

US EPA ARCHIVE DOCUMENT

GREAT LAKES BINATIONAL TOXICS STRATEGY

2007 Annual Progress Report

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ABBREVIATIONS

AC	Activated Carbon
ADA	American Dental Association
AHA	American Hospital Association
AMO	Association of Municipalities of Ontario
AOC	Area of Concern
APE	Alkylphenol Ethoxylate
ASI	Algoma Steel Inc.
B(a)P	Benzo(a)pyrene
BGSU	Bowling Green State University
BUI	Beneficial Use Impairment
CAA	Clean Air Act
CAD	Confined Aquatic Disposal
CAMR	Clean Air Mercury Rule
CAMU	Corrective Action Management Unit
CanMETOP	Canadian Model for Environmental Transport of Organochlorine Pesticides
CCME	Canadian Council of Ministers of the Environment
CDF	Confined Disposal Facility
CEPA	Canadian Environmental Protection Act
CGLI	Council of Great Lakes Industries
COA	Canada-Ontario Agreement
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CRL	Chicago Regional Laboratory
CWS	Canada-wide Standard(s)
CY	Cubic Yard
DDT	Dichlorodiphenyltrichloroethane
DSL	Domestic Substances List
EC	Environment Canada
EPA	Environmental Protection Agency
EPP	Environmentally Preferable Purchasing
ESCO	Environmental Services and Consulting
FDA	Food and Drug Administration
GIS	Geographic Information System
GLBTS	Great Lakes Binational Toxics Strategy
GLLA	Great Lakes Legacy Act
GLNPO	Great Lakes National Program Office
GLRC	Great Lakes Regional Collaboration
GLU	Great Lakes United
GLWQA	Great Lakes Water Quality Agreement
HAP	Hazardous Air Pollutant
HARP	Hayton Area Remediation Project
HC	Health Canada
HCB	Hexachlorobenzene
HCH	Hexachlorocyclohexane

HDPE	High-Density Polyethylene
Hg	Mercury
HPBA	Hearth, Patio and Barbeque Association
HRAI	Heating Refrigeration and Air Conditioning Institute of Canada
HWC	Hazardous Waste Combustors
H2E	Hospitals for a Healthy Environment
IADN	Integrated Atmospheric Deposition Network
IDEM	Indiana Department of Environmental Management
IJC	International Joint Commission
IPM	International Plow Match
LaMPs	Lakewide Management Plans
LDR	Land Disposal Restrictions
LLRW	Low-Level Radioactive Waste
MACT	Maximum Available Control Technology
MCDI	Midwest Clean Diesel Initiative
MDEQ	Michigan Department of Environmental Quality
MOE	Ministry of the Environment (Ontario)
MOU	Memorandum of Understanding
MPCA	Minnesota Pollution Control Agency
MUCC	Michigan United Conservation Clubs
MWC	Municipal Waste Combustors
MWI	Medical Waste Incinerator
NDAMN	National Dioxin Air Monitoring Network
NEI	National Emissions Inventory
NO _x	Nitrogen Oxides
NPL	National Priority List
NPRI	National Pollutant Release Inventory (Canada)
NRDA	Natural Resource Damage Assessment
NREPA	Natural Resources and Environmental Protection Act
NVMSRP	National Vehicle Mercury Switch Recovery Program
NWF	National Wildlife Federation
OCS	Octachlorostyrene
ORD	Office of Research and Development
OU	Operable Unit
OWB	Outdoor Wood (-Fired) Boiler
P2	Pollution Prevention
PAC	Public Advisory Council
PADEP	Pennsylvania Department of Environmental Protection
PAH	Polycyclic Aromatic Hydrocarbon
PBT	Persistent Bioaccumulative and Toxic
PCBs	Polychlorinated Biphenyls
PCDD	Polychlorinated Dibenzo-Para-Dioxins
PCDF	Polychlorinated Dibenzofurans
PCP	Pentachlorophenol
PM	Particulate Matter
POPs	Persistent Organic Pollutants

PPCPs	Pharmaceuticals and Personal Care Products
PPM	Parts per Million
PSI	Product Stewardship Institute
PTS	Persistent Toxic Substances
RAPs	Remedial Action Plans
RCO	Recycling Council of Ontario
RCRA	Resource Conservation and Recovery Act
RMS	Risk Management Strategy
ROPS	Remedial Options Pilot Study
R/V	Research Vessel
SAB	Science Advisory Board
SLRIDT	St. Louis River/Interlake/Duluth Tar
SOLEC	State of the Lakes Ecosystem Conference
SOP	Strategic Options Process / Standard Operating Procedure
SWAC	Surface Weighted Average Concentration
SWARU	Solid Waste Area Reduction Unit
SVOC	Semivolatile Organic Compound
TCDD	Tetrachlorodibenzodioxin
TDSB	Toronto District School Board
TEQ	Toxic Equivalent
TRC	Thermostat Recycling Corporation
TRI	Toxics Release Inventory (U.S.)
TSCA	Toxic Substances Control Act
UMBC	University of Maryland-Baltimore County
UNEP	United Nations Environment Programme
US ACE	United States Army Corps of Engineers
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
WG	Workgroup
WHO	World Health Organization
WLSSD	Western Lake Superior Sanitary District
WWTP	Waste Water Treatment Plant

Introduction

Signed in 1997 by Environment Canada (EC) and the United States Environmental Protection Agency (US EPA), the Great Lakes Binational Toxics Strategy (GLBTS, or Strategy) established challenge goals for Canada and the U.S. for 12 Level 1 persistent toxic substances, and targeted a list of Level 2 substances for pollution prevention measures. Over the past 10 years, the governments of Canada and the U.S., along with stakeholders from industry, academia, state/provincial and local governments, Tribes, First Nations, and environmental and community groups, have worked together toward the achievement of the Strategy's challenge goals. Of the Strategy's 17 challenge goals that were established in 1997, 12 have been achieved and one more is expected in the near future; significant progress has been made toward the remaining four challenge goals. This report documents the significant progress that has been achieved in reducing the use and release of Strategy substances.

About This Report

This report contains a compilation of activities and progress achieved under the GLBTS for the year 2007. Chapters 1 through 4 present highlights for the active Level 1 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 summary of progress toward the GLBTS challenge goals, a review of workgroup meetings, and descriptions of activities undertaken to reduce the use or emissions of the Level 1 substances. Chapter 5 presents a summary of Integration Workgroup activities, including the ten-year anniversary events held in May 2007, three other workgroup meetings, and two semiannual Stakeholder Forums held in 2007. Chapter 6 introduces two new groups formed in 2007 to help achieve the GLBTS mission as it continues to evolve: one group will focus on substances, and another will concentrate on collaboration with relevant industry sectors. Chapter 7 reports progress in remediating contaminated sediments in the Great Lakes Basin, including descriptions of Great Lakes sediment remediation projects, estimated sediment volumes remediated or capped, and estimated volumes of contaminated sediment remaining in specific Areas of Concern (AOCs). Chapter 8 features an example of efforts to evaluate the contribution and significance of the long-range transport of Strategy substances. Appendix A includes a timeline of activities related to the GLBTS that have been undertaken from 1997 to the present. Appendix B presents an overview of Canada's Chemicals Management Plan, which was announced in December 2006 as a means of protecting human health and the environment against hazardous chemicals.

Highlights of each chapter are presented below.

Mercury

As of 2006, Canada has achieved its challenge goal of a 90 percent reduction in mercury releases, compared to a 1988 baseline. The U.S. has also met its challenge goals of a 50 percent reduction in the deliberate use of mercury and a 50 percent reduction in mercury releases. In Canada, the most notable change is the reduction in mercury emissions from the electric power generation sector, which contributed 19 percent of total releases in 2006, down sharply from 29 percent in 2003. Both Canada and the U.S. continue to pursue reductions in mercury releases from sources resulting from human activity. For example, in the U.S., the National Vehicle Mercury Switch Recovery Program met its first-year goals of enlisting all states, and of developing a way to measure progress toward the goal of collecting at least 80 percent of available mercury switches in future years. Other ongoing reduction activities include changes in the chlor-alkali industry, thermostat recycling programs, fluorescent lamp stewardship programs, and other mercury collection and reclamation efforts.

PCBs

The U.S. and Canada have both made progress toward reaching the PCB challenge goals outlined in the Strategy. While the U.S. has made progress in reducing the amount of equipment in service containing >500 ppm PCBs, it is unable to determine the exact status of progress toward the U.S. goal of a 90 percent reduction of high-level PCBs. Canada continued its PCB Phase-out Awards program and granted two new awards in September 2007 to the City of Toronto and to Dofasco Inc. (now known as ArcelorMittal Dofasco Inc.) for reductions in the use and storage of PCB transformers. Based on preliminary data, it appears that Ontario has achieved a 90.2 percent reduction of high-level (>10,000 ppm) PCBs in storage. It also appears that approximately 68 to 70 percent of PCBs in use in Ontario have been eliminated or destroyed, compared to the Canadian goal of a 90 percent reduction of high-level PCBs in service. Proposed PCB regulations in Canada are expected to help the GLBTS meet the 90 percent reduction target for Ontario. These include strict phase-out dates for certain categories of PCBs in Canada. Final regulations are expected to be published in *Canada Gazette II* in 2008.

Dioxins/Furans

The U.S. has met its goal of a 75 percent reduction in dioxin/furan releases (at 89 percent as of 2000), and Canada has essentially reached its 90 percent dioxin/furan reduction goal, by achieving an 89 percent reduction (228 grams) of total releases within the Great Lakes Basin, relative to the 1988 Canadian baseline. During the past year, US EPA staff made outreach presentations at 15 venues in support of reductions in burn barrels and household garbage burning, which is the largest quantified source of dioxin emissions in both countries. These efforts will continue as part of the Burn Barrel Subgroup which will be incorporated into the HCB/B(a)P Workgroup. Similarly, an Agricultural Subgroup is also expected to continue to investigate opportunities to reduce agricultural waste burning, as part of the HCB/B(a)P Workgroup. Now that the GLBTS challenge goals have been met for both countries, the Dioxin workgroup is suspending further work, but will continue to monitor for dioxin in the Great lakes environment.

HCB/B(a)P

In striving to meet 90 percent reduction targets, both Canada and the U.S. have made significant reductions in emissions of HCB and B(a)P. Canada has reduced emissions of HCB and B(a)P by 73 percent and 52 percent, respectively, compared to a 1988 baseline. The U.S. reduced B(a)P emissions by approximately 77 percent in the Great Lakes States from 1996 to 2001. U.S. emissions of HCB have also declined (from a 1990 baseline). Three major HCB source categories—pesticide and agricultural chemical manufacturing, pesticide application, and chlorinated solvent production—reduced their emissions by 89 percent, 86 percent, and 83 percent, respectively, from 1990 to 2002. Actions to reduce HCB and/or B(a)P emissions have focused on residential wood combustion (including outdoor wood-fired boilers), scrap tire fires, coke ovens in the iron and steel sector, disposal of creosote-treated wood, and exhaust from diesel engines. A US EPA gold medal for exceptional service was awarded in 2007 for outstanding leadership and collaboration to a project for creating far-reaching environmental benefits by improving and disseminating vital management techniques to reduce the risk of improperly disposed scrap tires. This project was started by and supported through the HCB/B(a)P workgroup.

Integration Workgroup Meetings/Stakeholder Forums

The highlight of 2007 for the GLBTS Integration Workgroup was the series of ten-year anniversary events held in Chicago in May. The events began with a Stakeholder Forum followed by an evening reception and dinner with three featured speakers: G. Tracy Mehan III (a charter member of GLBTS and formerly of US EPA, now with The Cadmus Group); Claude-André Lachance of Dow Canada, representing Great Lakes industry partners; and Dr. Michael Murray of the National Wildlife Federation (NWF), representing environmental nongovernmental organizations (NGOs). A GLBTS Future Focus Workshop was also held in conjunction with the ten-year anniversary events. GLBTS Stakeholder Forums were held in Chicago in December 2006 and again in May 2007 (the latter in conjunction with the ten-year anniversary). Discussion topics included a presentation on the New York/New Jersey Harbor Project and progress toward the Strategy's challenge goals over the past ten years.

The Integration Workgroup met in December 2006 (Chicago), February 2007 (Windsor), and September 2007 (Windsor). Discussion topics included progress updates from the Mercury, Dioxin/Furan, PCB, and HCB/B(a)P Workgroups; a Michigan dioxin exposure study, a software tool for economic analysis of PCB transformer phase-outs, development of a *Great Lakes Mercury in Products Phase-Down Strategy*, the formation of two new GLBTS groups, and the future of the GLBTS as it embarks on its second decade.

GLBTS Path Forward: Two New Groups

Given the variety of emerging substances that have been detected and reported in the Great Lakes, the U.S. and Canada decided in September 2007 to explore a new path forward under the GLBTS, in addition to continuing Strategy work toward the reduction of legacy contaminants, where appropriate. Specifically, EC and the US EPA proposed the creation of a Substance Group and a Sector Group under the Strategy. The GLBTS Substance Group will focus on

information gathering and integration of data on potential toxic substances in the Great Lakes Basin. The GLBTS Sector Group will review information on industrial sectors within the Great Lakes Basin and explore potential opportunities for the GLBTS process to enhance the environmental management activities of select industries. These groups will work together to identify potential opportunities for action that may be effected under the GLBTS.

Sediment Challenge

More than 440,000 cubic yards of contaminated sediment were remediated from ten U.S. sites and one Canadian site in the Great Lakes Basin in 2006. Since 1997, more than 4.5 million cubic yards of contaminated sediment have been remediated in the U.S. Great Lakes Basin. In 2007, with the assistance of the Research Vessel *Mudpuppy*, US EPA conducted integrated sediment assessment surveys at eight sites in the Great Lakes. Since 1997, more than 48,000 cubic meters (approximately 63,200 cubic yards) of contaminated sediment have been remediated from Canadian sites in the Great Lakes. A risk-based decision-making framework for contaminated sediments was completed under the 2002–2007 *Canada-Ontario Agreement Respecting the Great Lakes Basin* (COA) and was released for public comment. U.S. sediment remediation projects included those in Duluth, Minnesota; Sault Ste. Marie, Michigan; Neenah, Wisconsin; and Sheboygan, Wisconsin, among eight others. Canadian sediment remediation or investigation projects included those in the Trent River, Port Hope Harbour, Hamilton Harbour, the Niagara River, and Wheatley Harbour, among five others.

Long-Range Transport Challenge

In support of the GLBTS challenge to assess atmospheric inputs of Strategy substances to the Great Lakes, a preliminary modeling assessment was conducted by EC on the atmospheric fate of HCB over the Great Lakes. HCB air concentrations modeled by CanMETOP were compared with those monitored by the Integrated Atmospheric Deposition Network (IADN). Results suggested that industrial emissions of HCB in the U.S. are a negligible source for its budget over the Great Lakes region. To identify the quantitative contribution of different HCB sources in the continent to the budget of HCB over the Great Lakes, six high-spatial-resolution model scenarios were simulated for the years 2000 and 2001, restricting sources to various geographic regions of the U.S. and Canada. On an annual basis, in 2000 sources in the Northwest U.S. made the largest contribution to HCB levels in the air and to wet depositions to the Great Lakes at 45 percent and 37 percent, respectively. The second major source of HCB over the Great Lakes was sources in the Canadian Prairies, followed by sources in the Northeast U.S. Sources in the Southeastern and Southwestern U.S. contributed 6 percent each to the air concentration level and wet deposition over the Great Lakes. The results also showed that sources in the Northwest U.S. contributed 47 percent of HCB air concentrations to Lakes Michigan and Erie, followed by Lake Superior at 45 percent and Lake Ontario at 43 percent.

Looking Ahead

As noted above, the year 2007 marked the tenth anniversary of the signing of the GLBTS. In its first decade, the GLBTS successfully accomplished 12 of 17 goals established for the legacy Level 1 substances. In conjunction with the ten-year anniversary events, EC and US EPA

considered broadening the current structure and mandate of the GLBTS to address emerging chemical threats to the Great Lakes Basin. With the creation of two new groups focused on emerging substances and their associated sectors, the GLBTS will explore opportunities to mitigate new chemical threats to the Basin. As the GLBTS moves forward in addressing issues of emerging concern, contributions will be made toward ongoing activities and commitments nationally and internationally, including Canada's Chemicals Management Plan, the U.S. High Production Volume Program, and the trilateral U.S./Canada/Mexico Security and Prosperity Partnership.

As noted by Mr. Lachance during the GLBTS ten-year anniversary dinner, the continued success of the GLBTS will depend on the ability to correctly and fully integrate environmental issues with economic performance, economic development, and societal needs. Addressing all of these factors—sometimes as competing factors—simultaneously becomes a critical need when the substances involved are no longer legacy chemicals but products in use for purposes that benefit society. These are significant challenges for the immediate future. The ability to bring the right people to the table to participate in future binational environmental activities will be enhanced by the GLBTS successes of the past.

1.0 MERCURY

Canadian Workgroup co-chairs: Robert Krauel, Edwina Lopes (acting co-chair 2006-2007)

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.

Both Canada and the U.S. have 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 GLBTS Mercury Workgroup is active; 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 slightly more than 90 percent between the 1988 baseline and 2006, thus achieving the Canadian 90 percent reduction target. Figure 1-1 illustrates the progress made toward the Canadian reduction target.¹ This figure shows that releases in Ontario have been cut by more than 12,600 kg since 1988, based on Environment Canada's (EC's) 2006 mercury inventory. Note that some of the sources listed in the legend of Figure 1-1 (e.g., paint, pesticides) refer to the baseline year of emissions and are no longer current sources. Figure 1-2 illustrates the 2006 sources of mercury releases in Ontario. This figure shows that the primary sources of releases are municipal (primarily land application of biosolids), electric power generation, iron and steel, cement and lime, and incineration. However, all of these sectors have reduced releases when compared to the 2003 inventory reported in the previous progress report.² Most notable is the reduction in the electric power generation sector, which contributed 19 percent of total releases in 2006 compared to 29 percent of total releases in 2003.

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, in accordance with periodic COA reviews of mercury use, generation, and release from Ontario sources.

² US EPA and EC. (2006). *Great Lakes Binational Toxics Strategy 2006 Annual Progress Report*, Tenth Anniversary Edition. Prepared by US EPA and Environment Canada. Report No. En161-1/2006E; 978-0-662-45249-2. Available at http://binational.net/bns/2006/2006GLBTS_en.pdf

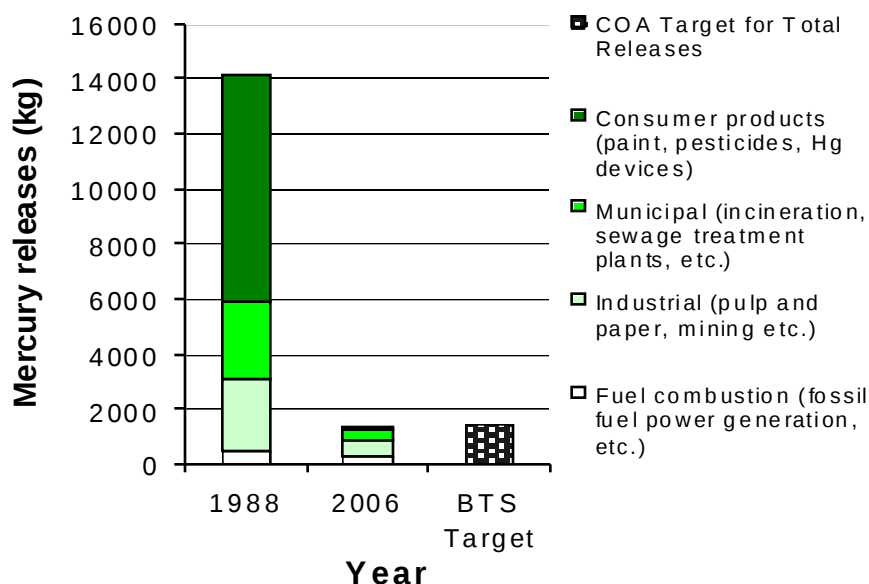


Figure 1-1. Reductions in Mercury Releases in Ontario from 1988 to 2006, by Sector. Source: Environment Canada, Ontario Region/Ontario Ministry of the Environment (2007)

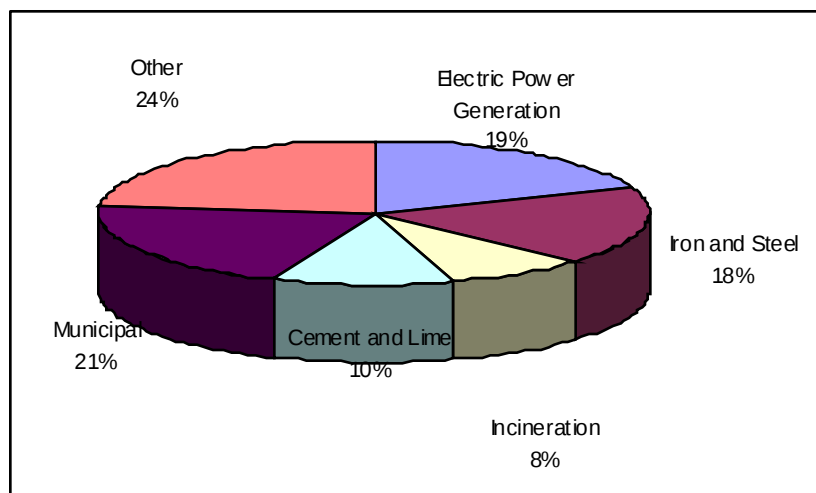


Figure 1-2. Sources of Mercury Releases in Ontario (2006). Source: Environment Canada, Ontario Region/Ontario Ministry of the Environment (2007)

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.

According to the most recent estimates from the National Emissions Inventory,³ U.S. mercury emissions decreased approximately 52 percent between 1990 and 2002 (see Figure 1-3).⁴ The 1990 and 2002 emissions estimates are highly comparable, because the 1990 mercury emissions estimates have been revised recently to include sources such as electric arc furnaces and gold mining, which were not included in the 1990 inventory, and to include more accurate emissions factors where these are available. It is very likely that actions taken since 2002 have resulted in additional reductions; in particular, emissions from gold mining and chlor-alkali plants have been reduced significantly since 2002.

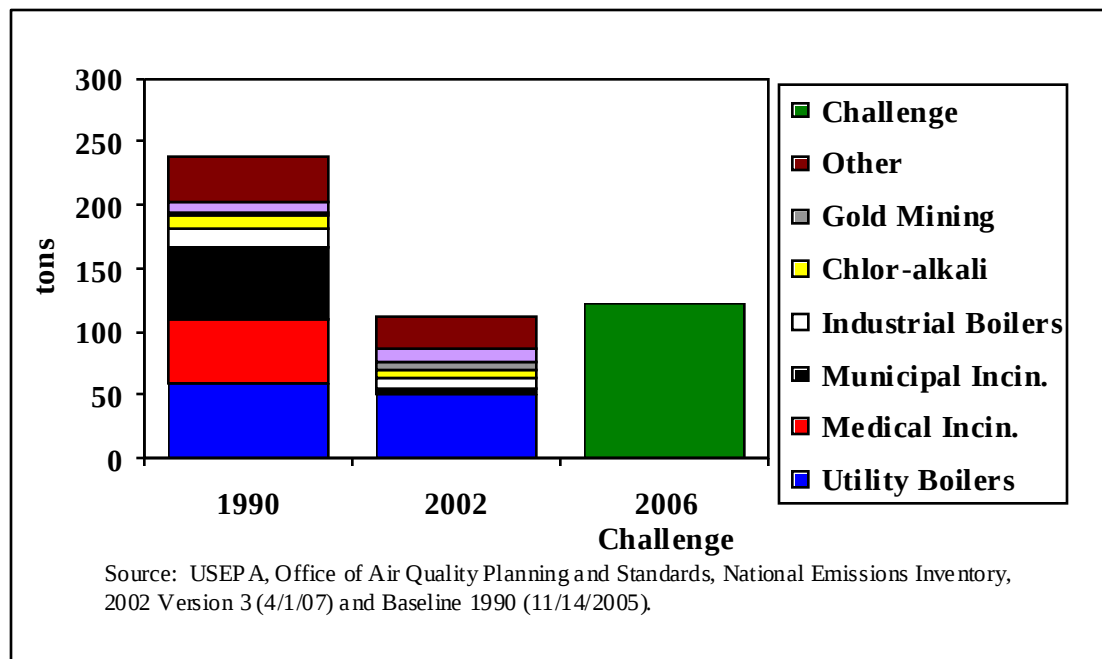


Figure 1-3. U.S. Mercury Emissions: 1990 Baseline and 2002 Estimates, Versus 2006 Challenge

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 (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 6 tons, compared with 32 tons

³ NEI (2007). National Emissions Inventories for the U.S. Web site prepared by US EPA. Available at <http://www.epa.gov/ttn/chief/net/index.html>.

⁴ Note that there is uncertainty associated with all emissions inventories. For more discussion, see Murray, M., Holmes, S.A. (2004). Assessment of mercury emissions inventories for the Great Lakes states. *Environ. Res.* 95:282-297.

estimated by the USGS for 1997. 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. Lamp manufacturers use mercury both in lamps themselves and in the production process.

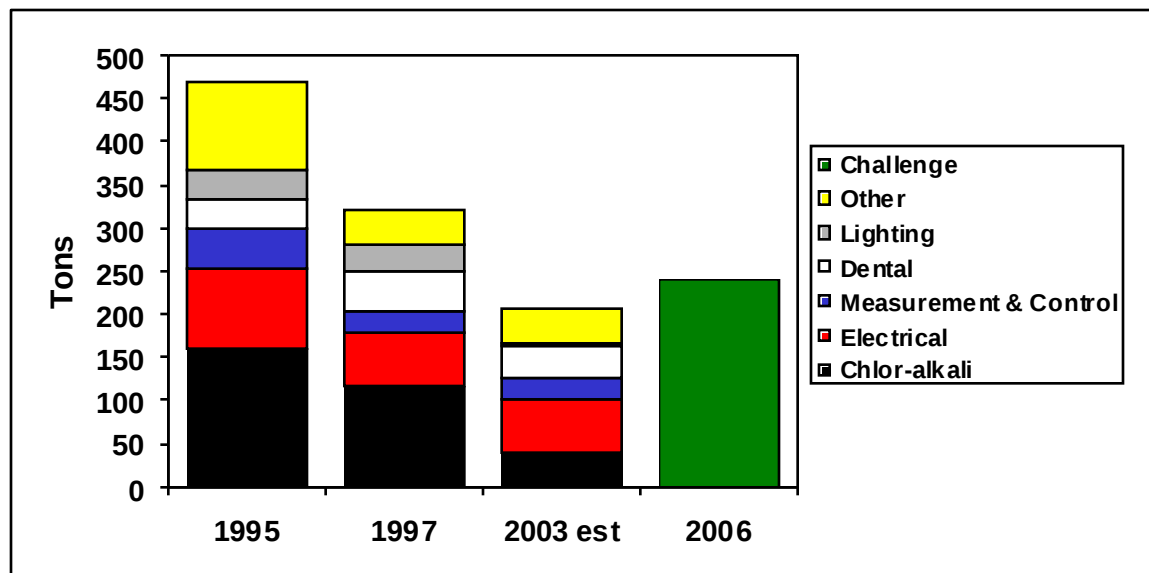


Figure 1-4. U.S. Mercury Use: 2006 Challenge, 2003 and 1997 Estimates, and 1995 Baseline.^{5,6,7}

It is likely that mercury use has declined even more than portrayed in Figure 1-4, because mercury use in other categories has also decreased. For instance, evidence suggests that the use of mercury in measurement and control devices, switches, and relays has decreased.

Workgroup Activities

On December 6, 2006, the Mercury Workgroup meeting focused on efforts to reduce mercury emissions from the metal mining and processing and steel production sectors. The workgroup discussed global emissions from gold mining and base metal smelting, and research on approaches that could limit mercury emissions from taconite processing plants in the Great Lakes region. In addition, the workgroup discussed efforts to reduce mercury emissions from steel production using recycled autos, through implementation of a National Vehicle Mercury Switch Partnership in the U.S. and through vehicle mercury switch collection in Canada. In addition, the workgroup discussed development of a *Great Lakes Mercury in Products Phase-*

⁵ USGS. (1995, 1997). *Minerals Yearbook*. Mercury 1995, by Josef Plachy; Mercury 1997, by Robert G. Reese, Jr. United States Geological Survey. Available at <http://minerals.usgs.gov/minerals/pubs/myb.htm>.

⁶ Chlorine Institute. (2004). *Seventh Annual Report to EPA*. Prepared by The Chlorine Institute, Arlington, Virginia.

⁷ NEMA. (2004). National Electrical Manufacturers Association, direct communication.

Down Strategy under the Great Lakes Regional Collaboration (GLRC),⁸ and options for the future of the Port Edwards, Wisconsin, mercury cell chlor-alkali plant.

U.S. Reduction Activities

National Vehicle Mercury Switch Recovery Program (NVMSRP)

This program was established by an August 2006 agreement among vehicle manufacturers, steelmakers, vehicle dismantlers, auto shredders, brokers, the environmental community, state representatives, and US EPA.⁹ Under this program, vehicle manufacturers, auto dismantlers, and steelmakers promote a voluntary program that facilitates and provides incentives for removal of mercury switches from automobiles at the end of life. NVMSRP met its first-year goals of enlisting all U.S. states to take part in the program, and of developing a way to measure progress toward the goal of collecting at least 80 percent of available mercury switches in future years.

Chlorine Industry Implements Voluntary Mercury Reductions

The Chlorine Institute released its *Tenth Annual Report to EPA*, showing an 89 percent capacity-adjusted reduction in mercury consumption by the U.S. chlor-alkali industry between 1995 and 2005, exceeding this sector's commitment to reduce mercury use by 50 percent by 2005.¹⁰ Including shutdowns of mercury cell factories, mercury use has decreased by 92 percent. The report also describes industry activities, including installation of new process equipment that will reduce mercury emissions, implementation of new air emissions control standards, and support for the United Nations Environment Program's (UNEP's) global partnership to reduce mercury releases from chlor-alkali plants. It also describes actions taken to meet the industry's 2004 commitments to enhance cell room mercury 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 2.9 tons in 2006.

Thermostat Recycling Corporation Continues to Increase Collections

In 2006, thermostat manufacturers increased collections through the Thermostat Recycling Corporation (TRC), which seeks to improve recovery of mercury-containing thermostats for recycling. 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 2006, the TRC recovered nearly 113,600 thermostats and thereby removed 1,080 lbs of mercury from the solid waste stream. These figures represent a 29 percent increase in thermostat collections and a 32 percent increase in recovered mercury from 2005. The number of mercury thermostats coming out of service has been estimated at more than 2 million annually.¹¹

⁸ GLRC. (August 2007). *Mercury in Products Phase-Down Strategy*. Draft report prepared by Great Lakes Regional Collaboration, Available at <http://www.glrc.us/documents/DraftMercuryPhaseDownStrategy.pdf>

⁹ US EPA. (August 11, 2006). *Memorandum of Understanding to Establish the National Vehicle Mercury Switch Recovery Program*. Available at <http://www.epa.gov/mercury/pdfs/switchMOU.pdf>

¹⁰ Chlorine Institute. (2007). *Tenth Annual Report to EPA*. Prepared by The Chlorine Institute, Arlington, Virginia

¹¹ PSI (October 18, 2004). *Thermostat Stewardship Initiative: Final Background Research Summary*. Report prepared by Product Stewardship Institute, Boston, Massachusetts. Available at <http://www.productstewardship.us/associations/6596/files/ILHgBkgrdSummaryFinal.doc>

Mercury thermostats that are not managed by the TRC or by household hazardous waste programs are either discarded in the trash or as part of construction and demolition waste.

Inclusion of Amalgam Separators in American Dental Association Best Management Practices for Amalgam Waste

The American Dental Association (ADA) has added the use of dental amalgam separators to the list of *Best Management Practices for Amalgam Waste* that it recommends dentists follow.¹²

Development of a Mercury Product Stewardship Strategy

The GLRC released a draft *Great Lakes Mercury in Products Phase-Down Strategy* for public comment.¹³ The draft *Phase-Down Strategy* was developed in response to the recommendation in the GLRC Strategy to implement “complete phase-outs of mercury uses, including a mercury waste management component, as practicable.” A workgroup including representatives from each Great Lakes state, tribes, and US EPA developed the draft *Phase-Down Strategy*.

Elemental Mercury Collection and Reclamation Program

An Elemental Mercury Collection and Reclamation Program formally began at Bowling Green State University (BGSU) in Ohio in January 1998. The program involves the collection and recycling of uncontaminated elemental mercury that is present in a variety of devices. These sources include thermometers, manometers, barometers, sphygmomanometers (blood pressure measurement devices), mercury-containing heating thermostats, and mercury switches, as well as individual containers of elemental mercury. The program is available and free to individuals, academic institutions, small businesses, industries, medical and dental facilities, emergency response and other governmental agencies, spill response companies, and any additional entity having unwanted, uncontaminated elemental mercury.

Collaborative partners in the program include BGSU, Ohio EPA (Division of Emergency and Remedial Response), Rader Environmental Services, Toledo Environmental Services, and ESCO (Elemental Services and Consulting). The Wood County Emergency Management Agency and the Wood County Health Department have also assisted in this effort. Since the program began, mercury has been removed from numerous sources throughout Ohio as well as from locations in Michigan, Indiana, Pennsylvania, West Virginia, Kentucky, Tennessee, Illinois, Wisconsin, Nebraska, Texas, and Georgia. Thus far, nearly 19,500 lbs of elemental mercury have been collected and recycled.

A more detailed explanation of BGSU’s collection and reclamation program as well as a sample of a mercury vapor video filmed at BGSU can be found at the following web site:

<http://www.bgsu.edu/offices/envhs/page18364.html>.

¹² ADA. (2007). *Best Management Practices for Amalgam Waste*. Prepared by American Dental Association, Chicago, Illinois. Available at http://www.ada.org/prof/resources/topics/topics_amalgamwaste.pdf

¹³ GLRC. (August 2007). Op. cit.

Mercury in Vehicle Switches

The National Wildlife Federation (NWF) released a report on mercury vehicle switches in Ohio, *Putting the Brakes on Quicksilver: Removing Mercury from Vehicles in Ohio*.¹⁴ The report provides an overview of the mercury switch issue, results of a survey of a small set of Ohio auto dismantlers (which indicated significant interest in obtaining more information on the issue), and recommendations for enhancing the effectiveness of switch collection programs. NWF also prepared and distributed a detailed fact sheet on mercury-containing thermostats in Ohio, emphasizing the importance of increasing participation in the voluntary TRC recycling program.

Canadian Reduction Activities

Canada-wide Standards for Mercury

Since 2001, Canada-wide Standards (CWS) have been developed by the Canadian Council of Ministers of the Environment (CCME) for specific mercury-containing products and sources of mercury emissions. Currently, standards exist for mercury-containing lamps, dental amalgam waste, emissions from base metal smelting, incinerators, and the coal-fired electric power generation sector. In Ontario, progress in reductions related to these standards includes:

- Under the CWS for lamps, the mercury content of fluorescent tubes has decreased by more than 74 percent.
- As a result of implementation of the Ontario Amalgam Waste Disposal Regulation,¹⁵ more than 95 percent of dentists in Ontario now have amalgam separators, which capture waste mercury. In 2002, only 27 percent of dentists across Canada had installed separators.
- Mercury emissions from coal plants have decreased by approximately 55 percent, or more than 300 kg.
- Mercury emissions from incineration have decreased by over 70 percent, or more than 300 kg.

