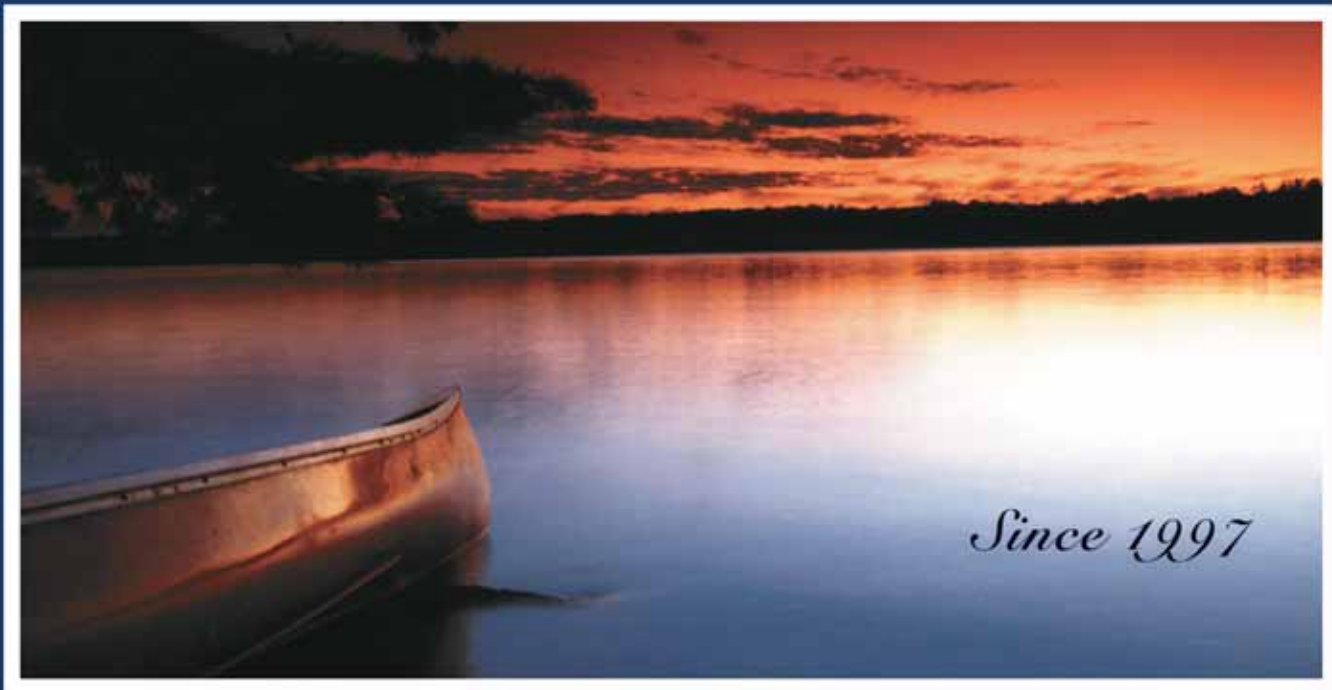


**Great Lakes Binational
Toxics Strategy**



Tenth Anniversary Edition

2006
Annual
Progress Report



Environment
Canada

Environnement
Canada



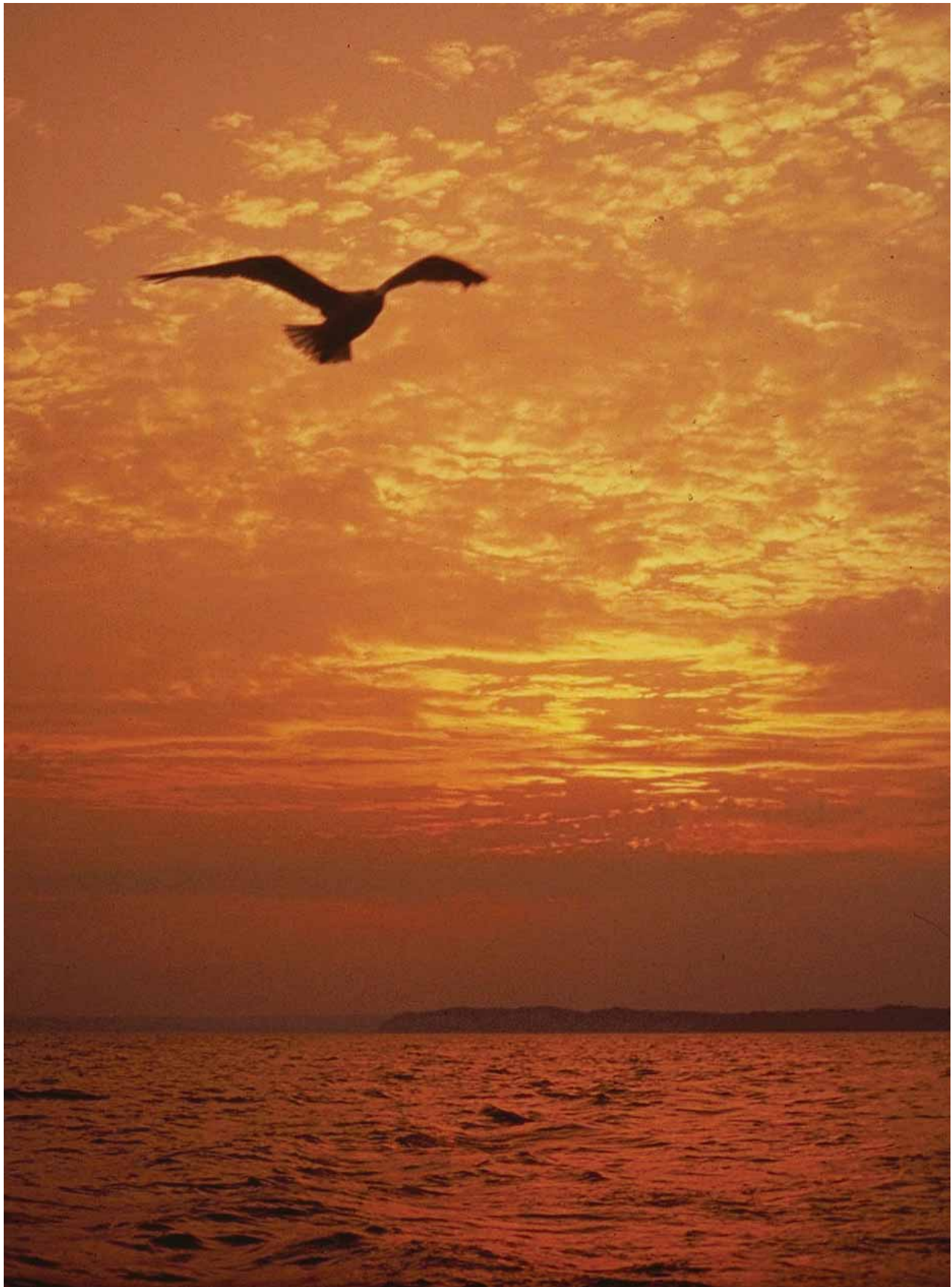
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GREAT LAKES BINATIONAL TOXICS STRATEGY

2006 Progress Report



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



TABLE OF CONTENTS

ACRONYMNS.....	i
LETTER FROM GLBTS CO-CHAIRS.....	v
STAKEHOLDER PERSPECTIVES.....	vii
INTRODUCTION.....	1
1.0 MERCURY.....	5
2.0 POLYCHLORINATED BIPHENYLS (PCBs).....	15
3.0 DIOXINS/FURANS.....	29
4.0 HEXACHLOROBENZENE/BENZO(a)PYRENE (HCB/B(a)P).....	37
5.0 INTEGRATION WORKGROUP.....	47
6.0 SEDIMENTS CHALLENGE.....	51
7.0 LONG-RANGE TRANSPORT CHALLENGE.....	69
8.0 ENVIRONMENTAL INDICATORS OF PROGRESS.....	73
APPENDIX A: GREAT LAKES BINATIONAL TOXICS STRATEGY STAKEHOLDERS.....	A-1
APPENDIX B: GREAT LAKES BINATIONAL TOXICS STRATEGY (GLBTS) PROGRESS OVERVIEW 1997 – 2006.....	B-1
APPENDIX C: PART I: GREAT LAKES BINATIONAL TOXICS STRATEGYASSESSMENT OF LEVEL 1 SUBSTANCES SUMMARY; AND PART II: GENERAL FRAMEWORK TO ASSESS MANAGEMENT OF GLBTS LEVEL 1 SUBSTANCES: BACKGROUND, OBJECTIVES, AND DOCUMENTATION.....	C-1



