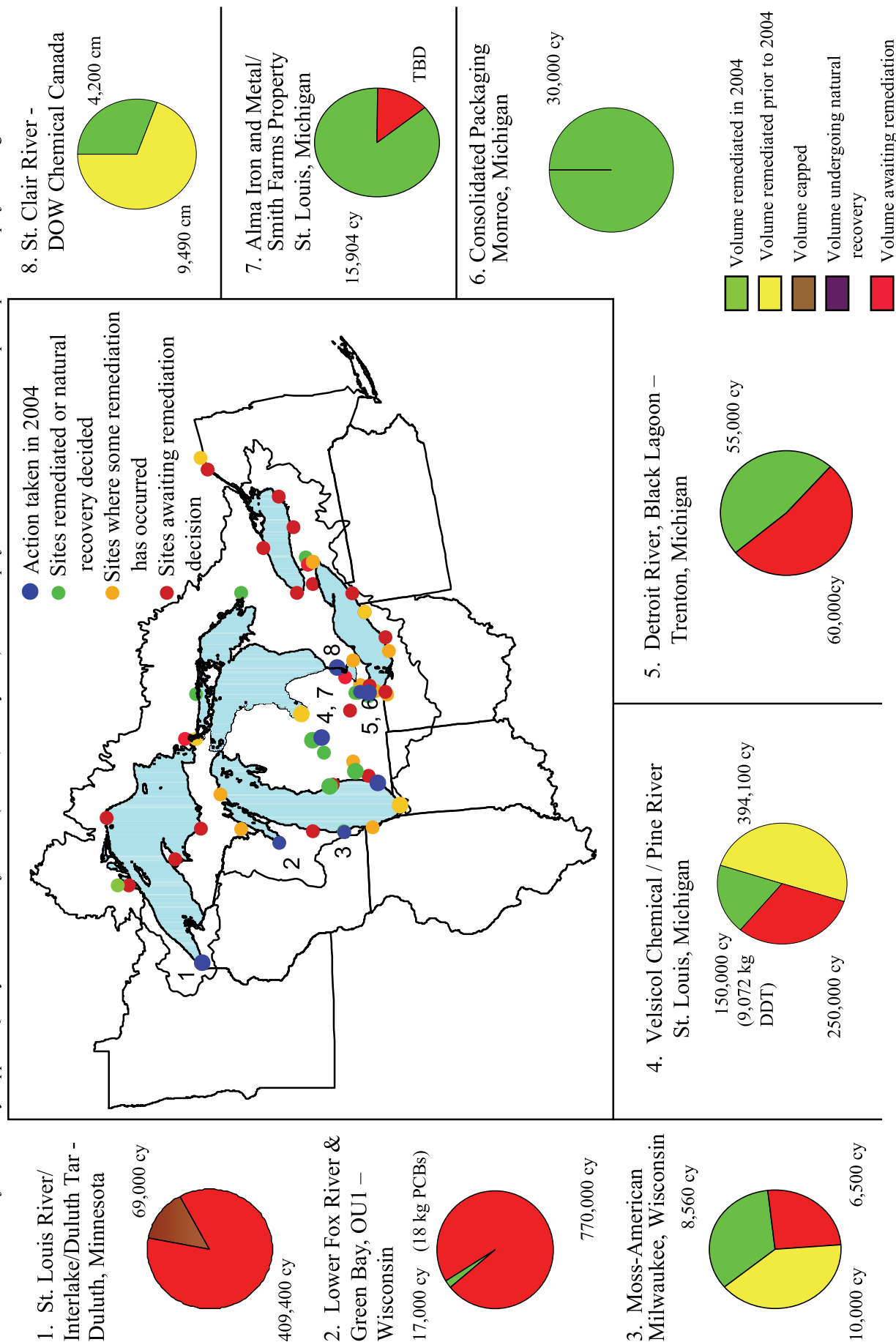
Table 6-1. Progress on Sediment Remediation in the Great Lakes since 1997 (continued)

Site/AOC/non-AOC	Cumulative Mass of Contaminant Remediated (kg)											Cumulative Volume Sediments Remediated 1997 thru 2004 (cm)	Volume Sediments Remediated 2004 (cm)	Ultimate Disposition
	aldrin/ dieldrin	benzo(a) pyrene	chlordane	DDT (+DDE/DDD)	hexachloro benzene	alkyl-lead	mercury & compounds	mirex	octachloro styrene	PCBs	Dioxins and Furans			
Canadian Sites														
Thunder Bay - Northern Wood Preservers		2,700										11,000 21,000		Thermal treatment Berm enclosure&capped
Nipigon Bay														
Jackfish Bay														
Peninsula Harbour														
St. Marys River														
Spanish River														
Severn Sound														
St. Clair River						19.3						13,690	4,200	Landfilled
Detroit River														
Wheatley Harbour														
Niagara River (Ontario)														
Hamilton Harbour														
Metro Toronto														
Port Hope														
Bay of Quinte														
St. Lawrence River (Cornwall, Ontario)														
TOTALS		2,700				19.3						45,690	4,200	
Information included in the matrix are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, January 2005). Detailed project information is available upon request from project managers.														



Great Lakes Sediment Remediations in 2004*

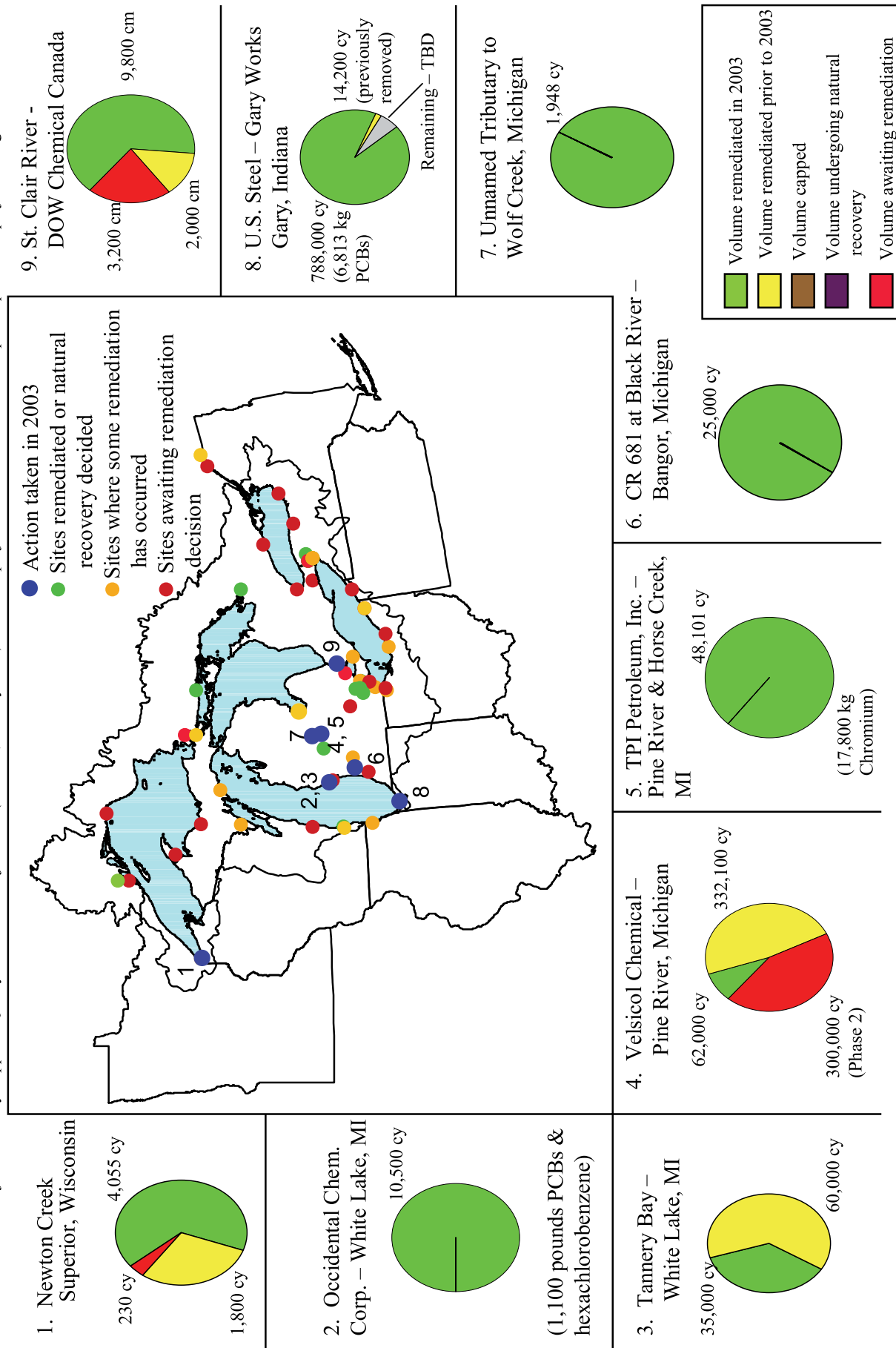
*Information included in the pie charts are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, January 2005). Detailed project information is available upon request from project managers.





Great Lakes Sediment Remediations in 2003*

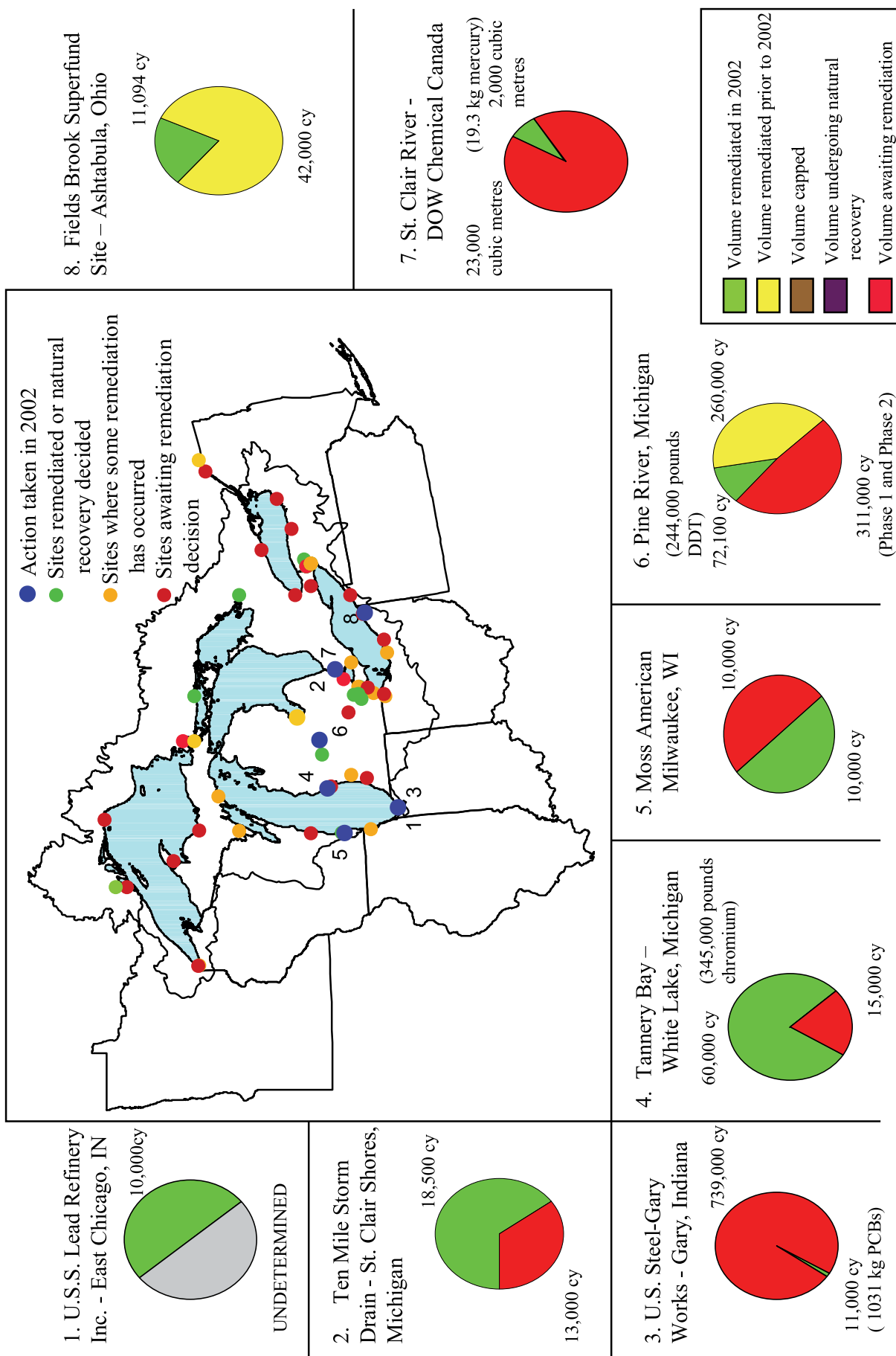
*Information included in the pie charts are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, January 2005). Detailed project information is available upon request from project managers.





Great Lakes Sediment Remediations in 2002*

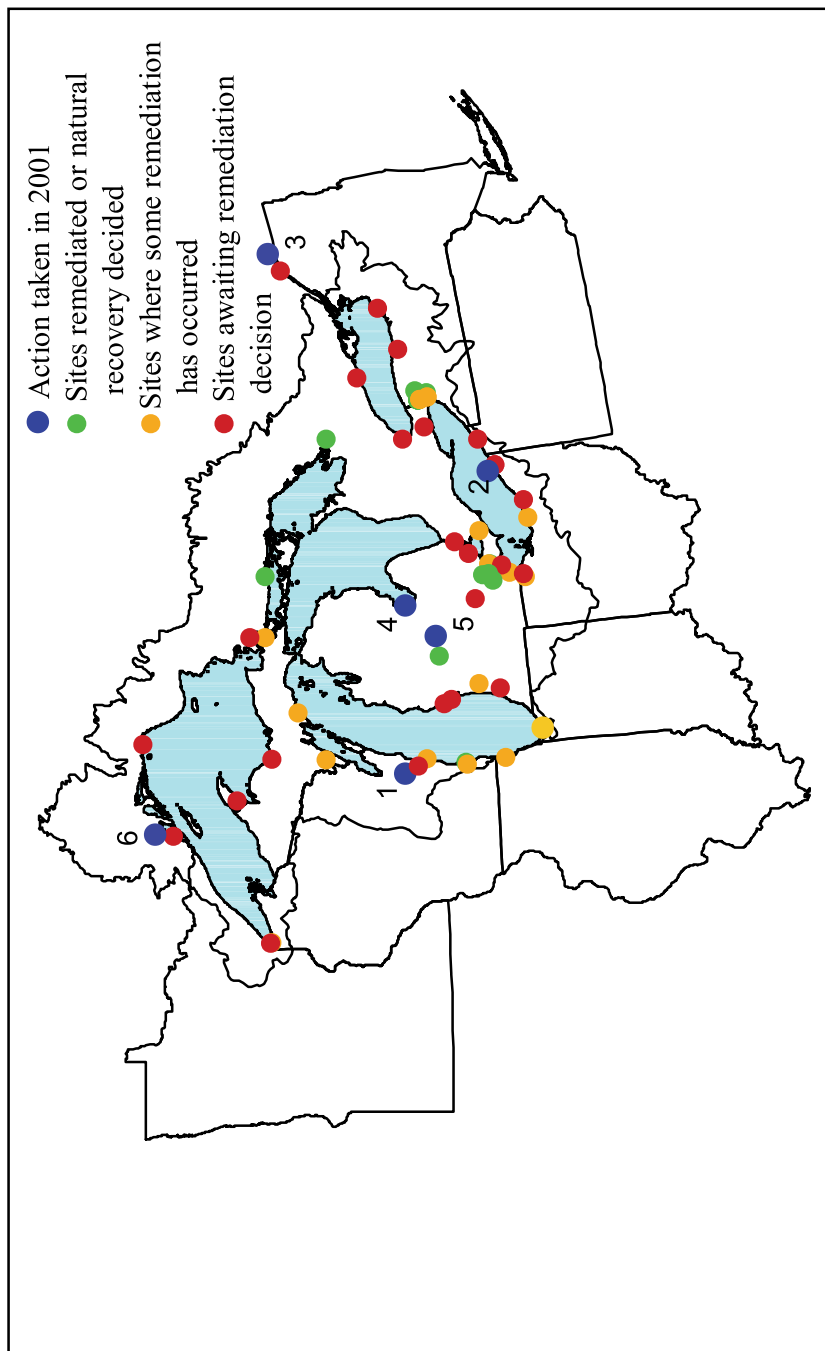
*Information included in the pie charts are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, January 2005). Detailed project information is available upon request from project managers.



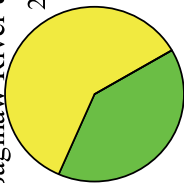


Great Lakes Sediment Remediations in 2001*

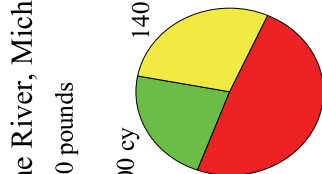
*Information included in the pie charts are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, January 2005). Detailed project information is available upon request from project managers.