¹⁴ Murray, M.W. (February 2007). *Putting the Brakes on Quicksilver: Removing Mercury from Vehicles in Ohio*. Report prepared by National Wildlife Federation. Available at <http://www.glrppr.org/docs/NWF-OH-AutoSwitchReport.pdf>.

¹⁵ Ontario (2003). *Dentistry Act, 1991; Ontario Regulation 205/94; Part III, Amalgam Waste Disposal Regulation 196/03*. Citing *Standard Practice of the Profession for Amalgam Waste Disposal*, published by the Royal College of Dental Surgeons of Ontario. Also citing *Best Management Practices for the Disposal of Dental Amalgam and Mercury Wastes in Ontario*, Environment Canada, October 2003. Available at <http://www.search.laws.gov.on.ca/navigation?file=home&lang=en/>.

Risk Management Strategy for Mercury-Containing Products

On December 20, 2006, Environment Canada posted a *Risk Management Strategy for Mercury-Containing Products (RMS)* and is holding consultations to obtain the views of Canadians.¹⁶ The RMS provides a framework for the development of control instruments to manage the environmental effects of mercury used in products.

Both of these initiatives are complementary to Canada's new Chemicals Management Plan (Appendix B). The plan takes immediate action to regulate chemicals that are harmful to human health or the environment and is part of the government's comprehensive environmental agenda.

For more information on these two mercury-related initiatives, please visit the "What's New?" section on the Mercury and the Environment website at this address:

<http://www.ec.gc.ca/MERCURY/EN/wn.cfm>. For further information on the Chemicals Management Plan, please see Appendix B or visit <http://www.chemicalsubstanceschimiques.gc.ca/en/>.

Clean Air Foundation Builds on Successful "Switch Out" Program

The Clean Air Foundation, a Canadian environmental not-for-profit organization, manages two mercury recovery programs in Canada. Switch Out (www.switchout.ca) is a voluntary automotive mercury switch collection program that operates in partnership with automotive recyclers across Canada. Switch the 'Stat (www.switchthestat.ca) is a mercury-containing thermostat collection program delivered in partnership with the Heating Refrigeration and Air Conditioning Institute of Canada (HRAI) and their member contractors. Both initiatives aim to reduce the amount of mercury released to the environment from the disposal of end-of-life consumer products—vehicles and thermostats.

Switch Out Program Results. Since 2001, through the voluntary participation of auto recyclers across Canada in British Columbia, Alberta, Ontario, Quebec, and Nova Scotia, more than 164,900 mercury-containing switches have been safely removed from end-of-life vehicles prior to recycling through the Switch Out program. This is equivalent to the recovery of approximately 140 kg of mercury. Specifically, from November 2006 to September 2007, approximately 34,100 mercury switches have been recovered, resulting in the safe capture and storage of approximately 29 kg of mercury. More than 68,000 switches (containing 57 kg of mercury) have been collected in Ontario alone.

Switch the 'Stat Program Results. Switch the 'Stat was officially launched by the Clean Air Foundation in partnership with 850 heating and cooling contractors in the Province of Ontario in September 2007. Contractors encourage the installation of energy-efficient programmable thermostats, while simultaneously recovering older mercury-containing thermostats. Between the time of the pilot project's launch in April 2006 and September 2007, 4388 switches (containing approximately 10.5 kg) have been collected in Ontario. Program partners and

¹⁶ EC. (December 20, 2006a). Risk Management Strategy for Mercury-Containing Products. Environment Canada. Available at http://www.ec.gc.ca/ceparegistry/documents/part/Merc_RMS/Merc_RMS.cfm.

fundes include HRAI, Fluorescent Lamp Recyclers, Ontario Power Authority, Ontario Ministry of the Environment, Enbridge Gas, and Union Gas.

Recycling Council of Ontario (RCO) Expands Fluorescent Lamp Stewardship Program

In 2005 the RCO studied and undertook a pilot study with the Grand Erie District School Board, which explored the feasibility of changing the end-of-life management of fluorescent lamps. Building upon this experience, the RCO worked with the larger Toronto District School Board (TDSB) in 2007. In the TDSB pilot, Osram-Sylvania and Wolf Electric and Lighting worked with the RCO to develop a reverse distribution system for spent lamps. The RCO is now looking toward a provincial rollout of their Fluorescent Lamp Stewardship program to the institutional, commercial, and industrial sectors.

Mercury Switches in End-of-Life Vehicles

On December 9, 2006, Environment Canada published a Proposed Notice¹⁷ under Part 4 of the Canadian Environmental Protection Act, 1999 (CEPA)¹⁸ outlining proposed requirements to prepare and implement pollution prevention plans for mercury releases from mercury switches in end-of-life vehicles processed by steel mills. The Proposed Notice targets vehicle manufacturers and steel mills.

Next Steps

The Mercury Workgroup will consider, and potentially help implement, the recommendations of the *Great Lakes Mercury in Products Phase-Down Strategy*, when it is finalized.¹⁹ In addition, the workgroup will serve as the primary mechanism for gaining stakeholder input on a new GLRC project—a Great Lakes Mercury Emissions Reduction Strategy. The workgroup will also continue to share information about cost-effective opportunities for mercury reduction.

¹⁷ EC. (December 9, 2006b). Proposed Notice Requiring the Preparation and Implementation of Pollution Prevention Plans in Respect of Mercury Releases from Mercury Switches in End-of-Life Vehicles Processed by Steel Mills, under Part 4, Section 56, of the Canadian Environmental Protection Act, 1999. Prepared by Environment Canada. Available at <http://canadagazette.gc.ca/partI/2006/20061209/html/notice-e.html>.

¹⁸ CEPA. (1999). Canadian Environmental Protection Act, 1999. Environment Canada, Chapter 33. Available at <http://www.ec.gc.ca/CEPARRegistry/archives/theact/actArchived/default.cfm>.

¹⁹ GLRC. (August 2007). Op. cit.

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 both continue to make progress toward reaching the PCB challenge goals outlined in the Strategy. However, as described below, some data gaps still 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, due to a lack of information, the U.S. is still unable to determine, with accuracy, the status of progress toward the goal. Based on preliminary data received from EC on the Canadian National Inventory system for Ontario, it appears that Ontario has achieved a 90.2 percent reduction of high-level PCBs (>10,000 ppm PCB) in storage. Canada is unlikely to meet the 90 percent reduction goal for PCBs that are still in service or in use in PCB equipment. Based on preliminary analyses, it appears that approximately 68 to 70 percent of PCBs in use in Ontario have been eliminated or destroyed.

The PCB Workgroup is active and continues to pursue reduction opportunities and outreach activities, and plans to prioritize recommendations developed in the 2006 Management Assessment for PCBs, which are outlined below:

- Continue existing Level 1 programs:
 - To decommission PCBs in use/service.
 - To control releases from storage and disposal facilities.
- Promote compliance activities for mandatory phase-out of PCBs in service as required by new Canadian PCB regulations.²⁰
- Continue data gathering and assessment to determine additional PCB sources and to plan for future resource commitments.
- Prioritize PCB inventory update and source emission studies.

These recommendations have been reviewed and accepted by the PCB Workgroup. The workgroup plans to address the following recommendations:

²⁰ Canada Gazette. (November 4, 2006). *PCB Regulations*. Proposed under Subsection 93(1) of CEPA, 1999. Canada Gazette Part I, Vol. 140, no. 44. Available at http://www.ec.gc.ca/ceparegistry/documents/regs/g1-14044_r1.pdf

- Review the literature annually for new information on PCB sources and new or updated data on PCB levels and trends in the Great Lakes.
- Prepare annual summary reports on the literature reviews but consider that, even though more information may be published, specific information on PCB releases from some sources are still poorly documented (e.g., contaminated sites, dispersive PCB sources).

Both Canada and the U.S. are evaluating opportunities to comply with the Stockholm Convention (Canada is signatory to the Stockholm Convention), which includes international goals to phase out PCBs.²¹ The PCB Workgroup will continue to work with the *Canada-Ontario Agreement (COA)* program in order to achieve COA goals in Ontario.²²

Ontario: Progress Toward the GLBTS Challenge

Environment Canada continues to update its inventory information annually. The information below summarizes previously compiled and evaluated inventory information through 2006.

According to EC's 2006 PCB Inventory reports, about 90.2 percent of previously stored high-level PCB wastes had been destroyed (compared to 1993 baseline; see Figure 2-1), and the number of PCB storage sites had been reduced to less than 400 from 1,529 in 1993 (see Figure 2-2). However, as described below, some data gaps exist regarding PCBs in remaining equipment that is still in service. In Ontario at the end of 2006, there were still approximately 2,771 tonnes (in net tonnes) (5.5 million lbs) of high-level PCBs in use/service that need to be targeted for phase-out (see Figure 2-3).

²¹ Stockholm Convention. (May 22, 2001). *Stockholm [Sweden] Convention on Persistent Organic Pollutants*. Available at <http://www.pops.int/>.

²² EC. (2002-2007). *Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem*. Prepared by Environment Canada. Available at <http://www.ec.gc.ca/CEPARRegistry/documents/agree/Fin-COA07/toc.cfm>.

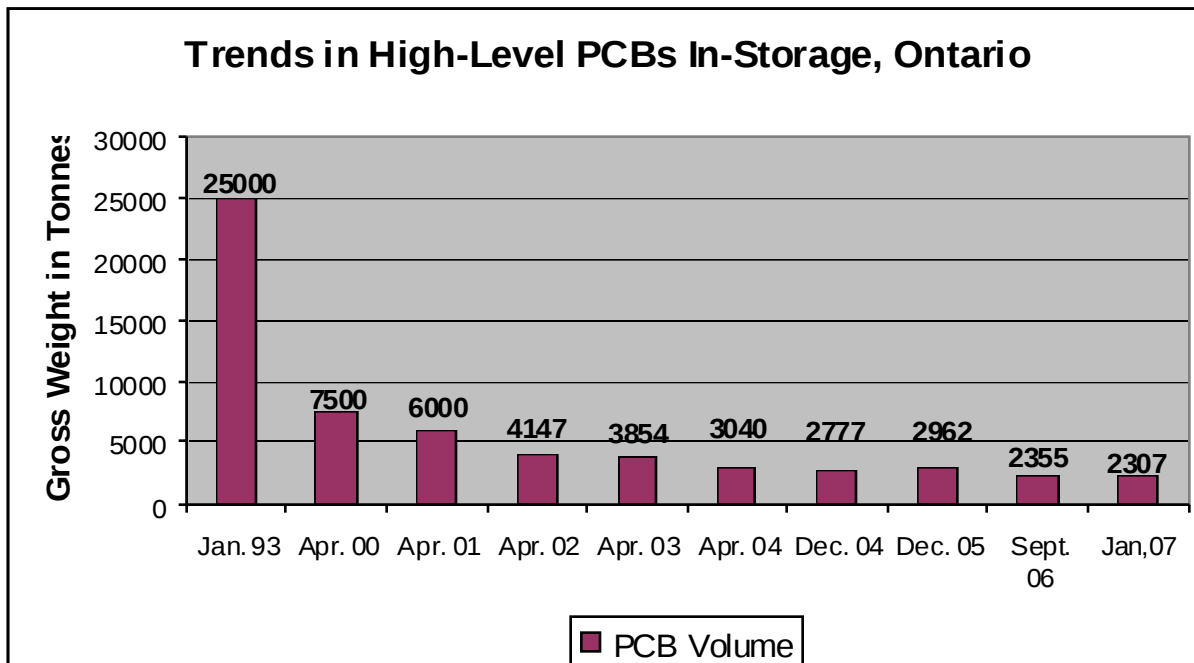


Figure 2-1. High-Level PCBs (Gross Tonnes) in Storage in Ontario. Source: Environment Canada and Ontario Ministry of Environment PCB Database

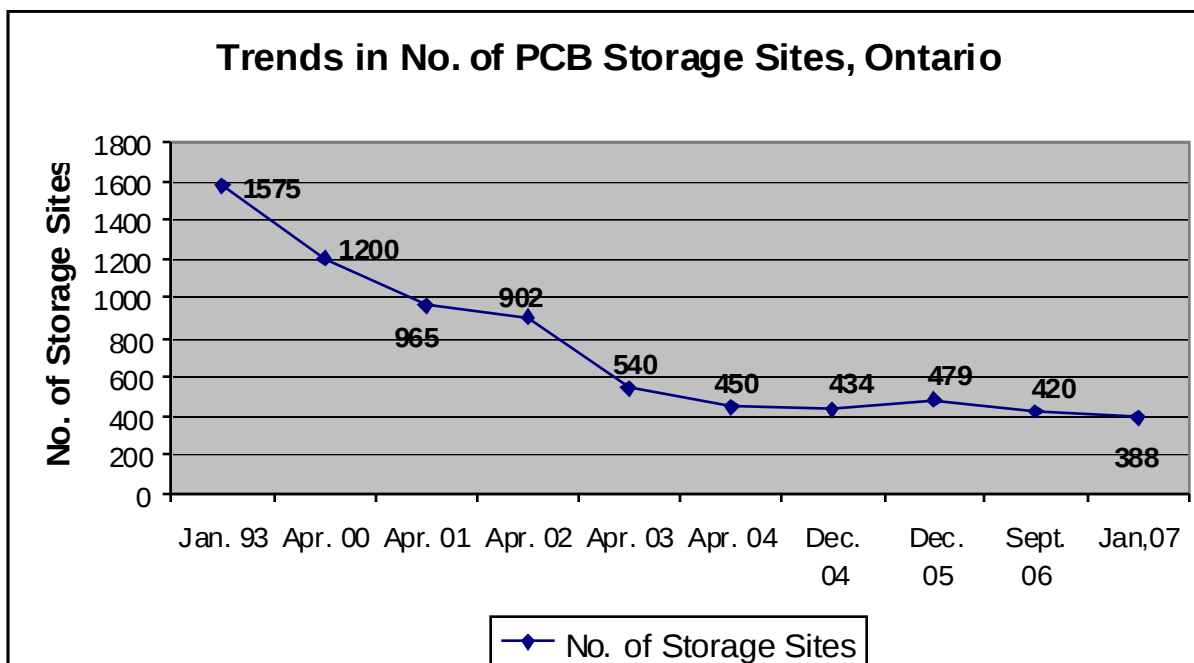


Figure 2-2. Trends in Number of PCB Storage Sites in Ontario. Source: Environment Canada

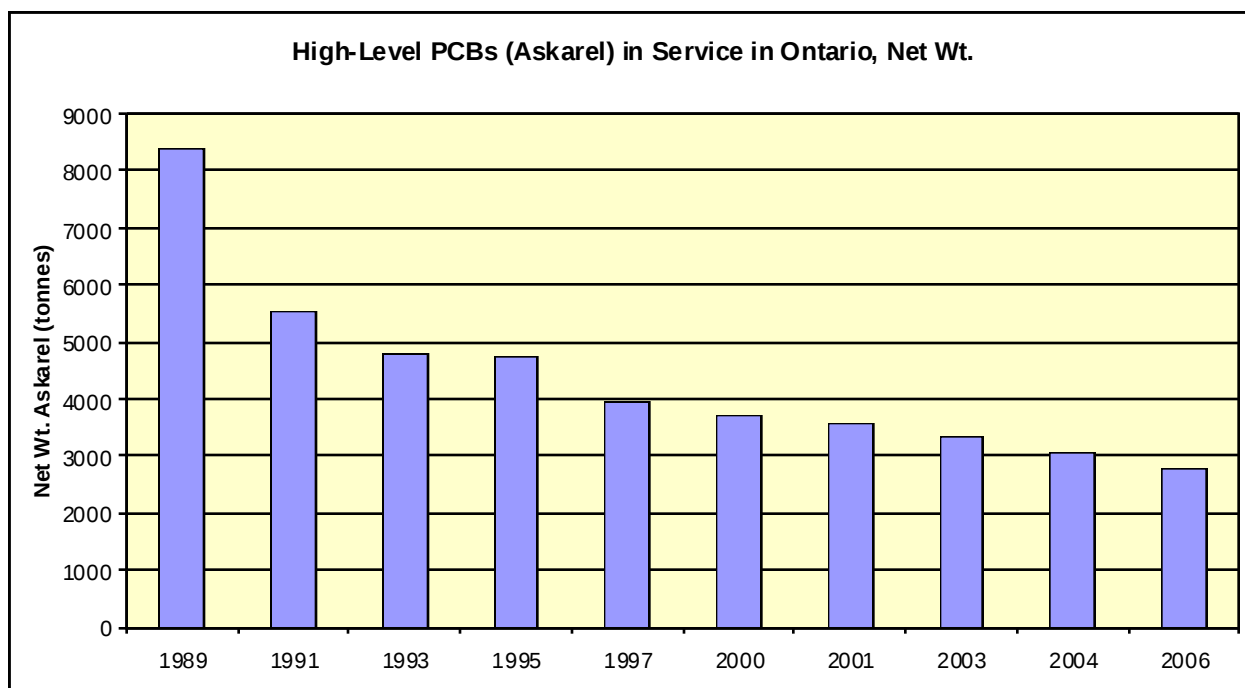


Figure 2-3. Trends in High-Level (Askarel) PCBs (Net Tonnes) in Service in Ontario. Source: Environment Canada

United States: Progress Toward the GLBTS Challenge

US EPA uses two sources of information to evaluate the estimated inventory of PCB transformers remaining in use: 1) annual reports submitted by PCB disposers, and 2) the PCB Transformer Registration Database. The annual report data has been compiled through 2005. Based on the annual report data thru 2005, an estimated 73,000 PCB transformers and 1,290,000 large PCB capacitors remained in use at the end of 2005. The estimates for the amount of equipment remaining in use in 2005 were obtained by subtracting the annual disposal data from the 1994 estimated baseline. However, according to the PCB Transformer Registration Database, updated in August 2006, only about 14,700 PCB transformers were registered with US EPA. Although the data from the annual reports is important for compliance purposes and can be used to compare trends for and between facilities and years, it is not particularly useful for determining the amount of PCB equipment that is remaining in service. Until and unless more specific or detailed data becomes available, the US EPA will continue to use this data to provide some insight to the amount of PCB equipment that may remain in service.

Workgroup Activities

Workgroup Meetings

The PCB Workgroup met on December 6, 2006. The December 6, 2006, meeting focused on three topics: 1) the development of a PCB software tool; a study of PCB emissions from PCB transformers; and 3) the Management Assessment for PCBs. A demonstration of the software was made, and a presentation was given on the results of the study on PCB emissions from PCB transformers. Each of these topics is discussed later in this chapter.

PCB Management Framework

The PCB Workgroup finalized the draft Management Assessment for PCBs at its December 2006 workgroup meeting. Comments received on the draft were addressed in final revisions to the report. The report will be used to guide the workgroup's future efforts.

U.S. Reduction Activities

U.S. PCB Phasedown Program

During 2007, US EPA launched an outreach program to the underground mining industry, mailing letters to underground mines across the U.S. that encouraged the voluntary phase-out and proper disposal of PCB electrical equipment. The mining industry was specifically targeted for this outreach effort due to US EPA concerns related to the potential abandonment of PCB equipment in mines. US EPA Region 8 in Denver, Colorado, lead the outreach effort and serves as the main point of contact through a Mining Hotline (1-303-312-7090).

U.S. Stakeholder PCB Phase-out Efforts

The Utility Solid Waste Activity 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. During the May 23, 2007, GLBTS Stakeholder Forum, a presentation was given on behalf of USWAG on U.S. utility industry efforts to phase-down its PCB equipment. The presentation included the following information:

- USWAG was formed in 1978 and its members include about 80 utilities and energy companies, which collectively deliver electricity to over 95 percent of U.S. consumers.
- USWAG's utility members currently have programs to remove PCB equipment upon failure and during service or maintenance. In addition, some PCB equipment is specifically targeted for removal. The programs include the following:
 - Removal on failure: All equipment that fails and cannot be repaired is disposed. PCB or PCB-containing equipment that can be repaired is retrofilled to less than 50 ppm and returned to services.
 - Removal for service: Equipment removed from operation is analyzed and, if found to contain over 50 ppm, is drained and refilled with non-PCB dielectric fluid or disposed. PCB equipment is generally not returned to service.

- o Targeted removal: Some targeted removal of functioning equipment is conducted to remove potential future liability associated with spills or to minimize perceived risks. In addition, many utilities have programs to target and remove PCB large capacitors.
- Downsides of removal programs include:
 - o Sampling burdens (labor) and costs.
 - o Removal of reliable equipment.
 - o Reliability and performance concerns with testing and replacement equipment.
 - o Increased immediate operational expenses.

In closing, USWAG indicated that “One size does not fit all” for PCB removal programs. There are operational, financial, systematical, and equipment differences between utilities. However, they are working to develop an integrated reduction program, and continue to promote the retirement of PCB equipment, share and coordinate information, awareness, and activities related to voluntary PCB phase-down efforts.

Electric and gas utility member companies of USWAG have continued with a wide range of voluntary PCB reduction efforts, both within the Great Lakes Basin and in other regions of the country. Details on the specific PCB phase-down efforts of specific USWAG members across the U.S. are included in previous GLBTS progress reports. The achievements of USWAG members are significant because they help demonstrate that the U.S. is fulfilling its anticipated obligations (were it to become a signatory) under the Stockholm Convention on Persistent Organic Pollutants to “make determined efforts” to identify and remove PCB equipment (>500 ppm PCBs) from use by 2025, and to “endeavor to” identify and remove PCB-contaminated equipment (>50 but <500 ppm PCBs) from use by 2025.

PCB Software – Financial Analysis of PCB Transformer Phase-Outs – A Study on the Costs and Benefits of PCB Phase-Out

Under a grant from US EPA, EMA Research & Information Center, subcontractor to the Tellus Institute, developed a spreadsheet tool to determine and compare the costs of phasing out PCB transformers against the costs of continued use. The tool was developed with the input of industry representatives and was based on actual case study information.

During the December 6, 2006, PCB Workgroup meeting and GLBTS Stakeholder Forum, Dr. Deborah Savage of EMA Research and Information Center gave an update and demonstration on the PCB transformer phase-out tool. The software was developed under a grant by US EPA’s Great Lakes National Program Office (GLNPO) to develop a tool to help firms understand the true costs associated with operating PCB transformers and phasing them out. A case study is included to help firms use the spreadsheet tool. In developing the spreadsheet, with the help of industry representatives, some of the major cost drivers and considerations were: the transformer age, size, type and rating; the fluid volume and PCB concentration; the location and accessibility of the equipment; spill containment and fire prevention; equipment reliability and importance; and regulatory compliance. The software specifically enables a firm to conduct an itemized financial assessment for the scenarios of keeping, removing, and retrofitting a PCB transformer,

including such factors as net present value and payback, depreciation, taxes, inflation, and discounting.

US EPA is currently evaluating the spreadsheet tool and will work with other industry representatives to conduct additional trial case studies on the use of the tool.

Canadian Reduction Activities

Canadian Regulatory Activities

The most significant proposed revisions to the regulations are the imposition of strict phase-out dates for certain categories of PCBs.²³ The most important events and dates relative to the phase-out targets proposed are as follows:

- During the 60-day comment period ending on January 3, 2007, comments were received from 43 PCB stakeholders. All comments have been reviewed by EC.
- EC proposed PCB Regulations Policy Changes for *Canada Gazette II* to the Environmental Protection Board in Ottawa on October 25, 2007, to seek approval on:
 - o End-of-use deadlines for lower risk PCBs.
 - o Criteria for proposed extension system.
 - o Consultation and implementation approach for proposed extension system.
- Regulations expected to be published in *Canada Gazette II* in 2008.

Proposed revisions to the Canadian PCB destruction regulations would see the strengthening of emissions release provisions to bring the federal regulations in line with existing provincial requirements. More information concerning this regulation can be accessed at: <http://www.ec.gc.ca/CEPARRegistry/regulations/detailReg.cfm?intReg=105>.

Canadian Stakeholder 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). Additional letters were sent in 2003 and 2004. From August to November 2005, EC sent over 1,000 letters to PCB owners (of both PCBs in storage and in use) in priority industry sectors for inventory updates. Over 400 inventory updates have been completed, signed, and returned to EC, along with copies of manifests and destruction and inspection reports. EC conducted an analysis to identify priority industry sectors and major sources of high-level PCBs (both in use and in storage). The inventory updates have also been extremely useful in updating the National PCB Inventory Database.

A number of companies in the iron and steel, utilities, pulp and paper, and metals and mining sectors have voluntarily undertaken initiatives to eliminate PCBs, especially high-level PCBs in

²³ Canada Gazette. (November 4, 2006). Op. cit.

use and/or storage. EC held personal meetings with officials of two major steel companies in Ontario (Stelco and Dofasco) and encouraged them to destroy high-level PCBs in storage and decommission PCBs in use. Many examples of voluntary PCB reduction efforts are included in previous GLBTS progress reports. Below are a couple of additional examples in the electric utility sector.

1. As of November 2006, the following utilities were PCB free: Whitby Hydro, Windsor Utilities Commission, Sault Ste. Marie Hydro, Innisfil Hydro, Brantford Power, Aurora Hydro, Peterborough Utilities, Essex Power, Port Colbourne, Guelph Hydro and Wellington Electric Distribution, and Festival Hydro.
2. As of September 2007, North Bay Hydro had only nine low-level (50 to 166 ppm) transformers in storage with 346 gallons of PCBs total.

Although the Canadian GLBTS target for stored high-level PCBs has been met, PCBs in use for the top six industry sectors are a challenge. These sectors include: 1) steel; 2) metals and metal mining; 3) sensitive areas; 4) utilities; 5) non-federal governments; and 6) pulp, paper, and forestry. Additional companies are being identified as PCB free, and these will be used to update the inventory of PCB free companies.

PCB Phase-out Awards Program (Canada)

Eight Canadian companies received PCB Phase-Out Awards prior to 2005. Two new awards were given in September 2007:

The City of Toronto, Facilities and Real Estate Division, eliminated all high-level (>10,000 ppm) transformers from 14 facilities at various locations in Toronto and closed 11 storage sites. Three sites remain open primarily to store PCB ballasts. The Division had audited 280 sites and will be active in phasing out all PCBs from other sites in the near future.

Dofasco Inc., Hamilton, Ontario, is an integrated steel plant. In recent years (2002 to present), Dofasco destroyed all high-level Askarel transformers (100 percent) from their Kenilworth facility and approximately 90 percent from their Bay Front facility, down from a total of 222 such transformers in service in 1999. As of September 2007, Dofasco had 23 such transformers remaining in service and planned to be free of PCB transformers within 2 years. Since being acquired by ArcelorMittal, Dofasco has adopted a new mission called “Transforming Tomorrow.”

Figure 2-4 shows city and company representatives receiving PCB Phase-out Awards from Ken De (EC), Danny Epstein (EC), and Gary Gulezian (US EPA).

EC will continue to target candidates for PCB phase-out programs and PCB awards. The strategy is to identify those companies with the largest PCB inventories, meet with them to discuss their phase-out strategies, explain the GLBTS goals and awards program, and attempt to obtain a commitment for prompt phase-out.



Figure 2-4. PCB Phase-Out Awards Given in September 2007. Top, from left: Ken De (EC) and Wayne Moss (City of Toronto). Bottom, from left: Danny Epstein (EC), Debbie Fennell and Elizabeth Shaw (Dofasco), and Gary Gulezian (US EPA). Source: Environment Canada

Canadian PCB Success Stories

Case studies have been written for each of the companies that have received Canadian PCB awards (except the two recent award winners: City of Toronto and Dofasco Inc.). 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. The case studies will be posted on the GLBTS PCB website. 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. Summaries of the two most recent award winners are presented above. Information on previous PCB phase-out activities and awards are included in past GLBTS progress reports.

Inventory Improvements

Source Profiles and Emissions of PCBs to Ambient Air from Transformers

A draft report on the study of PCB emissions from in-service PCB transformers was submitted to US EPA. A presentation on the study was made during the December 6, 2006, PCB Workgroup meeting. The study, conducted by Dr. William J. Mills of the University of Illinois, collected samples of ambient air around operating PCB Askarel transformers in January and October 2004. The study showed that PCB levels in rooms with transformers were at least 1 order of magnitude higher than outside background PCB concentrations collected on-site, and higher still than a background PCB concentration collected off-site. The workgroup discussed several issues regarding the study: the fact that some interferences were noted, such as wipe samples that found PCBs on the floor. The workgroup concluded that additional information specific to any potential source of PCBs at the facility would be needed to fully understand the relative contribution loading of PCB transformers. The other potential sources could include past spills, paint, caulk, or other PCB-containing equipment.

Canadian PCB Inventory Harmonization

EC's Ontario regional staff are working to improve the quality and update the information in the PCB inventory. PCB Workgroup members have met with Inspection and Enforcement staff who are responsible for updating and maintaining the Ontario Region's Database, and will continue to meet with them on a regular basis, to share inventory information gathered during meetings with PCB owners and from PCB commitment letters. Once the National PCB Database systems are updated with new inventory information, the PCB Workgroup will be able to provide more accurate and timely inventory information and evaluate progress toward meeting the GLBTS goals.

Next Steps

The workgroup and government agencies plan to continue seeking PCB reduction commitments and evaluate PCB Management Assessment recommendations for implementation.

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 Management Assessment Recommendations

The Management Assessment for PCBs was presented in final form at the December 2006 GLBTS Stakeholder Forum. The workgroup plans to begin working on the recommendations presented in the report.

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 an active Level 1 status, with initial priority placed on 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) clarify PCB trends and impacts on the environment; and (3) assess the ability of the GLBTS to effect further reductions.

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. The PCB Workgroup will continue to gather data to identify and determine relative contributions of PCBs to the environment from known and potential sources of PCBs. Once sufficient progress on this work is made, a better determination of the activities that can be undertaken, and by whom, to reduce releases from particular sources can be made. The workgroup will also consider future resource commitments by workgroup members for any future work.

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. has met its goal of a 75 percent reduction in dioxin/furan releases, and Canada has essentially reached its 90 percent dioxin/furan reduction goal.

Ontario: Progress Toward the GLBTS Challenge

Canada has essentially met the goal of a 90 percent reduction in releases of dioxins/furans, achieving an 89 percent reduction (228 grams) of total releases within the Great Lakes Basin, relative to the 1988 Canadian baseline. This reduction is based on the 2005 release inventory update for Ontario sources,²⁴ which estimates a total annual dioxin/furan release of 28 grams. Figure 3-1 illustrates reductions in the top Canadian (Ontario) dioxin/furan release sources since 1988.

To exceed Canada's 90 percent challenge goal, a further reduction of approximately 4 grams is needed. Several source sectors offer opportunities for potential reductions. For example, efforts by the GLBTS Burn Barrel Subgroup, such as education and outreach, can help reduce emissions from household garbage burning, the largest source of dioxin emissions in Ontario. Ontario has established a phase-out plan for coal-fired power units, and emission reductions from federal waste incinerators are expected due to closures. In addition, CWS for iron sintering and electric arc furnaces are expected to reduce emissions from these source categories.

²⁴ Point sources are mostly based on: EC. (2005). National Pollutant Release Inventory Data (NPRI) data. Web site of Environment Canada. Available at http://www.ec.gc.ca/pdb/npri/npri_dat_rep_e.cfm#highlights.

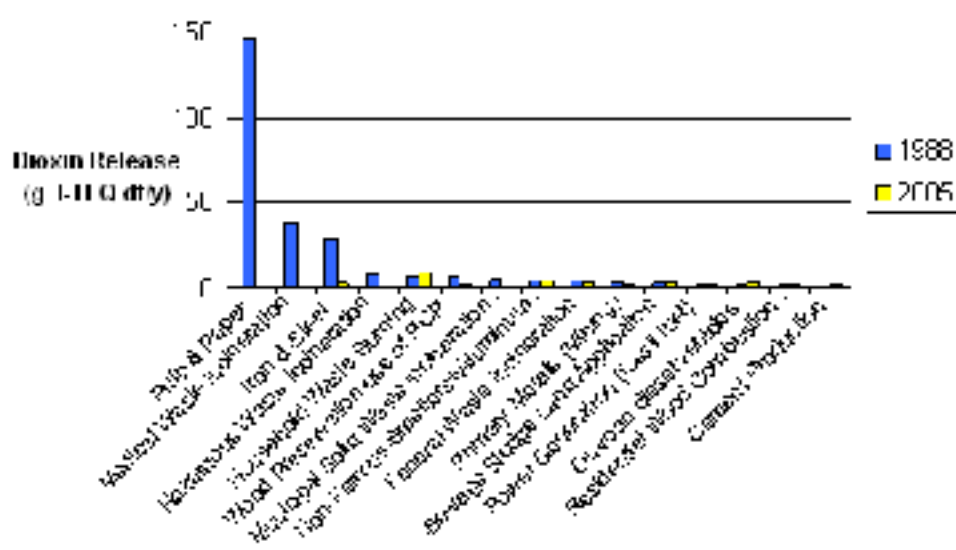


Figure 3-1a. Top Canadian (Ontario Region) Dioxin/Furan Release Sources, 1988 and 2005. Source: Environment Canada, Ontario Region

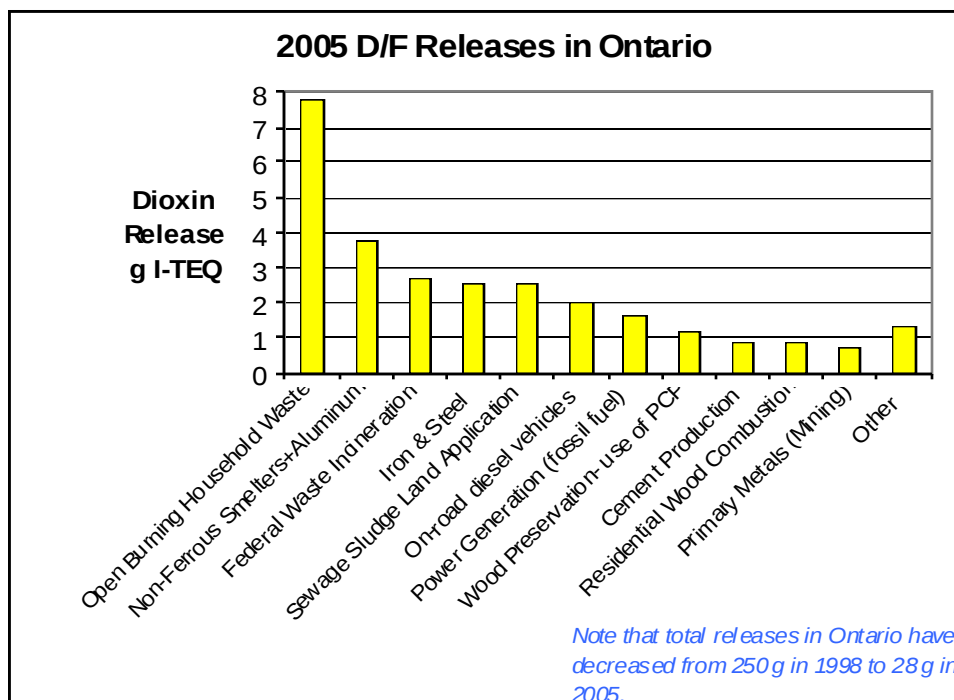


Figure 3-1b. Top Ontario 2005 Dioxin/Furan Release Sources. Source: Environment Canada, Ontario Region

United States: Progress Toward the GLBTS Challenge

According to *An Inventory of Sources and Environmental Releases of Dioxin-Like Compounds in the United States for the Years 1987, 1995, and 2000*, the U.S. has achieved an 89 percent reduction in dioxin releases nationally.²⁵ A significant portion of those reductions are a direct result of the maximum available control technology (MACT) standards enacted under the Clean Air Act (CAA).²⁶ For example, MACT standards reduced municipal waste combustion emissions from 8,905 grams TEQ in 1987 to 83 grams in 2000. 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 changes in processes and equipment to comply with standards, pre-existing actions in the design and retrofitting of facilities, and facility closures. The total U.S. inventory for dioxin releases has dropped from 13,965 to 1,422 g TEQ_{DF-WHO}/year. Figure 3-2 shows this drop in dioxin releases. Figure 3-3 provides a more detailed summary of the top inventoried dioxin sources in the year 2000. These figures, however, do not reflect full implementation of the MACT standards for medical waste incinerators. So while that source is shown as the second largest source of dioxin releases, US EPA has found substantial reductions while monitoring MACT implementation in subsequent years. It is now clear from these inventory figures that the largest source of quantified dioxin releases is household garbage burning.