ACRONYMS

ADA	American Dental Association
AER	Atmospheric and Environmental Research, Inc.
AHA	American Hospital Association
AOC	Area of Concern
B(a)P	Benzo(a)pyrene
BEC	Binational Executive Committee
BETR	Berkeley-Trent Model
BFRs	Brominated Flame Retardants
BGSU	Bowling Green State University
CAA	Clean Air Act
CAMNet	Canadian Atmospheric Mercury Measurement Network
CAMR	Clean Air Mercury Rule
CCME	Canadian Council of Ministers of the Environment
CanMETOP	Canadian Model for Environmental Transport of Organochlorine Pesticides
CEPA	Canadian Environmental Protection Act
CGLI	Council of Great Lakes Industries
COA	Canada-Ontario Agreement
CWS	Canada-wide Standards
EC	Environment Canada
EMEP	Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe
GEM	Global Environmental Multi-scale model
GIS	Geographic Information System
GLBTS	Great Lakes Binational Toxics Strategy
GLFCSP	Great Lakes Fish Contaminants Surveillance Program
GLNPO	Great Lakes National Program Office
GLRC	Great Lakes Regional Collaboration
GLWQA	Great Lakes Water Quality Agreement
HARP	Hayton Area Remediation Project
HBCD	Hexabromocyclododecane
HCB	Hexachlorobenzene
HCH	Hexachlorocyclohexane
Hg	Mercury
HPBA	Hearth, Patio and Barbeque Association
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
ISO	International Standards Organization
LaMPs	Lakewide Management Plans
LDR	Land Disposal Restrictions
LMMB	Lake Michigan Mass Balance
LRTAP	Convention on Long-range Transboundary Air Pollution
MACT	Maximum Available Control Technology
MCDI	Midwest Clean Diesel Initiative
MDEQ	Michigan Department of Environmental Quality
MDN	Mercury Deposition Network
MOE	Ministry of the Environment (Ontario)
MOU	Memorandum of Understanding
MWC	Municipal Waste Combustors
MWI	Medical Waste Incinerators
NAPS	National Air Pollution Surveillance Network
NDAMN	National Dioxin Air Monitoring Network
NADP	National Atmospheric Deposition Program
NEI	National Emissions Inventory
NGO	Non-Governmental Organization
NOx	Nitrogen Oxides
NPL	National Priority List
NPRI	National Pollutant Release Inventory (Canada)
NRDA	Natural Resource Damage Assessment
OCS	Octachlorostyrene
OTS	Ontario Tire Stewardship
OU	Operable Unit
P2	Pollution Prevention
PAH	Polycyclic Aromatic Hydrocarbon
PBDEs	Polybrominated Diphenyl Ethers
PBT	Persistent Bioaccumulative and Toxic
PC1	First Principal Component
PCA	Principal Components Analysis
PCBs	Polychlorinated Biphenyls
PCDD	Polychlorinated Dibenzo-Para-Dioxins
PCDF	Polychlorinated Dibenzofurans
PCP	Pentachlorophenol
PFCs	Perfluorochemical Compounds



PFOS	Perfluorooctanesulfonate
PM	Particulate Matter
POPs	Persistent Organic Pollutants
PTS	Persistent Toxic Substances
PVOC	Polar Volatile Organic Compounds
RAPs	Remedial Action Plans
RCRA	Resource Conservation and Recovery Act
ROPS	Remedial Options Pilot Study
SAB	Science Advisory Board
SOLEC	State of the Lakes Ecosystem Conference
SOP	Strategic Options Process
SWARU	Solid Waste Area Reduction Unit
SVOC	Semi-Volatile Organic Compound
TEQ	Toxic Equivalent
TF HTAP	Task Force on Hemispheric Transport of Air Pollutants
TGM	Total Gaseous Mercury
TSMP	Toxic Substances Management Policy
TRC	Thermostat Recycling Corporation
TRI	Toxics Release Inventory (U.S.)
TSCA	Toxic Substances Control Act
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
US EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
USWAG	Utility Solid Waste Activities Group
VOC	Volatile Organic Compound
WDNR	Wisconsin Department of Natural Resources
WETT	Wood Energy Technology Transfer
WG	Workgroup
WLSSD	Western Lake Superior Sanitary District



A Message from Gary Gulezian and Danny Epstein Co-Chairs of the Great Lakes Binational Toxics Strategy



Dear GLBTS Stakeholders,

On this the 10th anniversary of the Great Lakes Binational Toxics Strategy, we wish to extend our thanks to those individuals and organizations who have participated in and contributed to the work of the Strategy. Without your sustained involvement and contributions, the Strategy would not have achieved the many successes it has to become a key initiative of environmental management in the Great Lakes.