4. Saginaw River & Bay
205,000 cy

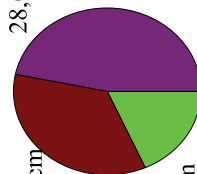


5. Pine River, Michigan
(50,300 pounds DDT)
120,000 cy



240,000 cy
(Phase 1 and Phase 2)

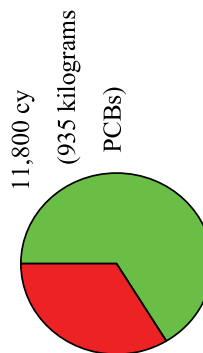
6. Thunder Bay – Northern Wood Preservers, Ontario
21,000 cm



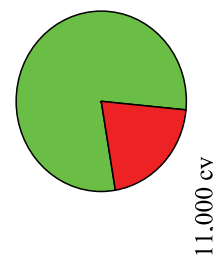
11,000 cm

Volume remediated in 2001
Volume remediated prior to 2001
Volume capped
Volume undergoing natural recovery
Volume awaiting remediation

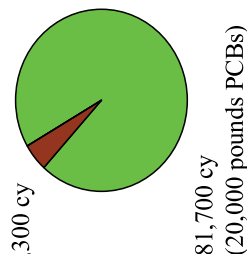
1. Hayton Area Remediation Project - OUI – Source Abatement, Wisconsin
11,800 cy
(935 kilograms PCBs)



2. Fields Brook Superfund Site, Ohio
42,000 cy

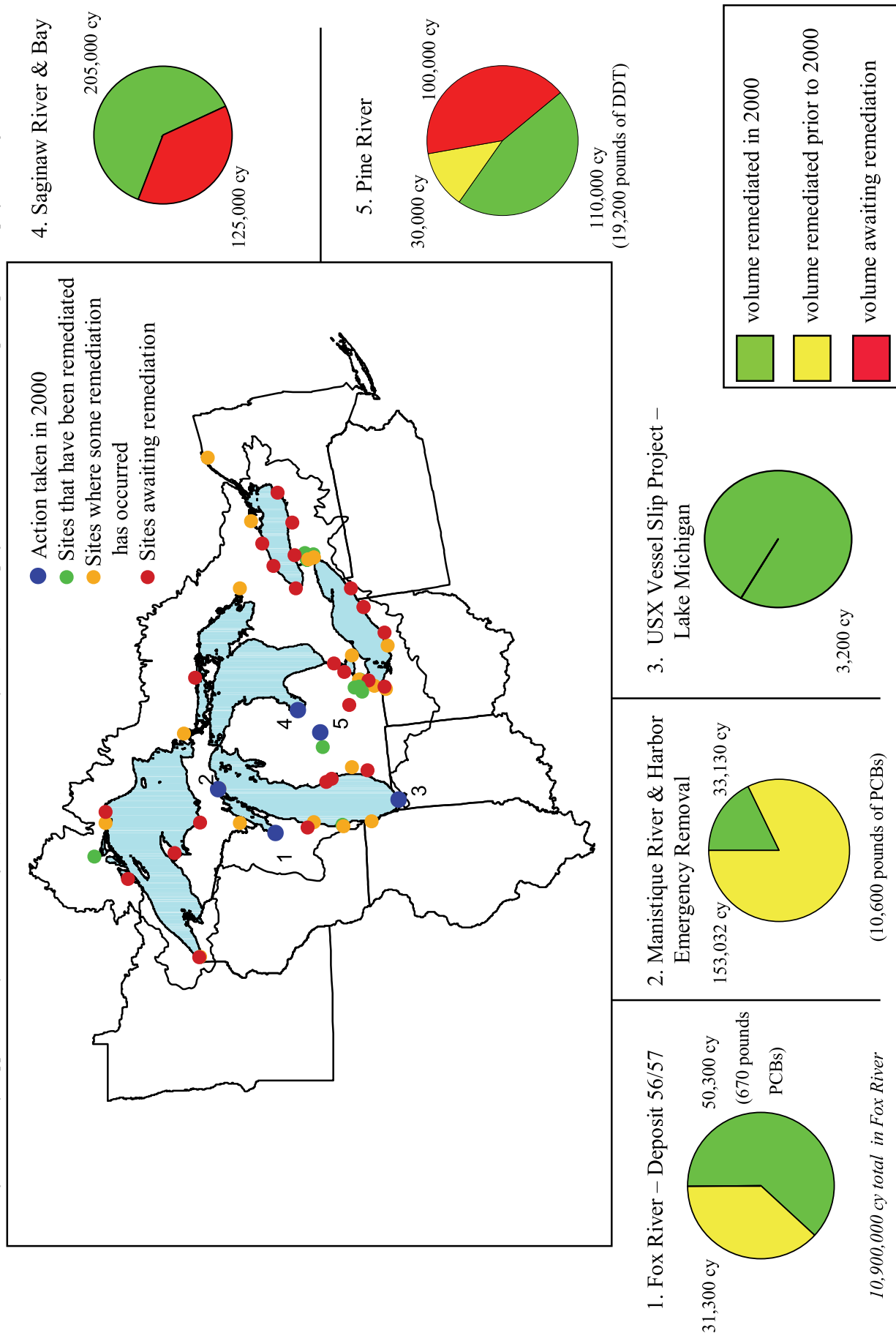


3. Reynolds Metals/Alcoa East St. Lawrence River
4,300 cy



Great Lakes Sediment Remediations in 2000*

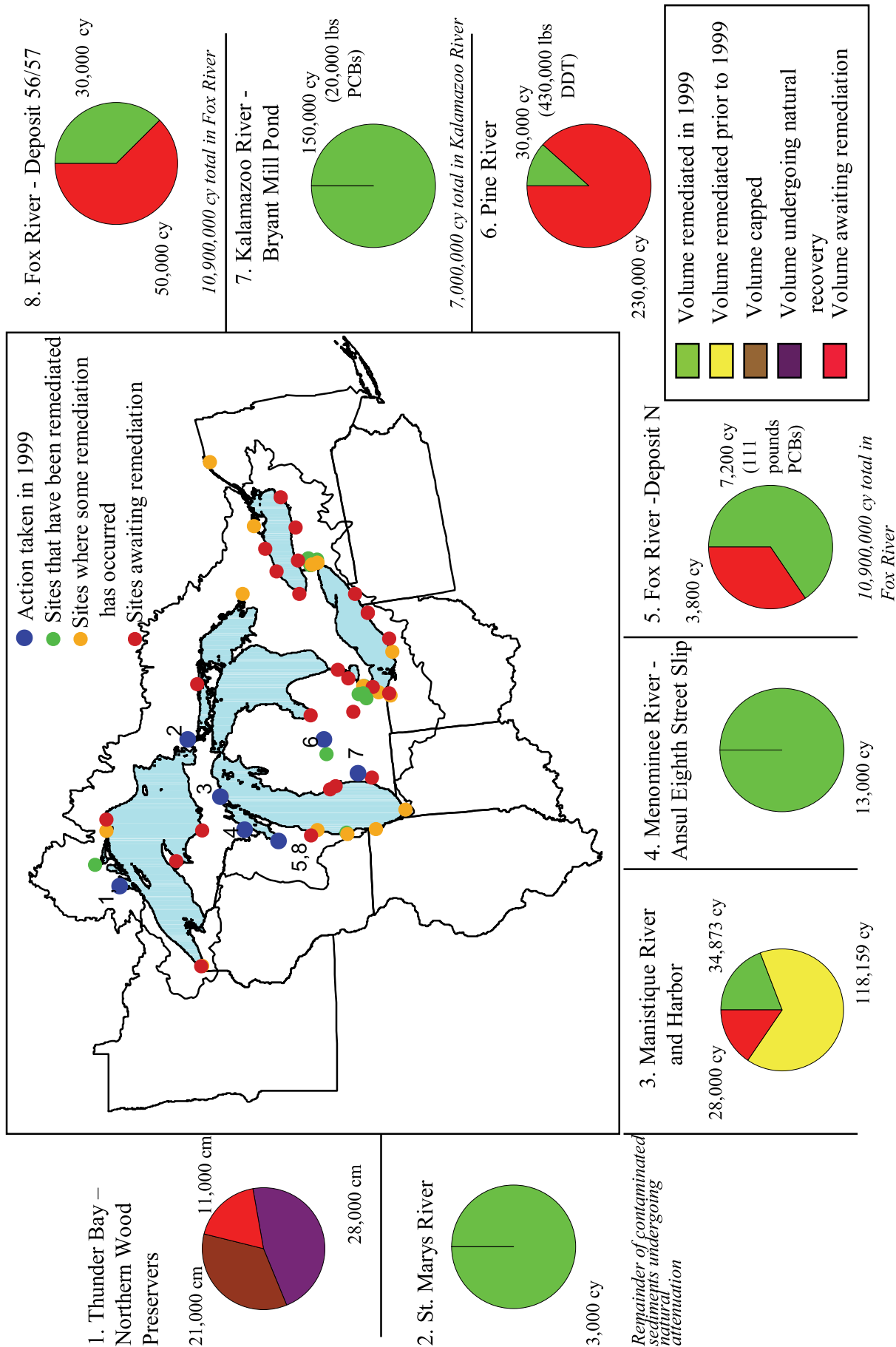
*Information included in the pie charts are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, January 2005). Detailed project information is available upon request from project managers.





Great Lakes Sediment Remediations in 1999*

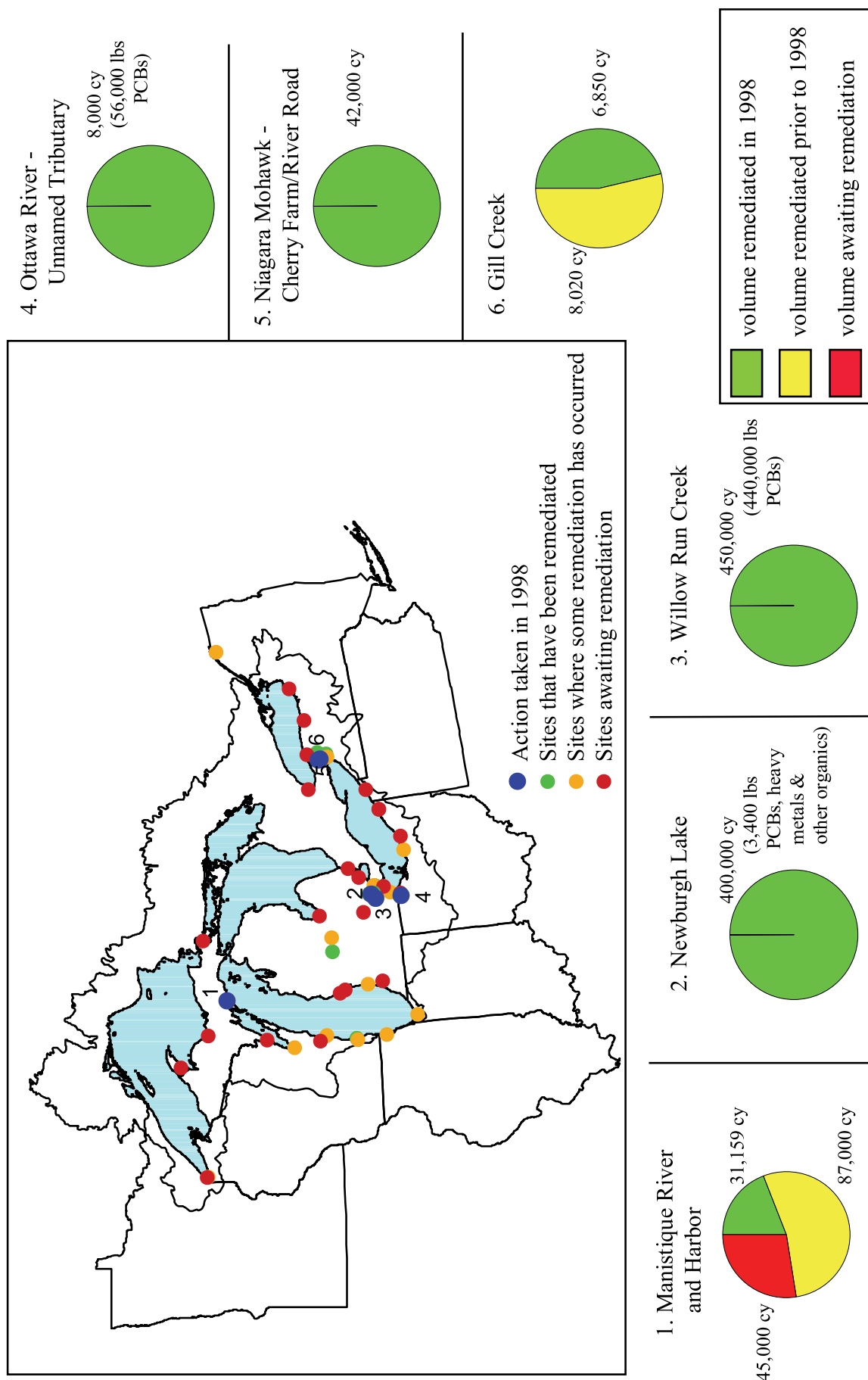
*Information included in the pie charts are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, January 2005). Detailed project information is available upon request from project managers.





Great Lakes Sediment Remediations in 1998*

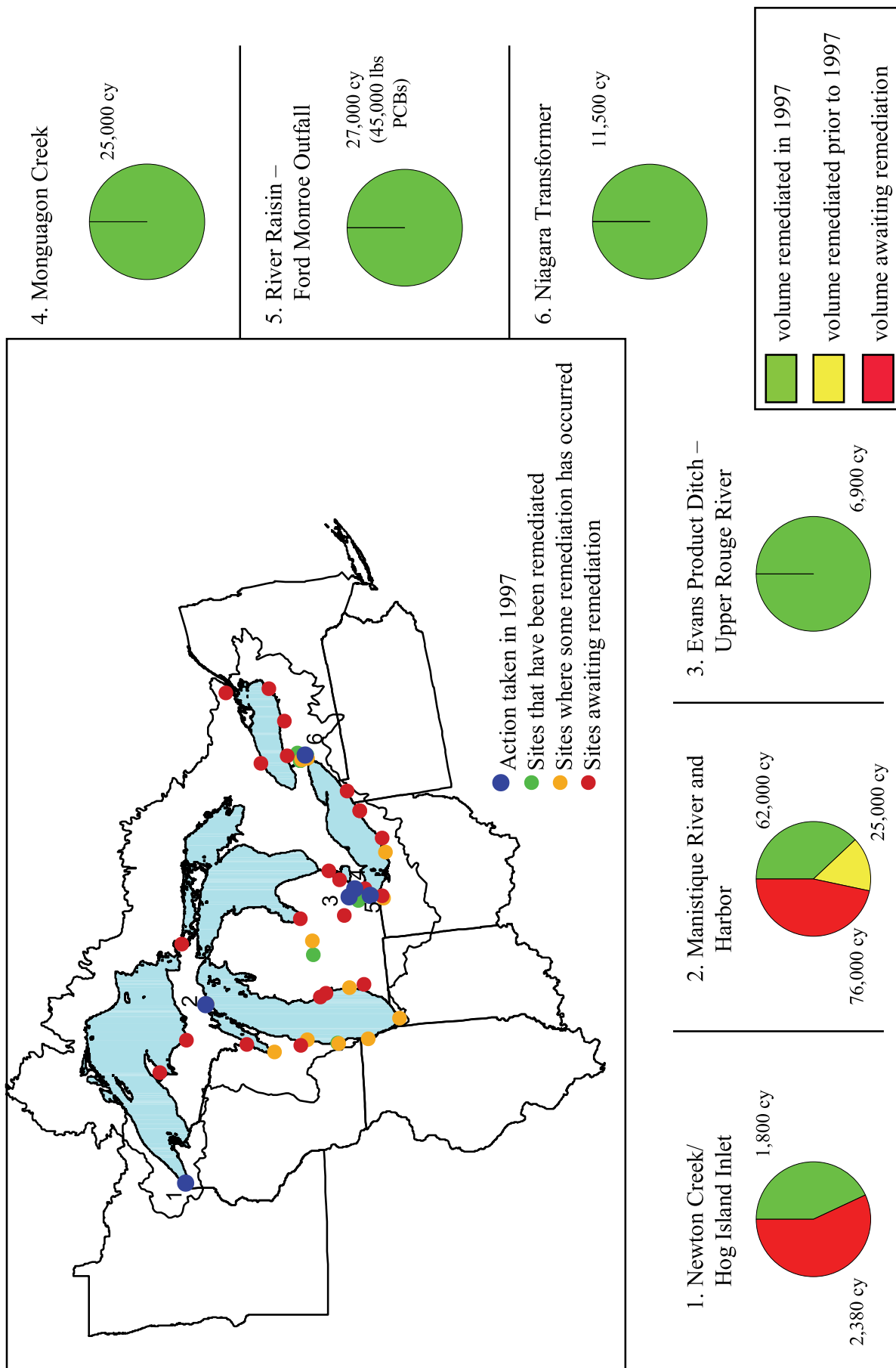
*Information included in the pie charts are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, January 2005). Detailed project information is available upon request from project managers.





Great Lakes Sediment Remediations in 1997*

*Information included in the pie charts are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, January 2005). Detailed project information is available upon request from project managers.





7.0 LONG-RANGE TRANSPORT CHALLENGE

Canadian Workgroup co-chair: S. Venkatesh
U.S. Workgroup co-chair: Todd Nettesheim

Under the Great Lakes Binational Toxics Strategy, EC and US EPA committed to:

“Assess atmospheric inputs of Strategy substances to the Great Lakes. The aim of this effort is to evaluate and report jointly on the contribution and significance of long-range transport of Strategy substances from worldwide sources. If ongoing long-range sources are confirmed, work within international frameworks to reduce releases of such substances.”

In support of this challenge, the U.S. and Canada have:

- Maintained the Integrated Atmospheric Deposition Network (IADN)
- Improved the integration of monitoring networks and data management
- Continued research on the atmospheric science of toxic pollutant transport
- Worked through existing international frameworks to reduce releases of Strategy substances and better assess the significance of long-range transport.

Canadian Activities

Global and Regional Atmospheric Heavy Metals Model (GRAHM) by A. Dastoor, Meteorological Service of Canada

New chemical kinetics for mercury have been emerging in the last couple of years, including better knowledge of springtime mercury depletion chemistry. EC's Global and Regional Atmospheric Heavy Metals Model (GRAHM) chemical mechanism has been updated to include the most recent mercury chemistry in gas and aqueous phases. Implications of the latest chemistry on the global mercury budgets, the lifetime of mercury, and long-range transport are being investigated.

Anthropogenic emissions for 2000 have been introduced into the model. In addition to increases in total global emissions, there are significant changes in the distribution of the emissions in the latest inventory compared to the 1990 and 1995 inventories. For example, Asian emissions in the 2000 inventory are approximately 52 percent of the total global emissions (2,269 tons/yr), an increase of 14 percent compared to 1990. GRAHM model simulations are being conducted to estimate the impact of these changes on the long-range transport of mercury into North America. Some preliminary results are presented below.

Chinese emissions are approximately half of the Asian emissions. The model estimates that China and North America contribute approximately 7 percent and 28 percent respectively, to the Great Lakes total mercury deposition. Figure 7-1 shows the seasonal variations of the contribution. Long-range transport from China across the Pacific is most active in the springtime as observed and also as simulated by the model (Figure 7-1a). The deposition contribution is greatest in the late spring and early fall due to the seasonal variations in transport and precipitation. The North American contribution to the Great Lakes surface mercury concentrations peaks during winter with another deposition maximum in the month of May (Figure 7-1d).

Toxaphene Residues in the United States Soils
– **What is Their Impact on the Great Lakes Basin?**
– by J. Ma, Meteorological Service of Canada

Considerably high toxaphene air concentrations were detected over the Great Lakes Basin, a region where toxaphene was not used extensively. This suggests that contamination in the Great Lakes and Arctic by toxaphene may not be a local issue but attributable to its volatilization from reservoirs where toxaphene has accumulated from past applications, followed by long-range transport on continental to global scales. Given that the U.S., especially the southern U.S., was the largest user of toxaphene in the world before the

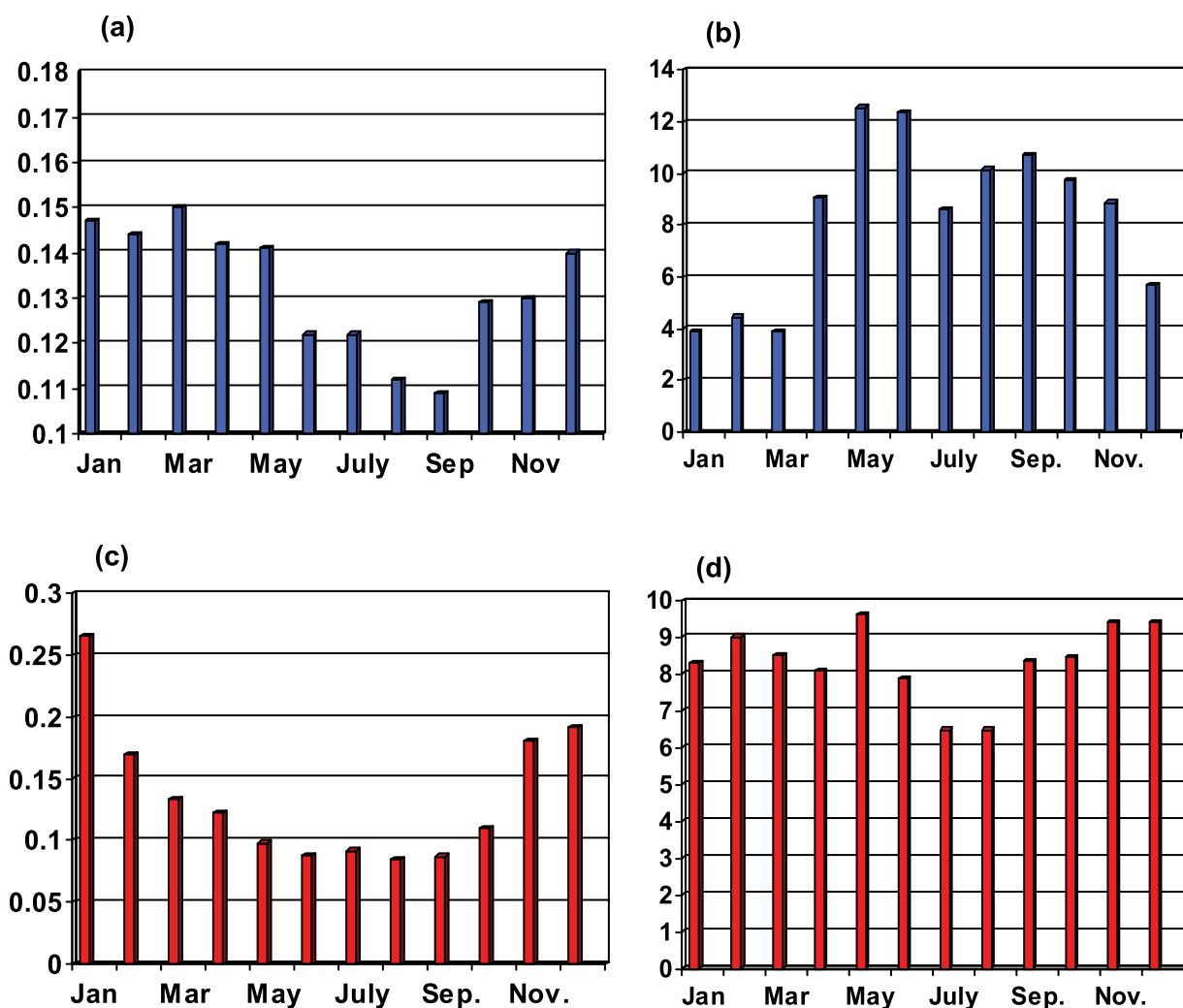


Figure 7-1. GRAHM model derived contribution to the surface air concentrations (ng/m3) and to the monthly deposition (percentage of annual contribution) to the Great Lakes from Chinese emissions ((a) and (b), respectively) and from North American emissions ((c) and (d), respectively).
Source: Meteorological Service of Canada, 2005

mid-1980s, and that a large amount of residues still persist in agricultural and non-agricultural soils in these areas, this region likely is a major source of toxaphene to the Great Lakes Basin and the Arctic. To investigate the contribution of the major toxaphene reservoirs in the U.S. to its budget in the Great Lakes Basin, a coupled regional-scale atmospheric transport, soil-air and water-air exchange model, the Canadian Model for Environmental Transport of Organochlorine Pesticides was used. The modeling looked at toxaphene pathways in multimedia environments in the North American continent in the year 2000. The model results indicated that, on an annual basis, southeast U.S. sources made the largest contributions to toxaphene levels in the air and depositions to all lakes (or basin-wide deposition), at

72 percent for the air concentration, 78 percent for dry deposition, and 88 percent for wet deposition (Figure 7 2).