²⁵ US EPA. (2006a). *An Inventory of Sources and Environmental Releases of Dioxin-Like Compounds in the United States for the Years 1987, 1995 and 2000*. Federal Register Notice of Availability. December 1, 2006, Volume 71, Number 231, pages 69564-69565. Citing the publication of "The Inventory of Sources and Environmental Releases of Dioxin-Like Compounds in the U.S.: the Year 2000 Update." March 2005, EPA 600-P-03-002A, external review draft report.

²⁶ CAA. (1990). Clean Air Act Amendments of 1990. US EPA. 42 U.S.C. s/s 7401 et seq. Available at <http://www.epa.gov/air/caa/index.html>.

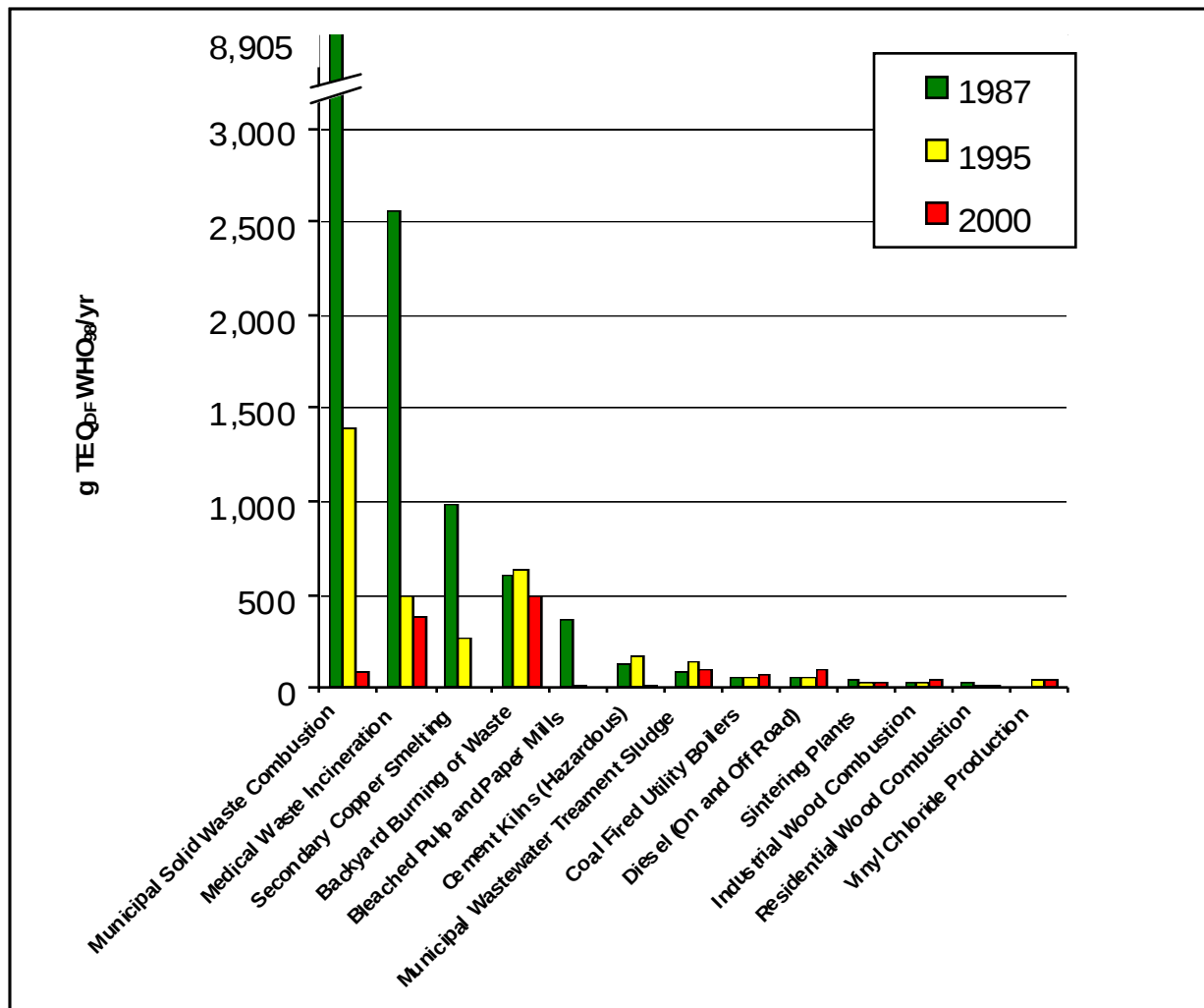


Figure 3-2. Top U.S. Inventoried Dioxin Releases for Years 1987, 1995, and 2000.²⁷

²⁷ US EPA. (2006a). Op. cit.

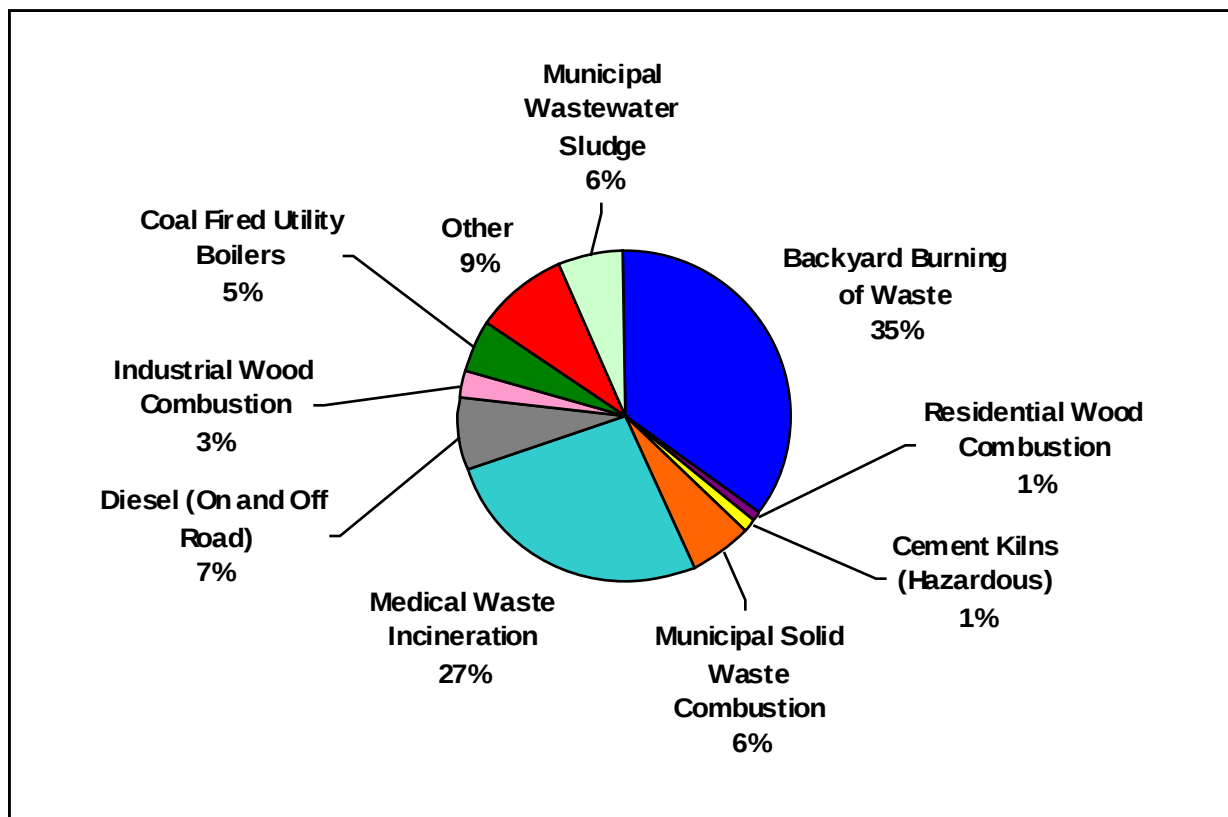


Figure 3-3. Top U.S. Inventoried Dioxin Releases in 2000.²⁸

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 a long-term goal of the US EPA.

Workgroup Activities

Workgroup Meetings

In the past year, the Dioxin/Furan Workgroup has conducted the following activities:

- The workgroup met on December 6, 2006, at the GLBTS Stakeholder Forum in Chicago. The workgroup discussed updates within the burn barrel program and issues related to agricultural burning. The workgroup also heard presentations from the U.S. Food and Drug Administration (FDA) and Health Canada (HC) relating to dioxin exposure in the food systems.

²⁸ US EPA. (2006a). Op. cit.

- The workgroup held a call on February 7, 2007, to review the management outcomes of the framework assessment for dioxin/furans, as requested by the GLBTS co-chairs. The workgroup tends to agree that the outcomes remain unchanged (i.e., active Level 1 substance). However, the workgroup role in pathway intervention needs to be revised to reflect the workgroup's decision to no longer pursue key pathway intervention opportunities, because this is beyond the mandate of the GLBTS. It was also proposed that the frequency of future workgroup meetings should depend on the issues to discuss. There is concern that there may be diminishing returns. A suggestion was made to review the Decision Tree developed in 1998 and use it to evaluate any outstanding sources.
- The Burn Barrel Subgroup met by teleconference four times in 2007: on March 20, May 29, July 10, and September 25. Topics related to reducing the practice of open burning were discussed, including: the burning of agricultural waste and plastics; US EPA's national burn barrel initiative, the distribution of a Burn Barrel Toolkit for local officials, and updates on local outreach activities. The subgroup discussed the benefits of continuing its operation, and there was agreement that the subgroup continues to serve as a valuable forum for states and provinces to share information to assist each other with their local open burning issues.

Pathway Intervention

According to the draft 2000 *U.S. Dioxin Reassessment*, over 90 percent of human exposure to dioxin/furans is attributed to food, in particular fish, meat, and dairy products.²⁹ The average adult daily intake is estimated to be 65 pg TEQ-WHO. The Dioxin/Furan Workgroup began to examine available intervention methods. Fish advisories are in place in both countries for dioxins/furans. To learn about other existing intervention methods, the workgroup invited officials from the FDA and HC to attend the December 2006 GLBTS meeting. International organizations agree in their assessments that the range of dioxin exposures is not desirable and that further action is warranted. Both the U.S. and Canada address risk management by sampling feed and food for dioxins/furans, and following up where sources are unusually high in dioxin levels. For example, the FDA has recalled a mineral premix product as a result of an investigation conducted on a dioxin-contamination source. The Canadian Food Inspection Agency also implements a trace-back program that identifies the source of the contamination and develops best management practices to reduce dioxins/furans in the food supply. Setting criteria levels in food is found to be difficult due the variation in different kinds of foods, species, etc.

A 2006 draft international *Code of Practice for the Prevention and Reduction of Dioxin and Dioxin-like PCB Contamination in Food and Feeds* was adopted by the Codex Alimentarius Commission.³⁰ Both the U.S. and Canada participated in the development of this Code, which

²⁹ US EPA. (2000a). *Draft Dioxin Reassessment Documents*; Dose-Response Modeling for 2,3,7,8-TCDD, Toxic Equivalency Factors (TEFs) for Dioxin and Related Compounds and Integrated Summary and Risk Characterization for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds. Federal Register Notice of Availability. October 4, 2000, Volume 65, Number 193, pages 59186-59188.

³⁰ Codex. (2006). *Code of Practice for the Prevention and Reduction of Dioxin and Dioxin-like PCB Contamination in Food and Feeds*, CAC/RCP 62-2006. Official Standard prepared by Codex Alimentarius Commission. Available at http://www.codexalimentarius.net/web/index_en.jsp.

focuses on measures for national authorities, farmers, and feed and food manufacturers to prevent or reduce dioxin and dioxin-like PCB contamination in foods and feeds. It applies to the production and use of all materials destined for feed and food at all levels, whether produced industrially or on farms. It serves as a source of information for developing good practices, but is not binding. The Code may be adopted by food/feed manufacturers, states/provinces, and others. However, there is no designated body responsible for implementing the Code.

HC presented biomonitoring data for dioxins/furans, which showed a declining trend in human milk and human tissue. The estimated current intake for the general Canadian population does not exceed 1 pg TEQ/kg body weight/day, well below the Canadian interim guideline of 2.3 pg TEQ/kg body weight/day. About 0.62 pg TEQ/kg body weight/day of this is from food.

The workgroup discussed its possible role in pathway intervention activities. The members agreed that while it is important to explore this issue within the GLBTS, the role of the workgroup should be limited to the following tasks: sharing information with health and food officials, pursuing source reduction activities that are complementary to pathway intervention, and promoting existing tools related to pathway intervention. Directing pathway intervention activities is beyond the mandate of the GLBTS and would require expertise within the health and food agencies.

Reduction Activities

Burn Barrels and Household Garbage Burning

The use of burn barrels and other household garbage burning methods remains a high reduction priority for the workgroup. Household garbage burning is the largest quantified source of dioxin emissions in both countries. The practice of household garbage burning typically is carried out in old barrels, open pits, wood stoves, or outdoor boilers. The Burn Barrel Subgroup is working to address this issue through continued outreach and education. The subgroup maintains a website for information sharing at www.openburning.org.

Over the past two years, US EPA developed a web-based burn barrel toolkit entitled *Learn Not to Burn*, which provides resources for local officials to reduce trash burning in their communities.³¹ The toolkit includes individual fact sheets for each state and case studies of efforts to reduce household garbage burning in various communities. The toolkit is available free of charge online, or communities may request CD toolkits via the *Learn Not to Burn* website at <http://www.iisgcp.org/learnnot2burn/>.

US EPA continued a series of outreach presentations on the toolkit for local officials in the Great Lakes states. In 2007, US EPA presented at 15 venues across the country, including:

- January 31, 2007 – Ohio Township Association Meeting, Columbus, OH.

³¹ US EPA. (2007a). *Learn Not to Burn: A Guide for Reducing Trash Burning in Your Community*. Toolkit web site prepared by US EPA, Illinois-Indiana Sea Grant College Program, US EPA Great Lakes National Program Office and Region 5 Air and Radiation Division. Available at <http://www.iisgcp.org/learnnot2burn/>.

- February 11, 2007 – AIRNow National Conference, Orlando, FL.
- May 22, 2007 – Pennsylvania Township Association Meeting, Hershey, PA.
- October 3, 2007 – North American Hazardous Materials Management Association Annual Meeting, San Diego, CA.

In Ontario, open burning information has been distributed to farms and rural landowners. EC is working with conservation authorities in four watersheds in an Adopt a Watershed Pilot Project, to promote community working group activities and stewardship initiatives to reduce open burning in rural areas. To date, 538 surveys were completed and 586 site visits were made by a total of 22 local “Citizen Ambassadors.” These activities are ongoing, and the survey results will be compiled and analyzed. The EC brochure on dioxins from open burning, *What Goes Up Must Come Down*,³² is being distributed.

Additional burn barrel case studies were compiled during 2007. A summary of over 20 burn barrel case studies is available on the Burn Barrel Subgroup’s website. These case studies include alternatives to burning in eight counties, six tribes, four states, three cities, and two solid waste districts across the U.S. The case studies highlight various approaches to reduce the practice of household garbage burning, including education and outreach, regulation, enforcement, incentives, infrastructure building, and voluntary efforts.

Great Lakes states (including Illinois, Indiana, Minnesota, New York, Michigan, and Wisconsin) and tribes 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. For example, the Michigan Department of Environmental Quality (MDEQ) completed a model ordinance, which is now available online.³³ In addition, MDEQ staff made a presentation on burn barrels, describing both the state program and the *Learn Not to Burn* toolkit, at the Michigan Township Association Meeting held in January 2007.

Agricultural Burning

There is little data regarding how dioxin enters the food supply, and this data gap limits the ability to control the input of dioxins/furans into the food supply. One potential pathway examined by the workgroup is from open burning activities on farms and in rural areas where the source of dioxin emissions is close to crops and livestock. An issue paper prepared by Environmental Health Strategies confirmed that open burning of agricultural waste and plastics does occur in the Great Lakes Basin.³⁴ The area of agricultural plastic burning was of particular interest to the workgroup, because it could be a likely source of dioxin emissions.

³² EC. (2007). *What Goes Up Must Come Down*. Brochure prepared by Environment Canada, Available at: http://www.c2p2online.com/documents/WGU_garbageburninghazard_e_v2.pdf

³³ MDEQ. (September 2006). *Model Ordinance for Outdoor and Open Burning: A Guide for Michigan Counties, Cities, Villages, and Townships*. Prepared by Michigan Department of Environmental Quality, Clean Air Assistance Program. Available at <http://www.deq.state.mi.us/documents/deq-ess-caap-modelordinance.pdf>

³⁴ EHS (March 31, 2005). *Toxic Emissions from Agricultural Burning*. Issue Paper prepared by Environmental

The workgroup held an initial call on this topic in July of 2006 and invited several agricultural agencies to participate. At that time, agricultural burning and more specifically agricultural plastic burning did not seem to be a large concern for many of the agencies the workgroup contacted. On the U.S. side, it appears this is a prevalent practice due to the increased amount of plastics in agriculture and the limited availability of recycling options. In Canada, agricultural burning is also a concern; however, there have been more advancements in plastic recycling capabilities. The need of this sector is to improve the recycling and waste disposal options for agricultural plastics in rural areas. This is a difficult challenge, which the workgroup has not been able to address. However, recently states like Wisconsin have approached the workgroup with similar concerns. If the workgroup can develop stronger partnerships with interested organizations, this sector could be addressed in the future.

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 continue to share information on common issues of concern including household garbage burning, outdoor wood-fired boilers (OWBs), agricultural plastics and trash burning, and diesel emissions. The two workgroups will continue to update members with new information and identify opportunities for joint work on common sources.

Next Steps

Education of the public and local officials on approaches to reduce household garbage burning will continue to be the Dioxin Workgroup's principal effort. In the future, the workgroup is expected to:

- Continue Burn Barrel Subgroup activities.
- Investigate opportunities to reduce agricultural waste burning.
- Consider a reduction in workgroup level of effort, now that the GLBTS challenge goals have been met for both countries.

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 percent 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

HCB Reduction

From 1988 to 2005 inclusive, Canada has reduced HCB emissions to the Great Lakes Basin by approximately 73 percent. Figure 4-1 shows the release estimates and progress achieved toward meeting the 90 percent reduction target.³⁵ Over 80 percent of the reductions achieved to date are due to:

- Lower residual HCB levels in pesticides and reduced use of certain pesticides known to contain HCB.
- Implementation of a CWS for waste incinerators and the closure of solid waste incinerators, such as Hamilton's Solid Waste Area Reduction Unit (SWARU).
- Reductions reported by the iron and steel sector and the closure of Algoma's Wawa sintering facility.
- Process changes within Ontario's chlorinated chemical manufacturing sector.

Canada's 2005 HCB releases in the basin are estimated at 31 lbs (14 kg). Major non-point sources include pesticide application, open burning, and the use of products containing trace HCB levels such as ferric or ferrous chloride. Such non-point sources account for about

³⁵ Based on Benazon. (July 13, 2000a). Hexachlorobenzene Sources, Regulations and Programs for the Ontario Great Lakes Basin 1988, 1998, and 2000, Draft Report No.1. Prepared by Benazon Environmental Inc. for Environment Canada; release data updated by Environment Canada—Ontario Region, based on NPRI facility release data, recent sector release assessments, and pesticide application release information received from Health Canada's Pest Management Regulatory Agency on August 29, 2005.

80 percent of Ontario's HCB releases. Point sources, including primary metals, steel, and cement production facilities, account for approximately 13 percent of Ontario's HCB releases.

Annual concentrations of HCB in ambient air at Ontario sites from 1997 to 2006 indicate that concentrations appear to have declined slowly in the past ten years.³⁶

B(a)P Reduction

From 1988 to 2005 inclusive, Canada has reduced B(a)P emissions to the Great Lakes Basin by approximately 52 percent. Figure 4-2 shows the release estimates and progress achieved toward meeting the 90 percent reduction target.³⁷ Most of the B(a)P reductions achieved to date have resulted from the following activities:

- Implementation of an environmental best practices manual by the iron and steel sector.³⁸
- Decrease in estimated wood consumption from 1986 to 2003; however, reliance on wood heat is expected to increase due to rising oil and gas costs.
- Implementation of control technologies by the petroleum refining sector.
- Decreased creosote-treating activities and shutdown of the Northern Wood Preservers Inc. facility in Thunder Bay.

The Ontario B(a)P inventory has been updated with new activity data and methodologies for some sectors, including residential wood combustion and creosote-treated railway ties. Canada's 2005 B(a)P releases in the basin from anthropogenic sources are estimated at 18,350 lbs (8,340 kg), representing a 52 percent reduction from 1988. This does not include 9,020 lbs/year (4,100 kg/year) of B(a)P released annually from forest fires (wildfires), based on a 2004 estimate.³⁹ Major non-point sources include residential wood combustion, use of creosote-treated railway ties, motor vehicle emissions, and open burning (prescribed and household waste burning), which account for about 60 percent of Ontario's B(a)P releases. The major point source is cokemaking from the steel manufacturing sector, which accounts for 30 percent of Ontario's B(a)P releases.

³⁶ US EPA and EC. (2006). Op. cit.

³⁷ Based on Benazon. (May 16, 2000b). *B(a)P/PAH Emissions Inventory for the Province of Ontario 1988, 1998, and 2000*. Draft Report No.1. Prepared by Benazon Environmental Inc. for Environment Canada; release data updated by Environment Canada—Ontario Region, based on NPRI facility release data and recent sector release assessments.

³⁸ EC. (March 2001). *Environmental Code of Practice for Integrated Steel Mills*, CEPA 1999 Code of Practice, First Edition, EPS 1/MM/7, Minerals and Metals Division, Environment Protection Service, Environment Canada. Available at <http://www.ec.gc.ca/nopp/docs/cp/1mm7/en/toc.cfm>.

³⁹ EHS. (March 31, 2004). *Toxic Emissions from Wildfires and Prescribed Burning*. Issue paper prepared by Environmental Health Strategies for Environment Canada.

B(a)P air monitoring data in the past ten years for Ontario stations show a slight decrease from 1997 to 2006, with little change in recent years. This is most notable in urban areas, where levels are about 2 to 5 times higher than those in rural areas.⁴⁰

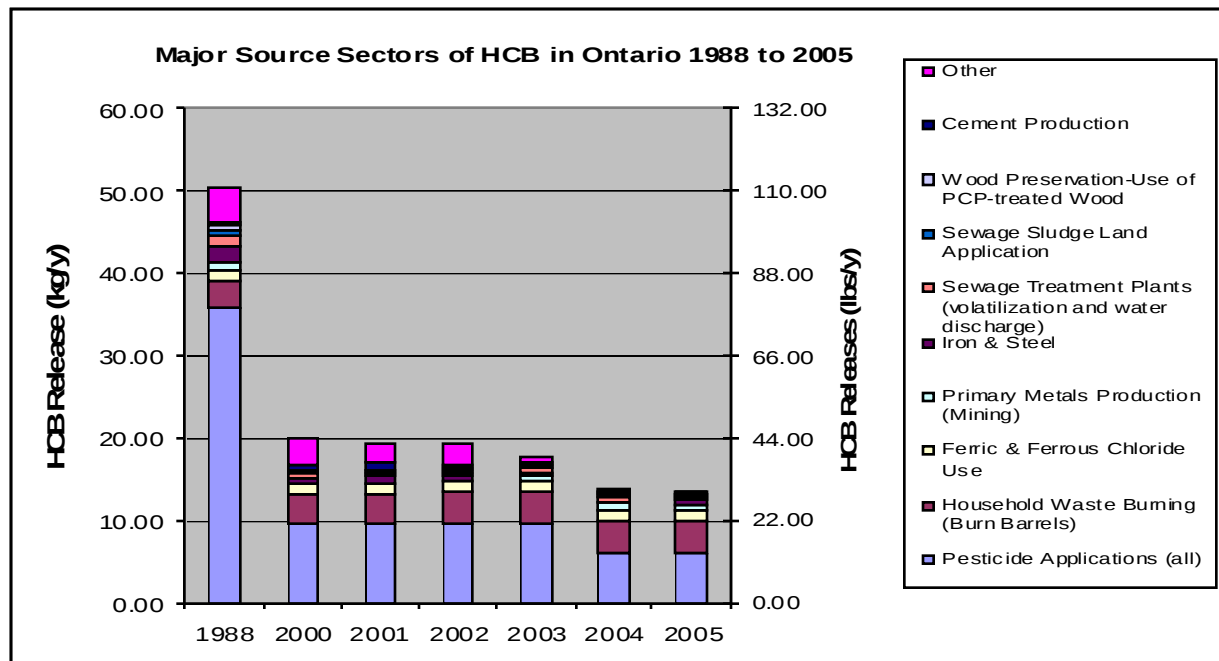


Figure 4-1. Estimated HCB Releases (to Air and Water) in Ontario by Sector, 1988-2005.⁴¹

⁴⁰ US EPA and EC. (2006). Op. cit.

⁴¹ Environment Canada (Environmental Protection Operations Division – Ontario Region) Inventory as of October 24, 2007, with an update on releases from pesticide application received from Health Canada's Pest Management Regulatory Agency (Letter dated April 11, 2005).

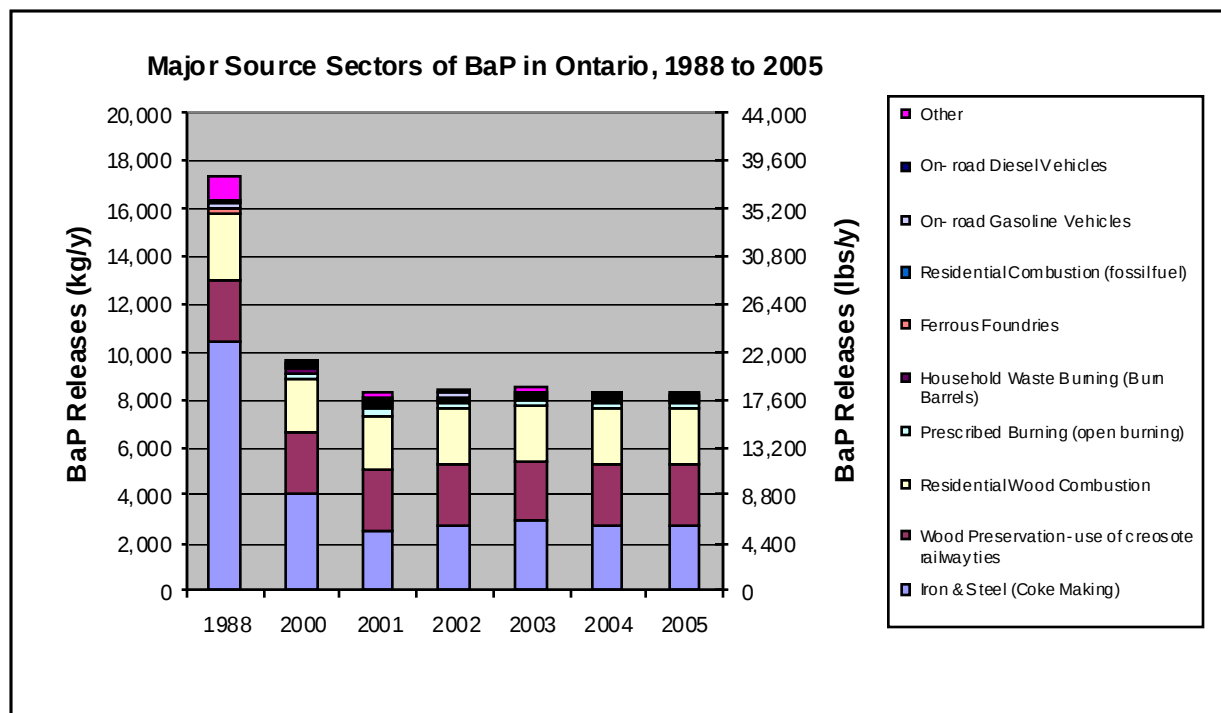


Figure 4-2. Estimated B(a)P Releases (to Air and Water) in Ontario by Sector, 1988-2005.⁴²

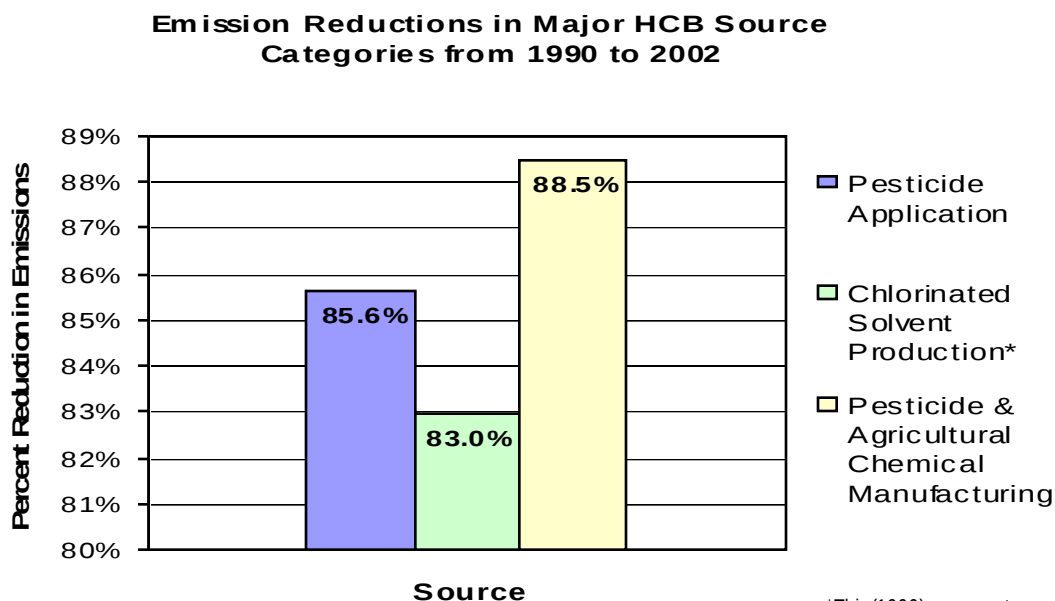
⁴² Environment Canada (Environmental Protection Operations Division – Ontario Region) Inventory as of October 24, 2007.

United States: Progress Toward the GLBTS Challenge

HCB Reduction

The U.S. has substantially reduced HCB emissions from certain source categories from 1990 to 2002, and more specifically, total HCB emissions were reduced by 28 percent [to 2,100 lbs/year (950 kg/year)] from 1999 to 2002. These reductions are mainly attributed to lower residual HCB levels in pesticides, along with reduced HCB emissions from chlorinated solvent production and pesticide manufacture (Figure 4-3). These three categories combined account for approximately 5,000 lbs/year (2,300 kg/year) 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 since 1990. Figure 4-4 presents the percent of total HCB emissions from the eight largest source categories in 2002. During 2006, US EPA commissioned work on an HCB Inventory, similar to US EPA's 2000 Dioxin Inventory. Figure 4-5 shows the fairly stable trends in HCB air and water releases reported to the Toxics Release Inventory (TRI) from 1990 to 2005.⁴³



*This (1990) source category was not reported in 2002 National Emissions Inventory. The 2002 category equals the sum of emissions from Industrial Organic Chemical and Industrial Inorganic Chemical manufacturing categories.

Figure 4-3. Emission Reductions in Major HCB Source Categories from 1990 to 2002 in the U.S.^{44,45}

⁴³ US EPA. (2007b). Toxics Release Inventory Program. Database prepared by US EPA. Available at <http://www.epa.gov/tri/>.

⁴⁴ US EPA. (1990). National Toxics Inventory, adjusted to reflect residential open burning emissions.

⁴⁵ US EPA. (2002). National Emissions Inventory.