Since its launch in 1997, the Strategy has succeeded in providing a governance model that facilitated government, business, First Nations and Tribes, and civil society to come together in a forum to collaborate and mutually work toward virtually eliminating toxic substances in the Great Lakes Basin. This is evidenced by the robust attendance and engagement that consistently characterizes Stakeholder Forum and Integration Workgroup meetings, as well as substance-specific Workgroup meetings and teleconference calls. Beyond this significant foundational accomplishment, others successes also warrant mention.

First, the Strategy has made significant progress toward the goals established by the Governments to virtually eliminate toxic substances in the Basin. The enclosed report sets out the full extent of the Strategy's progress. This has been made possible in part because stakeholders to the Strategy have taken on a shared sense of responsibility for the necessary actions to reduce and eliminate persistent, bioaccumulative and toxic substances from the Great Lakes Basin.

Second, through its evolution, the Strategy has established an important interface with the Lakewide Area Management Plan initiatives and the State of the Lakes Ecosystem Conference program. The work of each undertaking has benefited from the cooperation borne of those relations.

Third, the Strategy has forged a stronger relationship with the North American Free Trade Agreement's Commission for Environmental Cooperation Sound Management of Chemicals Workgroup. The Integration Workgroup has explored, with input from the Commission, how each initiative might enhance the work of the other, and, from this, proponents of each now confer regularly to exchange ideas on matters of mutual interest.

Fourth, the Strategy has become an exemplar of sustainable planning through the development and implementation of its four-step process. That process, being both systematic and transparent, has



provided consistency and objectivity with respect to the manner in which matters of significance in the Basin are taken up and pursued.

Fifth, the Integration Workgroup has become a forum for meaningful deliberation and direction setting. Stakeholder participants have forged strong, mature working relationships that balance the pursuit of both individual and collective interests.

Finally, the Strategy has evolved into an integrative and holistic approach to toxic substances management in the Great Lakes, by incorporating environmental surveillance in its overall strategy toward mitigating threats to the Basin.

Many individuals and organizations have contributed to the Strategy's ongoing success since its beginning. While those contributions have varied, one thing has remained consistent: each and every contribution has moved the Strategy forward in some manner, helping to sharpen its focus, sustain its approach, and define its success. To recognize the impact of those contributions, and to express our gratitude, we have sought, in Appendix A of this report, to identify each individual who has contributed to the Strategy.

For those now involved in the Strategy, we look forward to your continued participation; for those just discovering the Strategy, we eagerly encourage your involvement. Much remains to be done, and we welcome the opportunity to continue working together to secure sustainability in the Great Lakes Basin.

Thank you,

Gary Gulezian
U.S. GLBTS Co-Chair

Danny Epstein
Canadian GLBTS Co-Chair



Stakeholder Perspectives

In recognition of the 10-year anniversary of the GLBTS, stakeholders were invited to share their perspectives on significant achievements of the GLBTS over the past 10 years. The following viewpoints were submitted by stakeholders.

Council of Great Lakes Industries' Perspective

In the spring of 1997, following the official signing of the GLBTS, the Council of Great Lakes Industries (CGLI) called the document “a pragmatic approach to achieving virtual elimination.” CGLI pledged to join with other qualified stakeholders “in taking the next steps toward accomplishing the aggressive objectives set out by this strategy.”

Now, after 10 years of lively multi-stakeholder discussions, active recruitment of industry representatives, volumes of source characterization and release data, workshops and conferences, CGLI considers the GLBTS to be a successful program.

The GLBTS has been an effective program because of some of its unique and specific features. The first is the multi-stakeholder nature of the Strategy, which brings government, environmental groups, and industry together to meet the programmatic goals of the program. Second, the goals themselves are especially effective because there are specific goals for each substance, in each country, with established timetables. Third, the program is binational. Fourth, and critical to industry, the program is voluntary. Industry views voluntary programs as proactive, non-regulatory responses to societal needs. The GLBTS has sought solutions to supplement existing regulation in order to achieve the Great Lakes Water Quality Agreement (GLWQA) objectives. There has been a great deal of progress.

Multi-stakeholder

Over these 10 years, members of diverse groups, including industry, environmental groups, and governments, from both nations have come together to hold open discussions, create solutions to the remaining issues, and meet the set targets and timetables.