A significant proportion of these contributions occur during relatively short episodic events, particularly in the winter/spring and summer/autumn transition periods. This is due primarily to interseasonal changes in atmospheric circulation patterns. A strong episodic long range transport event of toxaphene air concentration from the southeast U.S., occurring during September 9-13, 2000, was captured by the numerical simulations (Figure 7-3). During this event, there was a warm and humid air mass moving from the Gulf of Mexico and the southern U.S. to the Great Lakes, resulting in strong precipitation and wet deposition to the Great Lakes.

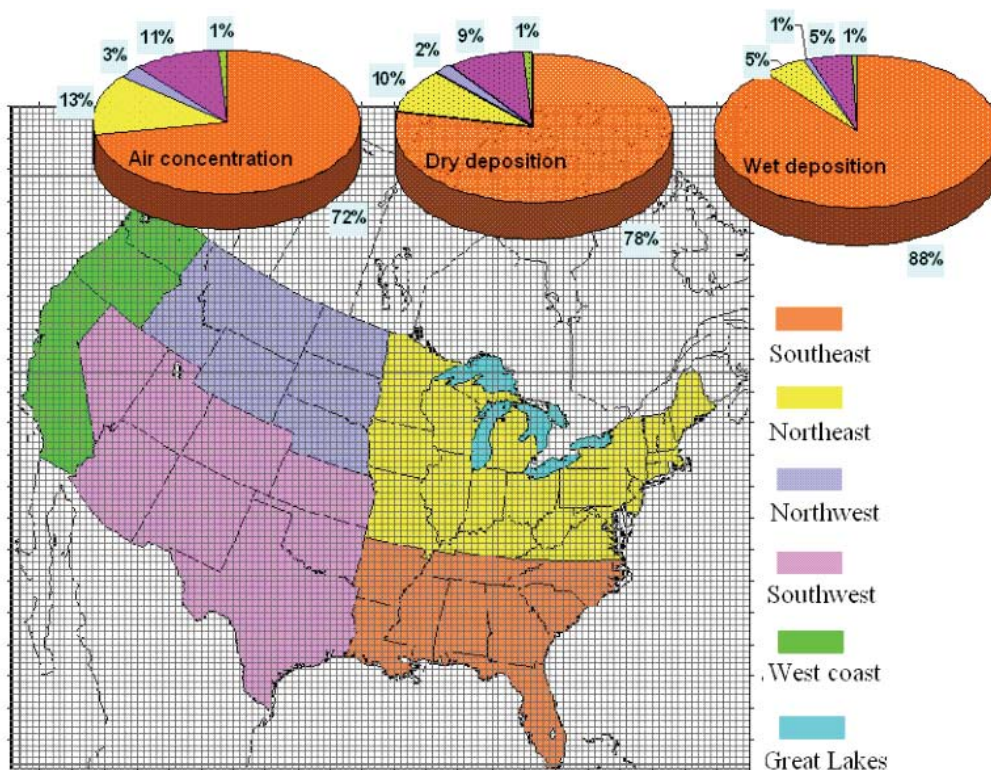


Figure 7-2. Percentage contribution of toxaphene soil residues in different regions of the U.S. to toxaphene air concentration, and dry and wet depositions in the Great Lakes.
Source: Meteorological Service of Canada, 2005

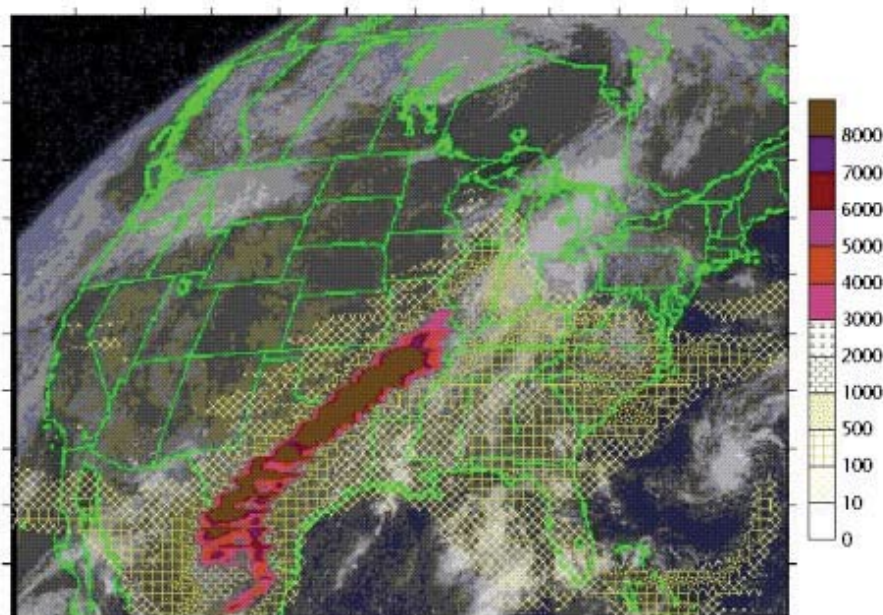


Figure 7-3. Toxaphene air concentration (pg/m³) at 1200 m superimposed on GOES-8 visible satellite image showing a rain band extending from the Gulf of Mexico and southern U.S. to the Great Lakes on September 10, 2000.
Source: Meteorological Service of Canada, 2005



Modeled annual dry, wet, and total (dry + wet) deposition fluxes to each lake show that Lakes Erie and Michigan received more toxaphene than the other three lakes (Figure 7-4). In the eastern Great Lakes (Lakes Erie, Ontario, and Huron), as a result of higher precipitation rates in this region, wet deposition contributed more to the total deposition, while dry deposition was higher in the two upper lakes (Lakes Michigan and Superior). Comparison of the modeled total deposition values of 1.5, 5.8, and 3.3 kg/yr for Lakes Superior, Michigan, and Ontario for the year 2000 from this study with estimated values of 18.8, 13.6, and 5 kg/yr, respectively, for the mid-1990s by Swackhamer et al. (1999), indicates a clear decreasing trend in toxaphene loading in each of the three lakes from the mid-1990s to 2000. For more information please see the listed references (below).

References

- Ma, J., Venkatesh, S., Li, Y., and Daggupaty, S. M. (2005), Tracking toxaphene in the North American Great Lakes basin – 1. Impact of toxaphene residues in the U.S. Soils, Environ. Sci. Technol., 39. In press.
- Ma, J., Venkatesh, S., Li, Y., Cao, Z. and Daggupath, S. M. (2005), Tracking toxaphene in the North American Great Lakes basin – 2. A strong episodic long-range transport event, Environ. Sci. Technol., 39. In press.
- Swackhamer, D. L., Schottler, S., and Pearson, R. F. (1999), Air-water exchange and mass balance of toxaphene in the Great Lakes. Environ. Sci. Technol., 33, 3864-3872.

U.S. Activities

Modeling Transport and Deposition of Level 1 Substances to the Great Lakes – by T. Nettesheim, US EPA Great Lakes National Program Office; and M. MacLeod, W. Riley, and T. McKone, Lawrence Berkeley National Laboratory

The US EPA GLNPO provided support to the Lawrence Berkeley National Laboratory to model the transport and deposition of Level 1 substances to the Great Lakes. Two multimedia mass balance models based on the Berkeley-Trent (BETR) model framework were used to calculate the efficiency of atmospheric transport and deposition to the Great Lakes for emissions of the Level 1 substances in different regions of North America and globally. The BETR model describes contaminant partitioning and fate in the environment using mass balance equations based on the fugacity concept.

The BETR North America model describes the North American environment as 24 ecological regions. Within each region, contaminant fate is described using a seven-compartment fugacity model, including a vertically segmented atmosphere, vegetation, soil, freshwater, freshwater sediments, and coastal ocean/sea water.

The BETR Global model is based on the same Berkeley-Trent contaminant fate modeling framework as the BETR North America Model. However, the BETR Global model incorporates several refinements

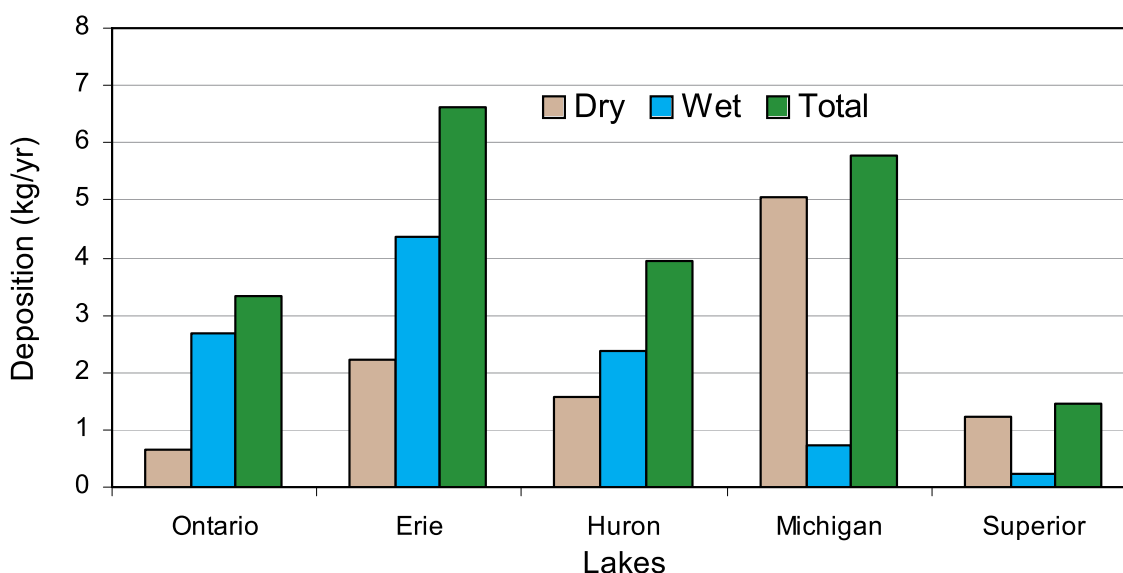


Figure 7-4. Modeled annual dry, wet, and total (=dry + wet) depositions (kg/yr) to each of the Great Lakes in 2000.

Source: Meteorological Service of Canada, 2005



to the general structure to allow more flexibility and to describe the global environment in more detail and with higher temporal resolution. The BETR Global model uses a monthly time scale to specify atmospheric conditions and a 15° by 15° grid coverage of the globe, resulting in 288 multimedia regions.

The model analysis allows the Level 1 substances to be categorized according to the spatial scale of emission likely to impact the Great Lakes:

- (1) Local or regional scale – dieldrin, aldrin, and B(a)P
- (2) Continental scale – chlordane, 2,3,7,8-tetrachlorodibenzodioxin, p,p,-DDT, toxaphene, OCS, and mirex
- (3) Hemispheric scale – PCBs
- (4) Global scale – HCB and alpha-HCH.

The model's transfer efficiency calculations can be used along with available emission inventory data to estimate the contribution of emissions in different locations to atmospheric deposition fluxes to the Lakes. As a case study, global estimates of emissions to air for individual PCB congeners on a country-by-country basis between 1930 and 2000 (Breivik et al., 2002a and 2002b) were used as inputs to the BETR Global model.

Comparison of cumulative historical emissions scenarios (Figures 7-5, 7-7, and 7-9) with estimated emissions in the year 2000 (Figures 7-6, 7-8, and 7-10) indicates that the relative contributions from sources outside North America are increasing as sources are curtailed in the U.S. and Canada. In particular, Eastern Europe appears to be becoming a relatively more important source to the Great Lakes. However, under all emission scenarios considered, the majority of PCB deposition to the Great Lakes is attributable to sources in North America.

The uncertainties associated with these assessments are believed to be dominated by uncertainties in emission estimates of the Level 1 substances. Further research should be focused on better characterization of emissions in North America and globally.

References

Breivik, K., Sweetman, A., Pacyna, J.M., Jones, K.C. 2002a. Towards a global historical emission inventory for selected PCB congeners — a mass balance approach: 1. Global production and consumption. The

Science of The Total Environment, Volume 290, Issues 1-3, 6 May 2002, Pages 181-198.

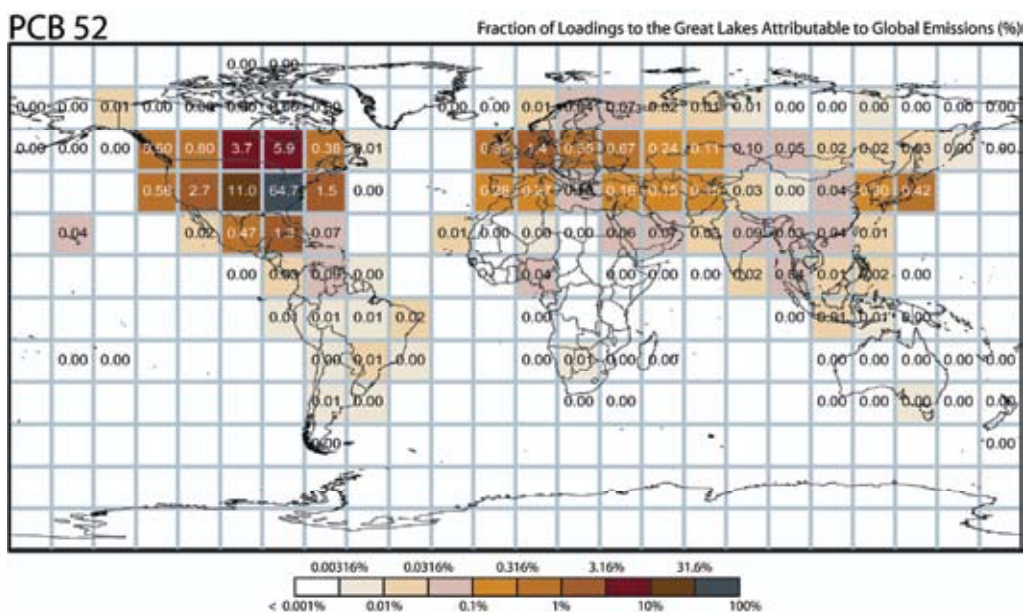
Breivik, K., Sweetman, A., Pacyna, J.M., Jones, K.C. 2002b. Towards a global historical emission inventory for selected PCB congeners — a mass balance approach: 2. Emissions. The Science of The Total Environment, Volume 290, Issues 1-3, 6 May 2002, Pages 199-224.

MacLeod, M., Riley, W.J., McKone, T.E. 2005. Modeling Transport and Deposition of Level 1 Substances to the Great Lakes. Ernest Orlando Lawrence Berkeley National Laboratory, Environmental Energies Technology Division.