**2002 HCB Source Categories
(Percent of total emissions)**

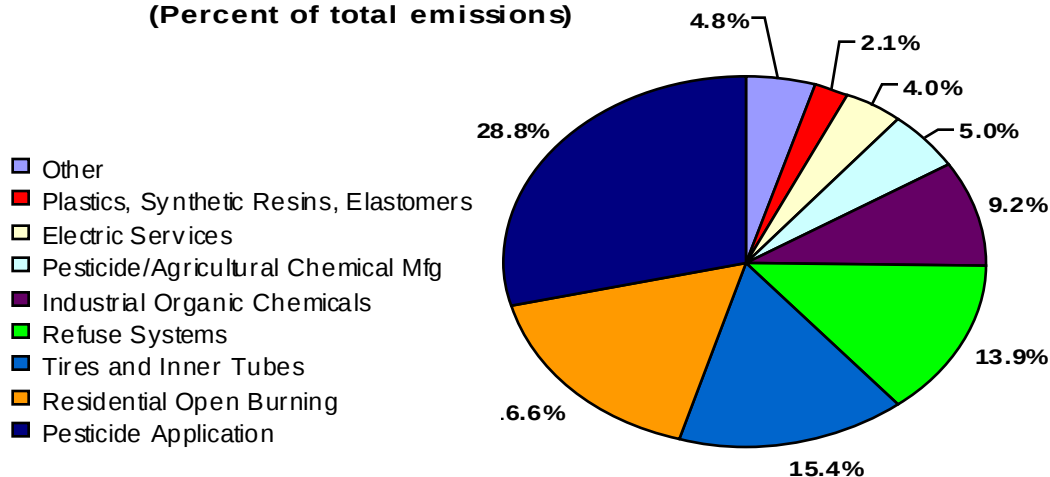


Figure 4-4. U.S. HCB Sources 2002, U.S. total ~2,100 lbs (950 kg)⁴⁶

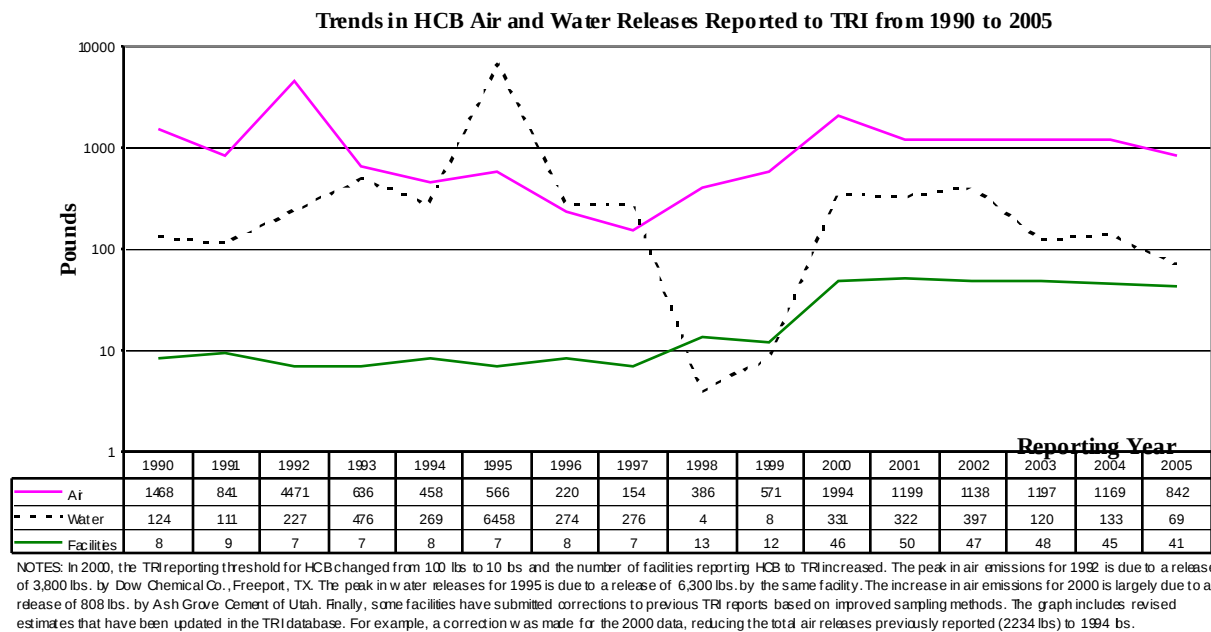


Figure 4-5. Trends in U.S. HCB Releases (to Air and Water) Reported to TRI, 1990-2005⁴⁷

⁴⁶ US EPA. (2002). National Emissions Inventory.

⁴⁷ US EPA. (2007b). Op. cit.

B(a)P Reduction

Figure 4-6 shows B(a)P release estimates and reduction progress within the U.S. Great Lakes Basin from 1996 to 2001.⁴⁸ B(a)P emissions from the eight Great Lakes states have been reduced by approximately 77 percent during that time, with annual emissions in 2001 estimated at 43,700 lbs (19,800 kg). 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.

Data from the 2002 *Great Lakes Regional Air Toxic Emissions Inventory* became available in 2006.⁴⁹ Total B(a)P emissions from the eight Great Lake states were estimated at 59,087 lbs (26,858 kg; see Figure 4-7). Estimated annual B(a)P emissions were substantially higher in the 2002 inventory than in the 2001 inventory, primarily due to improvements in the inventory. Residential wood combustion and coke ovens remain the largest B(a)P emission sources in the Great Lakes.

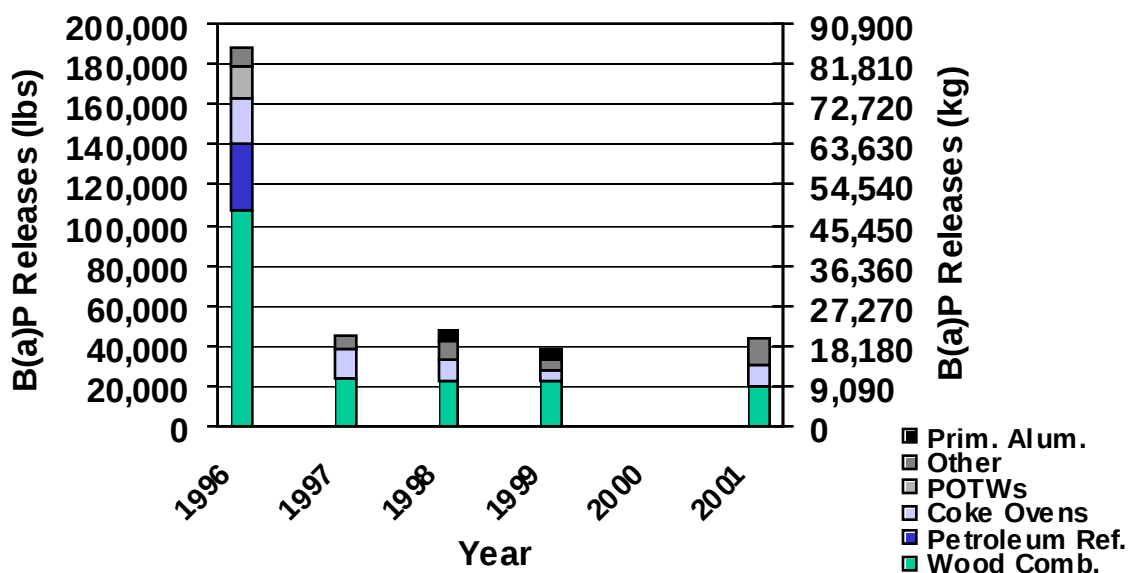


Figure 4-6. B(a)P Air Emissions in the U.S. Great Lakes States, 1996-2001⁵⁰

⁴⁸ Based on GLC. (1999-2004). *Great Lakes Regional Air Toxic Emissions Inventory for 1996 (published in 1999) through 2001 (published in 2004)*. Prepared by Great Lakes Commission, Ann Arbor, Michigan. Available at <http://www.glc.org/air/>. Petroleum refining emissions reduced to approximately 5 lbs beginning in 1997, as per revised estimates provided by the American Petroleum Institute (API, 2001).

⁴⁹ GLC. (2006). *Great Lakes Regional Air Toxic Emissions Inventory: 2002 Inventory of Toxic Air Emissions for the Great Lakes Region*. Prepared by Great Lakes Commission, Ann Arbor, Michigan. Available at <http://www.glc.org/air/>.

⁵⁰ GLC. (1999-2004). Op. cit.

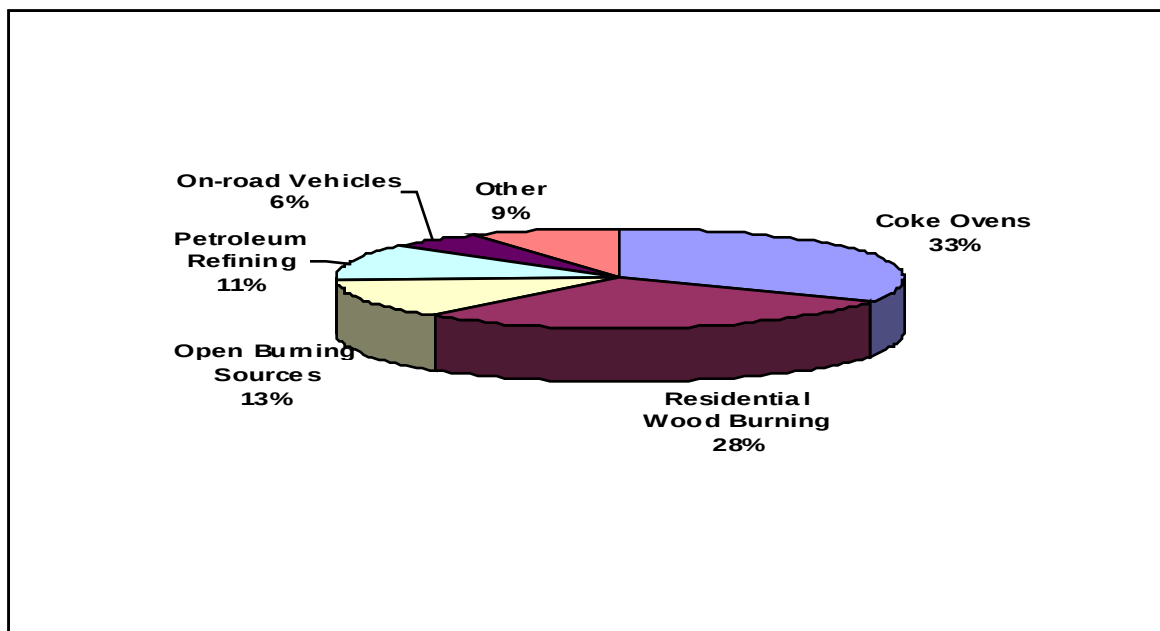


Figure 4-7. 2002 Great Lakes Basin Regional B(a)P Emissions 26,858 kg (59,087 lbs)⁵¹

Workgroup Activities

In 2007, the HCB/B(a)P Workgroup conducted the following activities:

- The workgroup met on December 6, 2006, at the GLBTS stakeholder forum in Chicago. The workgroup was presented with updates on HCB/B(a)P release inventories and reduction activities.
- At the May 23, 2007, GLBTS stakeholder forum in Chicago, the workgroup co-chairs reviewed the progress made in the past ten years, analyzed monitoring data for the past ten years, and summarized significant activities that took place to reduce emissions of HCB/B(a)P from 1997 to 2006.

U.S. Reduction Activities

Reducing Emissions from Residential Wood Combustion

- In 2007, the MDEQ was granted \$100,000 to perform an innovative wood stove change-out and outreach program. MDEQ will create a unique partnership with the Hearth, Patio, and Barbeque Association (HPBA) and Michigan United Conservation Clubs (MUCC). This partnership will create a campaign to educate Michigan citizens about the benefits of upgrading to cleaner burning technologies for hearth appliances, and an incentive program to

⁵¹ GLC. (2006). Op. cit.

achieve a goal of replacing 500 uncertified wood-burning stoves. The MDEQ's role will be to administer the grant, monitor progress toward meeting the goal, and evaluate the outcomes. The MUCC's role will be to create and administer the educational campaign and administer the incentive program. The HPBA will supply the incentives (with assistance from grant funds) and document change-outs.

- A comprehensive workshop was held in Philadelphia from September 25 to 27, 2007. The workshop provided information on:
 - The magnitude of the residential wood smoke issue, including fireplaces, wood stoves, and outdoor wood boilers (OWBs).
 - Emission inventories and emission factors.
 - Mechanisms for addressing the problem: wood stove change-outs; outreach campaigns; rules and ordinances.
 - Case studies of local air districts' efforts to address wood smoke.
 - Benefits and implementation of change-out programs.
 - Latest efforts and plans by states, localities, and others to address OWB emissions.

Reducing Emissions from Coke Production in Iron and Steel Sector

- 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 2005.⁵² This action, which addressed "residual risk," was the first of its kind by US EPA. In April 2006, new MACT rules went into effect for coke plant emission points, not included in the 1993 rules, for pushing, combustion stacks, and quench towers.⁵³ These MACT rules apply to all U.S. coke plants.
- Due to a number of closures, approximately 17 U.S. coke oven batteries remained in operation in the Great Lakes area in 2006.

Reducing Emissions from Outdoor Wood-Fired Boilers

- Outdoor wood-fired boilers have combustion chambers in small sheds outside of the home. Burning occurs in the shed with no emission control devices, and emissions are vented through a small stack (generally less than 12 feet). The cyclic nature of the boiler operation does not allow for complete combustion, which results in much higher emissions than from wood stoves. The use of OWBs is increasing, with about 500,000 expected to be in place nationwide by 2010, primarily in the Northeast and Midwest, including the Great Lakes area. Although US EPA is not adopting regulations to address OWBs, it has taken the following steps: (1) completed development of a test method specific to OWBs; and (2) entered into an

⁵² US EPA. (March 31, 2005a). Fact Sheet: Final Amendments to Air Toxics Standards for Coke Oven Batteries. Prepared by US EPA Office of Air Quality Planning and Standards. Available at http://www.epa.gov/ttn/oarpg/t3/fact_sheets/16879cokeovenfs.pdf

⁵³ US EPA. (July 26, 2005b). Fact Sheet: Final Amendments to Air Toxics Standards for Coke Ovens: Pushing, Quenching, and Battery Stacks, Prepared by US EPA Office of Air Quality Planning and Standards. Available at http://www.epa.gov/ttn/oarpg/t3/fact_sheets/3551cokeovenspqbfinafs.pdf

agreement with major OWB manufacturers, based on a previous voluntary incentive program.⁵⁴ As a result of this agreement, beginning in April 2007, wood boiler manufacturers are offering for sale at least one model of wood boiler that will emit 70 percent less emissions, with further reductions in subsequent years. In addition, a model rule has been developed for states and local agencies that will include emission limits, zoning, stack height, operation and maintenance, labels, and notices to buyers.

Reducing Emissions from Diesel Vehicles

- A recent polycyclic aromatic hydrocarbon (PAH) source apportionment study using atmospheric concentration data from 1996 through 2002 found that diesel vehicles in Chicago are a potential significant source of PAHs.⁵⁵
- The Midwest Clean Diesel Initiative (MCDI) is being implemented. It is a collaboration of federal, state, and local agencies, along with communities and private companies, working together to reduce emissions from diesel engines in the Midwest (US EPA Region 5).⁵⁶ The MCDI reduces diesel emissions (PM, VOCs, NO_x, HAPs) through retrofitting, reducing idling, refueling, repowering, and replacing diesel engines in the Midwest. Diesel retrofits have been performed on school buses and garbage trucks. The installation of Advanced Truck Stop Electrification systems provides diesel trucks the opportunity to “plug in” rather than keep their diesel engines idling for auxiliary power, and US EPA’s SmartWay Transport Partnership promotes voluntary measures that will reduce fuel use and emissions. As of October 2007, the MCDI had reduced emissions from 368,130 diesel engines. The MCDI goal is to reduce emissions from 1 million diesel-powered engines by 2010.

Reducing Emissions from Scrap Tire Fires

- A US EPA gold medal for exceptional service was awarded to the HCB/B(a)P Workgroup in 2007 for outstanding leadership and collaboration in creating far-reaching environmental benefits by improving and disseminating vital management techniques to reduce the risk of improperly disposed scrap tires. Among the workgroup’s many accomplishments was the production of the *Scrap Tire Cleanup Guidebook* (see publications in this link for more information <http://www.epa.gov/region5/>).⁵⁷

⁵⁴ US EPA. (2007c). *EPA Outdoor Wood-fired Hydronic Heater Program; Phase 1 Partnership Agreement between the Office of Air Quality Planning and Standards, US EPA, and [manufacturers]*. Available at http://www.epa.gov/woodheaters/pdfs/Partnership_Agreement_3_16_07.pdf

⁵⁵ Battelle. (July 31, 2007). Final Report: Source Apportionment of Data from Four IADN and Nearby Speciated PM Sites. Prepared by Battelle for Great Lakes Commission.

⁵⁶ MDCL. (2007). Midwest Clean Diesel Initiative, website prepared by US EPA. Available at <http://www.epa.gov/midwestcleandiesel>.

⁵⁷ US EPA (January 2006c). *Scrap Tire Cleanup Guidebook: A Resource for Solid Waste Managers Across the United States*, US EPA Region 5 and Illinois EPA Bureau of Land, EPA 905-B-06-001, Available at http://www.epa.gov/reg5rcra/wptdiv/solidwaste/tires/508%20guidebook/ScrapTireCleanupGuidebook_Jan-2006-508.pdf

- Under a Scrap Tire Pile Mitigation Support Project, the US EPA finished developing a scrap tire pile inventory for the Great Lakes states,⁵⁸ along with Geographic Information System (GIS) mapping of large tire piles (>500 tires; see Figure 4-8).

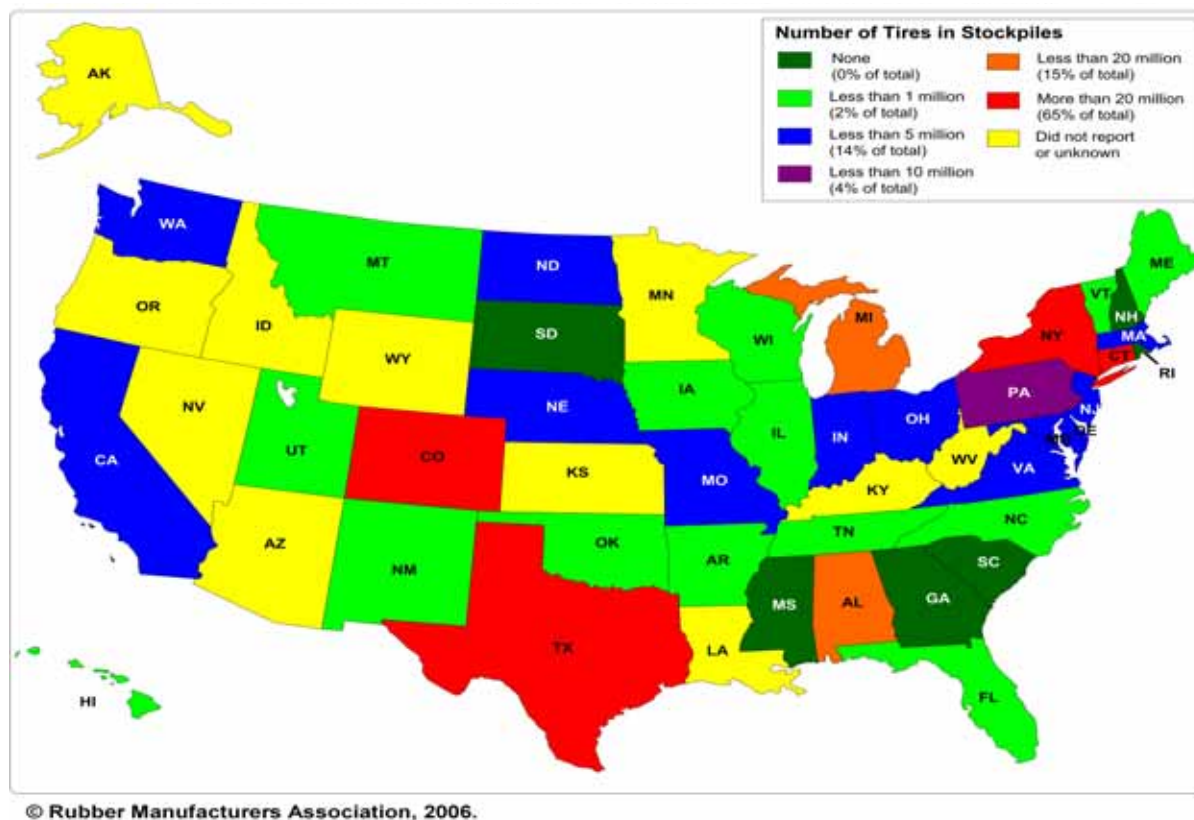


Figure 4-8. Scrap Tires Remaining in Stockpiles in the U.S., 2005⁵⁹

Reducing HCB Emissions

- US EPA Office of Pesticides will continue to review Confidential Statements of Formula for a number of pesticide products to more accurately determine residual HCB levels and the resulting HCB emissions from pesticide application.
- Syngenta Crop Protection (St. Gabriel, LA) reduced stack HCB emissions by 96 percent, from 253 lbs in 2000 to 10 lbs in 2004. HCB emissions are expected to remain in the 10 to 20 lb/year range depending on production volumes. In 2005, Syngenta reported 11 lbs of HCB emissions.

⁵⁸ RMA. (2006). *Scrap Tire Markets in the United States*. 2005 Edition. Prepared by Rubber Manufacturers Association. Available at <http://www.rma.org>.

⁵⁹ RMA. (2006). Op. cit.

- DuPont Johnsonville Plant (New Johnsonville, TN) reported a decline in HCB water releases from 160 lbs in 2000 to 1 lb in 2004. The plant's water releases remained at 1 lb in 2005.
- Solutia Inc. Delaware River Plant (Bridgeport, NJ) reported reductions in fugitive HCB air emissions from 42 lbs in 2000 to 2.5 lbs in 2004 and reductions in HCB water releases from 12 lbs in 2000 to 0.5 lb in 2005.

Other Reduction Activities

- US EPA Region 5 plans to follow up on work by the New York/New Jersey Harbor Project to determine the potential for reducing PAHs from creosote-treated wood and refined coal tar-based solvents.

Canadian Reduction Activities

Reducing Emissions from Residential Wood Combustion

- From 1997 to 2007 inclusive, over 9,000 Canadians and 250 Americans participated in the Burn-it Smart! program.
 - o Burn-it-Smart! workshops in conjunction with promotion of the Model Municipal By-law are planned in several Ontario municipalities for elected officials and staff.⁶⁰ This was the result of EC's attendance at the 2007 Association of Municipalities of Ontario (AMO) conference.



⁶⁰ EC. (2006). *Model Municipal By-Law for Regulating Woodburning Appliances*. Prepared by Environment Canada. Cat. No. En154-34/2006E, ISBN 0-662-42514-6. Available at <http://www3.gov.ab.ca/env/waste/pprevention/docs/Model%20By-Law.pdf>

- o Burn-it-Smart! outreach activities were conducted at the 2007 Spring Cottage Life Show in Toronto and the International Plow Match (IPM) in Crosby, Ontario. These shows attract large crowds and different audiences; for example, the IPM show attracted approximately 60,000 people during the four-day event.
- EC developed a plan for distributing residential wood combustion educational materials: fact sheets on Good Firewood, Wood Burning in the City, and Don't Burn Garbage, along with videos on wood stove operation and clean firewood via the internet.
- A DVD, developed by EC, containing three videos (Advanced Technology Woodstoves - EPA, Firewood Preparation, and Woodstove Operation) has become very popular among retailers and other interest groups. This DVD has been approved to be distributed to participants of a U.S. wood stove change-out program in Yakima, Washington.
- EC produced a brochure to provide First Nations education on wood-burning practices. This brochure is available for distribution. Response to the information in this brochure has been very positive.
- EC partnered with the HPBA to conduct a study to evaluate the emission characteristics of five conventional wood stoves. The results are not significantly different than expected and confirm the AP-42 emission factors published by US EPA.⁶¹ Results from the EC/HPBA study were presented at the 16th Annual Emission Inventory conference held in Raleigh, NC, in May 2007.
- EC and the HPBA of Canada have been working together to gather information on OWB use in Ontario and other provinces through a survey. The Ontario results were very informative. Plans are underway to extend this survey to the rest of Canada.

Reducing Emissions from Creosote-treated Wood

- An EC project to survey patterns of creosote-treated wood use in Ontario is underway and is anticipated to be completed in early 2008. The study will focus on use patterns including use volume, environmental issues, and use trends; identify disposal practices for out-of-service treated wood; identify how to best manage out-of-service wood; and seek an effective approach to promote a Users' Guidance Document that was prepared by EC and industry.⁶²

Reducing Emissions from Coke Production in Iron and Steel Sector

- From a 1988 base year, the iron and steel sector had reduced B(a)P emissions by approximately 73 percent in 2005.

⁶¹ US EPA. (2007d). Emissions Factors & AP 42. Web site prepared by US EPA Technology Transfer Network, Clearinghouse for Inventories & Emissions Factors. Available at <http://www.epa.gov/ttn/chieff/ap42/>.

⁶² EC. (2004). Industrial Treated Wood Users Guidance Document. Prepared by Environment Canada. ISBN En4-42/2004E-PDF 0-662-37885-7. Available at http://www.canelect.ca/en/Pdfs/UGD_eng.pdf

- Ontario's four integrated steel mills are on track to meet coke oven PAH targets set out in environmental codes of practice for integrated steel mills,⁶³ with reductions being achieved through rigorous coke oven battery maintenance and by implementation of innovative battery operating practices and procedures.

Reducing Emissions from Diesel Vehicles

- The Ontario Drive Clean Program reduces smog precursors (NO_x, nonmethane hydrocarbons, and PM). As a result, it might also reduce emissions of air toxics such as B(a)P.
- Canadian Vehicle and Engine Emission Regulation and Fuel Regulations help further reduce nitrogen oxides, particulate matter, nonmethane hydrocarbons, carbon monoxide, and formaldehyde. As a result, these regulations might also reduce emissions of air toxics such as B(a)P.

Reducing HCB Emissions

- Co-benefits of HCB reduction are gained from the efforts of the Burn Barrel Subgroup of the Dioxins/Furans Workgroup.
- EC is looking at pesticide use patterns in Ontario and is trying to identify options to promote further reductions of HCB, PAHs, and other air toxics.
- EC initiated work on developing a national HCB inventory to be used in a long-range transport modeling project. In conjunction with U.S. HCB data, the project will improve understanding of the major pathways and sources of HCB entering the Great Lakes atmosphere and water bodies.

Other Reduction Activities

- EC contracted Carleton University for a PAH receptor modeling and PAH source apportionment study. The study is anticipated to be completed in 2009. The study will apportion the PAH concentrations measured at air monitoring sites directly to their emission sources and identify major sources and their contributions. The source apportionment exercise may be used to validate the existing B(a)P emission inventory and identify additional emission sources that are not included in the current emission inventory.
- EC is studying the co-benefits of PAH reduction from the reduction of regulated air emissions (particulate matter, hydrocarbons, and nitrogen oxides) from motor vehicles and is trying to improve the B(a)P emission inventory estimates for this sector.

⁶³ EC. (March 2001). Op. cit.

Next Steps

The workgroup will continue ongoing efforts to improve the accuracy of the U.S. and Canadian HCB/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 pentachlorophenol (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; focus will be reduced for outreach activities due to priority changes and emphasis placed on regulation interests.
- Scrap Tires – US EPA Best Practices Guidebook⁶⁴ and additional training materials, scrap tire pile mapping and inventory initiatives.

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

- Actions to reduce releases from HCB-containing pesticides.
- Household Garbage Burning Strategy (Burn Barrel Subgroup of Dioxin/Furan Workgroup).
- 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.
- Continued solicitation of voluntary HCB reductions by chemical companies.

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

⁶⁴ US EPA. (January 2006c). Op. cit.

5.0 INTEGRATION WORKGROUP

Ten-Year Anniversary Event

Ten-Year Anniversary Evening Reception and Dinner – May 23, 2007, Chicago

An evening reception and dinner to commemorate ten years of progress in implementing the GLBTS was held at the South Shore Cultural Center in Chicago on May 23, 2007. G. Tracy Mehan, III, of The Cadmus Group provided the keynote address. Mr. Mehan was a charter member of the GLBTS and former Assistant Administrator for the US EPA Office of Water from 2001 to 2003. Mr. Mehan also served as Director of the Michigan Office of the Great Lakes from 1993 to 2001, during which time he was a member of the Water Quality Board of the International Joint Commission, the Great Lakes Commission, and the board of the Great Lakes Protection Fund. Mr. Mehan described progress made in protecting the waters of the Great Lakes from persistent, bioaccumulative, and toxic (PBT) pollutants, and he suggested future avenues for the GLBTS to pursue, including collaborative, voluntary, public-private efforts to address emerging issues such as endocrine-disrupting chemicals, nanotechnology, and pharmaceuticals in wastewater.

The second speaker, Claude-André Lachance of Dow Canada, described key features and successes that have been particularly important to industry. These included the following:

- **Measurable and Attainable Goals and Targets**—The specific GLBTS targets and defined timetables, the focus on tracking results and reporting progress, and the reliance on proactive non-regulatory means for achieving results have been program features that have attracted industry to this unique and unusual chemical management effort. For continued success, it will continue to be important to provide opportunities for companies to participate in the development of chemical management program objectives that can provide measurable improvement in the environment commensurate with their costs.
- **The Notable Successes**—GLBTS successes of particular significance to industry have included:
 - o The joint development by all stakeholders of the decision tree process that led to successful completion of the Octachlorostyrene (OCS) Workgroup's work and demonstration that industrial sources of this unintended by-product had been eliminated. This was an early virtual elimination success.
 - o The collective engagement of all stakeholders in the Dioxin Workgroup to examine one by one the numerous dioxin sources, confirming that controls have ended these releases, and a shift of focus to the largest remaining source category – uncontrolled burning.
 - o Multi-stakeholder diligence within the HCB/B(a)P Workgroup that tracked reductions of these substances and brought the focus to remaining non-point sources.
 - o PCB Workgroup inventory efforts that helped locate PCB units still in use, track removal from manufacturing facilities, and provide realistic business case software that can help companies determine the benefits of PCB equipment removal.

The ability to accomplish these successes has demonstrated the importance of moving on to address the next challenge rather than continuing to seek ever diminishing returns from continuing past pursuits. The GLBTS can make a real difference when partners can agree on the needs and work together to establish new targets and goals for addressing them.

- **Future Needs**—Continued success will depend on the ability to correctly and fully integrate environmental issues with economic performance/economic development, and societal needs—i.e., sustainable development. Industry is committed to supporting the science needed to merge and manage these issues and needs collectively. Addressing all of these factors, sometimes as competing factors, simultaneously becomes a critical need when the substances involved are no longer legacy materials but products in use for purposes that benefit society and are manufactured in quantities that result in, or support, significant portions of the region's economy. These are significant challenges for the immediate future.
- **Ensuring Future Success**—Industry remains committed to participating in solid approaches to toxics management. The ability to bring the “right people” to the table to participate in the activities that go forward will be enhanced by the GLBTS successes of the past. During this past year, the Council of Great Lakes Industries (CGLI) has successfully added personnel from existing sectors and representatives from new sectors to its industrial stakeholder list. It will take carefully designed initiatives, utilizing full stakeholder involvement, to define a “new” or continuing GLBTS that will ensure productive integration of these stakeholders into the effort.

The next speaker at the ten-year anniversary reception was Dr. Michael Murray of the NWF. Dr. Murray presented an overview of the past ten years of the GLBTS from an environmental group perspective. Dr. Murray recognized some of the achievements of the GLBTS, particularly the efforts of environmental organizations, and outlined challenges for the GLBTS in moving forward, including increasing stakeholder participation, assessing the structural organization of the GLBTS, and adopting a more proactive approach to chemicals policy and management.

Stakeholder Highlights: Industry Partners

Industry participation in the GLBTS has been strong throughout the 2006-2007 project year. Highlights of industry contributions through the year include:

- Assistance in implementation of a Green Chemistry Task Force to explore how green chemistry principles can be encouraged and further advanced through a GLBTS led effort.
- Comments and contributions regarding work initiated by Derek Muir (Environment Canada) and Philip Howard (Syracuse Research Corporation) on a project to develop "a systematic process for identification of important chemicals."
- Coordination of industry engagement in burn barrel efforts to understand and seek enhanced recycling opportunities for agricultural plastics materials.
- Coordination of industry engagement in the design of potential management options for unused pharmaceutical materials.
- Provision of information regarding national and international actions on persistent toxic substances.
- Coordination of presentation of the University of Michigan Dioxin Exposure Study information showing results that concluded "no significant blood and serum dioxin level differences between populations living within the Dow 'plume' and the general population."
- Updates on PCB equipment removal from public utility and other industrial facility operations.
- Comments and provision of information on national management actions regarding mercury-containing product collection and recycling initiatives.

Industry participation in the ten-year celebration event was also strong. CGLI representatives Allan Jones and Dale Phenicie participated in the event planning efforts. Representatives of several industry sectors and individual companies attended the meetings and events.

CGLI looks forward to continued progress on important Great Lakes restoration needs through the voluntary, multi-stakeholder based GLBTS process.

Ten-Year Anniversary Future Focus Workshop – May 24-25, 2007, Chicago

In conjunction with the GLBTS ten-year anniversary Stakeholder Forum, evening reception and dinner on May 23, 2007, a day and a half workshop, titled *The Strategy's Future Focus & Challenges: Sound Management of Chemicals in the Great Lakes Basin*, was held at the US EPA offices in Chicago on May 24 and 25, 2007. The overall purpose of the workshop was to consider ways in which the GLBTS should continue to move forward with its mission to ensure the sound management of chemicals in the Great Lakes Basin. The workshop engaged various stakeholders in discussions of how the GLBTS should address substances of emerging concern to the Great Lakes Basin, and workshop participants considered the impact of expanding the GLBTS mandate to include overall management of Annex 12 of the Great Lakes Water Quality Agreement (GLWQA). Workshop participants offered many comments concerning the future direction of the GLBTS, including the following:

- The GLBTS is well suited to address the management of Annex 12 program components (e.g., Early Warning System, health studies, monitoring data, screening studies), but the

governments should primarily be responsible for this new charge, with opportunity for stakeholders to provide input.

- In addressing new substances of concern to the Great Lakes Basin, a substance approach should be pursued first, followed by a combination of management approaches, depending upon the chemical.
- The GLBTS should continue to address Level 1 substances until a point of diminishing returns is reached.

More detailed information about the ten-year anniversary events can be found at <http://www.epa.gov/glnpo/bns/10thann.html>.

Integration Workgroup Meetings

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

Integration Workgroup Meeting – December 7, 2006, Chicago

The December meeting included updates from the co-chairs of the active substance workgroups (mercury, dioxins/furans, PCBs, and HCB/B(a)P) on the previous day's workgroup meetings. The Integration Workgroup heard summary presentations on the Lake Superior Lakewide Management Plan (LaMP) 2005 *Chemical Milestones* Report,⁶⁵ a Michigan Dioxin Exposure Study that analyzed dioxin levels in the residents and environment of the Midland/Saginaw area of Michigan,⁶⁶ a PCB software tool for conducting financial analyses of PCB transformer phase-outs,⁶⁷ the Canadian Environmental Protection Act (CEPA) Domestic Substances List (DSL) post-categorization, and workshops held at the 2006 State of the Lakes Ecosystem Conference (SOLEC) on Chemical Integrity. The Integration Workgroup also discussed the potential role of the GLBTS in establishing a Great Lakes Green Chemistry network.

Presentations at this meeting included:

- *Substance Workgroup Reports*
 - o PCBs—Tony Martig, US EPA
 - o Mercury—Alexis Cain, US EPA
 - o HCB/B(a)P—Steve Rosenthal, US EPA
 - o Dioxins/Furans—Anita Wong, EC

⁶⁵ Lake Superior LaMP. (2006). *Lake Superior Lakewide Management Plan: 1990–2005 Critical Chemical Reduction Milestones*. Prepared by the Superior Work Group, Chemical Committee, Toronto and Chicago. Available at <http://www.epa.gov/glnpo/lakesuperior/2006/lschemmiles.pdf>

⁶⁶ U of M. (2006). University of Michigan Dioxin Exposure Study. Web site prepared by University of Michigan School of Public Health. Available at <http://www.sph.umich.edu/dioxin/>.