CGLI has devoted considerable time and resources to meeting the objectives of the Strategy. In the process,

CGLI has reached out to industry representatives with the goal of increasing their participation in the GLBTS process.

When CGLI began contacting industry to participate in this program, it was difficult. Most had never heard of the program, some were reluctant to get involved in another government program, and still others were not eager to discuss their industry issues alongside environmentalists. Multi-stakeholder processes were not the norm.

CGLI has conducted an ongoing industry awareness program. Initially, CGLI created GLBTS awareness materials and held workshops for industry representatives to discuss release sources, reduction methods, and progress. Through phone calls, presentations to industry groups, websites, face-to-face meetings, and informational material prepared specifically for industry, CGLI has involved more than 165 industry representatives in the GLBTS process during the past 10 years. These industry participants were carefully selected to make sure that the right parties were part of the discussion for each substance workgroup. This outreach process has continued throughout the program. As some industries are identified as new sources, others were found to no longer use or produce the selected substances.

This unique collaborative process with government representatives and environmentalists has created relationships which go beyond the GLBTS. This process also created a better understanding of the issues, the trade-offs that often must be made, and the prioritization that is often necessary. Environmentalists learned of the impact of bad business cycles, and industry was sometimes surprised by being on the same side as environmentalists on certain issues.

These relationships have continued in other regional activities such as the GLWQA Review.

Specific Goals and Established Timetables

The process of meeting specific goals and timetables for each substance was easy for industry to understand. Industry's daily operations are based on meeting specific goals. It is how industry gets things done. By working toward the specific goals and timetables of the Strategy, industry understood the



goal, determined how to achieve the needed progress, and how to determine when the goal was reached. Industry operates efficiently to meet specific goals. While striving to meet the substance goals, CGLI and industry representatives worked to constantly inform the process. Industry efforts included:

- Worked to build source and release inventories
- Collected success stories of industry action
- Provided speakers on substance issues
- Researched industry incentives
- Prepared comprehensive workgroup reports
- Piloted and help implement a decision tree process for guiding industry sector significance
- Provided pollution prevention reports
- Introduced risk-based prioritization
- Examined U.S. Areas of Concern (AOC) sediment issues and the application of risk-based decision-making
- Conducted monthly industry stakeholder calls to update progress
- Developed chemical inventory source characterization
- Worked on communication planning
- Worked on issues such as burn barrels that contain a public outreach component
- Worked to ensure that the GLBTS process was conducted in coordination with national and international programs to address persistent, bioaccumulative, and toxic (PBT) chemicals
- Continually worked to involve all relevant industry sectors and to remove focus from sectors that were deemed not to be sources.

Binational

The members of the CGLI are from the U.S. and Canada. Because of the binational nature of the program, CGLI worked with industry, CGLI members and non-members, on both sides of the border to meet the differing goals of each country. The GLBTS meetings brought better understanding of how issues are dealt with in each country and emphasized the regional nature of the environmental issues of the

substances being addressed. The open discussion brought more opportunities to deal with the regional issues.

Voluntary

The proactive, non-regulatory responses to the GLBTS objectives have been especially attractive to industry. The program has given industries the ability to determine the most efficient and economically feasible ways to meet the specific challenges. In addition, it has provided a forum to showcase industry accomplishments in meeting the stated goals through innovative solutions. Industry pollution prevention programs, environmental stewardship programs, and the requirements of environmental management systems were shared with all stakeholders. The voluntary approach was showcased as a method of how best to make environmental improvements. Industries had the opportunity to learn from each other and an opportunity for public recognition of their efforts.

Future

As the GLBTS looks toward the future, CGLI has been involved in charting its new course of action. CGLI has:

- Participated in the development of the chemical evaluation protocol adopted by the Integration Workgroup
- Prepared a Level 2 substance pollution prevention report
- Provided comments for existing Level 1 Substance Management Assessment Reports
- Made recommendations regarding key considerations when contemplating whether to add to the substance list
- Provided a catalog of existing national and international screening programs.

While recommendations of the Great Lakes Regional Collaboration and the GLWQA Review process will impact a future GLBTS, CGLI believes that the current GLBTS program successes serve as the best model for future program designs.

The Chlorine Institutes' Perspective

In 1996, the Chlorine Institute and its U.S. based mercury cell chlor-alkali producers voluntarily



committed to reduce mercury use in the chlor-alkali industry by 50 percent by 2005 in support of the Canadian and U.S. GLBTS mercury reduction goals. The Chlorine Institute and its members also agreed to provide to U.S. EPA an annual report on the progress it has made.