Joint U.S. and Canadian Activities

North American Mercury Model Intercomparison Study (NAMMIS) – by R. Bullock, US EPA

From 2000 to 2004, a multi-phase atmospheric mercury model intercomparison study was organized by the Meteorological Synthesizing Centre – East, with the support of the European Monitoring and Evaluation Programme. This previous study focused on modeling atmospheric mercury transport and deposition over Europe. It provided valuable information about the way the various models treated certain physical and chemical processes and showed that these combinations of treatments can lead to significantly different modeling estimates. A follow-on effort with a focus on North America has been organized by the US EPA's National Exposure Research Laboratory Atmospheric Modeling Division (AMD). This North American Mercury Model Intercomparison Study (NAMMIS) is now under way to compare regional-scale atmospheric mercury models in a more tightly constrained testing environment. By having each of the models use the same meteorology inputs, emissions inputs, horizontal modeling grid, and simulated pollutant concentrations at the model boundary, it should be possible to better determine which particular scientific uncertainties and model treatments are leading to the most significant differences in simulation results. The regional-scale atmospheric mercury models being applied are: a mercury-specific version of the Community Multi-scale Air Quality model by the AMD, the Regional Modeling System for Aerosols and Deposition by Systems Applications



PCB 101

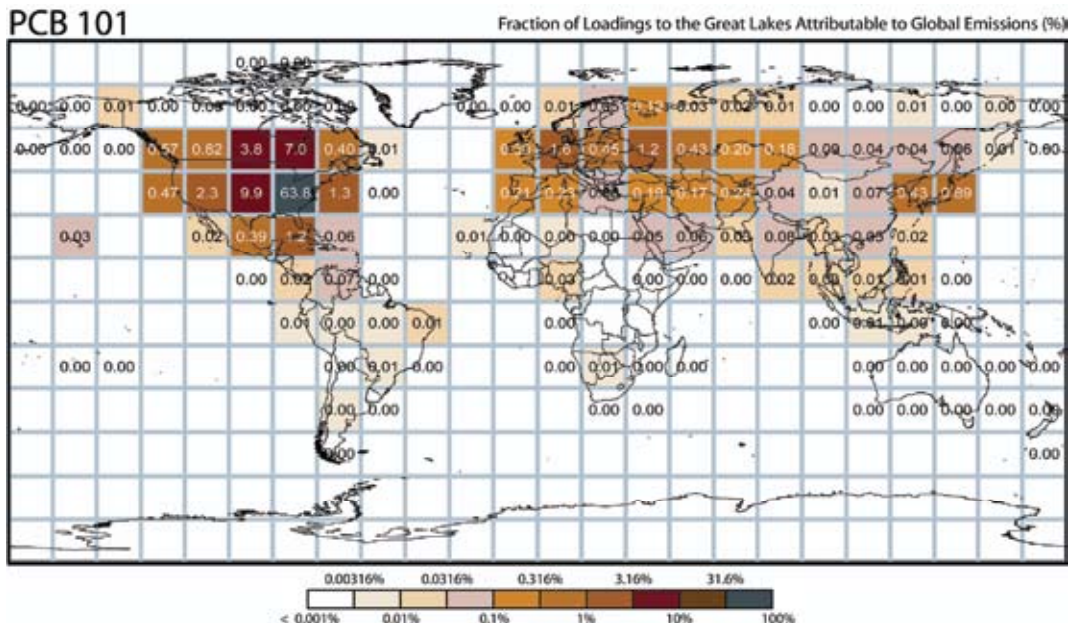


Figure 7-7. Estimated fraction of atmospheric loading of PCB 101 to the Great Lakes attributable to emissions in each region of the BETR Global model from cumulative 1930-2000 emissions.
Source: MacLeod et al., 2005

PCB 101 (2000 Emissions)

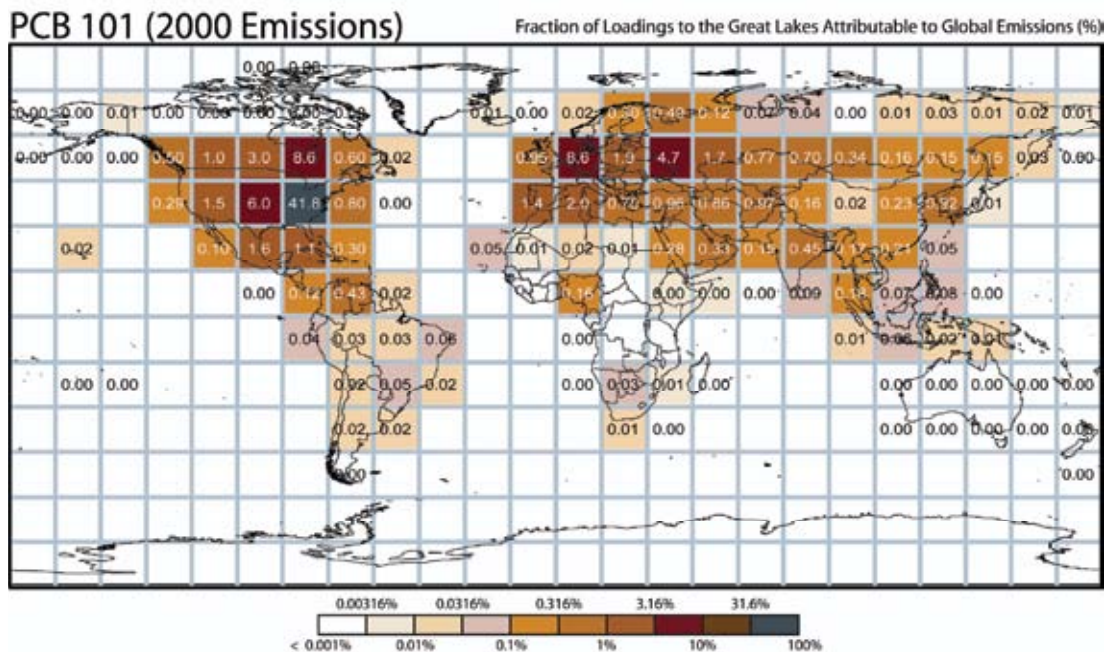


Figure 7-8. Estimated fraction of atmospheric loading of PCB 101 to the Great Lakes attributable to emissions in each region of the BETR Global model due to year 2000 emissions.
Source: MacLeod et al., 2005

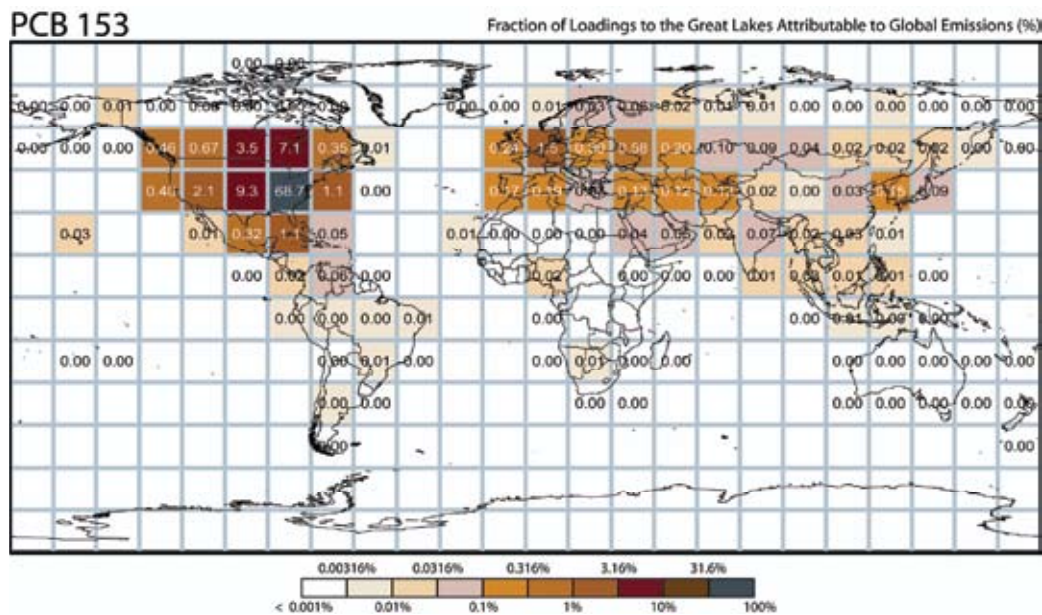


Figure 7-9. Estimated fraction of atmospheric loading of PCB 153 to the Great Lakes attributable to emissions in each region of the BETR Global model from cumulative 1930-2000 emissions. Source: MacLeod et al., 2005

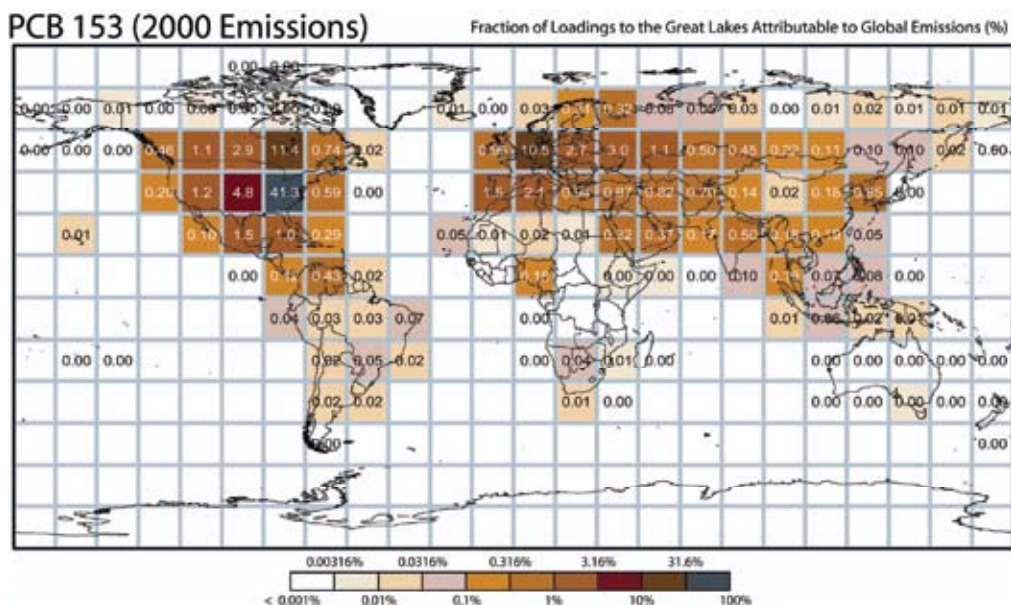


Figure 7-10. Estimated fraction of atmospheric loading of PCB 153 to the Great Lakes attributable to emissions in each region of the BETR Global model due to year 2000 emissions. Source: MacLeod et al., 2005



International, and the Trace Element Analysis Model of Atmospheric and Environmental Research, Inc. (AER).

The modeling domain for the study covers the 48 contiguous United States, southern Canada, northern Mexico, and Cuba. In a cooperative effort involving the AMD, US EPA's Office of Air and Radiation, US EPA's Office of Water, EC, AER, Harvard University, and the New York State Department of Environmental Conservation, three separate global-scale atmospheric mercury models will be applied to define three sets of initial condition and boundary condition (IC/BC) data for elemental mercury, reactive gaseous mercury and aerosol mercury air concentrations for the regional study area. The global models being applied are: the Chemical Tracer Model by AER, the

GRAHM model by EC, and the GEOS-CHEM model by Harvard University. The regional-scale models will then each use these three IC/BC sets along with identical meteorological and pollutant emissions data to simulate atmospheric mercury transport and deposition across the same regional modeling domain. Through model results intercomparison and comparison to available observations, the individual effects of IC/BC assumptions and science process treatments in the regional models can be better identified and quantified, and thus provide guidance to the research community regarding which scientific uncertainties are contributing most to discrepancies in the modeling of source attribution for atmospheric mercury deposition.



Swans on Lake Ontario
Photograph by Ashij Kumar



Trout Fishing on Newton Creek
Harrison, Michigan
Photograph Courtesy of MichiganTravelBureau



ACRONYMS

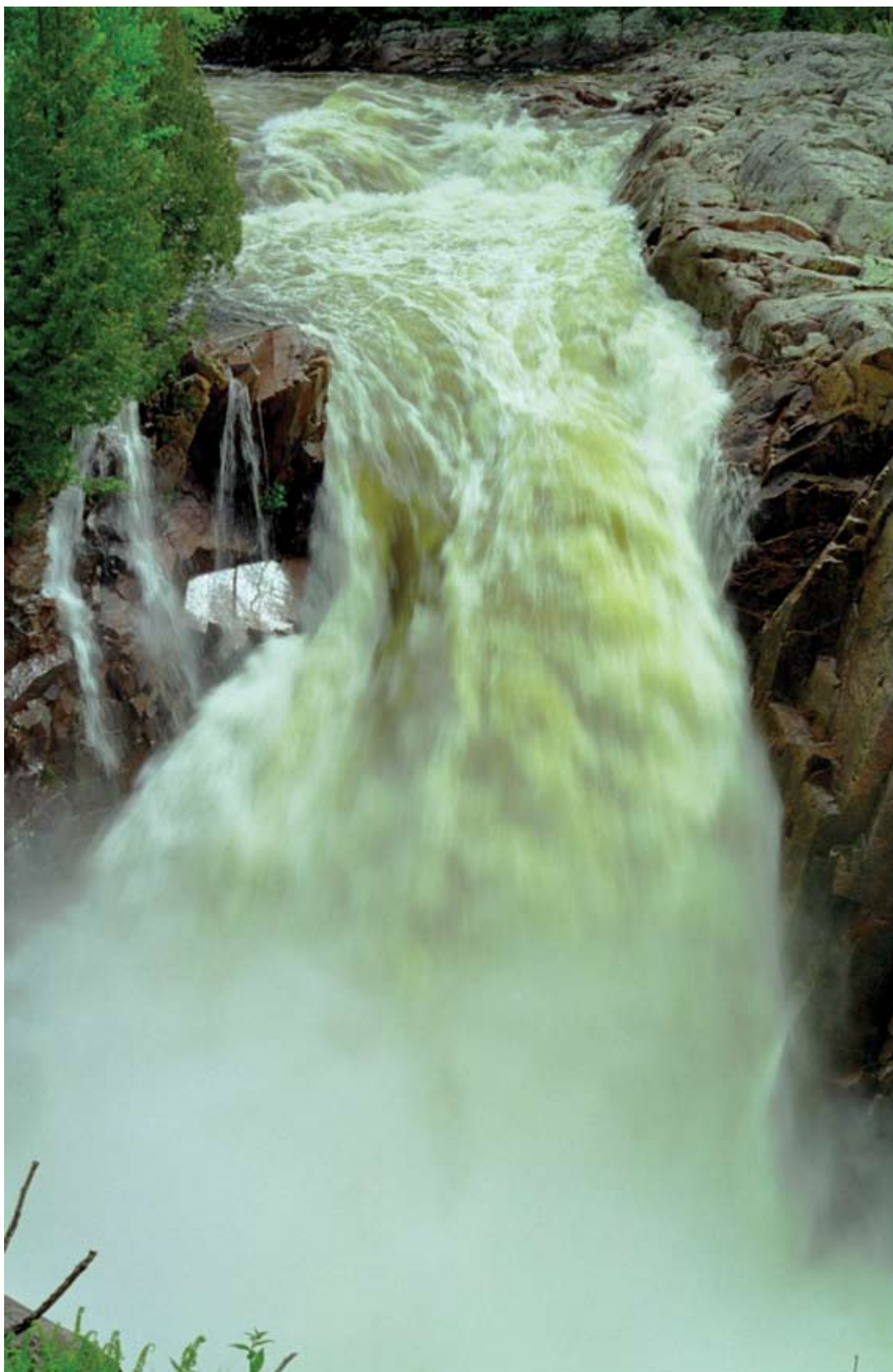
ADA	American Dental Association
AER	Atmospheric and Environmental Research, Inc.
AHA	American Hospital Association
ALMR	Association of Lighting and Mercury Recyclers
AMD	Atmospheric Modeling Division
AMRC	Association of Municipal Recycling Coordinators
AOC	Area of Concern
ASTM	American Society for Testing and Materials
B(a)P	Benzo(a)pyrene
BEC	Binational Executive Committee
BETR	Berkeley-Trent Model
BFRs	Brominated Flame Retardants
BMPs	Best Management Practices
CAA	Clean Air Act
CAMR	Clean Air Mercury Rule
CCME	Canadian Council of Ministers of the Environment
CDD	Chlorinated dibenzo-p-dioxin
CDF	Chlorinated dibenzo-p-furan
CEPA	Canadian Environmental Protection Act
CGLI	Council of Great Lakes Industries
COA	Canada-Ontario Agreement
COC	Contaminant of Concern
CWS	Canada-wide Standards
DfE	Design for the Environment
DNAPL	Dense Non-Aqueous Phase Liquid
DNR	Department of Natural Resources
EC	Environment Canada
GEOS	Goddard Earth Observing System
GLBTS	Great Lakes Binational Toxics Strategy
GLNPO	Great Lakes National Program Office
GLWQA	Great Lakes Water Quality Agreement
GRAHM	Global and Regional Atmospheric Heavy Metals Model
HBCD	Hexabromocyclododecane
HCb	Hexachlorobenzene
HCH	Hexachlorocyclohexane
Hg	Mercury
HVAC	Heating, Ventilation, and Air-Conditioning
HWC	Hazardous Waste Combustors
H2E	Hospitals for a Healthy Environment
IADN	Integrated Atmospheric Deposition Network
IC/BC	Initial condition and boundary condition
IDEM	Indiana Department of Environmental Management
IJC	International Joint Commission



ISO	International Standards Organization
LaMPs	Lakewide Management Plans
LDR	Land Disposal Restrictions
MACT	Maximum Available Control Technology
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
METAALICUS	Mercury Experiment to Assess Atmospheric Loading in Canada and the U.S.
MOE	Ministry of the Environment (Ontario)
MOU	Memorandum of Understanding
MPCA	Minnesota Pollution Control Agency
MWC	Municipal Waste Combustors
MWI	Medical Waste Incinerators
NAMMIS	North American Mercury Model Intercomparison Study
NAPS	National Air Pollution Surveillance Network
NDAMN	National Dioxin Air Monitoring Network
NADP	National Atmospheric Deposition Program
NEI	National Emissions Inventory
NEMA	National Electrical Manufacturers Association
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NPRI	National Pollutant Release Inventory (Canada)
NRDA	Natural Resource Damage Assessment
NY	New York
OCS	Octachlorostyrene
ODA	Ontario Dental Association
OME	Ontario Ministry of the Environment
OSPPERA	Ohio Spill Planning, Prevention, and Emergency Response Association
OTS	Ontario Tire Stewardship
OU	Operable Unit
P2	Pollution Prevention
PA	Pennsylvania
PAH	Polycyclic Aromatic Hydrocarbon
PCBs	Polychlorinated Biphenyls
PCDD	Polychlorinated Dibenzo-Para-Dioxins
PCDF	Polychlorinated Dibenzofurans
PCP	Pentachlorophenol
PM	Particulate Matter
POPs	Persistent Organic Pollutants
POTW	Publicly Owned Treatment Works
PTS	Persistent Toxic Substances
RAPs	Remedial Action Plans
RCRA	Resource Conservation and Recovery Act
SAB	Science Advisory Board
SOLEC	State of the Lakes Ecosystem Conference
SOP	Strategic Options Process
SWARU	Solid Waste Area Reduction Unit
SVOC	Semi-Volatile Organic Compound



TEQ	Toxic Equivalent
TGM	Total Gaseous Mercury
TSMF	Toxic Substances Management Policy
TRC	Thermostat Recycling Corporation
TRI	Toxics Release Inventory (U.S.)
TSCA	Toxic Substances Control Act
UNEP	United Nations Environment Programme
US EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
USWAG	Utility Solid Waste Activities Group
VOC	Volatile Organic Compound
WDNR	Wisconsin Department of Natural Resources
WDO	Waste Diversion Ontario
WETT	Wood Energy Technology Transfer
WG	Workgroup
WLSSD	Western Lake Superior Sanitary District



Aguasabon River, Ontario
Photograph by Patrick T. Collins,
Minnesota Department of Natural Resources



APPENDIX A

GREAT LAKES BINATIONAL TOXICS STRATEGY (GLBTS) PROGRESS OVERVIEW 1997 – 2005



Apostle Island National Lakeshore, Wisconsin
Photograph by Meg Turville-Heitz,
Wisconsin Department of Natural Resources



GREAT LAKES BINATIONAL TOXICS STRATEGY (GLBTS)

PROGRESS OVERVIEW 1997 – 2005

GLBTS Development, Integration Workgroup, and Stakeholder Forum

1997

- 4/7/97 U.S. and Canada sign the GLBTS: Canada-United States Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes
- 6/26/97 Stakeholders invited to workshop to develop a draft GLBTS Implementation Plan
- 12/97 GLBTS Implementation Plan distributed and Substance participation solicited
- 12/97 GLBTS Website is developed

1998

- 3/23/98 Kick-off implementation meeting in Chicago to form seven substance workgroups
- 6/19/98 The first GLBTS Integration Workgroup meeting is convened in Romulus, Michigan
- 6/98 GLBTS Website is redesigned; PCBs and Mercury Workgroup pages added
- 7/98 GLBTS Website is redesigned; Integration, Dioxins, Pesticides, HCB/B(a)P, Alkyl-lead, and OCS Workgroup pages added
- 10/21-23/98 GLBTS display and presentation (including GLBTS handouts, a brochure, Website cards, GLBTS progress timeline and activity sheets) at SOLEC in Buffalo, NY
- 11/16/98 The first GLBTS Stakeholder Forum is convened in Chicago, IL
- 11/16/98 The first GLBTS Progress Report is distributed