⁶⁷ Savage, D. (December 2006). Accelerating Phase-out of PCB Transformers: Software and Case Study. Project Review and Software Demo for the GLBTS Integration Workgroup Meeting, Chicago. Slide presentation describing a PCB Software Tool for financial analysis of transformer phase-outs. Available at <http://www.epa.gov/glnpo/bns/reports/stakedec2006/Savage120706.pdf>

- *Lake Superior 2005 Chemical Milestones Report*—Carrie Lohse-Hanson, Minnesota Pollution Control Agency
- *Michigan Dioxin Exposure Study*—David Garabrant, University of Michigan
- *SOLEC Conference Summary*
 - o Lin Kaatz Chary, Northwest Indiana Toxics Action Project
 - o Melissa Hulting, US EPA
 - o Ted Smith, US EPA
- *PCB Software: Financial Analysis of PCB Transformer Phase-outs*—Deborah E. Savage, EMA Research & Information Center
- *Canadian Environmental Protection Act: Domestic Substances List Post-Categorization and Relevance to the GLBTS*—Nicole Davidson, EC

Integration Workgroup Meeting – February 21, 2007, Windsor

The first 2007 Integration Workgroup meeting focused on preparing for the ten-year anniversary events to be held in May 2007. The substance workgroup co-chairs reviewed their respective management assessment outcomes and discussed recommendations for future work. The meeting included presentations on the status and achievements of the HCB/B(a)P Workgroup, which showed improved reductions but more work remaining. The PCB Workgroup completed its Management Assessment report and is beginning to address the report's outcomes. The PCB Workgroup will continue discussions with industry to determine if the U.S. Challenge Goal has been met. The Dioxin Workgroup reported that much progress has been made in reducing dioxins/furans, and the workgroup is experiencing diminishing returns. The Dioxin Workgroup co-chairs proposed that the workgroup continue to operate but at a reduced frequency (e.g., one meeting per year, in addition to conference calls). The Mercury Workgroup reported that a *Great Lakes Mercury in Products Phase-Down Strategy* has been drafted and is nearing completion. Implementation of this strategy could supplant the GLBTSMercury Workgroup's efforts or mesh with the workgroup's efforts. The Mercury Workgroup also discussed the possibility of new Challenge Goals, but did not reach a conclusion.

Presentations at this meeting included:

- *Update on International Activities relating to Persistent Toxic Substances*—Grace Howland, EC
- *Integrating GLBTS and Commission for Environmental Cooperation Sound Management of Chemicals Program Directions*—Luke Trip, Commission for Environmental Cooperation
- *Applying an Effect-Directed Strategy to the Search for Unrecognized Toxic Chemicals*—Raymond Vaughan, New York State Attorney General's Office
- *Ten-Year GLBTS Anniversary Stakeholder Forum / Reception and the May 2007 Workshop*—Alan Waffle, EC, and Ted Smith, US EPA

Integration Workgroup Meeting – September 20, 2007, Windsor

At the September 20 Integration Workgroup meeting, US EPA and EC proposed the formation of two new GLBTS groups: a New Substance Group co-chaired by Ted Smith (US EPA) and

Suzanne Easton (EC), and a Sector Workgroup co-chaired by Frank Anscombe (US EPA) and Edwina Lopes (EC). These groups are described in Chapter 6 of this report. The meeting also featured the presentation of PCB Awards to the City of Toronto and Dofasco for their efforts in helping to meet the GLBTS goal of eliminating 90 percent of high-level PCBs in Ontario. The co-chairs of the active substance workgroups provided updates on the status of the workgroups for mercury, dioxins/furans, HCB/B(a)P, and PCBs.

Presentations at this meeting included:

- *Great Lakes Mercury Phase-Down Strategy*—Alexis Cain, US EPA
- *Outcomes of Ten-Year Anniversary GLBTS Workshop*—Ted Smith, US EPA
- *Next Steps for the GLBTS: Decisions on a Framework for Future Activities*—Danny Epstein, EC, Edwina Lopes, EC, and Ted Smith, US EPA
- *Updates on Canada-Ontario Agreement Respecting the Great Lakes*—Julie Schroeder, Ontario Ministry of the Environment
- *Report on US EPA Great Lakes Surveillance Workshop*—Ted Smith, US EPA

Stakeholder Forum Highlights 2007

A GLBTS Stakeholder Forum is convened biannually with the purpose of highlighting issues and initiatives of relevance to the Strategy. Brief summaries of these Stakeholder Forum meetings are presented below.

Stakeholder Forum – December 6, 2006, Chicago

The December Stakeholder Forum meeting featured a keynote address by Marta Panero of the New York Academy of Sciences. Ms. Panero, Project Director, described Industrial Ecology, Pollution Prevention, and the New York/New Jersey Harbor (the Harbor Project). The Harbor Project seeks to develop pollution prevention strategies for contaminants in the New York/New Jersey Harbor that are similar to the contaminants addressed by the GLBTS.

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

Stakeholder Forum – May 23, 2007, Chicago

The first Stakeholder Forum meeting of 2007 was held in conjunction with the ten-year anniversary events. The workgroup leaders presented highlights of progress toward the Strategy's goals for mercury, dioxins/furans, PCBs, and HCB/B(a)P over the past ten years. Progress toward the sediment and long-range transport goals, as well as a continental overview of the sound management of chemicals, were also presented. Of the Strategy's 17 challenge goals that were established in 1997, 12 have been achieved, and significant progress has been made toward the remaining five. The Stakeholder Forum was followed by the ten-year anniversary evening reception and dinner, described above.

Stakeholder Highlights: National Wildlife Federation

The NWF was active on a number of projects addressing toxic chemicals through the GLBTS and related fora over the past year. This work, which has continued to focus on persistent, bioaccumulative, and toxic (PBT) chemicals, included the following:

- NWF worked with INFORM, Inc. in researching, preparing and releasing the report, *Environmentally Preferable Purchasing in the Great Lakes Region: A Survey of State, Municipal and Institutional Programs* (Lory et al., 2007). The report summarized a survey of Great Lakes state, municipality and university environmentally preferable purchasing (EPP) programs, highlighted strengths and limitations in existing programs, and included recommendations on using the approach to help reduce use and release of PBT chemicals in agency and institution practices.
- NWF took part in discussions at GLBTS meetings in December 2006, May 2007, and September 2007. Michael Murray also served on the planning committee organizing the GLBTS Ten-Year Anniversary Workshop on May 24-25, 2007.
- NWF maintained involvement in other activities addressing chemicals of emerging concern in the Basin and more broadly. For example, Dr. Murray briefly covered chemicals policy issues as a discussant in the Human and Ecological Risk Assessment breakout session at the National Conference on Science, Policy and the Environment meeting in Washington, D.C. on February 1, 2007, and also touched on these issues as a guest speaker in the Great Lakes Town Hall online forum in January 2007. He also took part in the US EPA meeting, Building an Integrated Surveillance System for Emerging Chemicals in the Great Lakes and Nationwide, in Chicago on July 16-18, 2007.

In summary, NWF continued to have an active involvement in chemicals policy issues through the GLBTS and related fora over the past year. While recognizing progress the Strategy has made, NWF also acknowledges remaining challenges, both with chemicals of longstanding focus and in particular with chemicals of emerging concern. NWF looks forward to working with GLBTS partners in helping to develop/extend programs to address chemical threats to the Great Lakes in a more proactive manner in the next year and beyond.

Reference

Lory, C.S., Scott-Runnels, A.E., Murray, M.W. (February 2007). *Environmentally Preferable Purchasing in the Great Lakes Region: A Survey of State, Municipal and Institutional Programs*. Report prepared by INFORM, Inc. for the NWF. Available at <http://www.glrpr.org/docs/NWF-EPP-Report-Feb-07.pdf>.

6.0 GLBTS PATH FORWARD: TWO NEW GROUPS

Canadian Substance Group co-chair: Suzanne Easton

U.S. Substance Group co-chair: Ted Smith

Canadian Sector Group co-chair: Edwina Lopes

U.S. Sector Group co-chair: Frank Anscombe

Background

As outlined in the previous chapters, significant progress has made toward the achievement of the Strategy's challenge goals. To date, 12 of 17 goals have been met with one more expected in the near future. The remaining four are well advanced toward their respective targets. Under the Strategy, EC and US EPA also agreed to consider new substances that may pose threats to the Great Lakes ecosystem, for potential reduction activities. The Strategy challenges the Parties (EC and US EPA) to consider:

“whether new substances which present threats to the Great Lakes ecosystem should be considered for inclusion on the Level I or II lists.”

Many studies have reported a great diversity of substances that can be detected in the environment (including the Great Lakes and other ecosystems) at trace levels. Given the variety of emerging substances of interest in the Great Lakes, the Parties have decided to explore a new path forward under the GLBTS, in addition to continuing Strategy work toward the reduction of legacy contaminants, where appropriate.

In addition, a renewed GLBTS aligns with the following:

- Respective national chemical management policies, such as the Canadian Chemicals Management Plan (see Appendix B) and the U.S. High Production Volume program and the Montebello accords.
- Recommendations from the GLWQA Review Working group B involving the GLBTS, particularly Annex 12 activities and new chemical threats.
- On the Canadian side, a need to support and contribute to the renewed *Canada-Ontario Agreement*, which commits the Province of Ontario and the federal government to develop and initiate a program for the Sound Management of Chemical Substances in the Great Lakes Basin by 2010.

At the GLBTS Ten-Year Anniversary Workshop in May 2007, stakeholders offered ideas about future directions for the GLBTS, including emerging substances of interest in the Great Lakes. The May workshop recognized that valuable GLBTS attributes have included measurable targets and timelines, collaborative participation by diverse stakeholders, an information-gathering and sharing process, and periodic reporting and program assessment. Another key message was that the governments should be responsible for selecting substances of interest to the Great Lakes Basin; at the same time, stakeholders would like to be informed about this process and be able to

provide comments. It is on such basis that EC and US EPA have begun to explore adding new aspects to the GLBTS.

Terms of Reference

In response to the various drivers identified above, and based on outcomes of the GLBTS Ten-Year Anniversary Workshop, at the September 20, 2007, Integration Workgroup meeting, EC and the US EPA proposed the creation of two new groups under the Strategy: a Substance Group and Sector Group.

The GLBTS Substance Group will focus on information gathering and integration of data on potential toxic substances in the Great Lakes Basin. The GLBTS Sector Group will review information on industrial sectors within the Great Lakes Basin and explore potential opportunities for the GLBTS process to enhance the environmental management activities of select industries. These groups will work together to identify potential opportunities for action that may be effected under the GLBTS. Each group will be co-chaired by EC and US EPA. Participation in both groups will be open and may include representatives from industry, environmental organizations, academics, citizens, and government representatives from federal, provincial, state, First Nations, and Tribal and local jurisdictions. Group members will be invited to provide input on various issues.

It is anticipated that the two new groups will work with the 4-step process analogous to the one found in the original Strategy, namely: gathering and integrating information; analyzing relevant regulations, initiatives, and programs; identifying management options; and implementing strategies. The two groups will meet on a regular basis to address issues identified in their respective Statements of Work, below. The majority of group interaction will take place via email correspondence and conference calls. Face-to-face meetings of the two groups may also be planned to correspond with GLBTS Stakeholder Forum meetings or GLBTS Integration Workgroup meetings.

The GLBTS will strive for consistency with respective national chemical management policies, such as the Canadian Chemicals Management Plan, the U.S. High Production Volume program, and the Montebello accords. The details of how the GLBTS will interact with these programs will be the subject of future discussions within the New Substance and Sector groups.

The GLBTS Substance and Sector Groups will be accountable to the GLBTS co-chairs. The groups will report on progress at GLBTS Integration Workgroup Meetings and/or Stakeholder Forum meetings, as directed by the GLBTS co-chairs, and will report on progress through the annual GLBTS Progress Report.

Substance Group

Objectives

- To continue to work toward the reduction of toxic substances in toxic amounts and virtual elimination of the release of persistent toxic substances⁶⁸ into the Great Lakes, in order to protect and ensure the health and integrity of the Great Lakes ecosystem;
- To identify toxic substances that may pose a threat to the health and integrity of the Great Lakes basin;
- To explore mitigation strategies, and identify management options toward addressing the release of toxic substances in the Great Lakes Basin.

Statement of Work

- To identify toxic substances which may pose a threat to the Great Lakes Basin.
- To gather information on sources and the use/release of toxic substances in the Great Lakes Basin
- To keep abreast of and engage with current available research efforts with respect to toxic substances in the Great Lakes Basin
- To review existing management tools and practices (both voluntary and mandatory) with respect to use and/or release of toxic substances in air, water and land (intentional and unintentional)
- To explore mitigation strategies and to identify management options toward addressing toxic substances in the Great Lakes Basin
- To ensure appropriate engagement of stakeholders throughout the process
- To ensure appropriate engagement of the GLBTS Sector Group throughout the process.

Sector Group

Objectives

- To continue to work toward the reduction of toxic substances in toxic amounts and the virtual elimination of the release of persistent toxic substances into the Great Lakes, in order to protect and ensure the health and integrity of the Great Lakes ecosystem;
- In conjunction with the Substance Group, to identify and work with sectors which may be important to the Great Lakes;
- To explore sector based mitigation strategies, and identify sector based management options toward addressing the release of toxic substances in the Great Lakes Basin.

Statement of Work

- To work with the Substance Group under the GLBTS to identify substance/sector synergies toward the mitigation of toxic substances in the Great Lakes;

⁶⁸ Hereunder “toxic substances” will mean toxic substances in toxic amounts and persistent toxic substances taken together.

- To review and work with existing sector based programs in Canada and the U.S. (including the Canadian Chemicals Management Plan, the US EPA Sector Strategies) and the three-nation Security and Prosperity Partnership (Montebello, Quebec framework for regulatory cooperation);
- To develop sector baseline information toxic substances in the Great Lakes. Sectors will be viewed in a comprehensive, life-cycle sense, including product formulators, distributors, and consumers. Also, geographically distant contributions via atmospheric transport will be considered;
- To review existing sector based management tools and practices (both voluntary and mandatory) with respect to toxic substances;
- To identify opportunities for the GLBTS to work with sectors to address toxic substances in the Great Lakes Basin;
- To ensure appropriate engagement of Stakeholders throughout the process
- To serve as a forum for sharing information about pollution prevention activities among industries within the Great Lakes region. The premise is to support continuous quality improvement within Regional industries via information sharing, appreciative that industries contain a great diversity of technological and economic circumstances.

Path Forward for Two New Groups

The GLBTS is at the tail end of the original ten-year commitments made by Canada and the U.S. Recognizing that it has been a successful governance model, a strategy for moving forward has been proposed. Timelines proposed for the GLBTS path forward have been identified in order to align with work being undertaken by other existing Great Lakes programs, such as the GLWQA,⁶⁹ which is currently under review with possible renegotiation on the horizon.

Consistent with Canadian domestic programs such as the *Chemical Management Plan* and the *Canada-Ontario Agreement Respecting the Great Lakes Basin*, which is initiating a new program for the sound management of chemicals (including emerging substances of concern), Canada will be looking to identify potential opportunities for action under the GLBTS with respect to substances and sectors within the Great Lakes Basin by December 2008. Once these opportunities have been identified, exploration of various management options and mitigation strategies will begin with stakeholders (anticipated for early to mid 2009).

Consistent with Annex 12 of the GLWQA and in cooperation with voluntary and regulatory domestic chemical management programs, the U.S. will seek to identify potential toxic substances that may pose a threat to the Great Lakes Basin, and will work with stakeholders to identify mitigation strategies and management options to address these substances. On a national scale, in keeping with the tri-lateral Security and Prosperity Partnership, the U.S. will undertake a comprehensive review of high production volume chemicals to ensure their sound management.⁷⁰ The U.S. review will assess and initiate needed actions regarding over 9,000

⁶⁹ IJC. (November 18, 1987). *Revised Great Lakes Water Quality Agreement of 1978, as Amended by Protocol Signed November 18, 1986*. Consolidated by the International Joint Commission, U.S. and Canada, Reprinted February 1994. Available at http://www.ijc.org/en/activities/consultations/glwqa/GLWQA_e.pdf.

⁷⁰ U.S., Canada, Mexico. (March 2005). *Security and Prosperity Partnership of North America*. Web site available at <http://www.spp.gov/>.

existing chemicals produced above 25,000 lbs per year. This thorough review is scheduled to be completed by 2012.

Stakeholder Highlights: Great Lakes United

Throughout 2006, Great Lakes United (GLU) continued its efforts to promote innovative solutions that target the root of emerging chemical problems presented in the GLBTS forum. Specifically, GLU focused on advancing strategic discussions on green chemistry, which by definition aims to reduce and eliminate chemical hazards in the design and production of chemicals. In November 2006, GLU coordinated a workshop at the State of the Lakes Ecosystem Conference (SOLEC) aimed at laying the groundwork for a Basin-wide multi-stakeholder green chemistry working group. The workshop featured green chemistry expert Dr. John Warner of the University of Massachusetts at Lowell as well as practitioners and experts presently working in the Basin to promote education and application of green chemistry. Following the workshop, GLU hosted monthly "green chemistry working group" teleconferences to explore workshop outcomes and form a basis for collaboration among academia, industry, non-governmental organizations, and governmental agencies from the U.S. and Canada. GLU presented on the workshop at the December 7, 2006, GLBTS Integration Workgroup meeting, offering an opportunity for stakeholders to examine workshop results and engage in the next steps of this green chemistry initiative. In 2007, GLU continued work to lay the foundation for a Great Lakes green chemistry network.

7.0 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.

2007 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 2 feet 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 original Great Lakes Areas of Concern (AOCs). In 2007, the following surveys were conducted with the assistance of the R/V *Mudpuppy*:

- **Ashtabula River, Ashtabula, OH** – Assisted US EPA Office of Research and Development (ORD) with the collection of Sediment Profiling Image camera photos in the Great Lakes Legacy Act (GLLA) project area; assisted US EPA ORD and the Ashtabula River Partnership in the collection of sediment samples within and downstream of the GLLA project area.
- **St. Louis River, Superior, WI** – Collected samples in support of a GLLA sediment evaluation project to determine the nature and extent of sediment contamination in the River.
- **Buffalo River, Buffalo, NY** – Collected samples in support of a GLLA sediment evaluation project to determine the extent and magnitude of contamination in the Lower Buffalo River and City Ship Canal.

- **Saginaw Bay, Saginaw, MI** – Assisted MDEQ with sampling to assess the concentration, trend, congener profile, and locational characteristics of dioxin contamination in the sediments of Saginaw Bay.
- **Menekaunee Harbor, Marinette, WI** – Collected sediment samples in the Harbor to aid in the evaluation of a potential GLLA remediation project at the Menominee River AOC.
- **Torch Lake, Houghton, MI** – Assisted MDEQ with sampling to characterize the extent of PCB and copper contamination within Torch Lake, and to help establish a baseline condition of the Lake to serve as a reference point for determining long-term natural attenuation.
- **Trenton Channel, Trenton, MI** – Conducted a post-remedial monitoring survey at the Black Lagoon (now Ellias Cove) GLLA sediment remediation project; assisted MDEQ with sampling the shoreline sediments adjacent to a BASF facility to determine the presence or absence of groundwater venting.
- **Muskegon Lake, Muskegon, MI** – Conducted a comprehensive sediment sampling survey in support of a GLLA sediment evaluation project to determine the nature and extent of contamination near the Division Street Outfall.

Great Lakes Sediment Remediation Projects - 2006⁷¹

In 2006, over 440,000 yd³ of contaminated sediment were remediated from ten U.S. sites and one Canadian site in the Great Lakes Basin. Five U.S. sites and one Canadian site initiated work for the first time in 2006; one of these U.S. sites and two others completed their remedial actions in 2006. Two sites continued to make progress on their remedial actions. A navigation dredging project was also included as one of the remediated sites due to the amount of contaminated sediment that was removed from the environment. In addition, the in-situ treatment of PCBs utilizing activated carbon (AC) was further evaluated as part of the Grasse River Pilot Study, and the Presque Isle Bay AOC continued its recovery utilizing monitored natural attenuation. The following is a list of specific details about each site.

U.S. Sites

St. Louis River/Interlake/Duluth Tar, Duluth, Minnesota – The St. Louis River/Interlake/Duluth Tar (SLRIDT) Superfund site is a state-led National Priority List (NPL) site. The Minnesota Pollution Control Agency (MPCA) has set 13.7 mg/kg total PAH as the cleanup level, because 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, and xylene). In 2006, a Confined Aquatic Disposal (CAD) facility was constructed in Slip 6, and approximately 48,500 yd³ of

⁷¹ Sediment remediation data for 2006 are presented because data lag a year behind in reporting (i.e., 2007 data will become available in 2008).

contaminated sediment were capped in Stryker Bay using the surcharge technique.⁷² Approximately 361,000 yd³ remain.

Tannery Bay, St. Marys River, Sault Ste. Marie, Michigan – Tannery Bay is located in the St. Marys River AOC. The pollution is mainly byproducts from the Northwestern Leather Company tannery that operated from 1900 to 1958. This GLLA project is cost shared by GLNPO, Phelps Dodge, and the MDEQ. In 2006, approximately 8,900 yd³ of sediment were mechanically dredged, and the material was disposed in a local landfill. The remaining 31,000 yd³ are scheduled to be removed in 2007. This cleanup will result in the removal of 95 percent of the chromium and mercury mass in Tannery Bay.

Lower Fox River, Operable Unit (OU) 1, Neenah, Wisconsin – The joint Superfund and Natural Resource Damage Assessment (NRDA) OU 1 (Little Lake Butte des Morts) project is in its third year of the cleanup of the Lower Fox River and Green Bay site. The remedial action is being conducted by two responsible parties under a court-approved consent decree. In 2006, approximately 102,000 yd³ of PCB-contaminated sediment were removed by hydraulic dredging using both a swinging arm cutterhead and Vic-Vac[®] dredge head. Sediment is pumped to a shoreline property for thickening prior to being placed in geotubes for dewatering. The dewatered sediment is then trucked to a private landfill where it is placed in a dedicated cell within the mixed solid waste fill area. The OU 1 project has a 1 ppm action level for PCBs and a surface weighted average concentration (SWAC) standard of 0.25 ppm.

Sheboygan River, Sheboygan, Wisconsin – Pollution Risk Services hydraulically dredged 8,723 yd³ from the Sheboygan River in 2006 as part of a consent decree with the US EPA Superfund. Sediment with total PCBs at concentrations of 50 ppm or greater was disposed of in a Toxic Substances Control Act (TSCA) landfill, and the rest of the contaminated material was disposed of in a local landfill. The cleanup goal is 0.5 ppm total PCBs.

Ruddiman Creek, Muskegon, Michigan – Ruddiman Creek is located within the boundaries of the Muskegon Lake AOC. This GLLA project, jointly funded by GLNPO and MDEQ, remediated sediments containing cadmium, chromium, lead, PCBs, and B(a)P that exceeded site-specific sediment quality criteria for protection of human health and the environment. Approximately 90,000 yd³ (35,900 yd³ in 2005 and 54,100 yd³ in 2006) of contaminated sediment were mechanically dredged from the main branch of Ruddiman Creek and Pond. This material was solidified onsite and transported to a Type II landfill in the area. Confirmation samples collected within selected locations of the dredge area verified that the goals of the project were met. The MDEQ will be working with GLNPO to develop a long-term monitoring program to gauge the overall success of the project.

Velsicol Chemical/Pine River, St. Louis, Michigan – The Velsicol Chemical/Pine River site is an NPL site. US EPA signed a removal action memorandum in 1998 and a Record of Decision in 1999 for the DDT-contaminated Pine River sediments (OU 2 of the site). Sediment removal from the river using dry excavation methods has been ongoing since 1999, first as a Superfund removal action, then as a Superfund remedial action. The removal action addressed a “hot spot”

⁷² The surcharge technique consolidates the underlying sediment and isolates contaminants without reducing water depth and natural resource functions (US EPA GLNPO Sediment Remediation web site).

cell in the river and removed sediments with concentrations greater than 3,000 ppm total DDT. The remedial action addressed sediments contaminated with total DDT at levels greater than 5 ppm. In 2006, the remedial action was completed by removing approximately 28,000 yd³ of contaminated sediment and 23 tons of DDT, which were disposed offsite in landfills. The total volume of sediment remediated (including both the removal action and the remedial action) was 669,975 yd³, and the total mass of DDT removed was 387 tons.

Lake Linton, Saginaw, Michigan – The Consumers Energy Manufactured Gas Plant, located on Lake Linton off of the Saginaw River, operated on the site until 1933. An investigation conducted by Consumers Energy found that tar, cyanide, VOCs, and semivolatile organic compounds (SVOCs) from the site had migrated into the sediment at the northeast corner of Lake Linton. Under Part 201 of the Natural Resources and Environmental Protection Act (NREPA),⁷³ Consumers Energy voluntarily removed 17,000 yd³ of contaminated sediment by mechanical dredging and excavated an additional 57,400 tons of contaminated soil from the bank and upland portions of the Lake. All excavated soil and sediments were disposed of in a Type II landfill.

BASF Riverview, Riverview, Michigan – This site was remediated under Part 201 of the NREPA. Contaminated groundwater was found to be discharging mercury, PCBs, dioxin, and PAHs from the site into the river. As part of the interim response activities required in a 2006 Consent Decree between the MDEQ and BASF Corporation, BASF was required to remove up to 30,000 yd³ of sediment adjacent to their property.⁷⁴ Removal was conducted to the top of river-bottom clay. Sediments will be capped onsite under the final site cover.

Ashtabula River, Ashtabula, Ohio – In 2005, the US EPA and the Ashtabula City Port Authority (on behalf of the Ashtabula River Partnership) signed an agreement under the GLLA to clean up PCB-contaminated sediment.⁷⁵ In 2006, approximately 60,000 yd³ were removed by hydraulic dredging (12-inch cutter head). The sediment was transported through a 2.5-mile long double-walled high-density polyethylene (HDPE) pipeline, then dewatered utilizing geo-textile tubes, and water was treated in a 5,000 gpm water treatment plant. Geo-textile tubes will remain in place in a TSCA permitted disposal facility specifically constructed for Ashtabula River sediments. The final cleanup goal of 0.25 ppm total PCBs will be met within ten years through a combination of dredging, placement of a sand cover, and monitored natural recovery, primarily through natural sedimentation.

Buffalo River, Buffalo, New York – In 2006, the U.S. Army Corps of Engineers (US ACE) Buffalo District dredged 82,961 cubic yards from the Buffalo River as part of the US ACE's Operations and Maintenance dredging mission. To determine the disposal location, the sediment was sampled, analyzed, and evaluated in accordance with guidance contained in the *Great Lakes*

⁷³ NREPA. (1994). Environmental Remediation, Part 201. Michigan Natural Resources and Environmental Protection Act, Public Act 451 of 1994. Section 324.

⁷⁴ MDEQ. (August 2006). Consent Judgment between Michigan Department of Environmental Quality and BASF Corporation. State of Michigan, Circuit Court for the 30th Judicial Circuit, Ingham County, Case No. 06-997-CE. Available at http://www.deq.state.mi.us/documents/deq-rrd-ce-fy06%20CJ_BSAF.pdf

⁷⁵ USEPA. (2005c). EPA, state and local partners will fund \$50 million cleanup of Ashtabula River; nation's largest Legacy Act cleanup. US EPA press release No. 05-OPA262, announcing agreement under Great Lakes Legacy Act with Ashtabula City Port Authority. Available at <http://www.epa.gov/glla/>.

Dredged Material Testing and Evaluation Manual.⁷⁶ This manual is used as a tool in making dredged material placement recommendations and decisions. The manual was developed jointly between the US EPA and the US ACE to evaluate impacts of contaminants from dredged material proposed for discharge to the Great Lakes. Based on this approach, the dredged material was determined to be unsuitable for open lake placement, and was therefore placed in the Buffalo confined disposal facility (CDF).

Grasse River Activated Carbon Pilot Study,⁷⁷ Massena, New York – Alcoa, Inc., the US EPA, Stanford University, and the University of Maryland-Baltimore County (UMBC) are conducting a joint in-situ pilot study along the Grasse River in Massena, NY. This study is evaluating the use of AC for reducing bioavailability of PCBs in river sediment, evaluating methods for in-situ delivery of AC to river sediment, and determining the extent of PCB and sediment release to river water during applications.

AC placement and mixing was conducted using various application techniques in September and October 2006. A 0.5-acre portion of the river was selected for the AC study area based on its surface sediment PCB concentrations (4 to 13 ppm) and relatively extensive width and shallow depth (620 and 15 ft, respectively). AC treatment involved adding black carbon to the upper, biologically active layer of sediment (typically the top 3 to 6 in.) where PCBs adsorb onto the surface of the carbon particles. In total, the study used a mass of 18,000 lbs of AC.

Water-quality monitoring during applications indicated no measurable changes in water-column PCB concentrations downstream of the study area. Downstream turbidity was slightly higher than upstream, but no negative impacts on water quality were identified. Sediment cores collected immediately after the applications were analyzed for AC content at an offsite laboratory. Physicochemical and biological assessments over the next two years will evaluate effectiveness of AC technology in reducing PCB bioavailability in Grasse River sediment. Pending the results, a third-year assessment or large-scale AC application may be implemented.

Presque Isle Bay,⁷⁸ Erie, Pennsylvania – The Presque Isle Bay AOC is located in northwestern Pennsylvania on the southern shore of Lake Erie. It is 4.5 miles long, 1.5 miles across at its widest point, and has an average depth of 13 feet. Sediment concentrations were compared to levels found in other urbanized areas and to the *Guidelines for Pollutational Classification of Great Lakes Harbor Sediments*.⁷⁹ Based on this comparison, the bay's sediments ranged from moderately to heavily polluted for ten heavy metals, nutrients, chemical oxygen demand, cyanide, oil and grease, and PAHs.

Since the 1980s, the Pennsylvania Department of Environmental Protection (PADEP) and its partners collected information on sediment quality conditions within the bay. Sediment

⁷⁶ U.S. Environmental Protection Agency and U.S. Army Corps of Engineers. (30 September 1998). Great Lakes Dredged Material Testing and Evaluation Manual. Available at <http://www.epa.gov/glnpo/sediment/gitem/>.

⁷⁷ The volume of material capped or covered by monitored natural attenuation at the Grasse River site is not included in the total amount of sediment remediated in calendar year 2006 or the cumulative total.

⁷⁸ The volume of material capped or covered by monitored natural attenuation at the Presque Isle Bay site is not included in the total amount of sediment remediated in calendar year 2006 or the cumulative total.

⁷⁹ US EPA. (1977). *Interim Guidelines for Pollutational Classification of Great Lakes Harbor Sediments*. Prepared by US EPA Region 5, Chicago, Illinois.

chemistry data were collected at a number of locations in the bay in 1982, 1986, 1990, 1992, 1993, 1994, 2000, and 2001. In addition, whole-sediment toxicity tests were conducted on samples collected within the AOC in 1982, 1986, 1994, and 2000. The sediments were found to contain broad, low-level contamination, primarily metals and PAHs, spread throughout the bay. The investigations also indicated that sediment quality conditions were improving in the bay. As a result, PADEP, in conjunction with the AOC's Public Advisory Council (PAC), determined that monitored natural attenuation, rather than active remediation within the AOC, would provide the most cost-effective and practical method for restoring the beneficial use impairment (BUI) restricting dredging activities. Based upon this conclusion and a decade-long downward trend in fish tumors, Presque Isle Bay was re-designated as an AOC in the Recovery Stage in 2002.

In September 2005, PADEP, Pennsylvania Sea Grant, Gannon University, the Regional Science Consortium at the Tom Ridge Environmental Center, and the Erie County Department of Health implemented a comprehensive sediment survey. Concentrations of metals and PAHs were detected in the sediments, but bioavailability measurements indicated that metals are not available for uptake by benthic organisms, and direct whole-sediment toxicity tests did not correlate with measured PAH concentrations. Based on this data, and calculations that predicted estimated concentrations of contaminants of potential concern (COPCs) in the CDF discharge based on concentrations detected in the sediment, the US EPA removed the dredging restriction BUI in April of 2007. Long term monitoring plans are being considered for this area to evaluate the ecosystem health of Presque Isle Bay.

Figure 8-1 presents the cumulative volume of sediment remediated in the U.S. since 1997. Information included in the bar graph 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*.⁸⁰ Detailed project information is available upon request from project managers.

⁸⁰ US EPA. (2006d). *Quality Assurance Project Plan for Great Lakes Sediment Remediation Project Summary Support*. Unpublished GLNPO document available from Mary Beth G. Ross (ross.marybeth@epa.gov).

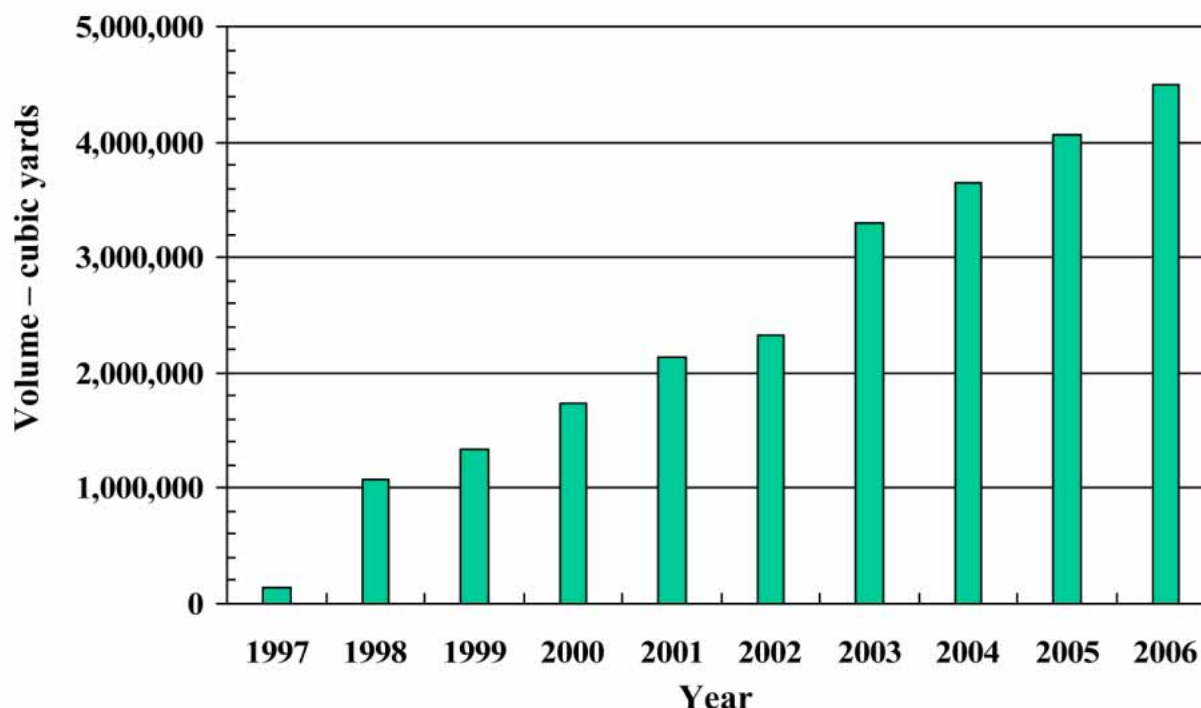


Figure 8-1. Cumulative Volume of Sediment Remediated in the U.S. Since 1997.
Source: US EPA – Great Lakes National Program Office

Canadian Sites

Sediment Remediation Guidance

Decision-Making Framework for Contaminated Sediments – A risk-based decision-making framework for contaminated sediments was completed under the 2002–2007 *Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA)*⁸¹ and placed on the Province of Ontario Environmental Registry for a public comment period (November 21, 2006, to January 20, 2007). One congratulatory letter was received from the Sarnia-Lambton Environmental Association, and no changes to the document were required. The Ontario Ministry of Environment (MOE) is integrating the document with existing guidance to produce *Guidelines for Identifying, Assessing and Managing Contaminated Sediments in Ontario: An Integrated Approach*. Pending final internal MOE review, the guidance will be applied throughout the province.