When the commitment was made, the industry used an average of 160 tons of mercury per year. In 2005, the industry used 10 tons, a reduction of nearly 94 percent. After adjusting for closed facilities, mercury use per ton of chlorine produced declined from 0.182 lb/ton in the base period to 0.017 lb/ton in 2005, a reduction of 91 percent.

During the period, the Chlorine Institute and its member mercury cell producers worked proactively to address many operational issues pertaining to the use of mercury in the industry. The following points summarize some of the more significant activities:

- Held half-day workshops for all worldwide members involved in mercury cell chlor-alkali production to discuss mercury issues at every Chlorine Institute Annual Meeting during the 10-year period. The topics discussed in the workshops included environmental, technical, safety, health, and regulatory issues. During these workshops, industry experts, and frequently regulators from agencies such as US EPA, presented topics of interest.
- Workshops involving all the mercury cell producers were held at various production sites throughout the 10-year period. These workshops were one to three days in length. The work products of the workshops were the following Chlorine Institute guidance documents:
 - Guidelines for the Handling of Rubber-Lined Cell Parts Potentially Contaminated with Mercury
 - Guidelines for Conducting a Mercury Balance
 - Guidelines for Technologies to Reduce Mercury in Sodium Hydroxide
 - Guidelines for Mercury Cell Chlor-Alkali Plants Emission Control: Practices and Techniques
 - Guidelines for the Optimization of Mercury Wastewater Treatment (Sulfide Precipitation Process) Systems
 - Guidelines to Physicians in Conducting Mercury Medical Surveillance Programs
 - Guidelines: Medical Surveillance and Hygiene Monitoring Practices for Control of Worker

Exposure to Mercury in the Chlor-Alkali Industry (This document was updated and expanded to include the Guidelines to Physicians document).

All of the above work products were distributed to mercury cell producers through the world and mostly at no cost. All were posted on the U.S. EPA Binational Toxics Strategy website.

- The members participated in key mercury reduction activities undertaken by various groups including the U.S. EPA, United Nations Economic Commission for Europe (UNECE), North American Commission for Environmental Cooperation, the U.S. Department of Defense Logistics, various U.S. States, and the Environmental Council of the States.
- The Chlorine Institute was one of the first groups to formally urge the United States to sign the UNECE's Heavy Metals Protocol.
- The Chlorine Institute and its members participated actively in GLBTS Mercury Workgroup activities and periodically gave reports at meetings describing the mercury reduction activities undertaken by Chlorine Institute members.
- The Chlorine Institute and its members participated in international workshops addressing the use of mercury in chlor-alkali plants in Brazil, India, and South America.
- In May 2006, the Chlorine Institute issued its Ninth Annual Report to EPA describing the last year's progress.
- The Chlorine Institute and its mercury chlor-alkali producers were separately commended for progress made at different times over the past 10 years by the EPA Region 5 Administrator and the U.S. EPA Administrator.

Western Lake Superior Sanitary Districts' Perspective

The Western Lake Superior Sanitary District (WLSSD) has benefited greatly from involvement with the GLBTS over the past 10 years. WLSSD staff have appreciated the interaction with representatives of other agencies, joint projects and the greater opportunity to receive grants to undertake larger initiatives than might have been possible alone.



WLSSD was especially interested in the emerging concept of voluntary pollution prevention programs, as pollution prevention concepts are ideal ways for wastewater treatment plants to reduce their contribution of toxins to the Great Lakes. The GLBTS afforded WLSSD the opportunity to share knowledge and learn from other relevant projects around the region, even those across international boundaries.

As members of the Mercury and Dioxin/Furan Workgroups and various subgroups, WLSSD received and managed numerous large US EPA GLNPO grants to undertake pollution prevention demonstration and public education projects. Notable projects include the Zero Discharge Demonstration Project for Lake Superior, the development of a “Blueprint for Mercury Reduction” to provide guidance to other wastewater treatment facilities in mercury reduction efforts, and the creation of a public garbage burning prevention campaign featuring the “Bernie the Burn Barrel” character. Most recently, as a member of the Burn Barrel Subgroup, WLSSD produced a toolkit for Great Lakes area local government officials entitled “Clearing the Air: Tools for Reducing Residential Garbage Burning.” The toolkit was produced in conjunction with an updated “Bernie” public awareness campaign about the hazards of burning which can be adapted for use in any municipality.