1999

- 1/26/99 GLBTS Integration Workgroup meets in Windsor, Ontario
- 4/27/99 GLBTS Stakeholder Forum is held in Toronto, Ontario
- 4/28/99 GLBTS Integration Workgroup meets in Toronto, Ontario
- EC and US EPA develop draft communications strategy, present it to Integration Workgroup, and revise strategy based on stakeholder comments
- 8/24/99 GLBTS Integration Workgroup meets in Detroit, Michigan
- 9/23-26/99 US EPA, EC and invited speakers give GLBTS session presentation at the IJC Great Lakes Water Quality Forum in Milwaukee, WI
- 9/24/99 A preliminary draft GLBTS Progress Report issued at IJC meeting in Milwaukee, WI
- 10/99 GLBTS main and Mercury Workgroup web pages are redesigned
- 10/7/99 A Canadian GLBTS Report on Level II Substances is posted on the GLBTS Website
- 11/18/99 GLBTS Stakeholder Forum is held in Chicago, IL
- 11/19/99 GLBTS Integration Workgroup meets in Chicago, IL
- 12/99 Preliminary planning initiated for a PCP Workshop (to include the GLBTS pesticides, HCB and Dioxin/Furan Workgroups)
- 12/3/99 a U.S. GLBTS Report on Level II Substances is posted on the GLBTS Website
- 12/15/99 Draft (Full) 1999 GLBTS Progress Report issued
- 1999 (various dates) Development of a Canadian GLBTS communications plan



2000
<ul style="list-style-type: none">- 1/28/00 Municipal Solid Waste and Incineration Workgroup planning conference call- 2/11/00 Municipal Solid Waste and Incineration Workgroup planning conference call- 2/15/00 GLBTS Integration Workgroup meets in Windsor, Ontario- 5/15/00 Protecting the Great Lakes, Sources of PBT Reductions Workshop on Municipal Solid Waste Management is held in Toronto, Ontario- 5/16/00 GLBTS Stakeholder Forum is held, with the theme “Meeting the Challenge”- 9/22/00 GLBTS Integration Workgroup meets in Chicago, IL- 2000 (various dates) GLBTS communications plan is finalized by EC; “key messages” finalized; various communications products in development (brochure, business cards, display unit, letterhead, Website improvements, success stories)
2001
<ul style="list-style-type: none">- 2/20/01 GLBTS Integration Workgroup meets in Windsor, Ontario- 2/21/01 GLBTS 2000 Progress Report is posted to GLBTS Website- 5/17/01 GLBTS Stakeholder Forum is held in Toronto, Ontario- 5/18/01 GLBTS Integration Workgroup meets in Toronto, Ontario- 6/18/01 GLBTS Sector Subgroup begins a series of conference calls to select a short list of sectors for a pilot effort- 8/28/01 GLBTS Integration Workgroup meets in Chicago, IL- 9/19/01 GLBTS Sector Subgroup begins information-gathering phase focusing on the short list of sectors- 11/14/01 GLBTS Stakeholder Forum is held in Chicago, IL, with the theme “Implementation – Partners in Progress”- 11/15/01 GLBTS Integration Workgroup meets in Chicago, IL- 11/16/01 GLBTS/LaMP Workshop in Chicago, IL, with the theme of “Program Synergies – Partners in Progress, Exploring how we can mutually support the pollutant reduction needs and efforts of each program synergistically”
2002
<ul style="list-style-type: none">- 1/25/02 GLBTS Sector Subgroup begins summarizing findings- 2/26/02 GLBTS Sector Subgroup presents summary of findings to Integration Workgroup- 2/26/02 GLBTS Integration Workgroup meets in Windsor, Ontario- The GLBTS EC/US EPA Website “binational.net” is created- 5/29/02 GLBTS Stakeholder Forum and Five-Year Anniversary event are held in Windsor, Ontario- 5/29/02 GLBTS Five-Year Perspective report issued- 5/30/02 GLBTS Integration Workgroup meets in Windsor, Ontario- 9/16/02 GLBTS Sector Subgroup holds conference call to discuss a pilot sector project- 9/18/02 GLBTS Integration Workgroup meets in Chicago, IL- 12/3/02 GLBTS Stakeholder Forum is held in Chicago, IL- 12/3/02 Draft GLBTS 2002 Progress Report issued- 12/4/02 GLBTS Integration Workgroup meets in Chicago, IL



2003

- 2/25/03 GLBTS Integration Workgroup meets in Windsor, Ontario
- 3/01/03 GLBTS Binational.net bookmark created as a marketing tool
- 4/01/03 GLBTS CD ROM containing the Strategy, annual progress reports (1998, 1999, 2000, 2001, & 2002), Five-Year Perspective, and various Strategy Updaters (all in both French and English) is created and 5,000 copies are sent to basin stakeholders and Washington and Ottawa government officials
- 4/03/03 GLBTS presentation to the Lake Superior LaMP Forum in Duluth, Minnesota
- 5/05/03 GLBTS presentation to International Pulp and Paper Conference in Portland, Oregon
- 5/13/03 GLBTS presentation to Commission for Environmental Cooperation, Sound Management of Chemicals (SMOC) meeting in Windsor, Ontario
- 5/14/03 Final GLBTS 2002 Progress Report posted at www.epa.gov/glnpo/bns and binational.net
- 5/14/03 GLBTS Stakeholder Forum held in Windsor, Ontario, in conjunction with CEC SMOC public meeting
- 5/15/03 GLBTS Integration Workgroup meets in Windsor, Ontario
- 6/01/03 GLBTS Update prepared, as well as GLBTS displays in French, Spanish, and English
- 6/11/03 GLBTS presentation to Canadian P2 Roundtable in Calgary, Alberta
- 6/16/03 Conference call with Agricultural Subgroup of Integration Workgroup
- 6/23/03 GLBTS presentation to IAGLR in Chicago, Illinois
- 7/31/03 GLBTS Public outreach tent set up at Chicago Tall Ships event in Chicago, Illinois
- 8/11/03 GLBTS presentation at Emerging Chemicals Workshop in Chicago, Illinois
- 8/19/03 Conference call with LaMP leads to discuss GLBTS/LaMP Crosswalk of priorities
- 9/01/03 GLBTS 2003 Activity Update prepared
- 9/04/03 Conference call held with small number of Integration Workgroup members to discuss draft GLBTS Level I Substance Assessment Process
- 9/11/03 GLBTS Integration Workgroup meets in Toronto, Ontario
- 9/11/03 GLBTS Fall 2003 Workgroup Activity Update distributed
- 9/18/03 GLBTS attendance at the IJC Public Forum in Ann Arbor, Michigan
- 10/24/03 GLBTS presentation to European delegation at EU REACH Program in Chicago, Illinois
- 11/25/03 Conference call with LaMP and GLBTS Stakeholders to discuss GLBTS Level I Substance Assessment Process
- 12/02/03 GLBTS presentation to Lake Superior LaMP Task Force in Thunder Bay, Ontario
- 12/16/03 GLBTS Stakeholder Forum is held in Chicago, IL
- 12/16/03 Draft GLBTS 2002 Progress Report issued
- 12/17/03 GLBTS Integration Workgroup meets in Chicago, IL



2004

- 2/04 Final GLBTS 2003 Progress Report posted at www.epa.gov/glnpo/bns and binational.net
- 4/13/04 – 4/15/04 GLBTS Management Framework Workshop in Chicago, Illinois
- 6/17/04 GLBTS Stakeholder Forum is held in Toronto, Ontario
- 6/18/04 GLBTS Integration Workgroup meets in Toronto, Ontario
- 10/07/04 GLBTS Integration Workgroup meets in Toronto, Ontario: Draft Management Assessment for OCS and Management Assessment for Dioxin and Furans presented
- 10/07/04 GLBTS Fall 2004 Workgroup Activity Update distributed
- 11/16/04 – 11/18/04 Presentation at Workshop on Environmental Health Effects of Persistent Toxic Substances – Hong Kong: “The GLBTS as a Governance Model to reduce PTS”
- 11/30/04 GLBTS Stakeholder Forum is held in Chicago, IL
- 12/01/04 Draft GLBTS 2004 Progress Report issued
- 12/01/04 GLBTS Integration Workgroup meets in Chicago, IL

2005 and Ongoing

- 2/10/05 GLBTS update presented to Lake Superior LaMP Chemical committee in Marquette, MI, given by Alan Waffle and E.Marie Wines
- 3/09/05 GLBTS update presented at GLRPPR in Chicago, IL, given by Alan Waffle
- 3/11/05 GLBTS attendance (Alan Waffle) at EC’s Workshop on Pharmaceuticals and Personal Care products in Burlington, Ontario
- 3/23/05 GLBTS Integration Workgroup meets in Windsor, Ontario: Draft Management Assessments for HCB, B(a)P, PCB, mercury, alkyl-lead, and pesticides presented
- 3/29/05 GLBTS attendance at IJC Chemical Exposure Workshop in Chicago, IL
- 4/11/05 GLBTS display presented at US National Environmental Partnership Summit
- 5/05 Final GLBTS 2004 Progress Report posted at <http://binational.net/bns/2004/index.html>
- 5/17/05 GLBTS Stakeholder Forum is held in Toronto, Ontario
- 5/18/05 GLBTS Integration Workgroup meets in Toronto, Ontario
- 5/24/05 GLBTS presentation given by Ted Smith at IAGLR in Ann Arbor, MI
- 6/01/05 GLBTS presentation at Canadian Pollution Prevention Roundtable in Victoria, British Columbia, given by Tricia Mitchell and Alan Waffle
- 9/15/05 GLBTS Integration Workgroup meets in Chicago, IL
- 9/27/05 GLBTS update presented to Lake Superior LaMP Workgroup in Thunder Bay, Ontario, given by Alan Waffle
- 9/29/05 GLBTS attendance (Ted Smith and Alan Waffle) at SOLEC Chemical Integrity Workshop in Windsor, Ontario
- 11/02/05 GLBTS attendance (Alan Waffle) at IJC GLWQA Public Meeting in Windsor, Ontario
- 12/06/05 GLBTS Stakeholder Forum is held in Chicago, IL
- 12/07/05 Draft GLBTS 2005 Progress Report issued
- 12/07/05 GLBTS Integration Workgroup meets in Chicago, IL



Substance Activities: Mercury (Hg)

GLBTS Workgroup Activities and Reports

1998

- 3/23/98 Workgroup (WG) is formed at the first implementation meeting
- 5/5/98 WG conference call is held
- 8/24/98 Background Information on Mercury Sources and Regulations is posted on the GLBTS Website
- 9/10/98 Options Paper Developing a Virtual Elimination Strategy for Mercury is posted on the GLBTS Website
- 11/16/98 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
- 11/17/98 GLBTS workshop on Potential Mercury Reductions at Electric Utilities is held in Chicago

1999

- 1/99 GLBTS web postings include: Wisconsin Mercury Source Book on community Hg reduction plans, findings of the Mercury Reduction at Electric Utilities workshop, and Mercury Success Stories
- 2/99 Information and FAQs on mercury fever thermometers posted on the GLBTS Website
- 3/99 GLBTS web postings include: The WDNR guide, Mercury in your Community and Environment, and a manual for hospitals, Reducing Mercury Use in Health Care
- 4/99 Workshop on community initiatives for reducing Hg
- 4/27/99 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario
- 11/18/99 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
- 11/99 Draft GLBTS Step 1&2 Sources and Regulations report for mercury is posted on the GLBTS Website

2000

- 5/16/00 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario
- 6/00 GLBTS web page on Mercury Thermometers and FAQs is updated
- 8/00 Memo on progress in reducing mercury use posted on the GLBTS Website
- 9/1/00 A final draft GLBTS Reduction Options (Step 3) report for mercury is prepared and posted on the GLBTS Website on 9/29/00
- 10/17/00 Expansion of mercury web page links
- 11/18/00 WG meeting at the GLBTS Stakeholder Forum in Toronto

2001

- 5/17/01 WG meeting at the GLBTS Stakeholder Forum in Toronto
- 11/14/01 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL

2002

- 5/29/02 – 5/30/02 WG meeting at the GLBTS Stakeholder Forum in Windsor, Ontario
- 12/2/02 WG meeting in Chicago, IL on reducing impact of dental mercury
- 12/3/02 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL



2003
<ul style="list-style-type: none"> - 5/14/03 – 5/15/03 WG meeting at the GLBTS Stakeholder Forum in Windsor, Ontario - 12/16/03 – 12/17/03 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
2004
<ul style="list-style-type: none"> - 6/17/04 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario - 8/04/04 Workgroup report revised: Options for Dental Mercury Reduction Programs: Information for State and Local Governments - 11/30/04 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
2005 and ongoing
<ul style="list-style-type: none"> - 5/17/05 WG meeting in Toronto, Ontario - 12/06/05 WG meeting in Chicago, IL
Other Mercury Related Activities
1997 and Earlier
<ul style="list-style-type: none"> - Chlorine Institute voluntary mercury commitment to reduce mercury use by 50% by 2005 - 12/97 Mercury Report to Congress is released by US EPA
1998
<ul style="list-style-type: none"> - 5/8/98 Chlorine Institute releases progress report on voluntary mercury commitment - 6/25/98 US EPA and AHA sign an MOU on reducing medical wastes - 9/15/98 Three northwest Indiana steel mills commit to developing mercury inventories and reduction plans - 10/98 IDEM household mercury collection efforts - Dow Chemical Company commits to mercury reductions - PBT Strategy grant to the Northeast Waste Management Officials' Association to encourage state mercury reduction efforts
1999
<ul style="list-style-type: none"> - 8/99 As part of 1998 agreement, mercury inventories at Indiana steel mills are completed - 10/99 Mercury waste collection component of the Cook County (Illinois) Clean Sweep pilot begins - Six Ontario hospitals sign MOU to voluntarily reduce Hg - Pollution Probe investigates Hg reduction options for electrical products sector in Ontario - Automotive Pollution Prevention Project efforts to phase out Hg - US EPA grant to Ecology Center of Ann Arbor: promoting mercury P2 in the health care industry - Western Lake Superior Sanitary District (WLSSD) begins multimedia zero discharge pilot / focus on Hg - Michigan Mercury Pollution Prevention Task Force - 11/16/98 Draft PBT National Action Plan for Mercury is released by US EPA - Total mercury used in lamps declines from an estimated 17 tons in 1994 to an estimated 13 tons in 1999, even though significantly more mercury-containing lamps are sold in 1999 than in 1994.



2000

- Chlorine Institute reports 42% reduction, production-adjusted, in mercury use
- US EPA, state agencies, and academic researchers conduct meetings with chlor-alkali industry representatives to coordinate mercury reduction projects
- Olin Corp. cooperates with US EPA, state, and academic researchers on mercury monitoring project at chlor-alkali plant
- Indiana steel mills complete mercury reduction plans; extend invitation to suppliers to commit to developing mercury inventories and reduction plans
- Auto Alliance commits to eliminate mercury switches in auto convenience lighting; New York DEC and Michigan DEQ implement mercury removal programs at auto scrap yards
- Hospitals for a Healthy Environment produces a Mercury Virtual Elimination Plan for hospitals under the AHA-US EPA MOU. State and local governments provide technical assistance to hospitals, and the National Wildlife Federation (NWF) continues its outreach and education efforts, signing up nearly 600 medical facilities to NWF's "Mercury Free Medicine Pledge."
- Wisconsin DNR and Department of Agriculture conduct a dairy mercury manometer replacement program; approximately 375 mercury manometers are recycled.
- University of Wisconsin extension creates a Website and list server to share information about mercury in schools.
- The Thermostat Recycling Corporation collects over 500 lbs of mercury from over 57,000 thermostats collected and processed from January 1, 1998 to June 30, 2000. The program is expanded to the Northeast and will gradually be expanded to include the entire U.S.
- The Great Lakes Dental Mercury Reduction Project funded by the Great Lakes Protection Fund produces a brochure template: Amalgam Recycling and Other Best Management Practices. Great Lakes Dental Associations reprint and distribute this document to their memberships. The University of Illinois-Chicago dental school and the Naval Dental Research Institute conduct research on controlling mercury in dental wastewater and help to educate dentists about best management practices.
- Coalitions including Health Care Without Harm and the National Wildlife Federation successfully encourage several national retailers to stop the sale of mercury-containing thermometers to the public. Duluth, Minnesota, Ann Arbor Michigan, unincorporated areas of Dane County, Wisconsin, and several Dane Country municipalities, ban the sale of mercury thermometers.

2001

- 651 hospitals join the National Wildlife Federation's Mercury-Free Hospitals campaign
- Ispat-Inland Indiana Harbor Works, Bethlehem Steel-Burns Harbor Division, US Steel-Gary Works, the Delta Institute, and Lake Michigan Forum created the Guide to Mercury Reduction in Industrial and Commercial Settings
- Mercury Switch-out Pilot Program launched by Pollution Probe, Ontario Power Generation, Ontario Ministry of the Environment, and Environment Canada to collect mercury switches from old vehicles
- 2/21/01 A workshop entitled "Extended Producer Responsibility and the Automotive Industry" is sponsored by the Canadian Autoworkers Union's Windsor Regional Environment Council and Great Lakes United



2002

- 2/27/02 Great Lakes United kicks off series of information-sharing sessions about auto mercury-switch removal programs for State agency staff
- 4/5/02 Chlorine Institute releases its Fifth Annual Report to US EPA, showing a 75% reduction in mercury use by the U.S. chlor-alkali industry between 1995 and 2001, more than meeting this sector's commitment to reduce mercury use 50% by 2005
- 10/1/02 Thermostat Recycling Corporation announces that it collected 28,000 thermostats and 231 pounds of mercury in the first half of 2002, a 15% increase from mercury collections in the first half of 2001. The program began to serve the 48 continental U.S. states in the fall of 2001.
- 10/18/02 The Hospitals for a Healthy Environment (H2E) program has 335 partners representing 1,019 facilities: 347 hospitals, 618 clinics, 22 nursing homes and 32 other types of facilities. These partners are health care facilities that have pledged to eliminate mercury and reduce waste, consistent with the overall goals of H2E.