The COA framework is being applied to evaluate the need for management actions in a number of the project sites in the AOCs.

⁸¹ EC. (2002-2007). Op. cit.

Remediation Update

The following information provides a status report on all sites in the Canadian AOCs that involve sediment investigations and known or potential sediment remediation projects.

Bay of Quinte (Trent River) – As part of the ongoing monitoring work to assess sediment quality, elevated levels of dioxins and furans were found in sediment at the mouth of the Trent River in 2001. A Human Health Risk Assessment completed in 2006 showed that exposures to sediment contaminants do not pose potential risk to people using the area for recreational purposes. An Ecological Risk Assessment completed in 2007 predicted that there is negligible risk to piscivorous wildlife and fish exposed to the contaminated sediment. Monitored natural recovery is the preferred management option. Source trackdown is continuing in the area.

Port Hope Harbour – Remedial investigations on harbour sediments are focusing on the uranium series radionuclides and secondarily on heavy metal contamination, particularly arsenic, copper, lead, and nickel. Remediation is linked to the Port Hope Area Initiative to develop a long-term waste management facility in the Municipality of Port Hope for historic low-level radioactive waste (LLRW) pursuant to a March 2001 agreement between the federal government and local municipalities.

Further sediment studies have been conducted in the harbour since 2001 to characterize the contaminated sediments and develop clean-up criteria. Studies have also been completed to assess the physical condition of the harbour perimeter and determine potential impacts to crib and wall support structures due to the presence of the historic LLRW contaminated sediment.

Suction dredging has been identified as the most appropriate means of remediating the approximately 110,000 cubic metres of contaminated sediments. Geotube testing is planned for the fall of 2007 to better define the sediment treatment requirements. Remediation is planned to take place in the early stages of the broader project, possibly as soon as 2012.

Hamilton Harbour (Randle Reef) – An engineering design study for the Randle Reef remedial option is nearing completion. An engineered containment facility about 9.5 hectares in size is being designed to cap 130,000 cubic metres and contain another 500,000 cubic metres of PAH-contaminated sediments. An Environmental Comprehensive Study Report is being completed for agency and public review. A federal and provincial funding commitment of \$60 million has been made for the remediation itself, and further municipal and industry stakeholder participation is being sought. Construction could begin in 2008 and extend to 2016.

Niagara River (Lyons Creek, East & West) – Arsenic-contaminated sediment from Lyons Creek West was excavated (500 cubic metres) in the summer of 2007 and placed in a secure landfill facility. Management options are being developed in consultation with various stakeholders to address sediments in Lyons Creek East and Lyons Creek West (the watercourse is bisected by the Welland Canal) that are contaminated with PCBs.

Wheatley Harbour – An Ecological Risk Assessment undertaken in 2007 concluded that there is negligible risk of PCB effects to piscivorous wildlife in the Muddy Creek wetland. Therefore,

it has been recommended by the Wheatley Harbour Implementation Team that no further action is required in this AOC prior to delisting.

Detroit River (Turkey Creek-Little River) – Turkey Creek upstream of Walker Road has elevated PCB and metal concentrations. Local stakeholders have been consulted and are in negotiations with MOE, EC, municipal government, and industry regarding cleanup of this site. The expectation is that the creek and its banks will be remediated in the summer of 2008.

St. Clair River (Zones 2 & 3) – These two zones are downstream from the “Chemical Valley” area of Sarnia. Various sediment investigations have been undertaken, and assessments are underway to evaluate the need for management interventions.

St. Marys River (Bellevue Marine Park and Algoma Boat Slip) – Algoma Steel Inc. (ASI) completed an assessment of PAH-contaminated sediment in its boat slip during 2005, and the dredging of 2630 cubic metres was undertaken in 2006. Sediments were disposed in an ASI landfill waste management facility.

Assessments of sediment contamination at the Bellevue Marine Park location were undertaken in 2006, and results are being evaluated to determine the cause of site-specific toxicity and the need for sediment management.

Peninsula Harbour – Results of assessments of mercury and PCB bioaccumulation and ecological risk have indicated the need for sediment management. Remedial options are currently being assessed in consultation with local stakeholders. A preferred option will be selected in 2008.

Thunder Bay (North Harbour) – Results of assessments of mercury bioaccumulation and ecological risk have indicated the need for sediment management. Remedial options are currently being assessed in consultation with local stakeholders. A preferred option will be selected in 2008.

Supporting Table and Graphics

Table 8-1 reports progress on sediment remediation projects at both AOCs and non-AOCs in the U.S. and Canada, from 1997 through 2006. The maps on the following pages illustrate the progress and achievements made in sediment remediation activities in the Great Lakes from 1997 through 2006. Information included in the tables and maps are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in a US EPA Quality Assurance Project Plan.⁸² 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. Readers should always refer to the most current version of the *GLBTS Annual Progress Report* for the most up-to-date sediment remediation estimates.

⁸² US EPA. (2006d). Op. cit.

Table 8-1. Progress on Sediment Remediation in the Great Lakes since 1997*

	Cumulative Mass of Contaminant Remediated (kg)											Cumulative Volume Sediments Remediated 1997 thru 2006 (yd ³)	Volume Sediments Remediated 2006 (yd ³)	Ultimate Disposition	
	Aldrin/dieldrin	Benzo(a)pyrene	Chlordane	DDT (+DDE/DDD)	Hexachlorobenzene	Alkyl-lead	Mercury & compounds	Mirex	Octachlorostyrene	PCBs	Dioxins/Furans				Toxaphene
Site/AOC/non-AOC (**)	U.S. Sites														
Alma Iron and Metal/Smith Farms Property**													15,904		Encapsulated on-site
Ashtabula River, OH													61,203	61,203	On-site TSCA landfill
Black River-S. Branch, MI**															
Black River, OH															
Black River, MI** - CR 681													25,000		Landfilled
Buffalo River, NY - Buffalo Color - Area D													127,961 45,000		Encapsulated on-site CDF
- Navigation Dredging													82,961	82,961	
Clinton River, MI															
Cuyahoga River, OH															
Deer Lake - Carp River, MI															
Detroit River, MI - Monguagon Creek - Black Lagoon - BASF Riverview													166,500 25,000 115,000 26,500	26,500	CDF Encapsulated on-site
Eighteenmile Creek, NY															
Fields Brook Superfund, OH**													53,094		Landfilled
Fox River, Green Bay, WI - Deposit 56/57 - Deposit N - Deposit O - OU 1										1,486.4 950 51 485.4			297,324 81,662 7,149 1,026 207,487	102,487	Landfilled
Grand Calumet, IN - U.S. Steel/Gary Works - U.S.S. Lead							369			7,193	0.03		827,570 802,200 25,370		CAMU CAMU & TSCA Facility
Kalamazoo River, MI - Bryant Mill Pond										10,000			150,000		Landfilled

Table 8-1. 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 2006 (yd ³)	Volume Sediments Remediated 2006 (yd ³)	Ultimate Disposition
	Aldrin/dieldrin	Benzo(a)pyrene	Chlordane	DDT (+DDE/DDD)	Hexachlorobenzene	Alkyl-lead	Mercury & compounds	Mirex	Octachlorostyrene	PCBs	Dioxins/Furans	Toxaphene			
Manistiquette River, MI**															
Manistique River, MI										4,771			161,162		Landfilled
Manitowoc River, WI** - HARP										1,180			17,400		Off-site TSCA facility and landfilled
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 - Moss American													29,960 8,000 21,960		Landfilled Landfilled
Muskegon Lake, MI - Ruddiman Creek													90,000	54,100	Landfilled
National Gypsum** - Alpena, MI															
Niagara River, NY - Scajaquada Creek - Gill Creek - Cherry Farm/River Road - Niagara Transformer													77,850 17,500 6,850 42,000 11,500		Landfilled
Paw Paw River, MI** - Aircraft Components													349		Landfilled
Pine River, MI** - Velsicol Chemical SF Site - TPI Petroleum, Inc.				351,080									718,076 669,975 48,101	28,000	Landfilled Landfilled
Presque Isle Bay, PA															
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															

Table 8-1. Progress on Sediment Remediation in the Great Lakes since 1997*

	Cumulative Mass of Contaminant Remediated (kg)											Cumulative Volume Sediments Remediated 1997 thru 2006 (yd ³)	Volume Sediments Remediated 2006 (yd ³)	Ultimate Disposition
	Aldrin/dieldrin	Benzo(a)pyrene	Chlordane	DDT (+DDE/DDD)	Hexachloro-benzene	Alkyl-lead	Mercury & compounds	Mirex	Octachloro-styrene	PCBs	Dioxins/Furans	Toxaphene		
Site/AOC/Non-AOC (**) - 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 - NRDA - Lake Linton										4,500			359,433 342,433 17,000	17,000 Off-shore CDF Landfilled
Sheboygan Harbor, WI										219			8,723	8,723 Off-site TSCA facility & landfilled
Shiawassee River, MI**													63	Landfilled
St. Clair River, MI														
St. Lawrence River, NY - Reynolds Metals/Alcoa E. - Alcoa Grasse River ROPS										10,000			112,000 86,000 26,000	Landfilled/ capped Landfilled
St. Louis River/Bay, MN/WI - Newton Creek/Hog Island Inlet - Interlake/Duluth Tar													169,643 52,143 117,500	48,500 Landfilled Capped
St. Marys River, MI - Cannelton - Tannery Bay													11,900 3,000 8,900	8,900 Landfilled Landfilled
Ten Mile Storm Drain** - St. Clair Shores, MI													18,500	Landfilled
Torch Lake, MI														
USX Vessel Slip**													3,200	Landfilled (on-site and off-site)
Waukegan Harbor, IL														
Waxdale Creek, WI**														
White Lake, MI - Tannery Bay - Occidental Chemical Corp.					495 [†]					495 [†]			105,500 95,000 10,500	Landfilled Landfilled

Table 8-1. Progress on Sediment Remediation in the Great Lakes since 1997*

	Cumulative Mass of Contaminant Remediated (kg)											Cumulative Volume Sediments Remediated 1997 thru 2006 (yd ³)	Volume Sediments Remediated 2006 (yd ³)	Ultimate Disposition
	Aldrin/dieldrin	Benzo(a)pyrene	Chlordane	DDT (+DDE/DDD)	Hexachlorobenzene	Alkyl-lead	Mercury & compounds	Mirex	Octachlorostyrene	PCBs	Dioxins/Furans	Toxaphene		
Willow Creek - AOC (**)†										200,000			450,000	On-site TSCA facility
Wolf Creek - Unnamed Tributary, MI**													1,948	Landfilled
TOTALS				351,080	495[†]		369			532,039[†]	0.03		4,545,163	438,374
* Values included in the matrix are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the <i>Great Lakes Sediment Remediation Project Summary Support Quality Assurance Project Plan</i> (GLNPO, March 2006). Detailed project information is available upon request from project managers.														
** Sites marked with double asterisk are non-area-of-concern sites.														
† Mass displayed is the combined total of PCBs and HCB.														
Abbreviations: CAMU = corrective action management unit; CDF = confined disposal facility; TSCA = Toxic Substances Control Act;														

Table 8-1. Progress on Sediment Remediation in the Great Lakes since 1997*

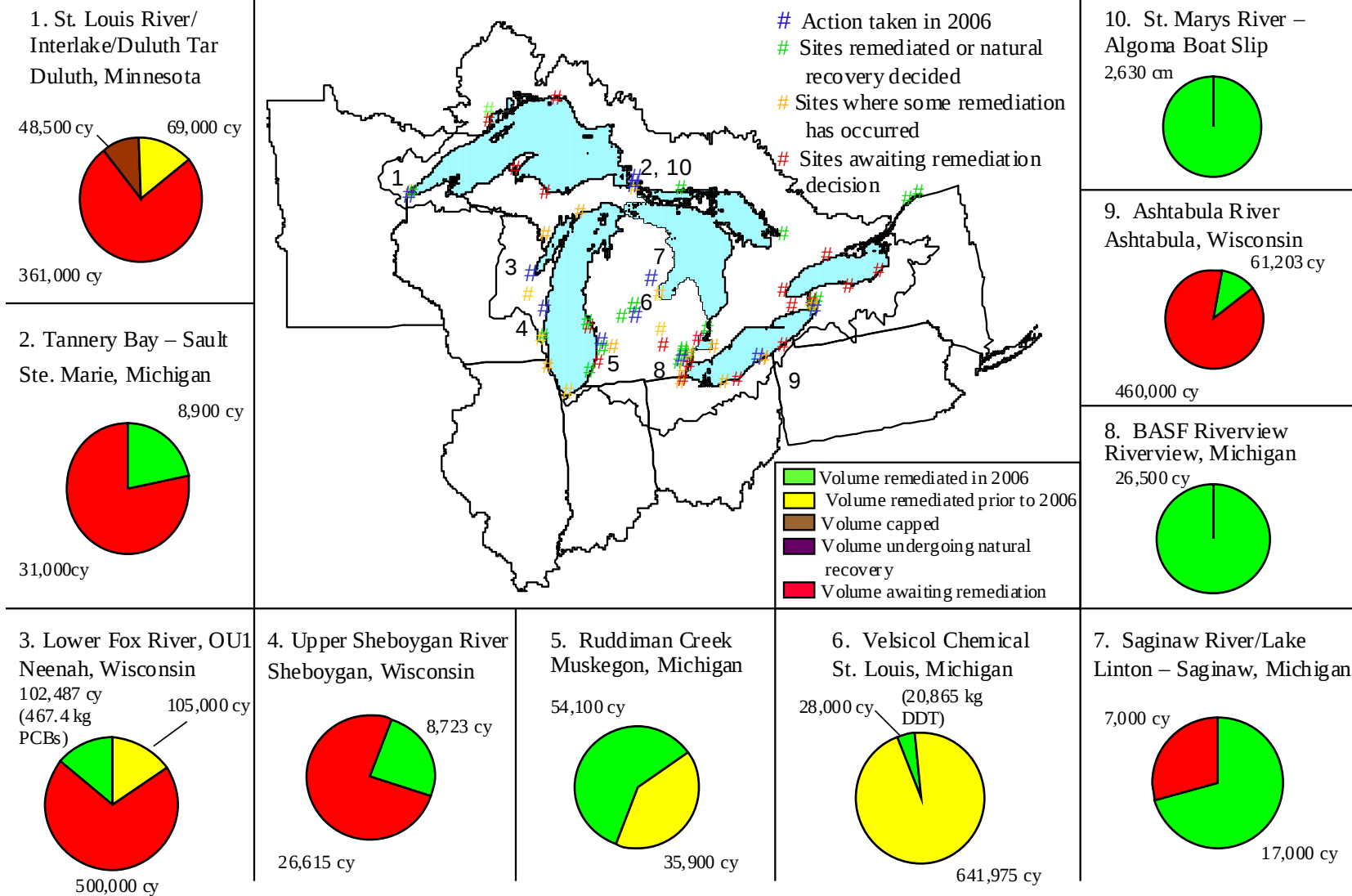
Site	Cumulative Mass of Contaminant Remediated (kg)											Cumulative Volume Sediments Remediated 1997 thru 2006 (m³)	Volume Sediments Remediated 2006 (m³)	Ultimate Disposition	
	Aldrin/dieldrin	Benzo(a)pyrene	Chlordane	DDT (+DDE/DDD)	Hexachlorobenzene	Alkyl-lead	Mercury & compounds	Mirex	Octachlorostyrene	PCBs	Dioxins/Furans				Toxaphene
Canadian Sites															
Thunder Bay - Northern Wood Preservers - North Harbour		2,700											11,000 21,000		Thermal treatment Berm enclosure & capped
Nipigon Bay															
Jackfish Bay															
Peninsula Harbour															
St. Marys River - Algoma Boatslip - Bellevue Marine Park													2,630	2,630	Landfilled
Spanish River															
Severn Sound															
St. Clair River - Dow Chemical - Zones 2 & 3							19.3						13,690		Landfilled
Detroit River - Turkey Creek (Windsor)															
Wheatley Harbour															
Niagara River (Ontario) - Lyons Creek															
Hamilton Harbour - Randle Reef - Windermere Basin - Dosasco Boatslip															
Toronto Waterfront															
Port Hope															
Bay of Quinte - Trent River															
St. Lawrence River - Cornwall															

Table 8-1. Progress on Sediment Remediation in the Great Lakes since 1997*

	Cumulative Mass of Contaminant Remediated (kg)											Cumulative Volume Sediments Remediated 1997 thru 2006 (m ³)	Volume Sediments Remediated 2006 (m ³)	Ultimate Disposition
	Aldrin/ dieldrin	Benzo(a) pyrene	Chlordane	DDT (+ DDE/DDD)	Hexachloro-benzene	Alkyl-lead	Mercury & compounds	Mirex	Octachloro-styrene	PCBs	Dioxins/ Furans			
Site TOTALS		2,700					19.3					48,320	2,630	
* Values included in the matrix are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the <i>Great Lakes Sediment Remediation Project Summary Support Quality Assurance Project Plan</i> (GLNPO, March 2006). Detailed project information is available upon request from project managers.														

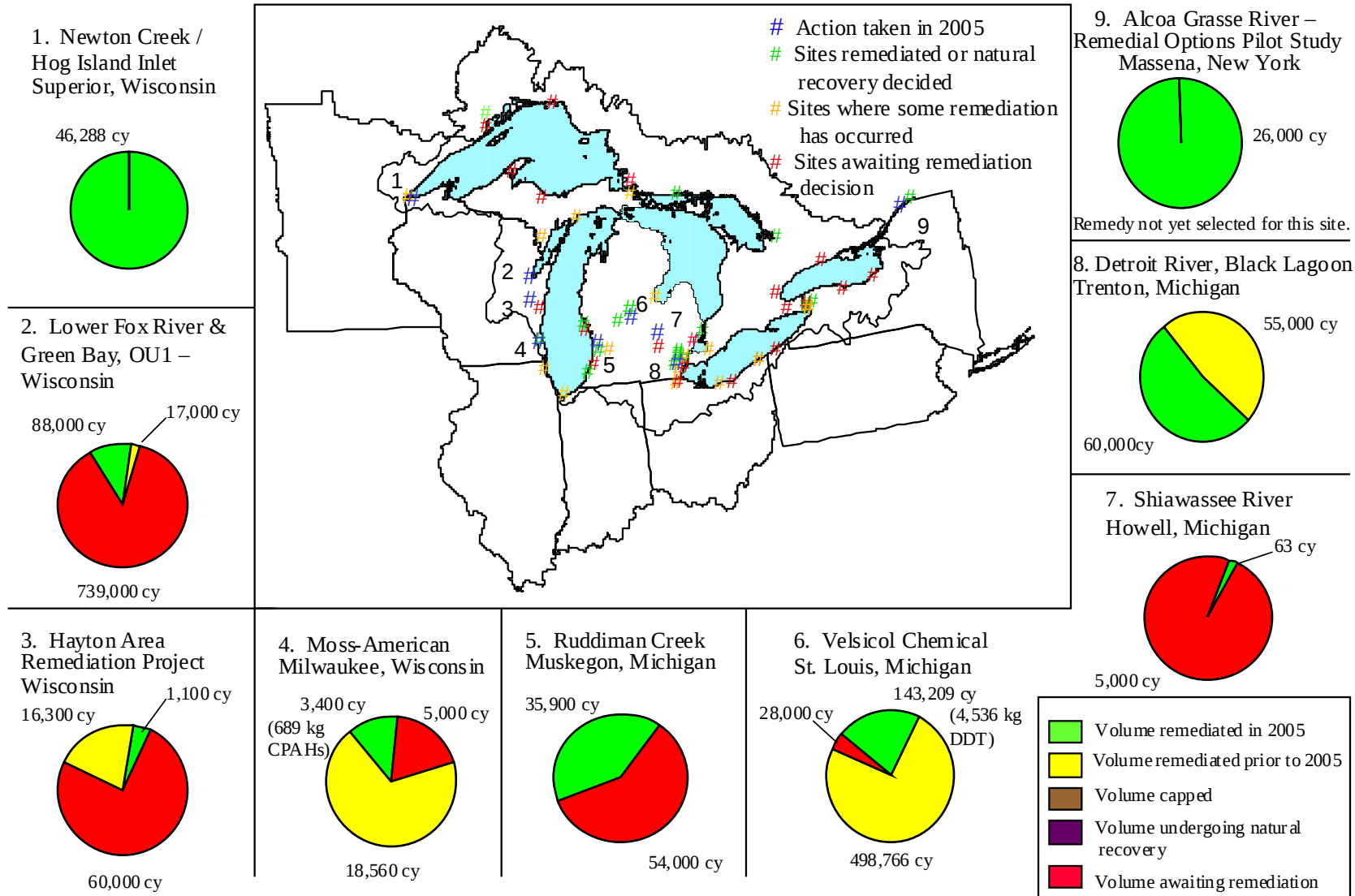
Great Lakes Sediment Remediations in 2006*

*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, March 2006). Detailed project information is available upon request from project managers.



Great Lakes Sediment Remediations in 2005*

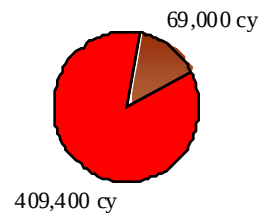
*Information included in the pie charts are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, March 2006). Detailed project information is available upon request from project managers.



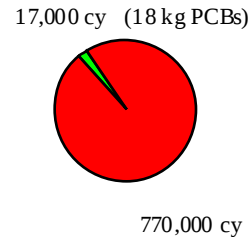
Great Lakes Sediment Remediations in 2004*

*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, March 2006). Detailed project information is available upon request from project managers.

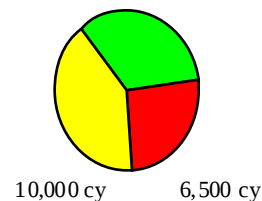
1. St. Louis River/
Interlake/Duluth Tar -
Duluth, Minnesota



2. Lower Fox River &
Green Bay, OU1 -
Wisconsin



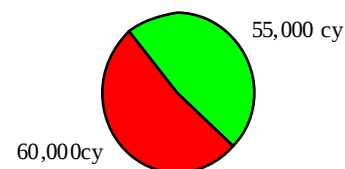
3. Moss-American
Milwaukee, Wisconsin



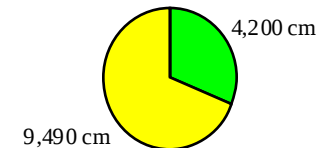
4. Velsicol Chemical / Pine River
St. Louis, Michigan



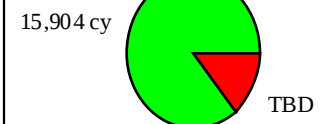
5. Detroit River, Black Lagoon -
Trenton, Michigan



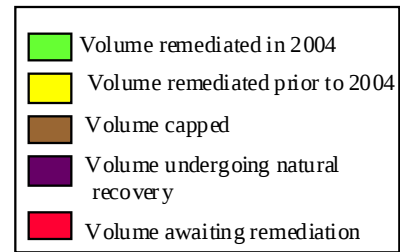
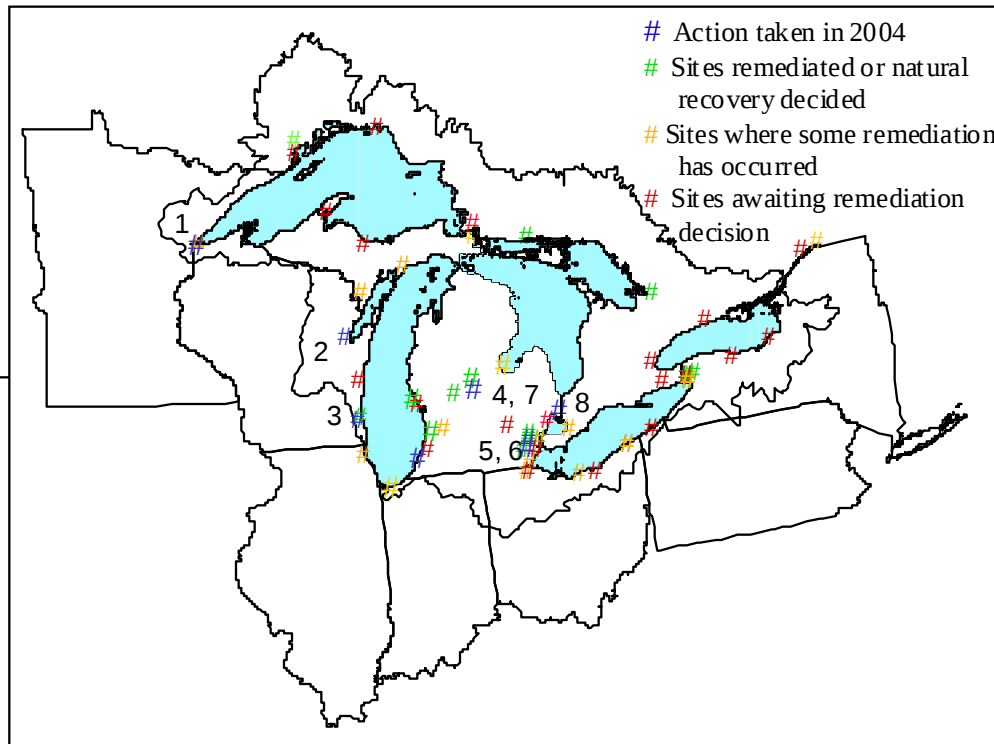
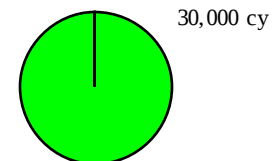
8. St. Clair River -
DOW Chemical Canada



7. Alma Iron and Metal/
Smith Farms Property
St. Louis, Michigan

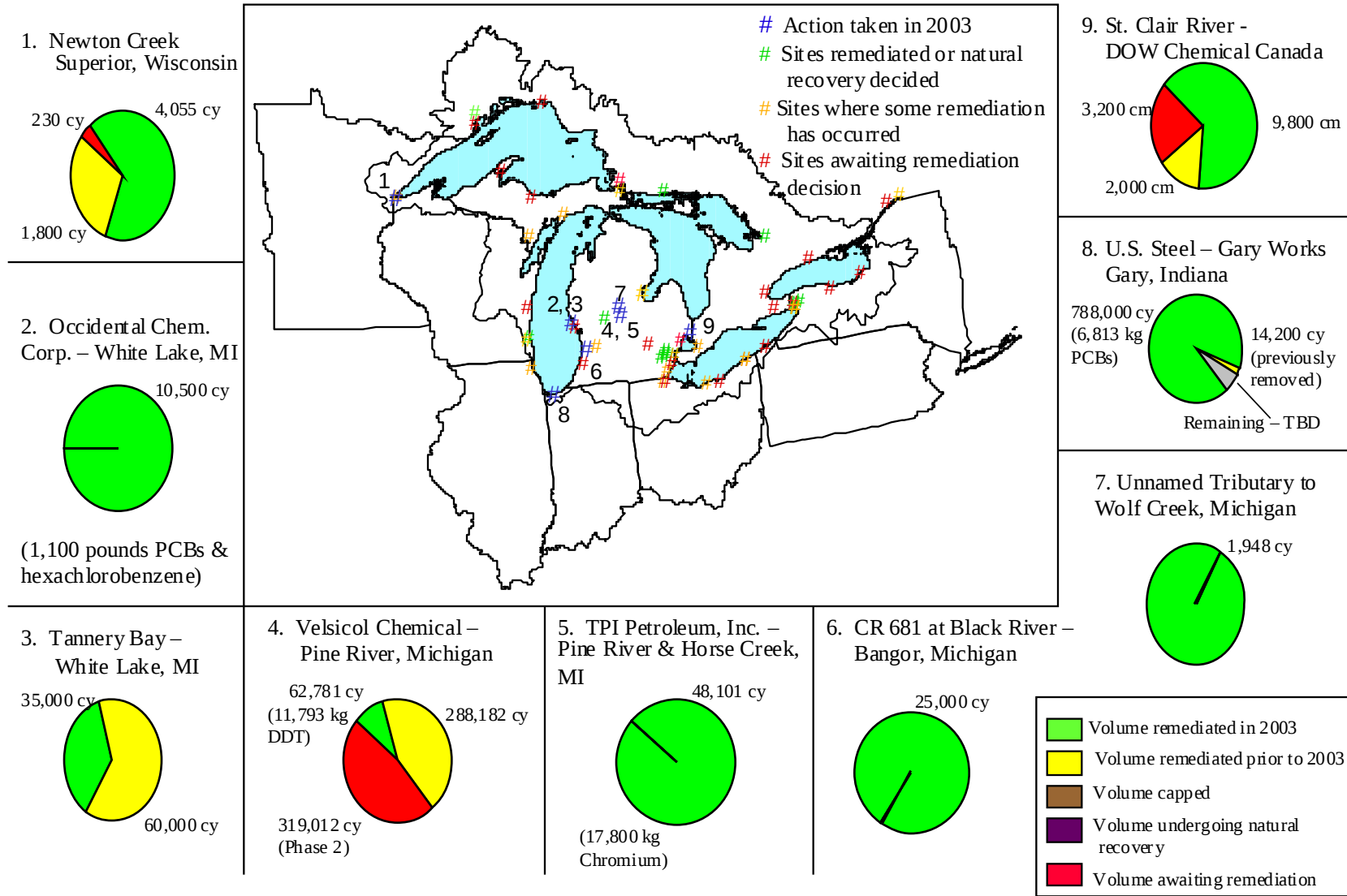


6. Consolidated Packaging
Monroe, Michigan



Great Lakes Sediment Remediations in 2003*

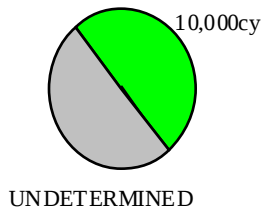
*Information included in the pie charts are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation on Project Summary Support" Quality Assurance Project Plan (GLNPO, March 2006). Detailed project information is available upon request from project managers.



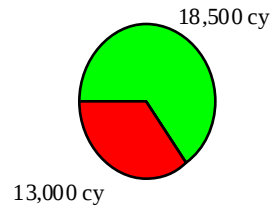
Great Lakes Sediment Remediations in 2002*

*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, March 2006). Detailed project information is available upon request from project managers.