These projects allowed WLSSD to further its mission to prevent pollution and protect Lake Superior. WLSSD applauds the past work of the GLBTS, and hopes to see additional future reductions in persistent toxins as the GLBTS completes its important goals.

National Wildlife Federations’ Perspective

The National Wildlife Federation (NWF) has looked upon the GLWQA as a landmark binational commitment by the citizens of the U.S. and Canada to protect and restore the waters of the Great Lakes. The Agreement has been innovative in its vision for Great Lakes protection, including in its purpose to “restore and maintain the physical, chemical, and biological integrity of the waters of the Great Lakes Basin Ecosystem,” and the commitment to virtual elimination goals for toxic chemicals.

Consistent with our strong support for the GLWQA, NWF was encouraged with the signing of the Canada-U.S. Great Lakes Binational Toxics Strategy (GLBTS) in 1997, which facilitated a collaborative process – with an emphasis on pollution prevention – to work

toward the goals of the GLWQA. While we have supported strong regulatory mechanisms to address toxic chemical issues in the Great Lakes, we have recognized the importance of pursuing voluntary approaches as well in efforts to protect and restore Great Lakes water quality. NWF has been fortunate to have been involved in the GLBTS since its inception. We have appreciated the opportunity to work with a number of stakeholders in support of shared goals for protection and restoration of Great Lakes water quality, goals toward which NWF has worked through activities out of our Great Lakes office for over two decades.

We believe the GLBTS organizing structure has worked quite well through the years, with the emphasis on substance-specific workgroups; this has allowed a focus that may have facilitated progress addressing some of the chemicals of concern. We have been supportive of the governance system (in particular following discussions on this issue in 1999 and 2000), which has allowed for significant stakeholder input into the GLBTS process, from consideration of topics for individual workgroup meetings to contributions to broader strategic questions that the GLBTS has periodically considered. This aspect is particularly important now as we assess next steps for the GLBTS after 10 years of efforts.

Through our Great Lakes office, NWF has been involved in a diverse array of pollution prevention (P2) projects for the past decade and more involving PBT chemicals. This work has involved a number of current and former NWF staff and interns through the years, including Guy Williams, Tim Eder, Lisa Yee-Litzenberg, Jully Metty Bennett, Molly Chidsey, Tony Defalco, Jane Reyer, Freya McCamant, Andy Buchsbaum, Zoe Lipman, and Michael Murray. Though not formally done through the GLBTS, we were heavily involved in supporting the Great Lakes Initiative process, through which common water quality standards were developed for a number of PBT chemicals for all Great Lakes States, a framework which has helped spur innovative P2 work in the region. By the mid-1990s we were significantly involved in P2 outreach and education with the healthcare and wastewater treatment plant sectors (in particular concerning mercury), and more recently have extended our outreach to other sectors.

Examples of NWF P2 activities conducted through the GLBTS have included the following:



- From 1999 through 2001, NWF ran the Mercury-Free Medicine campaign (conducted in partnership with Health Care Without Harm), through which hospitals would commit to phasing out uses of mercury in their facilities. This involved numerous meetings and presentations around the region by Molly Chidsey and Guy Williams. The period saw significant growth in the interest in the campaign and in the number of participating facilities. The campaign – currently operated through Hospitals for a Healthy Environment – now boasts over 4,000 participating healthcare facilities throughout the U.S.
- We worked on P2 issues in other ways with the healthcare sector, ranging from developing the 1997 report Mercury Pollution Prevention in Healthcare, which included approaches to phasing out mercury and case studies of successful P2 programs around the Basin, to work from 2000 to 2003 preparing and updating materials for healthcare professionals. The latter included A Woman’s Guide to Eating Fish Safely, a brochure on the risks of fish contaminants and ways to reduce exposures (in English, Spanish, and Arabic), to be distributed via women’s health clinics, as well as annotated fact sheets on fish contaminants of concern for medical professionals.
- NWF was particularly active in the early years of the GLBTS in a number of efforts addressing PBT chemicals in the Lake Superior Basin, including participation in discussions involving the Lake Superior Zero Discharge Demonstration Project, conducting outreach (including through a joint meeting with Marquette wastewater treatment plant staff) on mercury P2 in healthcare, and initiating, with other partners’ efforts, the ongoing St. Louis River Total Maximum Daily Load (TMDL) Partnership.
- In 2000, NWF advanced the idea of development and implementation of comprehensive mercury phase-out strategies in lieu of costly and complex mercury TMDLs, and developed scenarios for reaching an aggregate 90 percent reduction in emissions in Michigan and Ohio. We have promoted this concept within and outside the GLBTS through correspondence and deliberations with US EPA and other stakeholders over subsequent years, including within the Quicksilver Caucus, through which a related National Mercury Reduction Strategy was developed in 2003.
- NWF has continued work with wastewater treatment plants, including working with the Detroit Water and Sewerage Department to develop a survey of significant industrial users on their use of mercury-containing products and PCB-containing electrical components in 2002.
- In parallel projects in recent years, NWF produced several reports on mercury-containing products, including Getting Serious About Mercury on approaches to developing state-based mercury reduction programs, Mercury Products Guide on alternatives to mercury-containing products, and An Assessment of Mercury Products Policies and Programs in Six Great Lakes States.
- NWF has been significantly involved in deliberations on approaches to reducing mercury emissions from coal-fired power plants (including improved efficiency, demand-side management, and other non-control options), including formally participating in state utility workgroups in Michigan, Indiana, and Wisconsin and providing significant technical input to deliberations in other Great Lakes States.
- NWF has examined mercury release inventories in detail, both through earlier work on scenarios to meet 90 percent reduction targets and in an assessment of three major inventories for each of the Great Lakes States, published as a paper in Environmental Research in 2004.¹
- In recent years, we have become more involved in promoting environmentally preferable purchasing (EPP) as a means of reducing sources of PBT chemicals in the Basin. This has included, in a parallel project, producing an EPP guidebook, Environmentally Preferable