Substance Activities: Polychlorinated Biphenyls (PCBs)

GLBTS Workgroup Activities and Reports

1998 and Earlier

- As of January 1993, approximately 25,000 tonnes of high-level PCBs are either in use or in storage in Ontario; 1529 active PCB storage sites in Ontario
- 3/23/98 WG is formed at the first implementation meeting
- 6/15/98 WG requests that the IG develop a strategy on sediments
- 11/10/98 Options Paper Virtual Elimination of PCBs is posted on GLBTS Website
- 11/16/98 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL

1999

- 4/27/99 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario
- 11/18/99 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
- 11/99 Draft GLBTS Step 1&2 Sources and Regulations report for PCBs is posted on the GLBTS Website
- WG solicits and gains commitment of 3 U.S. auto manufacturers to reduce PCBs
- WG solicits commitment of steel producers to reduce PCBs

2000

- 5/16/00 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario
- Final draft GLBTS Step 3 Reduction Options report for PCBs is prepared (7/14/00) and posted (9/29/00) on the GLBTS Website
- WG continues to use PCB reduction commitment letters, through EC and US EPA, to seek commitments to reduce PCBs. Specific companies are targeted, primarily major owners of PCB transformers and capacitors, and associations, such as CGLI
- WG solicits and gains commitment to reduce PCBs from 2 Canadian auto manufacturers, 4 Canadian steel producers, and over 30 municipal electrical utilities in Ontario
- WG leaders and Council of Great Lakes Industries (CGLI) finalize outreach letters used to seek PCB reduction commitments from trade associations. CGLI identifies specific trade associations to begin outreach. EC mails letters to trade initial associations. US EPA mailings to follow.
- WG begins to compile case study reports on reasons why companies remove their PCBs



- WG begins to collect photographs of PCB-containing electrical equipment to assist potential owners with identification of equipment which may contain PCBs
- WG drafts a fact sheet on PCB-containing submersible well pumps to be used for outreach to potential users of wells and servicers of well pumps.
- As of April 2000, approximately 7,500 tonnes of high-level PCBs are either in use or in storage in Ontario; 1,191 active PCB storage sites in Ontario

2001

- WG continues to mail letters to companies and trade associations seeking commitments to phase out PCBs
- WG prepares case studies submitted by Bethlehem Steel Corporation's Burns Harbor Division and ComEd Energy Delivery, a unit of Chicago-based Exelon Corporation, for posting on the GLBTS Website
- 1/01 PCB federal databases are updated for Canada.
- 5/01 PCB WG progress meeting held in Toronto, Ontario, Canada. WG discusses two reasons that companies are unable to commit immediately to PCB reductions: 1) reduction/replacement is dependent on companies' internal planning and budgeting cycle; 2) reduction/ replacement is tied to market conditions. US EPA and EC will continue mailing out the voluntary reduction and commitment letters to the priority sectors and associations seeking additional commitments to reduce PCBs.
- 5/17/01 WG meeting at the GLBTS Stakeholder Forum in Toronto
- 7/01 US EPA compiles and analyzes data for 1995-1999 submitted by U.S. PCB disposers
- 8/29/01 WG posts photographs of electrical equipment which may contain PCBs (transformers, and capacitors) to GLBTS Website to help increase awareness of the types of equipment that may contain PCBs
- 9/01 In coordination with LaMP activities, EC mails a package of information to all small quantity PCB owners (over 300 owners) in the Lake Superior and Lake Erie Basins to help raise awareness of PCB initiatives underway in support of the GLBTS. The information package contained a copy of PCB Owners Outreach Bulletin, fact sheets, and maps of PCB Storage sites in the Lake Erie and Lake Superior Basins.
- 11/01 PCB WG meeting is held in Chicago, IL. WG discusses the need for more outreach, especially toward small and medium sized companies. Representatives of General Motors outline the company's plan to phase-out all PCB materials from its North American facilities.
- As of April 2001, 80% of high-level PCBs (Askarel > 1%, 10,000 ppm) had been destroyed in Ontario, Canada; however only 25% of low-level PCBs were destroyed, mostly from stored contaminated soil from a contaminated site clean-up in Ontario.
- As of April 2001, approximately 6,000 tonnes of high-level PCBs are either in use or in storage; 992 active PCB storage sites in Ontario.
- 8/30/01 Fact sheet posted to GLBTS Website: PCBs in Submersible Well Pumps
- 11/14/01 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL



2002
<ul style="list-style-type: none"> - WG continues to modify BNS-PCB Website based on recommendations received in an email survey conducted by EC and US EPA in November 2001 - 5/02 WG meeting is held at the GLBTS Stakeholder Forum in Windsor, Ontario - 5/02 Hydro One representative states that the company is free of all high-level PCBs but still has several small stations and other sources of low-level PCBs. Hydro One has introduced a PCB management program that extends to the year 2020. - 5/02 MOE representative presents a strategy to implement an annual charge for having equipment with PCBs. Amendments for Regulation 362 are proposed, including the addition of a schedule of destruction targets. - 10/02 Approx. 400 PCB commitment letters are sent to school boards and other sensitive sites in Ontario. - 10/02 Canada develops a new (draft) plan of outreach and recognition to try to increase the rate of PCB phase-out in Canada. The main elements of the draft plan are to identify and recognize contributions made by individual companies or their industry associations that go beyond regulatory requirements and to publicize success stories. - As of April 2002, 84% of high-level PCBs (Askarel > 1%, 10,000 ppm) had been destroyed in Ontario, compared to 1993. - As of April 2002, approximately 4,147.4 tonnes of high-level PCBs are either in use or in storage in Ontario; 916 active PCB storage sites in Ontario.
2003
<ul style="list-style-type: none"> - 5/14/03 WG meeting at the GLBTS Stakeholder Forum in Windsor, Ontario - 9/11/03 PCB Reduction Recognition Awards presented to Enersource Hydro, Hydro One, Slater Steel, and Stelpipe Ltd. - 12/16/03 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
2004
<ul style="list-style-type: none"> - 6/17/04 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario - 6/17/04 PCB Reduction Recognition Awards presented to City of Thunder Bay and Canadian Niagara Power - 11/30/04 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
2005 and Ongoing
<ul style="list-style-type: none"> - 5/17/05 WG meeting in Toronto, Ontario - 12/06/05 WG meeting in Chicago, IL
Other PCB Related Activities
1999 and Earlier
<ul style="list-style-type: none"> - US EPA finalizes PCB regulations which include a requirement for U.S. owners to register their PCB transformers - EC and Ontario government hold two workshops on PCB management in the Toronto area - 10/99 PCB waste collection component of the Cook County (Illinois) PCB/Hg Clean Sweep pilot begins - U.S. PCB transformer registration database is updated - Requests for voluntary PCB reduction commitments are mailed to automotive, iron & steel, and municipal electrical power utilities in Ontario



2000
<ul style="list-style-type: none">- Region 5 PCB Phasedown Program and pilot phasedown enforcement policy are finalized- A PBT workgroup continues to work on a National Action Plan for PCBs- 2/00 EC mails survey to approximately 500 registered owners of in-use PCB equipment in Ontario, requesting updated information- Cook County PCB/Hg Clean Sweep pilot concludes- 11/00 Canada mails letter to over 2000 registered PCB waste storage owners/managers in Ontario for a recent update of their stored PCB inventory which will be used to modify federal databases for better tracking and monitoring- Update and modification of Federal PCB databases started in 2000 and will continue until completion in 2003- Three Canadian Federal PCB Regulations are being amended: (1) Chlorobiphenyl Regulation; (2) Storage of PCB Material Regulations; (3) PCB Export Regulations- Extensive Public Consultation is conducted during summer and fall of 2000 and will continue
2001
<ul style="list-style-type: none">- 5/2/01 Final Reclassification of PCB and PCB-contaminated Electrical Equipment rule becomes effective- US EPA finalizes a rule on Return of PCB Waste from U.S. Territories Outside the Customs Territory of the U.S. The rule clarifies that PCB waste in U.S. territories and possessions outside the customs territory of the U.S. may be moved to the customs territory of the U.S. for proper disposal at approved facilities.- EC updates National PCB In-Service Inventory from survey of registered owners and prepares fact sheet- EC's regulatory amendment process proposes the strengthening of federal regulations regarding PCB management
2002
<ul style="list-style-type: none">- 42 electrical utilities submit voluntary reduction commitment letters to Environment Canada- Algoma voluntarily commits to eliminate 71,103 kgs (44,400 litres) of PCBs by Dec. 2005- Approximately 27 school boards and sensitive sites respond to PCB commitment letters; 18 of those companies reported that all PCBs were eliminated from their inventories; 3 reported that all high-level PCBs were eliminated from their inventories
2003 and Ongoing
<ul style="list-style-type: none">- Amended Canadian PCB regulations are expected to be published in the Canada Gazette I and II in 2003. These regulations will target phase-out of high-level PCB use by 2007, low-level PCB use by 2014, and prohibit storage after 2009.



Substance Activities: Dioxins/Furans

GLBTS Workgroup Activities and Reports

1998

- 3/23/98 WG is formed at the first implementation meeting
- 11/16/98 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL

1999

- 4/27/99 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario
- 6/1/99 WG Conference call: sources discussions
- 7/7/99 WG Conference call: sources discussions
- 9/7/99 WG Conference call: developing a decision tree source prioritization process
- 10/5/99 WG Conference call: finishing development of a decision tree process
- 11/18/99 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
- 12/7/99 WG Conference call: application of the decision tree process

2000

- 1/11/00 WG Conference call: continuing the decision tree process
- 2/1/00 WG Conference call; decision made to initiate a Burn Barrel Subgroup
- 3/7/00 WG Conference call: continuing the decision tree process
- 4/4/00 WG Conference call: continuing the decision tree process
- 4/4/00 Burn Barrel Subgroup has inaugural teleconference
- 4/25/00 Burn Barrel Subgroup teleconference: strategy matrix discussed
- 5/2/00 WG Conference call: continuing the decision tree process
- 5/16/00 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario: decision tree process is completed
- 5/26/00 GLBTS draft Step 1&2 Sources and Regulations report is prepared
- 7/11/00 WG Conference call: developing reduction projects for high priority sectors
- 8/1/00 Burn Barrel Subgroup teleconference: discussion Terms of Reference; link to Lake Superior LaMP
- 8/18/00 An addendum to the GLBTS Draft Sources and Regulations report is prepared to address the newly released U.S. Dioxin Reassessment and the draft report is posted (9/29/00) on the GLBTS Website
- 9/12/00 WG Conference call: developing reduction projects
- 9/12/00 Burn Barrel Subgroup teleconference: discussion of Chisago County "Buyback" program; discussion of survey questions regarding state/local regulatory frameworks, and garbage quantity/quality questions.
- Final GLBTS Step 3 Reduction Options report is prepared (9/27/00) and the report is posted (9/29/00) on the GLBTS Website
- 11/14/00 Burn Barrel Subgroup teleconference: outline of a strategy document prepared.
- 11/00 Discussion papers on Landfill Fire and Incinerator Ash Management prepared for workgroup review.



2001

- The WG continues to collect information regarding emissions from steel manufacturing, landfill fires, and incinerator ash management
- 1/16/01 Burn Barrel Subgroup teleconference: Burn Barrel Strategy
- 2/6/01 WG Conference call
- 2/13/01 Burn Barrel Subgroup teleconference: Review presentation for Integration Workgroup
- 3/13/01 Burn Barrel Subgroup teleconference: Status of efforts to prepare regulatory profile
- 4/10/01 Burn Barrel Subgroup teleconference: Proposal for US EPA funding of subgroup activities
- 5/8/01 Burn Barrel Subgroup teleconference: Review Strategy/ Implementation Plan document
- 5/17/01 WG meeting at the GLBTS Stakeholder Forum in Toronto: WG approves Burn Barrel Strategy/ Implementation Plan document; Canadian and US presentations on wood preservation
- 6/12/01 Burn Barrel Subgroup teleconference: Implementation activities for Summer/Fall
- 6/22/01 Burn Barrel Subgroup receives \$55k of US EPA PBT funding
- 10/9/01 Burn Barrel Subgroup teleconference: Regional Lake Superior campaign
- 11/6/01 Burn Barrel Subgroup teleconference: Sharing information
- 11/14/01 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
- 12/18/01 Burn Barrel Subgroup teleconference: Sharing information

2002

- 2/12/02 Burn Barrel Subgroup teleconference: web page initiation, bylaws/ordinance discussion.
- 3/19/02 Burn Barrel Subgroup teleconference: web page & list serve development, outreach updates
- 4/5/02 Lake Superior Region workshop on household garbage burning issue – Thunder Bay, ON
- 4/16/02 Burn Barrel Subgroup teleconference: web page & list serve development
- 4/24/02 WG Conference call: discussing ash management
- 5/14/02 Burn Barrel Subgroup teleconference: finalize web page, prepare for Windsor GLBTS meeting
- 5/30/02 WG meeting at the GLBTS Stakeholder Forum in Windsor: demonstration of newly launched subgroup Website “Trash and Open Burning in the Great Lakes”. The WG meeting was held jointly with the HCB/B(a)P WG due to common issues that are of interest to both workgroups.
- 6/18/02 Burn Barrel Subgroup teleconference: Planned activities for summer, addressing “burners” for sale; purchase Website domain name www.openburning.org
- 7/24/02 WG Conference call: discussing the treated wood issue
- 9/10/02 Burn Barrel Subgroup teleconference: Updates on activities in various jurisdictions
- 11/13/02 WG Conference call: discussing a pilot project on the treated wood issue

2003

- 3/18/03 Burn Barrel Subgroup teleconference: Exploring partnerships with health organizations
- 5/14/03 WG meeting at the GLBTS Stakeholder Forum in Windsor, Ontario
- 6/3/03 Burn Barrel Subgroup teleconference: US EPA Office of Solid Waste outreach materials
- 7/31/03 WG teleconference: Draft two-year workplan
- 9/9/03 Burn Barrel Subgroup teleconference: WDNR’s “Air Defenders” kit
- 11/4/03 Burn Barrel Subgroup teleconference: Addressing suppliers of small backyard incinerators



- 11/4/03 WG teleconference: Draft two-year workplan; finalizing the Burn Barrel Strategy
- 12/16/03 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
2004
- 3/02/04 WG teleconference: Progress on issue papers
- 3/09/04 Burn Barrel Subgroup teleconference
- 5/11/04 Burn Barrel Subgroup teleconference
- 6/04 Draft issues papers prepared on Emissions from Agricultural Burning, Structure Fires, Tire Fires, and Wildfires and Prescribed Burning
- 6/17/04 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario
- 9/14/04 Burn Barrel Subgroup teleconference
- 9/09/04 Burn Barrel Subgroup teleconference
- 10/14/04 WG teleconference: Draft Management Assessment for Dioxins
- 11/30/04 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
2005 and Ongoing
- 5/17/05 WG meeting in Toronto, Ontario
- 12/06/05 WG meeting in Chicago, IL
Other Dioxin/Furan Related Activities
1999 and Earlier
- WLSSD begins multimedia zero discharge pilot / focus on dioxins
- Two Ontario utilities eliminate use of PCP in treated poles
2000
- 1/00 WLSSD report on open barrel burning practices is released
- 2/00 Wood stove changeover pilot programs in Traverse City, MI, and Green Bay, WI
- 6/12/00 draft chapters of the U.S. Dioxin Reassessment for external scientific review are released
- 9/28/00 Three draft chapters of the U.S. Dioxin Reassessment for SAB review are released
2001
- February 2001, Release of National Inventory of Releases of Dioxins and Furans, Updated Edition, by EC
- May 2001, Release of report "Characterization of Organic Compounds from Selected Residential Wood Stoves and Fuels" by EC
2002
- PCP re-registration review proceeding as joint Canada/U.S. endeavor
2003
- 7/18/03 CEC draft Phase One North American Regional Action Plan on Dioxins and Furans, and Hexachlorobenzene available for public comment
- Ash Characterization Study in Ontario
- Secondary metal smelter release inventory study in Ontario
- US EPA develops Backyard Trash Burning Website and brochures available at www.epa.gov/nsw/backyard
- Public release of first US National Dioxin Air Monitoring Network (NDAMN) ambient air monitoring data
- Canada-wide Standards for iron sintering and steel manufacturing endorsed in March 2003
- Release of Wisconsin "Air Defenders" Kit for Burn Barrel education



- Dioxin sampler added at an Integrated Atmospheric Deposition Network (IADN site), Burnt Island
2004 and ongoing
- US EPA compiles case studies of open burning reduction efforts
Substance-Specific Activities: Pesticides
GLBTS Workgroup Activities and Reports
1998
- 3/23/98 WG is formed at the first implementation meeting
- 11/16/98 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
- 12/31/98 Draft GLBTS Challenge report for the Level I pesticides is posted on the GLBTS Website
1999
- 4/27/99 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario
- 11/18/99 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
2000
- 5/16/00 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario
- GLBTS U.S. Pesticides Challenge Report: The Level 1 Pesticides in the Binational Strategy is finalized (3/1/00) and posted (9/29/00)
- 5/00 EC announces that with the cooperation of PMRA they have reevaluated their position on Level I pesticides, and that based on all available information have met the Level I challenge.
2001
- WG reviews pollution prevention opportunities for Level II pesticides (endrin, heptachlor, lindane and HCH, tributyl tin, and pentachlorophenol) and begins preparing report
Other Pesticide Related Activities
1999 and Earlier
- 10/96 EC prepares report: Canada-Ontario Agreement Objective 2.1: Priority Pesticides Confirmation of No Production, Use, or Import in the Commercial Sector in Ontario
- US EPA funding to four existing Clean Sweep programs for pilot data collection efforts for Level I pesticides
2000
- Draft National Action Plan for Level 1 Pesticides under the U.S. National PBT Initiative completed and released for review and public comment
- PBT Pesticides Workgroup reviewing toxaphene remediation in Brunswick, GA
- Level I PBT pesticides (except mirex) are regularly collected by ongoing Clean Sweep programs
- Phase out of the Level II Pesticides lindane and tributyl tin compounds are the subject of bi-national negotiations through pesticide regulatory agencies in the U.S. and Canada
2001
- Waste pesticide collections (Clean Sweeps) continue
- 10/5/01 Members of the world's primary maritime organization, the International Maritime Organization, adopt the International Convention on the Control of Harmful Anti-fouling Systems on Ships. The agreement calls for a global prohibition on the application of organotin compounds by January 1, 2003, and a complete prohibition by January 1, 2008.
2002
- PCP re-registration review proceeding as joint Canada/U.S. endeavor



Substance-Specific Activities: Hexachlorobenzene (HCB) / Benzo(a)pyrene (B(a)P)

GLBTS Workgroup Activities and Reports

1998

- 3/23/98 WG is formed at the first implementation meeting
- 9/98 & 10/98 Discussions are held with the pesticide manufacturing, chlorinated solvent manufacturing, and petroleum refinery industries regarding their emission levels, and to determine any success stories, pollution prevention opportunities, and other planned or possible emission reduction actions
- 11/16/98 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL

1999

- 4/27/99 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario
- 11/18/99 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
- 11/99 Draft GLBTS Step 1&2 Sources and Regulations Reports for B(a)P and HCB are posted on the GLBTS Website

2000

- 5/16/00 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario
- Discussions held with the U.S. Scrap Tire Management Council and scrap tire managers in the Midwest
- 6/15/00 Final drafts GLBTS Step 3 Reduction Options reports for B(a)P and HCB are prepared
- 7/12/00 Final drafts GLBTS Step 3 Reduction Options reports for B(a)P and HCB are posted on the GLBTS Website
- 9/21/00 WG conference call is held
- 10/00 draft Canadian Steps 1& 2 reports for HCB and B(a)P (PAHs) circulated to stakeholders and workgroup members for comments

2001

- 5/17/01 WG meeting at the GLBTS Stakeholder Forum in Toronto
- 11/14/01 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
- Canada implements Strategic Options Processes with steel mills and wood preservers
- Algoma Steel signs an Environmental Management Agreement with EC and OME to address environmental priorities
- A Wood-stove Changeout Program is held in Georgian Bay, Ontario, in conjunction with the Hearth Products Association of Canada

2002

- 5/30/02 WG meeting at the GLBTS Stakeholder Forum in Windsor, Ontario
- Wood stove change-out outreach material in development, a Website may be developed to promote change-outs and share information with stakeholders
- Petroleum refinery B(a)P emissions analysis completed
- Preparation of incentives for scrap tire pile recycling begins
- Status and potential for reduction of newly inventoried primary aluminum B(a)P emissions determined
- Work with Council of Great Lakes Industries (CGLI) and pesticide industry continues to determine pesticide HCB contaminant levels
- Success stories of reductions in HCB TRI releases from the chemical industry are identified



- Outreach activities (e.g., Website development, preparation of consumer information sheets) are conducted to increase public awareness of environmental impacts, safe handling, and applications of used treated wood
- WG seeks to improve linkages and integration of release information and environmental data on persistent toxics
- WG works to fill release data gaps, resolve questions about company NPRI release estimates for Level I substances, and develop reduction projects with stakeholders
- 12/3/02 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL

2003

- 5/14/03 WG meeting at GLBTS Stakeholder Forum in Windsor, Ontario
- Work with CGLI and pesticide industry, to determine pesticide HCB contaminant levels, continues
- Rubber Manufacturers Assn. provides detailed information on scrap tire management in the Great Lakes Basin
- Resource needs identified to successfully implement a Scrap Tire Outreach Plan
- B(a)P emissions from coke ovens in basin continue to decline as a result of shutdowns and regulations
- Work on more accurate B(a)P inventory (especially for air emissions)
- Several conference calls held on Woodstove Smoke Reduction contract to encourage best practices and develop outreach materials
- Natural Resources Canada Burn it Smart! campaign conducts over 300 residential wood-burning workshops across Canada; campaign presentation to be updated to include wood stove change-out and more workshops planned for Ontario
- Initial discussions held with Canadian Vehicle Manufacturers' Association on verification of B(a)P release estimates for the on-road motor vehicle sector
- 12/16/03 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL