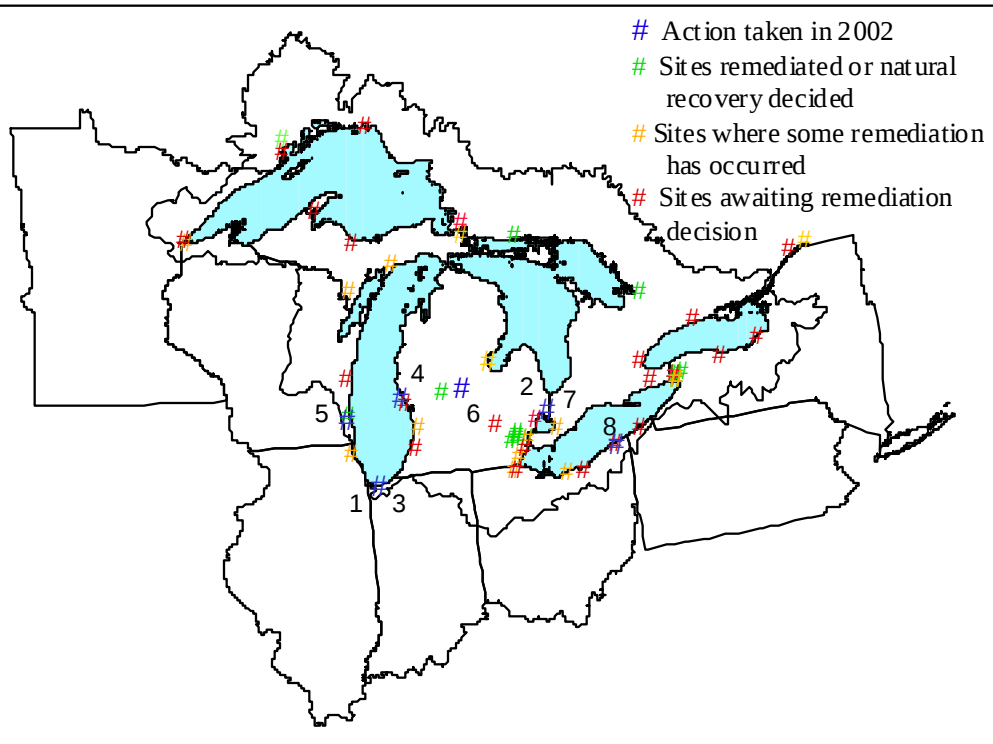
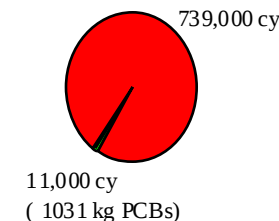
1. U.S.S. Lead Refinery Inc. - East Chicago, IN



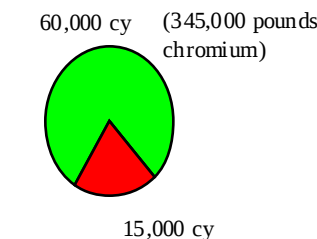
2. Ten Mile Storm Drain - St. Clair Shores, Michigan



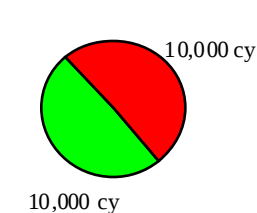
3. U.S. Steel-Gary Works - Gary, Indiana



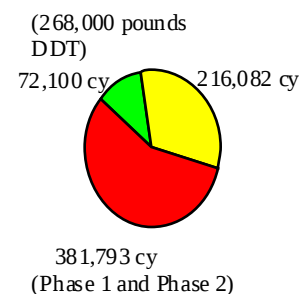
4. Tannery Bay - White Lake, Michigan



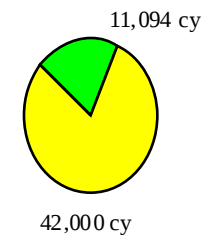
5. Moss American Milwaukee, WI



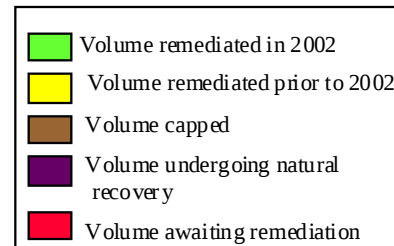
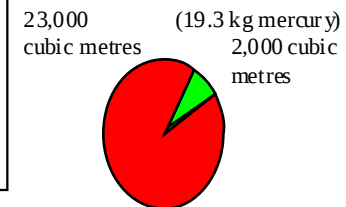
6. Pine River, Michigan



8. Fields Brook Superfund Site - Ashtabula, Ohio

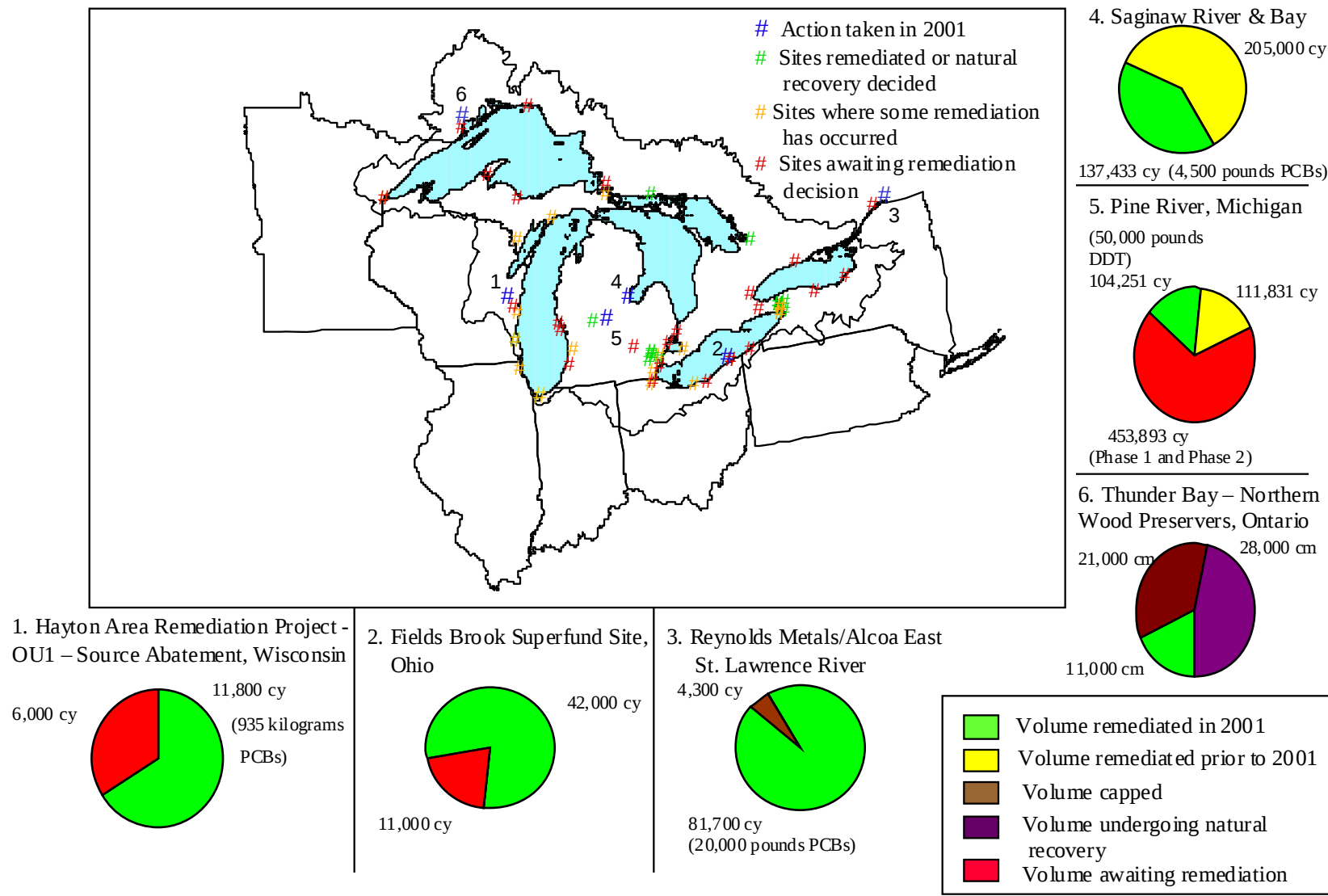


7. St. Clair River - DOW Chemical Canada



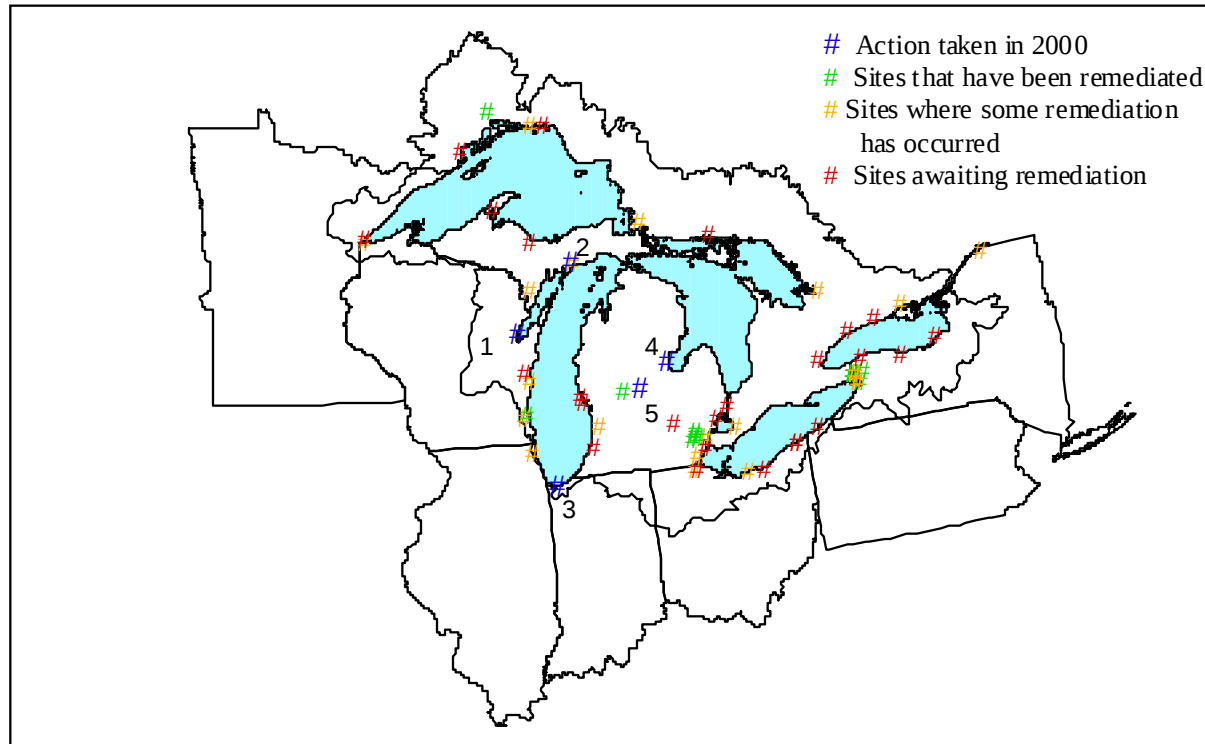
Great Lakes Sediment Remediations in 2001*

*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, March 2006). Detailed project information is available upon request from project managers.

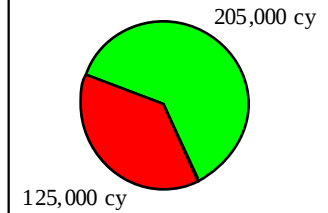


Great Lakes Sediment Remediations in 2000*

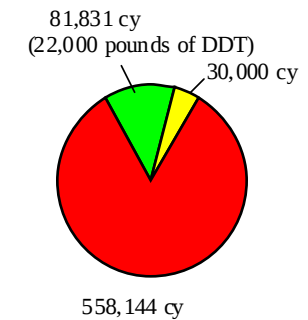
*Information included in the pie charts are quantitative estimates as reported by project managers. Data collection and reporting efforts are described in the "Great Lakes Sediment Remediation Project Summary Support" Quality Assurance Project Plan (GLNPO, March 2006). Detailed project information is available upon request from project managers.



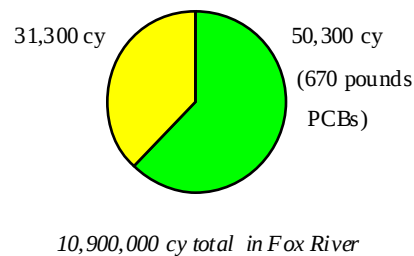
4. Saginaw River & Bay



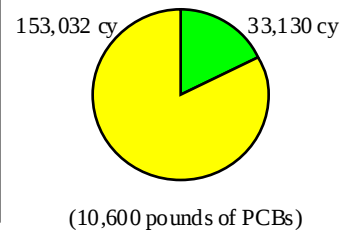
5. Pine River



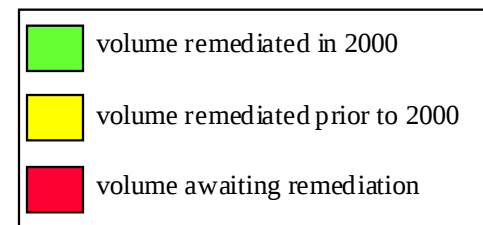
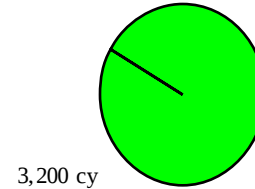
1. Fox River – Deposit 56/57



2. Manistique River & Harbor Emergency Removal



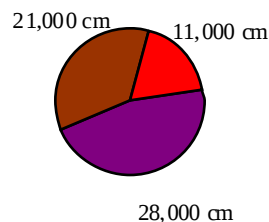
3. USX Vessel Slip Project – Lake Michigan



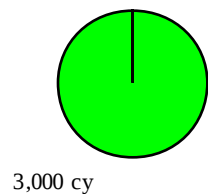
Great Lakes Sediment Remediations in 1999*

*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, March 2006). Detailed project information is available upon request from project managers.

1. Thunder Bay – Northern Wood Preservers

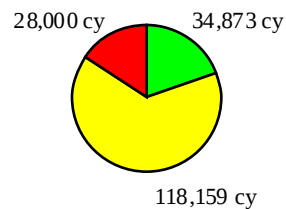


2. St. Marys River

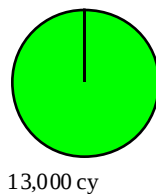


Remainder of contaminated sediments undergoing natural attenuation

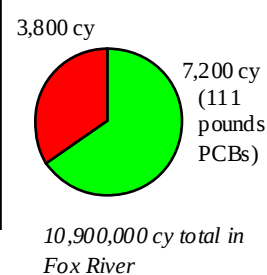
3. Manistique River and Harbor



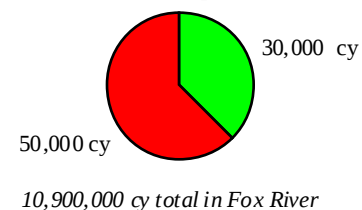
4. Menominee River - Anslu Eighth Street Slip



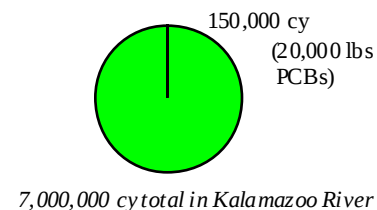
5. Fox River - Deposit N



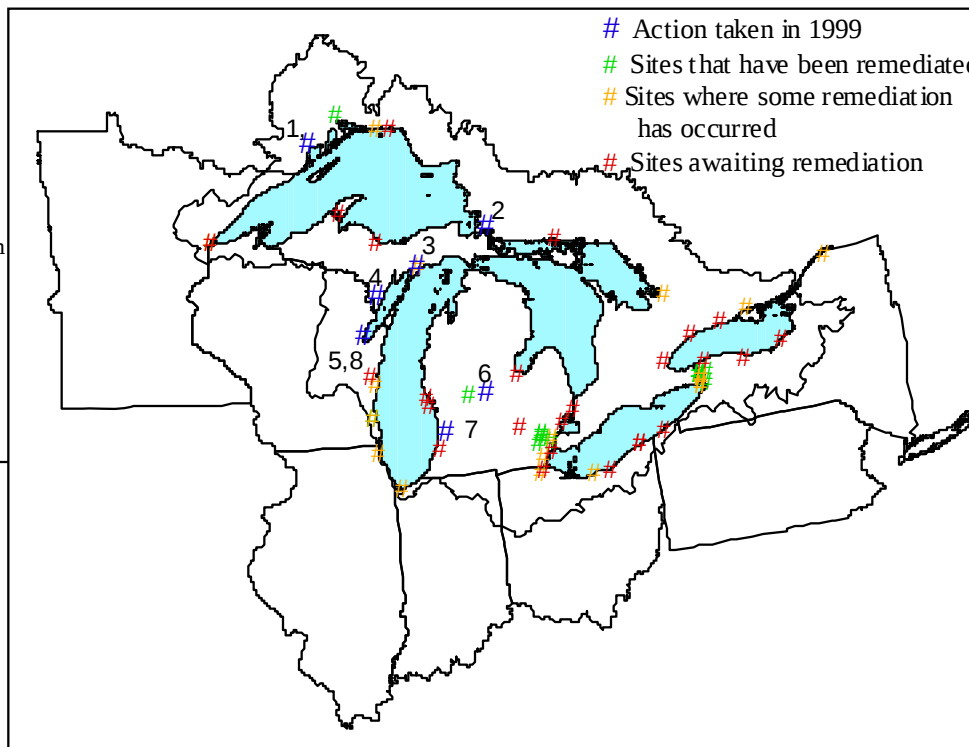
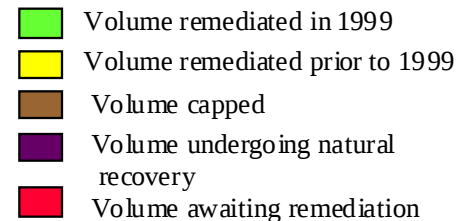
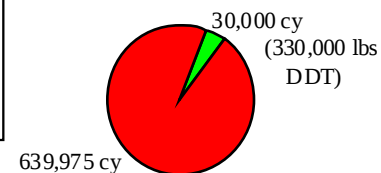
8. Fox River - Deposit 56/57



7. Kalamazoo River - Bryant Mill Pond

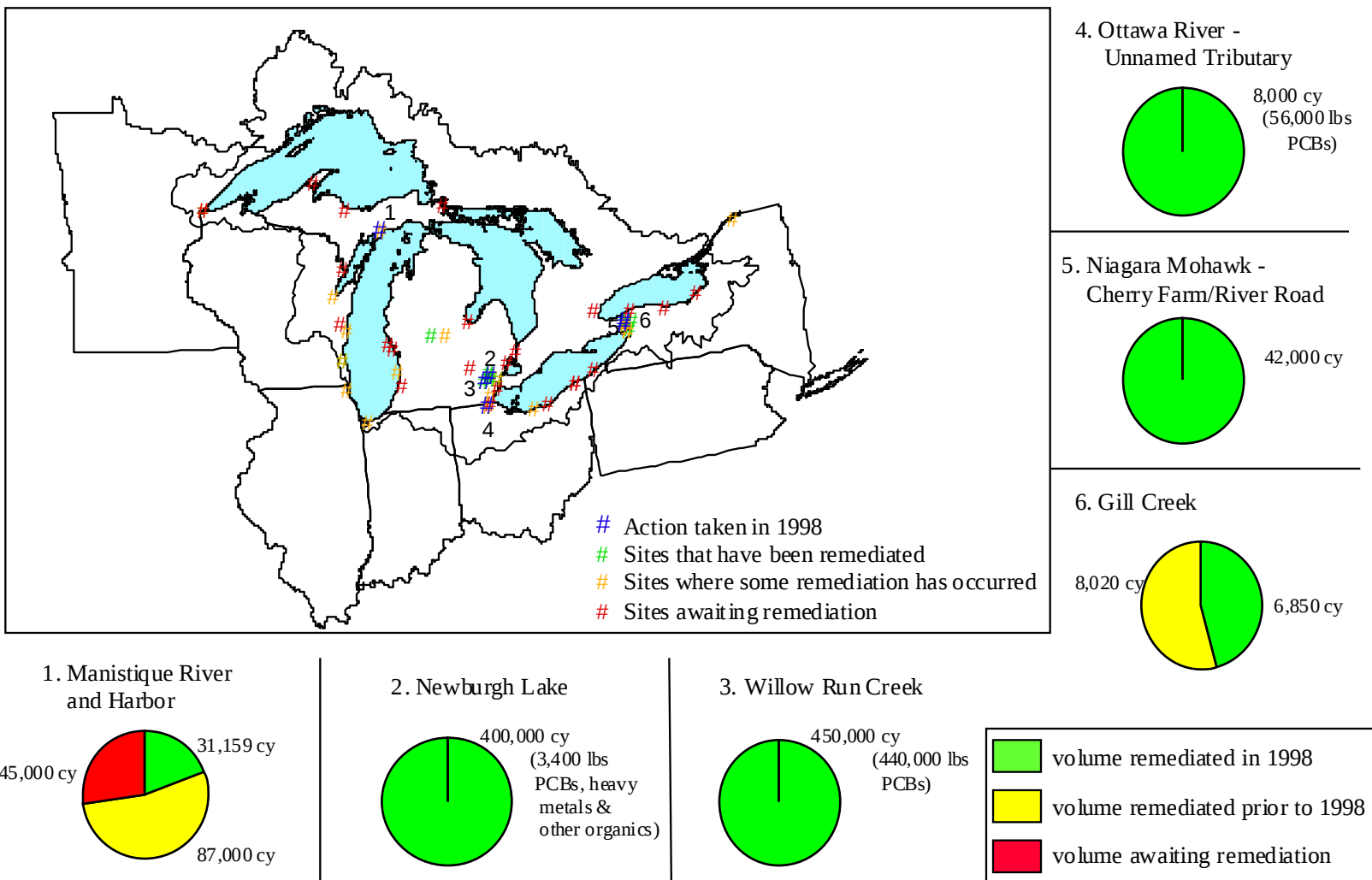


6. Pine River



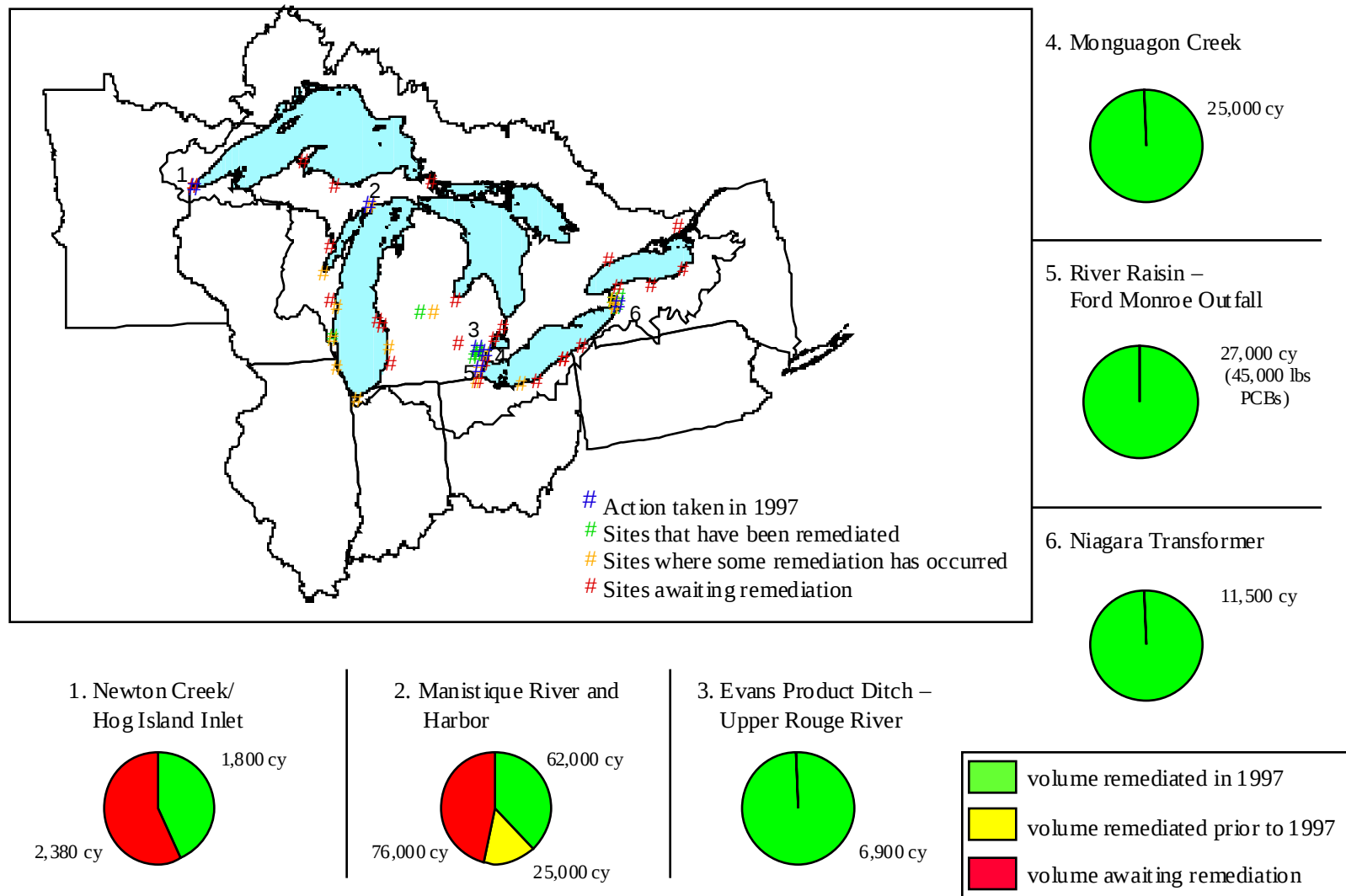
Great Lakes Sediment Remediations in 1998*

*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, March 2006). 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, March 2006). Detailed project information is available upon request from project managers.



8.0 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.”

The following efforts were undertaken in support of the above challenge.

Canadian Activities

The Atmospheric Fate of Hexachlorobenzene over the Great Lakes: A Preliminary Modeling Assessment

Prepared by: Jianmin Ma and Yi-Fan Li, Air Quality Research Division, Science and Technology Branch, Environment Canada, Toronto
Cindy Yang, Environmental Protection Branch, Ontario Region, Environment Canada

Previous studies indicate a significant degree of uncertainty in the half-life of HCB, the value ranging from about 3 to 23 years in soils and about 2 years in air. Even with a 2-year half-life in soil and air, secondary emissions (i.e., volatilization from previously contaminated environments) would play an important role in the fate of HCB in the Great Lakes Basin. It has been suggested that measured HCB concentrations over the Great Lakes during the 1990s could be attributed mostly to re-emissions due to volatilization of HCB accumulated in both soil and water from previous use.^{83,84} Using the soil residues of HCB accumulated from the 1950s to the 1970s as the source of HCB (initial condition), the Canadian Model for Environmental Transport of Organochlorine Pesticides (CanMETOP)⁸⁵ was used and integrated from 1978 to 2003 to study and calibrate atmospheric transport and sources of HCB that possibly contaminate the Great Lakes ecosystem.

Extensive model scenario runs have been conducted to assess the contribution of industrial releases and secondary emissions (accumulated from past application as a pesticide) of HCB to the HCB budget over the Great Lakes region. Using the industrial HCB air and land release data

⁸³ Bailey R.E. (2001). Hexachlorobenzene concentration trends in the Great Lakes, report prepared for HCB/B(a)P work group of the Great Lakes Binational Toxics Strategy.

⁸⁴ Ma, J., Venkatesh, S., Jantunen L.M.M. (2003a). Evidence of the impact of ENSO events on temporal trends of Hexachlorobenzene air concentrations over the Great Lakes, Sci. Total Environ. 313/1-3, 177-184.

⁸⁵ Ma, J., Daggupaty, S.M., Hamer, H., Li, Y.F. (2003b). Impacts of lindane usage in the Canadian prairies on the Great Lakes ecosystem - 1: Coupled atmospheric transport model and modeled concentrations in air and soil, Environ. Sci. Technol., 37, 3774-3781.

in 2001 collected from the TRI of the US EPA, the HCB air concentrations modeled by CanMETOP were three orders of magnitude lower than the air concentrations monitored by the Integrated Atmospheric Deposition Network (IADN). This suggests that the industrial emissions of HCB in the U.S. are a negligible source for its budget over the Great Lakes region. An effort has been made in EC to create gridded HCB usage, emission, and soil residue inventories from historical pesticide applications in the U.S. and Canada.⁸⁶ Figure 9-1 shows (at left) total HCB air and land releases in the U.S. (from TRI) and soil residues from past pesticide use in 2001. Figure 9-1 shows (at right) the gridded soil residues with a 35 km × 35 km resolution in the North American continent in 1978. Figure 9-1 (left) reveals considerably high HCB soil residues in North America, even decades after its ban as a pesticide in 1977 in Canada and in 1985 in the U.S.⁸⁷ Using the residue inventory in 1978 (Figure 9-1, right), CanMETOP was implemented and integrated from 1978 to 2003 to investigate the impact of continuous reemission of the residues from the contaminated soil to air and subsequent atmospheric transport on the Great Lakes ecosystem.

Figure 9-2 illustrates the modeled annually averaged daily air concentration of HCB (pg m^{-3}) at the 1.5 m height in 1978, 1986, 1994, and 2002. The air concentration over the continent is seen to exhibit a decreasing trend, corresponding to its degradation rate in soil and air. The figure also shows a uniform spatial pattern of the air concentration since the 1990s across the continent, due partly to its strong persistence in the air. Measurements by Shen et al. also show similar uniformity of air concentrations.⁸⁸

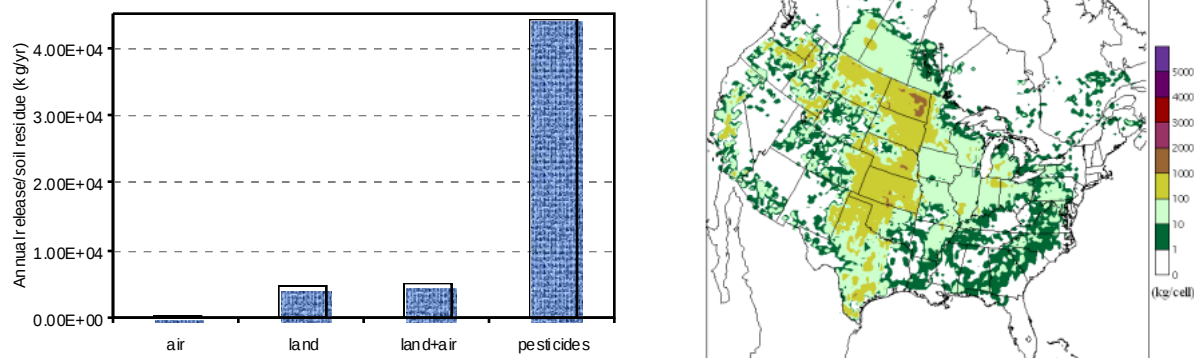


Figure 9-1. Left: U.S. Industrial Air and Land Release (kg yr^{-1}) in 2001 from US EPA TRI and Total Soil Residues (kg) of HCB in North America in 2001 from Historical Pesticide Application. Right: Gridded HCB Soil Residue (kg cell^{-1} , 1 cell = 35 km × 35 km)

⁸⁶ Li, Y.F. (March 2007). Gridded HCB usage, emission and residue inventories from pesticide applications in the United States and Canada. EC, Toronto.

⁸⁷ Li. (March 2007). Op. cit.

⁸⁸ Shen, L., Wania, F., Lei, Y.D., Teixeira, C., Muir, D.C.G., Bidleman, T. (2005). Atmospheric distribution and long-range transport behavior of organochlorine pesticides in North America. Environ. Sci. Technol, 39, 409-420.

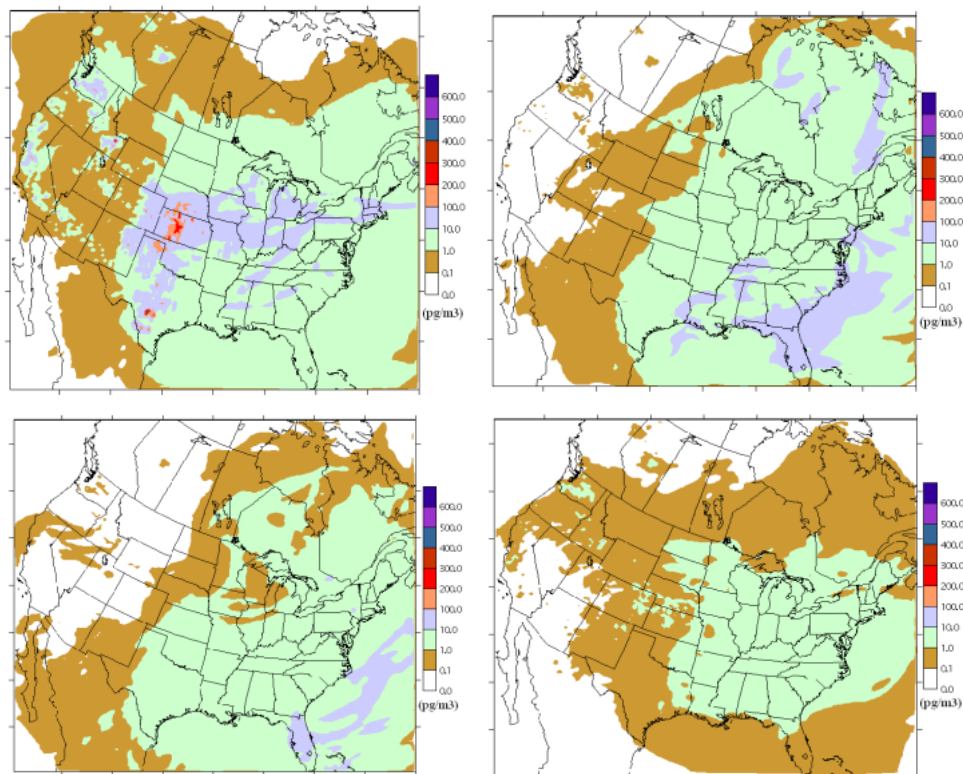


Figure 9-2. CanMETOP Modeled Annually Averaged Daily Air Concentration (pg m⁻³) of HCB in 1978 (top left), 1986 (top right), 1994 (bottom left), and 2002 (bottom right)

To identify the quantitative contribution of different HCB sources in the continent to the budget of the substance over the Great Lakes, six high-spatial-resolution (24 km × 24 km) model scenarios were simulated for the years 2000 and 2001. These scenarios consisted of model simulations as follows:

1. All sources in the continent
2. Southeast U.S. sources only
3. Northeast U.S. sources only
4. Northwest U.S. sources only
5. Southwest U.S. sources only
6. Canadian Prairies sources only

These regions in the model domain are displayed in Figure 9-3a. For each of the model scenarios 2 through 6 (considering HCB sources in the different regions of the continent), following Ma et al.,⁸⁹ the ratios of annually averaged daily air concentrations and depositions

⁸⁹ Ma, J., Venkatesh, S., Li, Y., 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, 8132-8141.

averaged over each lake to those from model scenario 1 (where all sources are considered) were computed. Figure 9-3b illustrates the ratios of the modeled annually averaged daily air concentrations and Figure 9-3c the annually accumulated wet deposition over the Great Lakes (averaged over all five lakes) in the year 2000. On an annual basis, in 2000 sources in the Northwest U.S. made the largest contribution to HCB levels in the air and to wet depositions to the Great Lakes at 45 percent and 37 percent, respectively. The second major source of HCB over the Great Lakes is sources in the Canadian Prairies, followed by sources in the Northeast U.S. Sources in the Southeast and Southwest contributed 6 percent each to the air concentration level and wet deposition over the Great Lakes.

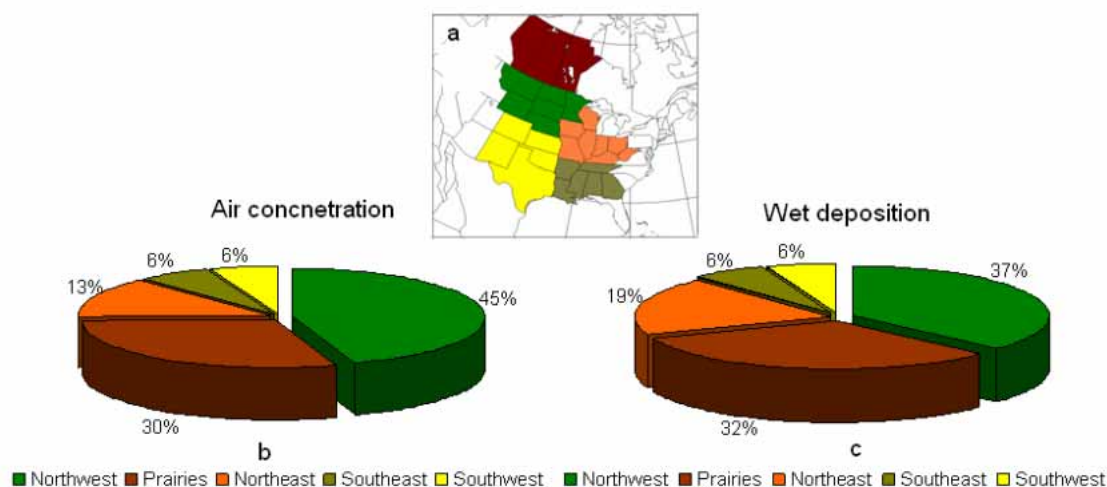


Figure 9-3. Model Estimated Ratios of Model Scenarios 2 through 6 and Scenario 1 over the Great Lakes: (a) Source Regions for Model Scenarios 2 through 6, (b) Annually Averaged HCB Air Concentrations, (c) Annually Accumulated Wet Deposition

The results also showed that sources in the Northwest U.S. contributed 47 percent of HCB air concentrations to Lakes Michigan and Erie, followed by Lake Superior at 45 percent and Lake Ontario at 43 percent. The relative contributions of the various source regions to wet deposition follow similar patterns to those for HCB air concentrations, but the contribution from sources in the Northwest U.S. is lower than that for the air concentration, at 37 percent. It has been noted that the upper lakes (Lakes Superior and Huron) tend to receive lower air concentrations and wet depositions from sources in the Northwest U.S. For instance, sources in the Prairies made an almost identical contribution to the HCB air concentration over Lake Huron as that made by sources in the Northwest U.S. By comparison, sources in the Prairies made a 47 percent contribution to the wet deposition to Lake Huron, higher than Northwest U.S. sources, which made only a 26 percent contribution to the Lake. These results suggest that the source strength, proximity, and dominant westerly flow in the Northwest U.S. and Canadian Prairies are major pathways for the HCB budget in the Great Lakes region. Although the Southwest U.S. was also a source with high HCB soil residue concentrations, it contributed only 6 percent of air concentration and wet deposition to the Great Lakes.

The modeled HCB air concentrations in 2000 and 2001 were compared with measured concentrations collected by the IADN. The results show that the modeled air concentration is 1

order of magnitude lower than measurements. This result is similar to those from the HCB modeling investigation by Cohen et al.,⁹⁰ which could account for only about 10 percent of observed HCB air concentrations around the Great Lakes. The causes of the modeled low air concentrations are likely: (1) unknown HCB sources in the continent, as reported by Cohen et al.;⁹¹ (2) underestimation of HCB soil residues; and (3) lack of consideration of atmospheric transport from regions outside of North America, which may contribute to higher HCB atmospheric concentrations around the Great Lakes, as suggested by Cohen et al.⁹² and Bailey.⁹³ In a recent modeling study of the global lindane budget in 2005 by Ma et al.,⁹⁴ several strong episodic trans-Pacific transport events of lindane from its Asian sources have been detected. One of these events, occurring during the period 23 to 31 May 2005, is illustrated in Figure 9-4. The figure superimposes eight daily snapshots of the lindane air concentration for the period, showing clearly the eastward movement of lindane in the atmosphere from Asian sources to the west coast of Canada. Likewise, such a trans-Pacific transport may also take place for HCB. However, due to the lack of information for HCB emissions in Asia, it is not possible to extend the current global modeling investigation to study the trans-Pacific transport of HCB and its impact on the Great Lakes. Further efforts are needed to accomplish this task.