2004

- 6/17/04 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario
- US EPA wood stove/fireplace initiatives: media outreach package, Website, fact sheets and labeling program promoting EPA-certified stoves and clean/safe wood burning practices.
- Fifty-one Burn it Smart public education workshops delivered in 40 Ontario rural and First Nations communities in 2004
- Work with CGLI and pesticide industry to determine pesticide HCB contaminant levels, continues
- Re-assessment of Ontario HCB and B(a)P releases from use of pentachlorophenol-treated and creosote-treated wood products.
- 11/30/04 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL

2005 and Ongoing

- 5/17/05 WG meeting in Toronto, Ontario
- Prepared Management Assessment Reports for HCB and B(a)P using the General Framework to Assess Management of GLBTS Level 1 Substances
- 31 Burn it Smart workshops held in various First Nation communities, Ontario communities and 2 U.S. border cities
- Conducted tests on artificial logs to determine emissions
- Worked with CGLI, pesticide industry, and the Pest Management Regulatory Agency of Health Canada to determine HCB releases from pesticide application



<ul style="list-style-type: none"> - Surveyed 2001 Georgian Bay Wood Stove Changeout and Education seminar attendees to follow-up on changes to their wood burning practices - Continued to promote scrap tire pile inventory development and mapping, and clean-up initiatives - 12/06/05 WG meeting in Chicago, IL
Other HCB/B(a)P Related Activities
1999 and Earlier
<ul style="list-style-type: none"> - Dow Chemical Company commits to HCB reductions - Two Ontario utilities eliminate use of PCP in treated poles - U.S. chlorothalonil manufacturer reduces HCB content through process improvements - 10/99 Draft Report, Global HCB Emissions (Robert Bailey, 1999), is distributed to the WG - 1/99 wood stove changeover pilot program for Eastern Ontario
2000
<ul style="list-style-type: none"> - 1/00 WLSSD report on open barrel burning practices is released - 2/00 Wood stove changeover pilot programs in Traverse City, MI, and Green Bay, WI - PBT workgroups continue to work on draft National Action Plans for HCB and B(a)P - 5/5/00 Robert Bailey prepares report, HCB Concentration Trends in the Great Lakes, for the WG
2001
<ul style="list-style-type: none"> - 2/01-4/01 The Hearth Products Association expands the Great Lakes Great Stove Changeout Program to 12 states - 6/01 US EPA issues an administrative order requiring Magnesium Corporation of America (Rowley, UT) to ensure proper handling, containment, and disposal of anode dust found to contain high levels of HCB (>12,000 ppm), as well as dioxins, PCBs, and chromium
2002
<ul style="list-style-type: none"> - Source release information to improve inventories collected through voluntary stack testing - An emission testing program for wood burning in fireplaces, woodstoves, and pellet stoves developed and implemented with partners to fill information gaps - PCP re-registration review proceeding as joint Canada/U.S. endeavor
2003
<ul style="list-style-type: none"> - 7/18/03 CEC draft Phase One North American Regional Action Plan on Dioxins and Furans, and Hexachlorobenzene available for public comment - A US EPA rule to control emissions (including HCB) from hydrochloric acid production is promulgated - The "Voluntary Woodstove/Fireplace Smoke Reduction Activities and Outreach Materials" contract awarded by US EPA - A US EPA rule for the control of coke oven battery stack emissions (including B(a)P) is promulgated - HCB added to CEPA listing of prohibited toxic substances; proposed regulation published to prohibit products with concentrations greater than 20 ppb
2004
<ul style="list-style-type: none"> - Twelve Wood Energy Technology Transfer Inc. training workshops held in Ontario - US EPA Scrap Tire Pile Mitigation Support Project underway promoting mapping and clean-up of tire piles. - Scrap tire pile cleanup forum held in Chicago on February 23 – 24, 2004.



- Proposed Ontario Tire Stewardship scrap tire diversion program awaiting approval from the Ontario Ministry of the Environment.
- Independent third party audits verify Ontario's four metallurgical coke producers meeting reduction goals set out in best practice manual for controlling PAH (includes B(a)P) releases).

2005 and Ongoing

- Amendments to U.S. Air Toxics Standards for Coke Oven Batteries came out in April 2005.
- US EPA finalized rules on wastewater discharges from iron and steel facilities.
- Developing U.S. best practices Scrap Tire Cleanup Guidebook.
- Partnered with The Home Depot to promote Burn it Smart at six stores in Eastern Ontario.
- Partnered with the Puget Sound Clean Air Agency to conduct more emissions testing on wax firelogs and regular cord wood.
- Commenced Ontario B(a)P mapping project to highlight priority areas.

Substance-Specific Activities: Alkyl-lead

GLBTS Workgroup Activities and Reports

1998

- 3/23/98 WG is formed at the first implementation meeting
- 11/16/98 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
- 12/31/98 Draft GLBTS Challenge report for alkyl-lead is posted on the GLBTS Website

1999

- 1/99 EC prepares Alkyl Lead Inventory Study - Sources, Uses and Releases in Ontario, Canada: A Preliminary Review, and posts report on the GLBTS Website. The report concludes that the Canadian challenge of reducing alkyl-lead use by 90% between 1988 and 2000 has been exceeded.
- 9/8/99 GLBTS and PBT workgroups meet with National Motor Sports Council to discuss voluntary phase-out of leaded gasoline
- 10/29/99 draft GLBTS Sources, Regulations and Options (Steps 1, 2 & 3) Report for Alkyl-Lead is posted on the GLBTS Website

2000

- GLBTS Sources, Regulations, and Reduction Options (Step 1, 2 & 3) report for alkyl-lead is finalized (6/00) and posted (9/29/00) on the GLBTS Website
- GLBTS U.S. Challenge on Alkyl-lead: Report on the Use of Alkyl-lead in Automotive Gasoline is finalized (6/00) and posted (9/29/00) on the GLBTS Website

2001

- The U.S. meets the challenge of confirming no use of alkyl-lead in automotive gasoline. The US EPA PBT Program takes the lead for the U.S. in coordinating stakeholder efforts to reduce remaining alkyl-lead releases

Other Alkyl-lead Related Activities

1999 and Earlier

- Work begins on a draft National PBT Action Plan for Alkyl-lead

2000

- 8/25/00 A Draft PBT National Action Plans for alkyl-lead is posted on the PBT Website for public review and comment
- Auto racing industry expresses interest in working with US EPA to find lead-free gas substitutes



2001
- US EPA begins working with NASCAR to permanently remove alkyl-lead from racing fuels used, specifically, in the Busch, Winston Cup, and Craftsman Truck Series
Substance-Specific Activities: Octachlorostyrene (OCS)
GLBTS Workgroup Activities and Reports
1998
- 3/23/98 WG is formed at the first implementation meeting - 6/16/98 Background Paper and Draft Action Plan for OCS posted on GLBTS Website - 11/16/98 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL - 12/31/98 Draft GLBTS Challenge report for OCS is posted on the GLBTS Website
1999
- 4/27/99 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario - 11/18/99 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL - Data on OCS trends in fish is assessed by the WG
2000
- 5/16/00 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario - 6/30/2000 EC draft report on Octachlorostyrene Sources, Regulations and Programs for the Province of Ontario 1988, 1998, and 2000 forwarded to interested stakeholders - 9/22/00 Draft GLBTS Stage 3 report for OCS is distributed at the 9/22 Integration Workgroup meeting and e-mailed to the OCS Workgroup - 12/00 US EPA and EC convene a meeting of North American magnesium producers to promote sharing of lessons regarding methods for preventing and managing OCS and other chlorinated hydrocarbon wastes
2004
- 8/04 Draft Management Assessment for OCS (Step 4) Report prepared
Other OCS Related Activities
1999 and Earlier
- 3/10/99 CGLI report, OCS and Suggested Industrial Sources: A Report to the GLBTS Workgroup, is submitted to the workgroup
2000
- 8/25/00 A Draft PBT National Action Plan for OCS is posted on the PBT Website for public review and comment
2002
-4/02 Toxics Release Inventory data for 2000 is made available to the public
Sediments
Canadian and U.S. Activities
1998 and Earlier
- 6/15/98 PCB WG requests that the IG develop a strategy on sediments - 6/19/98 Integration WG discusses sediments challenge - US EPA provides guidance to workgroups on how to deal with sediments within chemical-specific workgroups



1999
<ul style="list-style-type: none">- 1/26/99 Overview and presentation of IJC SedPAC Activities given at Integration WG meeting- 2/99 Integration WG members develop a draft charge for a sediments subgroup- 4/28/99 Draft Sediments subgroup charge presented at Integration WG meeting
2000
<ul style="list-style-type: none">- 2/15/00 US EPA and EC present a draft sediment reporting format at the Integration WG meeting. The proposed format will map progress and report annually on sediment remediation in the Great Lakes Basin using 1997 as the baseline year- 5/16/00 At the Stakeholder Forum, US EPA and EC present the draft sediment reporting format and commit to hold a sediment technology workshop
2001
<ul style="list-style-type: none">- 4/24/01 US EPA and EC host a two-day workshop on "Removing and Treating Great Lakes Contaminated Sediment," presenting sediment remediation technologies and case studies
2002 through 2005
<ul style="list-style-type: none">- Ongoing assessments and remediations in both the U.S. and Canada within the Great Lakes watershed (see Section 6.0)
Related Sediment Activities
1998 and Earlier
<ul style="list-style-type: none">- 11/97 The IJC's Sediment Priority Action Committee (SedPAC) issues draft white paper Overcoming Obstacles to Sediment Remediation in the Great Lakes Basin- 12/1-2/98 IJC SedPAC holds "Workshop to Evaluate Data Interpretation Tools Used to Make Sediment Management Decisions" in Windsor, Ontario
2002
<ul style="list-style-type: none">- 1/02 The second National Sediment Quality Survey report to Congress, The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, National Sediment Quality Survey: Second Edition, is released for review by US EPA
2004
<ul style="list-style-type: none">- Work under The Great Lakes Legacy Act begins
Long-Range Transport (LRT) Activities
1999
<ul style="list-style-type: none">- 11/19/99 EC presents the status of their LRT effort at the Integration WG meeting
2000
<ul style="list-style-type: none">- 3/27/00 EC prepares report: Long-Range Transport of Persistent Toxic Substances to the Great Lakes: Review and Assessment of Recent Literature (Ortech Environmental)
2001
<ul style="list-style-type: none">- Several studies are undertaken in the U.S. and Canada to characterize global transport processes.
2003 and Ongoing
<ul style="list-style-type: none">- 9/16/03 - 9/17/03 EC and US EPA sponsor LRT Workshop in Ann Arbor, MI, with support of the CEC, the IJC, and the Delta Institute- 9/03 LRT workshop background paper, the workshop program, presentations, and draft summary document are posted on the Internet at http://delta-institute.org/pollprev/lrtworkshop/_workshop.html- Research into long-range transport of persistent toxic substances to the Great Lakes continues



General Activities Related to Reductions in GLBTS Substances

US EPA Regulatory Determinations

1998 and Earlier

- 12/95 Maximum Available Control Technology (MACT) rules for large Municipal Waste Combustors (MWC) are promulgated
- 9/97 MACT rules for Medical Waste Incinerators (MWI) are promulgated
- 4/15/98 Pulp, Paper, and Paperboard Cluster Rule is promulgated
- 6/29/98 Amendments to the PCB Disposal Regulations are finalized
- 11/12/98 Federal Plan for MACT Implementation for large MWCs is finalized

1999

- 5/28/99 An Advance Notice of Proposed Rulemaking is released for the RCRA LDR for Mercury-Bearing Hazardous Wastes
- 7/6/99 Federal Plan for MACT Implementation for MWI is proposed
- 8/30/99 MACT for small MWCs are proposed (expected to be final in 2000)
- 9/30/99 Final Standards for Hazardous Air Pollutants for HWC are promulgated
- 10/29/99 TRI Amendments: new PBT reporting thresholds

2000

- 12/00 Compliance deadline for large MWC MACT
- 9/02 Compliance deadline for MWI MACT
- 1/1/00 New TRI reporting thresholds for PBTs become effective

2001

- US EPA finalizes the Reclassification of PCB and PCB-contaminated Electrical Equipment rule and a rule on Return of PCB Waste from U.S. Territories Outside the Customs Territory of the U.S.

2002

- PCP re-registration review proceeding as joint Canada/U.S. endeavor
- 4/02 the first year of data reported under TRI PBT rule become available
- 2/14/02 President Bush announces Clear Skies Initiative to cut mercury emissions from power plants by 70%

2005

- 5/18/05 US EPA publishes Clean Air Mercury Rule

US EPA Activities

1999 and Earlier

- 6/97 Deposition of Air Pollutants to the Great Waters: Second Report to Congress is released
- 12/97 Mercury Report to Congress is released
- 4/98 Final Emission Inventory Data for Section 112(c)(6) Pollutants is released
- 11/16/98 US EPA's Multimedia PBT Strategy is announced
- 11/16/98 Under the PBT Strategy, a draft National Action Plan for Mercury is released
- PBT Strategy grant awarded to WLSSD to work on reducing open trash burning
- U.S. PCB transformer registration database is updated
- Sample collection begins for the National Study of Chemical Residues in Fish
- U.S. GLBTS workgroup leaders participate in development of Draft National Action Plans of part of PBT Strategy



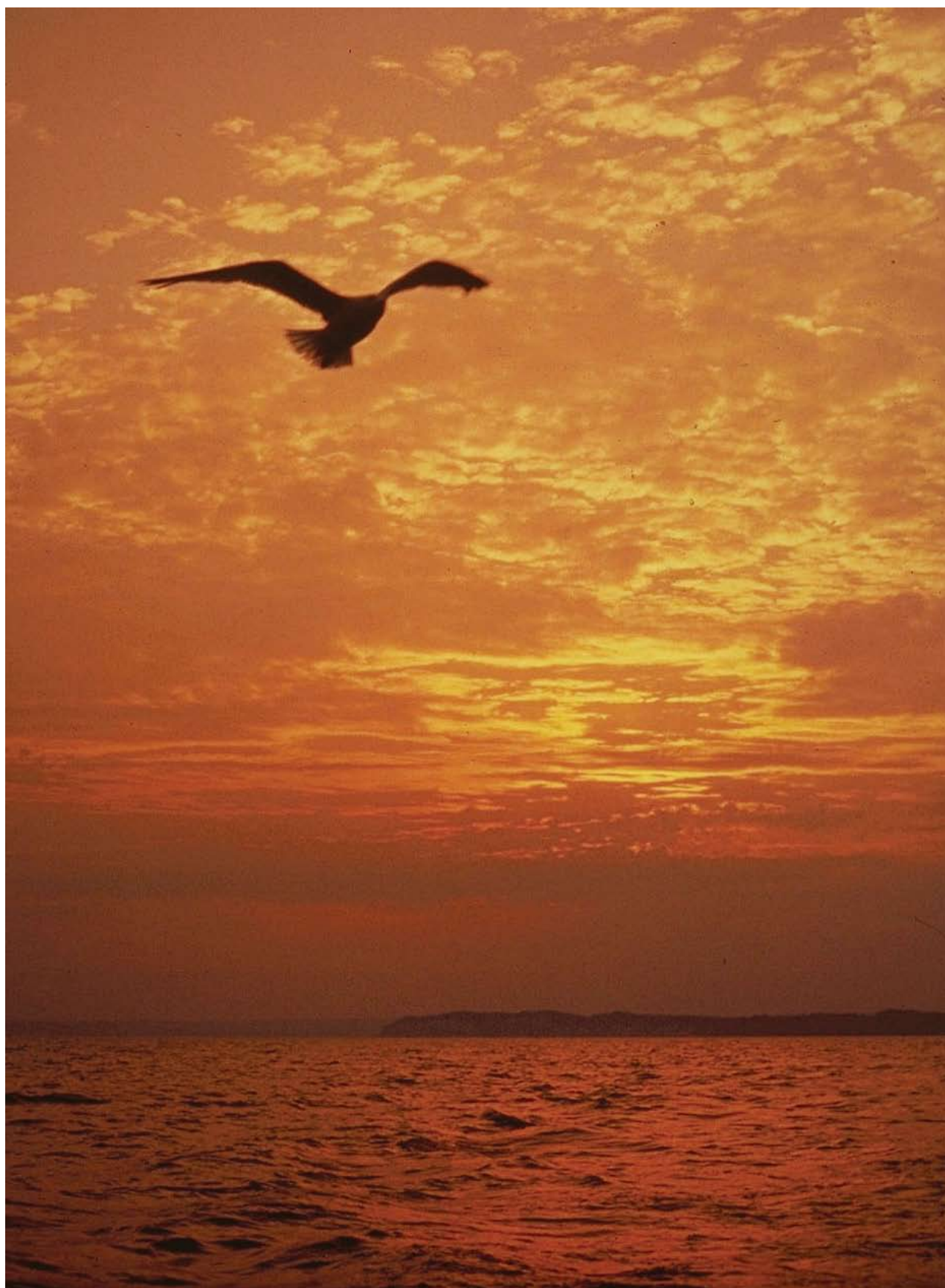
2000
<ul style="list-style-type: none"> - 6/00 Deposition of Air Pollutants to the Great Waters: Third Report to Congress is released - 6/12/00 draft chapters of the U.S. Dioxin Reassessment for external scientific review are released - 9/00 US EPA's 1996 National Toxics Inventory is released - 9/28/00 Three draft chapters of the U.S. Dioxin Reassessment for SAB review are released - PBT workgroups continue to work on National Action Plans for HCB, B(a)P, the Level I pesticides, and PCBs - US EPA's Office of Air and Radiation and Office of Water collaborate on an Air-Water Interface Workplan to address atmospheric deposition of toxics and nitrogen to U.S. water bodies.
2001
<ul style="list-style-type: none"> - 5/23/01 U.S. signs the United Nation's global treaty on Persistent Organic Pollutants (POPs)
2002
<ul style="list-style-type: none"> - 1/02 The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, National Sediment Quality Survey: Second Edition is released for review - 7/23/02 Final PBT National Action Plan for Alkyl-lead published - Preliminary data from first year of National Study of Chemical Residues in Lake Fish Tissue released
2004
<ul style="list-style-type: none"> - 5/18/04 Great Lakes Interagency Task Force created by U.S. Executive Order
EC Regulatory Determinations
1999 and Earlier
<ul style="list-style-type: none"> - Canadian Environmental Protection Act is renewed
2000
<ul style="list-style-type: none"> - Canada-Wide Standards (CWS) (release limits) are developed for mercury, particulate matter, ozone, and benzene, and are being developed for dioxins/furans. - Canadian Strategic Options Processed (SOPs) are under development for the Iron and Steel Manufacturing sector and finalized for the Wood Preservation sector - 6/19/00 EC solicits public comments on proposed amendments to the PCB regulations under CEPA
2001
<ul style="list-style-type: none"> - 2/19/01 Canada announces \$120.2 million in new regulatory and other measures to accelerate action on clean air - 7/7/01 A notice with respect to Polychlorinated Biphenyls in Automotive Shredder Residue is published in the Gazette, Part I, for automobile shredding facilities that generated PCB-contaminated residue during 1998, 1999, or 2000. - EC proposes amendments to the Chlorobiphenyl Regulations and Storage of PCB Material Regulations promulgated in 1977 and 1992, respectively - Canada's PCB Waste Export Regulations (SOR/97-108) are being amended
2005
<ul style="list-style-type: none"> - 6/05 CCME accepts in principle a draft CWS for the coal-fired electric power generation sector. Final endorsement of the CWS is expected prior to the end of 2005.



EC Activities	
1999 and Earlier	
<ul style="list-style-type: none"> - Ontario "Drive Clean" program - 1/99 The Canadian Dioxins and Furans and Hexachlorobenzene Inventory of Releases is finalized. - EC upgrades and digitizes its National PCB database 	
2000	
<ul style="list-style-type: none"> - Draft HCB, B(a)P (PAH), and OCS release inventories for Ontario are updated and circulated for review - EMA with Algoma Steel being finalized. - EC, in coordination with the Hearth Products Association, conducts testing of conventional and US EPA-certified wood stoves to investigate releases of dioxins/furans, PAHs, HCB, and particulate matter 	
Other Activities	
1998 and Earlier	
<ul style="list-style-type: none"> - CEC issues Continental Pollutant Pathways Initiative - 7/98 UNEP POPs negotiations initiated 	
1999	
<ul style="list-style-type: none"> - Under the GLWQA, The Lake Ontario LaMP Stage 1 report is released - By the end of 1999, emission control retrofits either completed or underway at all large MWC in the U.S. - The initial Great Lakes Regional Air Toxics Emissions Inventory, using 1993 data, is released - The Lake Ontario LaMP Update 1999 is released 	
2000	
<ul style="list-style-type: none"> - Under the GLWQA, Canada and the U.S. work on restoring beneficial uses to 43 AOCs in the Great Lakes Basin through the RAP program - The Lake Erie, Lake Michigan, and Lakes Superior LaMPs 2000 are released - The Lake Ontario Lamp Update 2000 is released - The Lake Huron Initiative Action Plan is released - Numerous pilot projects and pollution prevention/reduction agreements relevant to toxics of concern are underway with the steel, automobile, and other manufacturing industries and utilities in Ontario and the U.S. Great Lakes states - 11/8/00 – 11/9/00 Atmospheric deposition workshop held, Using Models to Develop Air Toxics Reduction Strategies - 12/00 Final POPs negotiations - The 1996 Great Lakes Inventory of Toxic Air Emissions is prepared by the Great Lakes Commission 	
2001	
<ul style="list-style-type: none"> - 2/01 21st session of the UNEP Governing Council is held: UNEP will undertake a global study on the health and environmental impacts of mercury - 8/22/01 The IJC issues a Review of Progress under the Canada-United States Great Lakes Binational Toxics Strategy - Monitoring of air deposition of toxic pollutants in the Great Lakes Basin under IADN 	
2002	
<ul style="list-style-type: none"> - Monitoring of air deposition of toxic pollutants in the Great Lakes Basin continues under IADN 	



2003
<ul style="list-style-type: none">- 9/19/03 – 9/20/03 IJC 2003 Great Lakes Conference and Biennial Meeting in Ann Arbor, MI- Monitoring of air deposition of toxic pollutants in the Great Lakes Basin continues under IADN
2004 and Ongoing
<ul style="list-style-type: none">- 4/23/04 Great Lakes Commission releases 2001 Great Lakes Regional Air Toxic Emissions Inventory, available online at www.glc.org/air- 10/6/04 – 10/8/04 State of Lakes Ecosystem Conference (SOLEC) held in Toronto, Ontario- Monitoring of air deposition of toxic pollutants in the Great Lakes Basin continues under IADN



Lake Michigan Sunset
Leland, Michigan
Photo by: Michigan Travel Bureau



APPENDIX B

GENERAL FRAMEWORK TO ASSESS MANAGEMENT OF GLBTS LEVEL 1 SUBSTANCES: BACKGROUND, OBJECTIVES, AND DOCUMENTATION



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BACKGROUND

Over the past thirty years, the governments of Canada and the United States have joined together with industries, citizen groups, and other stakeholders in a concerted effort to identify and eliminate threats to the health of the Great Lakes ecosystem resulting from the use and release of persistent toxic substances. A major step in this process was the enactment of the Revised Great Lakes Water Quality Agreement (GLWQA) of 1978 which embraced, for the first time, a philosophy of “virtual elimination” of persistent toxic substances from the Great Lakes. In 1987, the GLWQA was amended, establishing Lakewide Management Plans (LaMPs) as a mechanism for identifying and eliminating any and all “critical pollutants” that pose risks to humans and aquatic life. In 1994, the International Joint Commission’s Seventh Biennial Report under the GLWQA called for a coordinated binational strategy to “stop the input of persistent toxic substances into the Great Lakes environment.” This led to the signing of the Great Lakes Binational Toxics Strategy (GLBTS, or Strategy) in 1997. The Strategy specifies Level 1 substances, each targeted for virtual elimination and each with its own specific challenge goals, along with Level 2 substances targeted for pollution prevention. The substances were selected on the basis of their previous nomination to lists relevant to the pollution of the Great Lakes Basin, and the final list was the result of agreement on the nomination from the two countries. The specific reduction challenges for each substance include individual challenge goals for each country, within a time frame that expires in 2006.

Significant progress has been made toward achieving the Strategy’s challenge goals. As 2006 approaches, an analysis of progress and determination of next steps is needed to respond to the mandate set forth in the Strategy. The purpose in developing the General Framework to Assess Management of GLBTS Level 1 Substances is to provide a tool to assist the Parties (Environment Canada and the United States Environmental Protection Agency) and stakeholders in conducting a transparent process to assess the Level 1 substances.

OBJECTIVE

The framework presents a logical flow diagram for evaluating progress and the need for further action by the GLBTS on the Level 1 substances in order to meet the following objective:

Evaluate the management of GLBTS Level 1 substances with the following potential outcomes:

1. Active Level 1 Status & Periodic Reassessment by GLBTS
2. Consider Submission to BEC for New Challenge Goals
3. Engage LaMP Process
4. Suspend GLBTS Workgroup Activities. Where warranted, refer to another program and/or participate in other fora. Periodic Reassessment by GLBTS, until Parties determine substance has been virtually eliminated.

Additional outcomes that may result from the framework are:

- Recommend benchmark or criteria development as a high priority; and
- Recommend additional environmental monitoring as a high priority.

The framework is intended to serve as a guide in determining the appropriate management outcome(s) for the Level 1 substances: mercury, polychlorinated biphenyls (PCBs), dioxins and furans, hexachlorobenzene (HCB), benzo(a)pyrene (B(a)P), octachlorostyrene (OCS), alkyl-lead, and five cancelled pesticides: chlordane, aldrin/dieldrin, DDT, mirex, and toxaphene. The framework is not intended to specify details of how a Level 1 substance should be addressed once a management outcome is determined.

STRUCTURE OF THE FRAMEWORK

The framework is set up in a hierarchical fashion to allow efficiencies in the decision process. The hierarchy of the framework is to first consider progress toward the challenge goals committed to in the Strategy, then to conduct an environmental analysis and finally, a GLBTS management assessment which leads to various potential management outcomes for a substance.

The environmental analysis (depicted in green) and the GLBTS management assessment (depicted in blue) comprise the two main parts of the framework. The environmental analysis considers available



Canadian and U.S. monitoring data and established human health or ecological criteria as the primary basis for an objective evaluation of a substance's impact on the Basin. For substances lacking sufficient risk-based criteria or environmental monitoring data, the framework recommends the development of benchmarks or criteria and additional monitoring as a high priority. While the environmental analysis places emphasis on good monitoring data, evidence of use, release, exposure, or precautionary concerns may also be considered.

If the environmental analysis concludes that there is no basis for concern, GLBTS workgroup activities may be suspended, with periodic reassessment of the substance until the Parties determine that the substance has been virtually eliminated. If, on the other hand, the environmental analysis concludes that there is a reason for concern, the GLBTS management assessment evaluates the ability for the GLBTS to effect further improvements in and out of the Basin. The GLBTS management assessment also considers whether the impact of a substance is basinwide or restricted to a single lake. In cases where the GLBTS can effect further reductions, consideration will be given as to whether new Strategy challenge goals can be established. Virtual elimination is an underlying tenet of the Strategy and should be kept in mind throughout the assessment process.

The GLBTS management assessment can result in a number of potential management outcomes; the outcomes provided in the framework allow a substance to remain in active Level 1 status or GLBTS workgroup activities to be suspended. The outcomes also recognize that it may be appropriate to more actively involve a LaMP process, to refer a substance to another program, to represent GLBTS interests in other fora (e.g., international programs), or to consider proposing new challenge goals. All outcomes include a periodic reassessment by the GLBTS (approximately every two years).

While it is recognized that the Parties have an ongoing responsibility to promote GLBTS interests in other arenas, a potential outcome of the framework is to recommend referral to another program and/or GLBTS representation in other fora. In the GLBTS framework, this option is presented when there is no evidence of Basin effects, or when the GLBTS cannot effect further significant reductions on its own, but can advocate substance reductions in other programs and in international fora.

It should be noted that, in using the framework to conduct assessments for the Level 1 substances, it may not be possible to definitively answer "YES" or "NO" to all questions. It is not necessary to have a definitive answer to proceed in the framework. For example, in assessing whether there is environmental or health data to assess the impact of the substance in the Basin, it may be determined that, while additional data would be helpful, there is some data on releases and environmental presence in certain media with which to assess the status of the substance. In this case, judgment is needed to decide whether these data are sufficient to proceed along the "YES" arrow or whether the available data are not adequate and the analysis should proceed along the "NO" arrow, placing the substance on a high priority list for monitoring. As a general guide, the framework allows flexibility and judgment in interpreting environmental data and in determining the most appropriate management outcome(s).

Each decision node, or shape, in the framework is illustrated below along with a brief explanation that describes, in further detail, the question to be assessed.



GLBTS Level 1 Substances

Have the challenge goals for the substance been met?

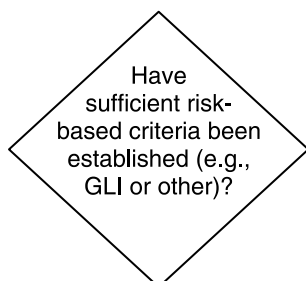
All 12 Level 1 substances will be assessed.

The first question to consider in assessing the GLBTS status and future management of a Level 1 substance is whether the challenge goals agreed to in the Strategy have been met. The answer to this question informs the subsequent assessment in many ways, not only indicating progress, but also revealing issues associated with the ability to pursue further reductions. Progress toward the U.S. and Canadian goals will be considered jointly. Challenge goals will be evaluated with the best data presently available. Note that some challenge goals target “releases” of a substance while others target its “use”. As a result, different types of data may be required to evaluate challenge goal status (e.g., “use” data vs. environmental “release” data). The framework continues with both the environmental analysis and GLBTS management assessment, notwithstanding the status of the challenge goals.

ENVIRONMENTAL ANALYSIS



High
Priority
for
Monitoring



Characteristics of acceptable monitoring data to assess the temporal, spatial, and population representativeness of a substance in the Great Lakes Basin ecosystem include (but are not limited to) basin-specific measures in water, air, sediment, soil, indoor environments (e.g., dust), fish, biota, or human biological samples. If necessary, use or release data may be used as surrogates (e.g., in the case of alkyl-lead).

“What gets measured gets managed.” Substances entering this box will be recommended as a high priority for monitoring to the Parties. The intent is that these GLBTS substances will be considered by a wide range of government or private agencies when they make decisions regarding which analytes to monitor in the environment. As sufficient monitoring data is developed, substances will be re-evaluated.

Relevant criteria include, but are not limited to:

- Water quality criteria
- Fish tissue concentrations
- Ambient or indoor air standards
- Sediment or soil standards
- Limits based on reference doses
- Health-based standards for human biota measurements



High Priority
for Benchmark
or Criteria
Development

Do
levels
in biota, air,
water, etc.
exceed
criteria?

Is the
trend
decreasing?

Is there a reason
for concern based
on use/release/
exposure data or
the precautionary
approach?

If there are no criteria against which to evaluate current levels, the GLBTS will consider whether there is a need for the Parties to recommend the development of human health or ecological criteria. This box effectively creates a GLBTS list of substances that are in need of human health or ecological criteria with which to identify exceedances in the environment.

As the framework is intended to be flexible in its implementation, the choice of criteria to use in answering this question may vary. For example, the most strict criteria in one or more media may be used to evaluate environmental levels.

If there are no criteria, or if current levels do not exceed criteria, this box considers whether there is a decreasing trend. A decreasing trend could be defined as a statistically significant negative slope. If the trend is decreasing, the substance is evaluated for evidence of concern based on use, release, exposure, or the precautionary approach. If a decreasing trend cannot be established, then the substance moves directly to the GLBTS management assessment to determine the ability of the GLBTS to effect further reductions.

* Note that, in the event that there are established criteria and the GLBTS substance is below those criteria but not decreasing in trend, further analyses may be required to estimate when criteria might be exceeded.

In cases where sufficient monitoring data is not available, or where environmental trends are decreasing and criteria have either not been established or are not being exceeded, the relevant question is whether there is evidence of Basin effects based on documented use, release, or exposure data, or from a precautionary point of view. An example of a precautionary point of view would be documented evidence of significant impact in another geographic location with the same sources and use patterns as in the Basin, or because the effects of a pollutant would be significant by the time it was able to be measured through monitoring.

GLBTS MANAGEMENT ASSESSMENT

Ability for
GLBTS to
effect further
reductions?

Answering this question involves an accelerated version of the first three steps of the GLBTS 4-step process,²¹ looking at sources and current programs and regulations to see where the reduction opportunities lie. Part of the assessment will involve consideration of whether the reduction opportunities will be significant enough to merit the effort.

²¹ The GLBTS four-step process to work toward virtual elimination is: 1) Information gathering; 2) Analyze current regulations, initiatives, and programs which manage or control substances; 3) Identify cost-effective options to achieve further reductions; and 4) Implement actions to work toward the goal of virtual elimination.



Principally
lake specific?

Based on a joint GLBTS-LaMP determination that the impact of a substance is restricted to a single lake, the appropriate LaMP will be engaged for coordination of leadership for reduction actions to be undertaken by the responsible organizations.

Can new
challenge goals
be established?

The GLBTS will assess the practicality of setting forth new challenge goals.

GLBTS MANAGEMENT ASSESSMENT

Active
Level 1
Status &
Periodic
Reassessment
by GLBTS

The substance will continue as a Level 1 with reduction actions addressed by the appropriate process and with periodic reassessment, approximately every two years, using the General Framework to Assess Management of GLBTS Level 1 Substances.

Consider
Submission
to BEC for
New
Challenge
Goals

The GLBTS will consider recommending new challenge goals to BEC. The justification for new challenge goals will incorporate the findings of the framework analysis and will include assessment of the desired environmental improvement and feasibility. If the GLBTS decides to propose new challenge goals, the recommendation to BEC will include a reduction percentage, reduction timeline, and baseline for the proposed new challenge goals.

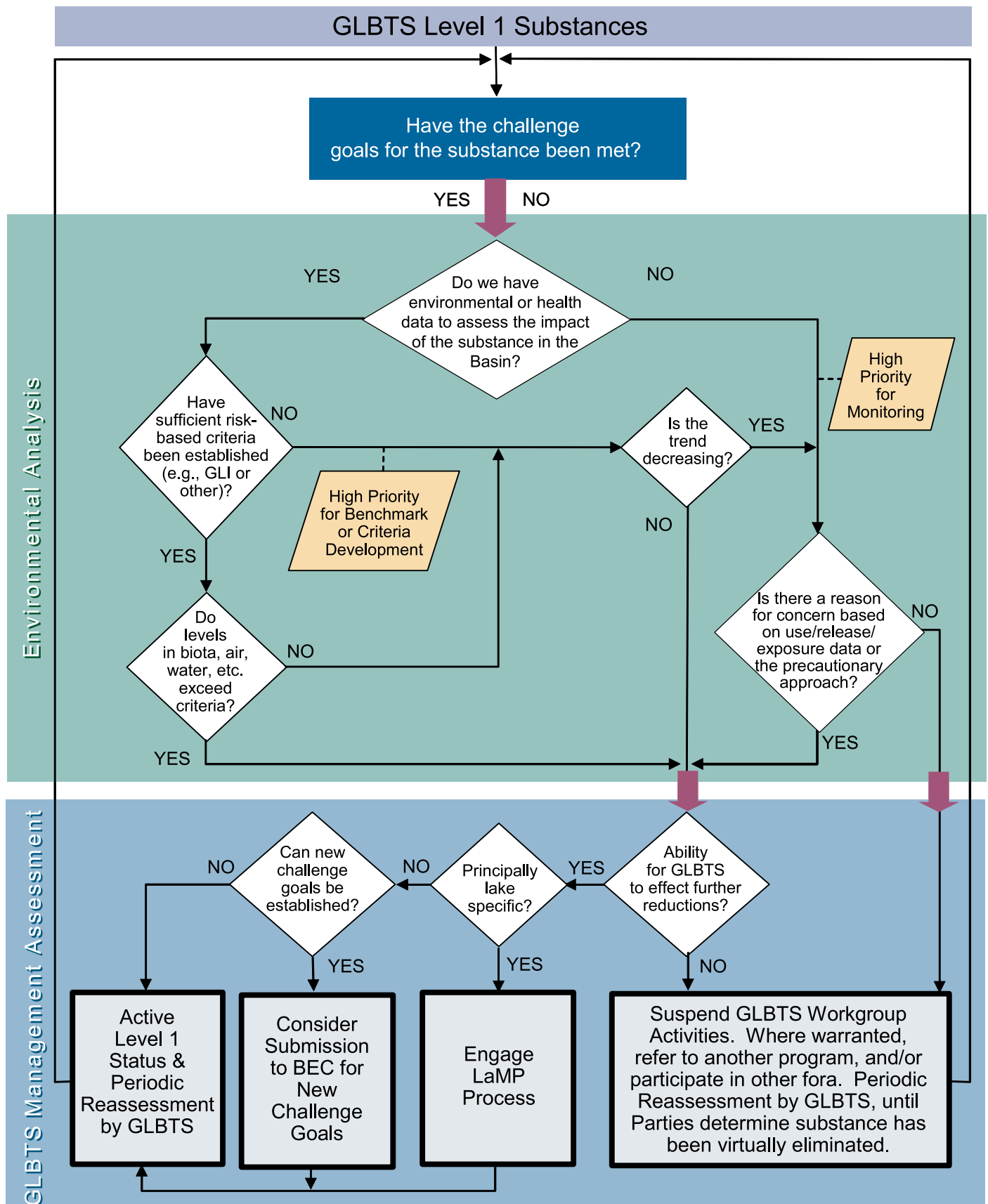
Engage
LaMP
Process

For substances whose impact is lake-specific, the appropriate LaMP will be engaged to coordinate substance reduction activities with continued support from the GLBTS, recognizing the limited direct implementation capacity of the LaMPs. It is understood that much of the actual implementation would be carried out by the agencies with responsibility to address these substances. A joint review of progress would be undertaken periodically.

Suspend GLBTS Workgroup Activities. Where warranted, refer to another program, and/or participate in other fora. Periodic Reassessment by GLBTS, until Parties determine substance has been virtually eliminated.

In the event that the GLBTS is not able to effect further reductions, or there is no evidence of Basin effects, GLBTS workgroup activities will be suspended. Where warranted, a recommendation will be made to a) refer reduction efforts for the substance to another program, and/or b) represent GLBTS interests in other fora (e.g., Commission for Environmental Cooperation, United Nations Environment Programme). There will be no ongoing workgroup involvement with these substances, though each one will undergo periodic reassessment, approximately every two years, using the General Framework to Assess Management of GLBTS Level 1 Substances, until the Parties determine that virtual elimination has been reached.

General Framework to Assess Management of GLBTS Level 1 Substances





For Information Contact Us

Alan Waffle, P. Eng.
Great Lakes Manager
Program Integration and Coordination Section
Ontario, Environmental Protection Operations Division
4905 Dufferin Street, Toronto, Ontario M3H 5T4
Tel: (416) 739-5854 Fax: (416) 739-4797
Email: Alan.Waffle@ec.gc.ca

Edwin R. (Ted) Smith
Pollution Prevention &
Toxics Reduction Team Leader
Great Lakes National Program Office
U.S. Environmental Protection Agency
77 W. Jackson Blvd (G-17J)
Chicago, IL 60604

www.binational.net

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