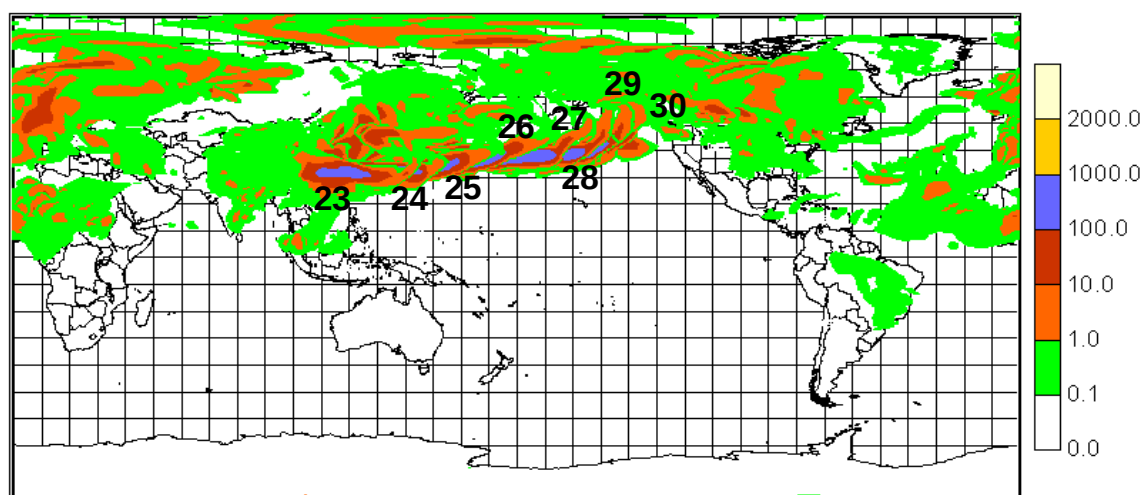


Figure 9-4. Global CanMETOP Modeled Daily Lindane Air Concentration (pg m^{-3}) at 3000 m Height for 23 to 31 May 2005. The Figure Superimposes Eight Snapshots of Daily Air Concentrations for the Period. The Digit Number in the Figure Indicates the Date of the Period

⁹⁰ Cohen M., Commoner, B., Eisl, H., Bartlett, B., Dicker, A., Hill, C., Quigley, J., Rosenthal, J. (1995).

Quantitative estimation of the entry of dioxins, furans and hexachlorobenzene into the Great Lakes from airborne and waterborne sources, Center for the Biology of Natural Systems, Queens College, CUNY, New York.

⁹¹ Cohen et al. (1995). Op. cit.

⁹² Cohen et al. (1995). Op. cit.

⁹³ Bailey. (2001). Op. cit.

⁹⁴ Ma, J., Venkatesh, S., Li, Y. (in preparation) Global lindane budget in 2005: a modeling perspective. Unpublished manuscript in preparation.

APPENDIX A

**GREAT LAKES BINATIONAL TOXICS STRATEGY (GLBTS)
PROGRESS OVERVIEW 1997 – 2007**

GREAT LAKES BINATIONAL TOXICS STRATEGY (GLBTS) PROGRESS OVERVIEW 1997 – 2007

GLBTS Development, Integration Workgroup, and Stakeholder Forum	
1997	
	- 4/7/97 U.S. and Canada sign the <i>GLBTS: Canada-United States Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes</i> - 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 <i>Report on Level II Substances</i> 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. <i>GLBTS Report on Level II Substances</i> 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

GLBTS Development, Integration Workgroup, and Stakeholder Forum	
2000	
	- 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	
	- 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	
	- 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

GLBTS Development, Integration Workgroup, and Stakeholder Forum

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

GLBTS Development, Integration Workgroup, and Stakeholder Forum

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

- 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

GLBTS Development, Integration Workgroup, and Stakeholder Forum

2006

- 2/08/06 Presentation to Binational Executive Committee in Chicago on GLBTS successes and path forward by Gary Gulezian and Danny Epstein
- 2/16/06 GLBTS Integration Workgroup meets in Windsor, Ontario
- 3/07/06 to 3/08/06 GLBTS attendance (Ted Smith and Alan Waffle) at Environment Canada/Ontario Ministry of the Environment "Emerging Chemicals Workshop" in Toronto, Ontario
- 3/29/06 to 3/30/06 GLBTS attendance (Alan Waffle and Tricia Mitchell) at Environment Canada's "Workshop on Pharmaceuticals" in Burlington, Ontario
- 4/26/06 to 4/27/06 GLBTS attendance (Alan Waffle) at CEC SMOC meeting in Windsor, Ontario
- 4/28/06 GLBTS attendance (Ted Smith and Alan Waffle) at EC & US EPA GLWQA Review in Chicago
- 4/28/06 to 12/06 GLBTS participation as the US (Ted Smith) and Canadian (Alan Waffle) co-chairs of the Toxics Workgroup reviewing the GLWQA
- 5/17/06 GLBTS Stakeholder Forum is held in Toronto, Ontario
- 5/18/06 GLBTS Integration Workgroup meets in Toronto, Ontario
- 5/31/06 GLBTS presentation to Lake Superior LaMP Workgroup in Duluth, Minnesota, given by Alan Waffle
- 6/14/06 GLBTS presentation at Canadian Pollution Prevention Roundtable in Halifax, given by Alan Waffle
- 6/22/06 GLBTS attendance (Alan Waffle) at Great Lakes Cities Initiative meeting in Perry Sound, Ontario
- 7/31/06 Final *GLBTS 2005 Progress Report* posted at <http://binational.net/bns/2005/2005-GLBTS-English-web.pdf>
- 08/02/06 GLBTS and GLWQA presentations at DePaul University, Chicago, given by Danny Epstein and Susan Nameth
- 8/03/06 to 8/07/06 GLBTS promotion booth at Tall Ships event on the Chicago Waterfront, hosted by staff from EC (Canadian lead Tricia Mitchell) and US EPA (US EPA Lead E.Marie Wines)
- 9/19/06 GLBTS Integration Workgroup meets in Chicago, IL
- 9/19/06 GLBTS presentations at Harbin Institute of Technology in Harbin, China, given by Alan Waffle
- 9/25/06 to 9/26/06 *International Workshop on Contaminated Site of Lindane and POPs in China*, Xian, China, given by Alan Waffle, S. Venkatesh, and Yi-Fan Li
- 10/11/06 to 10/12/06 GLBTS attendance (Alan Waffle) at State of Lake Huron Workshop in Honey Harbour, Ontario
- 11/01/06 GLBTS display booth at SOLEC
- 11/05/06 to 11/09/06 GLBTS attendance (Tricia Mitchell) at Society of Environmental Toxicology and Chemistry 27th Annual Meeting in Montreal
- 11/20/06 GLBTS Presentation at University of Toronto, given by Alan Waffle, S. Venkatesh, and Tricia Mitchell
- 12/06/06 GLBTS Stakeholder Forum is held in Chicago, IL
- 12/07/06 Draft *GLBTS 2006 Progress Report* issued
- 12/07/06 GLBTS Integration Workgroup meets in Chicago, IL
- 12/12/06 to 12/14/06 GLBTS attendance (Ted Smith and Alan Waffle) at first U.S. Conference Characterizing Chemicals in Commerce in Austin, Texas

GLBTS Development, Integration Workgroup, and Stakeholder Forum

2007 and ongoing

- 1/24/07 GLBTS presentation to Richview Collegiate physics students, Toronto, given by Alan Waffle and Tricia Mitchell
- 2/21/07 Integration WG meeting, held in Windsor
- 3/5/07 GLBTS attendance by Tricia Mitchell at Pharmaceuticals and Personal Care Products in the Canadian Environment: Research and Policy Directions, Niagara-on-the-Lake, Ontario
- 3/27/07 GLBTS attendance by Tricia Mitchell at Lake Ontario Contaminant Monitoring & Research Workshop - Planning for the 2008 Cooperative Monitoring Year, Grand Island, New York
- 3/28/07 GLBTS attendance by Tricia Mitchell at Lake Ontario LaMP Workgroup meeting, Grand Island, New York
- 4/16/07 GLBTS presentation by Danny Epstein at CEC Sound Management of Chemicals Meeting, Monterey, Mexico
- 5/23/07 BTS 10 Year Anniversary Evening Reception and Dinner, held in Chicago, along with Stakeholder Forum
- 5/24/07 to 5/25/07 BTS 10th Anniversary Workshop: Strategy's Future Focus and Challenges, held in Chicago
- 6/14/07 Presentation to Canadian Pollution Prevention Roundtable, Winnipeg, given by Alan Waffle
- 6/25/07 GLBTS attendance by Ted Smith at American Water Resources Association, Vail, Colorado
- 8/9/07 GLBTS attendance by Ted Smith at New England Interstate Water Pollution Control Commission on PPCPs, Portland, Maine
- 9/20/07 Integration WG meeting, held in Windsor
- 9/26/07 GLBTS presentation of proposal for new Substance and Sector Groups to Binational Executive Committee, by Danny Epstein
- 10/9/07 GLBTS presentation by Ted Smith at North American Hazardous Materials Management Association, San Diego, California
- 10/23/07 Attendance at Lake Ontario LaMP WG meeting, Grand Island, NY, by Alan Waffle
- 10/29/07 Attendance at "Making a Great Lake Superior," Duluth, Minnesota, by Alan Waffle
- 11/12/07 GLBTS presentations by Ted Smith at Society of Environmental Toxicology and Chemistry, Milwaukee, Wisconsin
- 11/15/07 GLBTS presentation at Univ. of Toronto, by Alan Waffle and Tricia Mitchell

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 <i>Background Information on Mercury Sources and Regulations</i> is posted on the GLBTS Website - 9/10/98 Options Paper <i>Developing a Virtual Elimination Strategy for Mercury</i> 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: <i>Wisconsin Mercury Source Book</i> on community Hg reduction plans, findings of the Mercury Reduction at Electric Utilities workshop, and <i>Mercury Success Stories</i> - 2/99 Information and FAQs on mercury fever thermometers posted on the GLBTS Website - 3/99 GLBTS web postings include: The WDNR guide, <i>Mercury in your Community and Environment</i>, and a manual for hospitals, <i>Reducing Mercury Use in Health Care</i> - 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 <i>Sources and Regulations</i> 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 <i>Reduction Options</i> (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	
	- 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	
	- 6/17/04 WG meeting at the GLBTS Stakeholder Forum in Toronto, Ontario - 8/04/04 Workgroup report revised: <i>Options for Dental Mercury Reduction Programs: Information for State and Local Governments</i> - 11/30/04 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
2005	
	- 5/17/05 WG meeting in Toronto, Ontario - 12/06/05 WG meeting in Chicago, IL
2006	
	- 02/06 WG finalizes Management Assessment for Mercury - 5/17/06 WG meeting in Toronto, Ontario - 12/06/06 WG meeting in Chicago, IL
2007 and ongoing	
	-
Other Mercury Related Activities	
1997 and Earlier	
	- Chlorine Institute voluntary mercury commitment to reduce mercury use by 50 percent by 2005 - 12/97 <i>Mercury Report to Congress</i> is released by US EPA
1998	
	- 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	
	- 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 <i>PBT National Action Plan</i> 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 percent 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 County 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 EPA*, showing a 75 percent 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 percent by 2005
- 10/1/02 Thermostat Recycling Corporation announces that it collected 28,000 thermostats and 231 lbs of mercury in the first half of 2002, a 15 percent 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.

2006

- 6/06/06 US EPA reaffirms Clean Air Mercury Rule (CAMR)
- 8/06 National Vehicle Mercury Switch Recovery Program established by agreement among vehicle manufacturers, steelmakers, vehicle dismantlers, auto shredders, brokers, the environmental community, state representatives, and the US EPA.
- 12/9/06 EC published a Proposed Notice under Part 4 of the Canadian Environmental Protection Act of 1999 outlining proposed requirements to prepare and implement pollution prevention

plans for mercury releases from mercury switches in end-of-life vehicles processed by steel mills. The Notice targets vehicle manufacturers and steel mills.

- 12/20/06 E.C. posted a Risk Management Strategy (RMS) for Mercury-containing products and is holding consultations to obtain the views of Canadians. The RMS provides a framework for the development of control instruments to manage the environmental effects of mercury used in products.

2007

- 2/07 NWF issues report, *Putting the Brakes on Quicksilver: Removing Mercury from Vehicles in Ohio*.
- 4/17/07 Report to Congress: *Mercury Contamination in the Great Lakes* released. Available at http://www.arl.noaa.gov/data/web/reports/cohen/NOAA_Great_Lakes_Mercury_Report.pdf
- 5/07 [confirm date] Chlorine Institute releases its *Tenth Annual Report to EPA*, showing an 89 percent capacity-adjusted reduction in mercury consumption by the U.S. chlor-alkali industry between 1995 and 2005.
- 8/07 GLRC released draft *Great Lakes Mercury in Products Phase-Down Strategy* for public comment.
- 9/07 Switch the 'Stat program launched by the Clean Air Foundation in partnership with 850 heating and cooling contractors in Ontario, to encourage programmable thermostats and collect mercury-containing thermostats.

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.

Substance Activities: Polychlorinated Biphenyls (PCBs)	
	- 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 percent of high-level PCBs (Askarel > 1 percent, 10,000 ppm) had been destroyed in Ontario, Canada; however only 25 percent of low-level PCBs were destroyed, mostly from stored contaminated soil from a contaminated site cleanup 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	
	- 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 <i>Regulation 362</i> 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 percent of high-level PCBs (Askarel > 1 percent, 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	
	- 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

Substance Activities: Polychlorinated Biphenyls (PCBs)

2004

- 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

- 5/17/05 WG meeting in Toronto, Ontario
- 12/06/05 WG meeting in Chicago, IL

2006

- 5/17/06 WG meeting in Toronto, Ontario
- 12/06/06 WG meeting in Chicago, IL

2007 and Ongoing

-

Other PCB Related Activities

1999 and Earlier

- 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

- 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	
	- 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	
	- 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	
	- Amended Canadian PCB regulations are expected to be published in the <i>Canada Gazette I</i> and <i>II</i> 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.
2005	
	- 06/05 An event report on the May 2005 PCB Award Ceremony is published under the title: "Ontario companies recognized for PCB phase-out" page 8, Canadian HazMat Magazine, June/July 2005, accessible at www.hazmatmag.com.
2006	
	- 11/04/06 Proposed Canadian PCB regulations are published in the <i>Canada Gazette I</i>.
2007 and Ongoing	
	- 1/3/07 EC received comments on PCB regulations from 43 stakeholders (following 60-day comment period). - 10/25/07 EC proposed PCB Regulations Policy Changes to EP Board regarding end-of-use deadlines for lower risk PCBs, criteria for proposed extension system, and implementation approach for proposed extension system. - 9/20/07 City of Toronto and Dofasco Inc. received PCB Phase-Out Awards for reductions in the number of PCB transformers in use.

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 Bum 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 Bum Barrel Subgroup has inaugural teleconference - 4/25/00 Bum 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 <i>Sources and Regulations</i> report is prepared - 7/11/00 WG Conference call: developing reduction projects for high priority sectors - 8/1/00 Bum Barrel Subgroup teleconference: discussion Terms of Reference; link to Lake Superior LaMP - 8/18/00 An addendum to the GLBTS Draft <i>Sources and Regulations</i> 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 Bum 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 <i>Reduction Options</i> report is prepared (9/27/00) and the report is posted (9/29/00) on the GLBTS Website - 11/14/00 Bum 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 Bum Barrel Subgroup teleconference: Bum Barrel Strategy - 2/6/01 WG Conference call - 2/13/01 Bum Barrel Subgroup teleconference: Review presentation for Integration Workgroup

Substance Activities: Dioxins/Furans

- 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

Substance Activities: Dioxins/Furans	
	- 9/14/04 Burn Barrel Subgroup teleconference - 9/09/04 Burn Barrel Subgroup teleconference - 10/14/04 WG teleconference: Draft <i>Management Assessment for Dioxins</i> - 11/30/04 WG meeting at the GLBTS Stakeholder Forum in Chicago, IL
2005	
	- 5/17/05 WG meeting in Toronto, Ontario - 12/06/05 WG meeting in Chicago, IL
2006	
	- 5/17/06 WG meeting in Toronto, Ontario - 12/06/06 WG meeting in Chicago, IL
2007 and Ongoing	
	- 2/07/07 WG conference call to review management outcomes of framework assessment for dioxins/furans and to discuss the status of the WG - 3/20/07 Burn Barrel Subgroup teleconference - 5/29/07 Burn Barrel Subgroup teleconference - 7/10/07 Burn Barrel Subgroup teleconference - 9/25/07 Burn Barrel Subgroup teleconference - 11/13/07 WG conference call to discuss the Dioxin Decision Tree

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 <i>U.S. Dioxin Reassessment</i> for external scientific review are released - 9/28/00 Three draft chapters of the <i>U.S. Dioxin Reassessment</i> for SAB review are released
2001	
	- February 2001, Release of <i>National Inventory of Releases of Dioxins and Furans, Updated Edition</i>, 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 - <i>Ash Characterization Study</i> 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	
	- US EPA compiles case studies of open burning reduction efforts
2007 and Ongoing	
	- 1/31; 2/11; 5/22; 10/3/07 US EPA staff conducted outreach presentations at conferences and meetings for local officials in Ohio, Florida, Pennsylvania, and San Diego, among others.

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: <i>The Level 1 Pesticides in the Binational Strategy</i> 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: <i>Canada-Ontario Agreement Objective 2.1: Priority Pesticides Confirmation of No Production, Use, or Import in the Commercial Sector in Ontario</i> - 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 <i>International Convention on the Control of Harmful Anti-fouling Systems on Ships</i>. 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
2004 and Ongoing	
	- At the end of 2004, lindane use was discontinued in Canada. - In 2006 U.S. manufacturers agreed to relinquish the remaining registrations for lindane (use will cease in the U.S. in 2009).

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 <i>Sources and Regulations</i> 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 <i>Reduction Options</i> reports for B(a)P and HCB are prepared - 7/12/00 Final drafts GLBTS Step 3 <i>Reduction Options</i> 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/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 <i>Environmental Management Agreement</i> with EC and Ontario MOE to address environmental priorities - A Woodstove 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 <i>Burn it Smart!</i> 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 <i>Burn it Smart!</i> 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/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
- 5/17/05 WG meeting in Toronto, Ontario - Prepared <i>Management Assessment Reports for HCB and B(a)P</i> using the General Framework to Assess Management of GLBTS Level 1 Substances - 31 <i>Burn it Smart!</i> 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 - 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 cleanup initiatives - 12/06/05 WG meeting in Chicago, IL
2006
- 5/17/06 WG meeting in Toronto, Ontario - 17 <i>Burn it Smart!</i> workshops held in various First Nation and tribal communities, Ontario communities, and two U.S. border cities. Approximately 220 people attended these workshops. - Initiated a North American HCB modeling project to evaluate long-range transport impacts - Worked with CropLife Canada and Pest Management Review Agency to improve estimates of Canadian HCB releases from pesticide application. - New York Academy of Sciences held a conference call in October with stakeholders from both U.S. and Canada to discuss estimates of PAH releases from creosote-treated wood. - 12/06/06 WG meeting in Chicago, IL
2007 and Ongoing
-

Other HCB/B(a)P Related Activities	
1999 and Earlier	
	- 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, <i>Global HCB Emissions</i> (Robert Bailey, 1999), is distributed to the WG - 1/99 wood stove changeover pilot program for Eastern Ontario
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 - PBT workgroups continue to work on draft <i>National Action Plans</i> for HCB/B(a)P - 5/5/00 Robert Bailey prepares report, <i>HCB Concentration Trends in the Great Lakes</i>, for the WG
2001	
	- 2/01-4/01The Hearth Products Association expands the Great Lakes Great Stove Change out 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	
	- Source release information to improve inventories collected through voluntary stack testing - An emission testing program for wood burning in fireplaces, wood stoves, and pellet stoves developed and implemented with partners to fill information gaps - 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 - 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	
	- Twelve Wood Energy Technology Transfer Inc. training workshops held in Ontario - US EPA <i>Scrap Tire Pile Mitigation Support Project</i> underway promoting mapping and cleanup 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	

- 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 cordwood.
- Commenced Ontario B(a)P mapping project to highlight priority areas.

2006

- US EPA initiated Green Stoves Labeling Program
- US EPA initiated studies to evaluate Outdoor Wood Boilers
- EC commenced information gathering exercise with Hearth, Patio and Barbecue Association of Canada on outdoor wood boiler usage in Ontario and Eastern Canada
- EC completed B(a)P mapping project for the Great Lakes Basin by adding Ontario information
- EC worked with Ontario Ministry of the Environment and initiated other projects to improve the emission inventories of HCB/B(a)P.
- New York Academy of Sciences published an Ecological Assessment and Pollution Prevention Report detailing PAH releases from all sources in New York and New Jersey Harbor
- *Burn-it-Smart!* public education information provided at Cottage Life Shows in Toronto in April and November, at the International Plow Match in Peterborough in September, and the Home Hardware national sales meeting in St. Jacobs (north of Waterloo) in September
- EC produced final report on artificial log study with Puget Sound Clean Air Agency
- EC partnered with Hearth, Patio and Barbecue Association on emission testing of five conventional wood stoves and drafted report
- Ontario Ministry of the Environment announced that the Used Tire Program was deferred beyond the immediate future
- US EPA initiated a Mid-West Clean Diesel Initiative in Region 5 to reduce diesel emissions

2007 and Ongoing

- 4/07 Agreement between US EPA and major outdoor wood boiler manufacturers takes effect; manufacturers must offer at least one model of wood boiler that will produce 70 percent less emissions, with further reductions in subsequent years.
- 5/07 EC and the Hearth, Patio, and Barbecue Association partnered to conduct a study of conventional wood stoves, results presented at 16th Annual Emission Inventory conference in Raleigh, NC.
- 9/25/07 Comprehensive workshop in Philadelphia on outdoor wood boilers, wood stove change-outs, local air districts' efforts to reduce wood smoke.

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 percent 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

Substance-Specific Activities: Alkyl-lead	
	- 10/29/99 draft GLBTS <i>Sources, Regulations and Options</i> (Steps 1, 2 & 3) Report for Alkyl-Lead is posted on the GLBTS Website
2000	
	- GLBTS <i>Sources, Regulations, and Reduction Options</i> (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: <i>Report on the Use of Alkyl-lead in Automotive Gasoline</i> 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 <i>National PBT Action Plan</i> for Alkyl-lead
2000	
	- 8/25/00 A Draft <i>PBT National Action Plans</i> 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	

Substance-Specific Activities: Octachlorostyrene (OCS)

- 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

Substance Group Activities

2007

- 11/30/07 Introductory meeting of Substance Group (joint meeting with Sector Group conducted by teleconference) to review draft terms of reference for the new groups.

Sector Group Activities

2007

- 11/30/07 Introductory meeting of Sector Group (joint meeting with Substance Group conducted by teleconference) to review draft terms of reference for the new groups.

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

- 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

- 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

- 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 and Ongoing

- Ongoing assessments and remediations in both the U.S. and Canada within the Great Lakes watershed (see Section 7.0)

Related Sediment Activities

1998 and Earlier

- 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

Sediments

2002

- 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

- Work under The Great Lakes Legacy Act begins.

Long-Range Transport (LRT) Activities

1999

- 11/19/99 EC presents the status of their LRT effort at the Integration WG meeting.

2000

- 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

- Several studies are undertaken in the U.S. and Canada to characterize global transport processes.

2003 and Ongoing

- 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

General Activities Related to Reductions in GLBTS Substances	
	- 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 US Territories Outside the Customs Territory of the US
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 percent
2005	
	- 5/18/05 US EPA publishes Clean Air Mercury Rule
2006	
	- 6/06/06 US EPA reaffirms Clean Air Mercury Rule
2007	
	- 9/20/07 US EPA publishes a Proposed Rule under 40 CFR Part 63 on Electric Arc Furnace Steelmaking Facilities, regarding a MACT standard for controlling emissions of mercury when such facilities use steel scrap that contains auto switches and other devices that contain mercury (72 FR 53814-53836).

General Activities Related to Reductions in GLBTS Substances	
US EPA Activities	
1999 and Earlier	
	- 6/97 <i>Deposition of Air Pollutants to the Great Waters: Second Report to Congress</i> is released - 12/97 <i>Mercury Report to Congress</i> is released - 4/98 <i>Final Emission Inventory Data for Section 112(c)(6) Pollutants</i> is released - 11/16/98 US EPA's Multimedia PBT Strategy is announced - 11/16/98 Under the PBT Strategy, a draft <i>National Action Plan for Mercury</i> 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	
	- 6/00 <i>Deposition of Air Pollutants to the Great Waters: Third Report to Congress</i> is released - 6/12/00 draft chapters of the U.S. <i>Dioxin Reassessment</i> 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. <i>Dioxin Reassessment</i> 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	
	- 5/23/01 U.S. signs the United Nation's global treaty on Persistent Organic Pollutants (POPs)
2002	
	- 1/02 <i>The Incidence and Severity of Sediment Contamination in Surface Waters of the United States, National Sediment Quality Survey: Second Edition</i> 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	
	- 5/18/04 Great Lakes Interagency Task Force created by U.S. Executive Order
EC Regulatory Determinations	
1999 and Earlier	
	- <i>Canadian Environmental Protection Act</i> is renewed
2000	
	- 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 Processes (SOPs) are under development for the Iron and Steel Manufacturing sector and finalized for the Wood Preservation sector

General Activities Related to Reductions in GLBTS Substances

- 6/19/00 EC solicits public comments on proposed amendments to the PCB regulations under CEPA

2001

- 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

- 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.

2006

- 11/04/06 Proposed Canadian PCB regulations are published in the *Canada Gazette, Part I*.
- 11/21/06 to 1/20/07 Province of Ontario collected public comments on a risk-based decision-making framework for contaminated sediments completed under the 2002-2007 Canada-Ontario Agreement Respecting the Great Lakes Ecosystem.
- 11/29/06 Final regulatory amendments to include Pentachlorobenzene, and Tetrachlorobenzene on the Prohibition of Certain Toxic Substance Regulations, 2005 were published in *Canada Gazette, Part II*
- 12/08/06 Canada announces intention to commit \$300 million over four years to implement the Chemicals Management Plan (Appendix B).
- 12/13/06 Hexachlorobutadiene (HCBD) was added to the *Virtual Elimination List* with a level of quantification in chlorinated solvents.

2007

- 12/9/06 Environment Canada published a Proposed Notice under CEPA 1999: requiring the preparation and implementation of pollution prevention plans for mercury (Hg) releases from mercury switches in end-of-life vehicles processed by steel mills.

EC Activities

1999 and Earlier

- 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

- 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

2007

- 12/06 Canada's Chemicals Management Plan announced

Other Activities	
1998 and Earlier	
	- CEC issues Continental Pollutant Pathways Initiative - 7/98 UNEP POPs negotiations initiated
1999	
	- 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 <i>Great Lakes Regional Air Toxics Emissions Inventory</i>, using 1993 data, is released - The Lake Ontario LaMP Update 1999 is released
2000	
	- 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, <i>Using Models to Develop Air Toxics Reduction Strategies</i> - 12/00 Final POPs negotiations - The 1996 Great Lakes Inventory of Toxic Air Emissions is prepared by the Great Lakes Commission
2001	
	- 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	
	- Monitoring of air deposition of toxic pollutants in the Great Lakes Basin continues under IADN
2003	
	- 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	
	- 4/23/04 Great Lakes Commission releases 2001 Great Lakes Regional Air Toxic Emissions Inventory, available at www.glc.org/air - 10/6/04 – 10/8/04 State of Lakes Ecosystem Conference (SOLEC) held in Toronto, Ontario

2006	
	- 11/01/06 – 11/03/06 State of Lakes Ecosystem Conference (SOLEC) held in Milwaukee, WI - Monitoring of air deposition of toxic pollutants in the Great Lakes Basin continues under IADN
2007 and Ongoing	
	- 2/07 NWF issues report, Environmentally Preferable Purchasing in the Great Lakes Region - 7/16/07 US EPA workshop, Building an Integrated Surveillance System for Emerging Chemicals in the Great Lakes and Nationwide, held in Chicago

APPENDIX B
CANADA'S CHEMICALS MANAGEMENT PLAN

Appendix B: Canada's Chemicals Management Plan

Chemical substances are everywhere around us—in the environment, our food, clothes, and even our bodies. Many of these chemical substances are used to improve the quality of our lives. Most of these chemical substances are not harmful to the environment or human health. However, some have the potential to cause harm, in certain doses, and should be used only when the risks are appropriately managed.

Canada's Chemicals Management Plan will improve the degree of protection against hazardous chemicals. It includes a number of new, proactive measures to make sure that chemical substances are managed properly.

This new plan will build on Canada's position as a global leader in the safe management of chemical substances and products. It will marshal new and better science to improve the assessment and mitigation of risks, and it will provide Canadian families with better information about the safe use and disposal of a range of everyday products.

Canada's Chemicals Management Plan includes:

- Regulations and enforcement
- Challenge to industry
- Restrictions on re-introduction and new uses
- Rapid screening of lower risk chemical substances
- Accelerated re-evaluation of older pesticides
- Mandatory ingredient labeling of cosmetics
- Regulations to address environmental risks posed by pharmaceuticals and personal care products
- Enhanced management of environmental contaminants in food
- Health monitoring, surveillance, and research
- Good stewardship of chemical substances.

Regulations and Enforcement

The Government of Canada will be taking immediate action on five substance categories confirmed to be harmful to the environment and to human health in the long run, moving toward prohibiting most uses. Industry recognizes the necessity of these actions and in many cases has been moving to find solutions. The Government of Canada will also be establishing a Virtual Elimination List under the Canadian Environmental Protection Act⁹⁵ and adding the first substances to that list.

⁹⁵ CEPA. (1999). Op. cit.

Challenge to Industry

Categorization identified 193 chemical substances that are potentially harmful to human health or the environment that represent the highest priorities for risk assessment and appropriate controls. The Government of Canada will use existing tools and regulations to challenge industry to provide new information about how it is managing these 193 chemical substances.

These chemical substances will be assessed between 2007 and 2010. Every three months, data on groups of 15 to 30 substances are being released to industry and stakeholder groups for a six-month comment period. The Government of Canada will then decide what actions to take.

Restrictions on Re-introduction and New Uses

In December 2006, the Government of Canada issued a notice of intent to apply Significant New Activity requirements under CEPA 1999 to approximately 150 high-hazard chemical substances not currently in use in Canada. In 2007, the Government of Canada also issued notices of intent to apply the Significant New Activity requirements to two organotin substances and to six substances solely used as pesticides. These notices mean that industry must provide data to be reviewed by EC and HC before any of the chemical substances on the list can be re-introduced into Canada.

In early 2008, Significant New Activity provisions under CEPA 1999 will be applied to an additional 20 chemical substances that are highly hazardous to humans. While current uses of these substances are responsibly managed, this will ensure that any new or increased use of these substances is not allowed without informed assessment and appropriate controls.

Rapid Screening of Lower Risk Chemical Substances

Categorization identified a number of lower risk substances that were unlikely to pose a threat to the environment, based on available evidence. These substances were screened quickly, and the results were released for public comment on June 23, 2007.

A number of substances, while meeting the categorization criteria, are not likely to pose a risk to the environment in the amounts at which they are found. The accelerated screening approach applied a worst-case scenario to determine whether further assessment is necessary. Of the 1,066 substances that were evaluated, 312 substances were identified as requiring further screening assessment to evaluate their potential to cause ecological harm.

Accelerated Re-evaluation of Older Pesticides

The Government of Canada will accelerate the re-evaluation of the remaining 200 older pesticides, targeted for completion by 2009. These re-evaluations are being conducted to determine if these pesticides meet today's health and environmental standards. Review and registration of new and reduced-risk pesticides, to potentially replace older pesticides removed from the market following a re-evaluation decision, will also be done more quickly.

Mandatory Ingredient Labelling of Cosmetics

On November 16, 2006, the Government of Canada brought into force amended *Cosmetic Regulations* requiring ingredient labelling on all cosmetic products.⁹⁶

Regulations to Address Environmental Risks Posed by Pharmaceuticals and Personal Care Products

The Government of Canada intends to work closely with stakeholders to complete the health and environmental assessments of more than 9,000 substances used in products regulated under the Food and Drugs Act.⁹⁷ In addition, the Government of Canada will work with stakeholders to promote best practices for the proper disposal of Food and Drugs Act products, such as PPCPs, to reduce the burden on the environment.

Enhanced Management of Environmental Contaminants in Food

Canada's food supply is already one of the safest in the world. However, Canadians are increasingly concerned about chemical contaminants. The regulation of contaminants under the Food and Drug Regulations will be strengthened.⁹⁸ Actions will be taken to identify and reduce these contaminants in the food supply and to minimize potential health impacts on Canadians. Consumers will be provided with up-to-date food safety information to help them make healthy food choices for themselves and their families.

Health Monitoring, Surveillance, and Research

Working with Statistics Canada, provinces, territories, and other agencies, the Government of Canada will build a monitoring and surveillance regime that will track exposure to toxic substances.

Sensitive species will be observed through an ecological monitoring program, which will also serve as an early warning system for harmful substances in the ecosystem.

In addition to identifying emerging substances that warrant attention, the program will ensure that we can measure progress on our actions.

Good Stewardship of Chemical Substances

The Government of Canada is taking immediate and decisive action to address substances of high concern, and is moving to reassure Canadians about substances that are of lesser concern. There are also more chemical substances that have been identified as requiring further

⁹⁶ Canada Gazette. (December 1, 2004). Food and Drugs Act, Regulations Amending the Cosmetic Regulations, P.C. 2004-1326, 16 November, 2004. Canada Gazette vol. 138, no. 24. Available at <http://canadagazette.gc.ca/partII/2004/20041201/html/sor244-e.html>.

⁹⁷ HC. (January 18, 2007). Consolidation of the Food and Drugs Act and the Food and Drug Regulations. Prepared by Health Canada. Available at http://www.hc-sc.gc.ca/fn-an/legislation/acts-lois/fda-lad/index_e.html.

⁹⁸ HC. (January 18, 2007). Op. cit.

assessment in future years. The Government of Canada is committed to assessing all of the substances that have been identified through categorization via successive rounds of assessment and, where necessary, regulatory action. Continuously improved information on the uses and effects of chemical substances will help establish these next rounds of priorities. This plan includes the investments needed to get this work started, and to keep Canada at the forefront of chemicals management globally.

Managing chemicals safely also relies on strong stewardship from Canadian industry. The government will work with key sectors to develop and codify comprehensive, sound management practices that will protect Canadians and the environment. The federal government will also work to ensure that information about chemical substances, their hazards, and also practices for their safe management is available to Canadians.

The Government of Canada will improve product labelling programs as well as the way we deal with imported products that contain chemical substances prohibited in Canada. The Government of Canada will also look at ways to enhance its current monitoring of consumer products.

More information about the Chemicals Management Plan, including the list of substances to be addressed, can be found via the Chemical Substances Web site at <http://www.chemicalsubstances.gc.ca>.