¹ Murray, M. and Holmes, S.A. (2004) Assessment of mercury emissions inventories for the Great Lakes states. Environ. Res. 95:282-297.



Purchasing: A Getting Started Guide, that provides an overview of the process and includes a number of fact sheets and resolutions on EPP initiatives from around the country. We are also completing an assessment of EPP programs in the Great Lakes States and selected municipalities, which will help highlight opportunities to further advance EPP as a tool for contributing to toxics reductions.

- We have also expanded P2 outreach and education to additional sectors, including targeting auto salvage yards in Ohio. We completed a survey of a small subset of yards indicating interest in mercury switch removal programs, and we are promoting a new state-initiated voluntary program through direct outreach. We have also conducted outreach to contractor associations to expand interest in participating in mercury thermostat recovery programs.
- NWF has also been significantly involved in recent fora related to the GLBTS, including the development of recommendations on toxic chemicals through the Great Lakes Regional Collaboration, and the ongoing review of the GLWQA, through participation in both Review Working Group B (on toxic chemicals) and the Special Issues Working Group.

In addition to the above activities, NWF has contributed significantly to regular reviews of progress under the GLBTS, including providing reviews of several management assessment documents prepared over the past two years, and we have appreciated being involved in strategic discussions within the Integration Workgroup on broader issues involving the strategy.

Looking forward, we believe there remain opportunities for the GLBTS to contribute to reductions in toxic chemical releases in the Great Lakes Basin. While much progress has been made, it is clear that further progress will be necessary in meeting virtual elimination goals (and elimination of fish consumption advisories) for several of the Level 1 substances. But it is also clear that increased attention is needed on additional chemicals in the Basin, including some Level 2 substances and other chemicals of emerging concern. As the GLBTS approaches the 10-year mark, it is a propitious time to both evaluate progress to date and formulate a

path forward that recognizes both remaining work to be done on existing chemicals and the importance of addressing emerging chemical threats to Great Lakes water quality.

We believe the GLBTS should be open to a more holistic approach to addressing chemicals in the Basin, which may include greater emphasis on promotion of green chemistry, design-for-the-environment, life-cycle assessment, and related approaches that can help lead to both a healthier regional economy and more proactive policies that prevent injury (and the need for expensive remediation) to the ecosystem in the future. In addition, we feel it is important to make additional efforts to increase stakeholder participation in overall GLBTS efforts, in particular among regional industry, academic institutions, and nongovernmental organizations, in order to create more momentum for broader systemic change that will be necessary to protect the Great Lakes from toxic chemical threats in the next decade and beyond.

Great Lakes Uniteds' Perspective

As an instrument dedicated to achieving water quality objectives set forth in the Great Lakes Water Quality Agreement, this international forum and collaborative working group has been a rich and unique opportunity to advance specific pollution prevention strategies in the Great Lakes Basin. Certainly the GLBTS governance model has been successful in promoting open and substantive dialogue among agency, industry, and environmental stakeholders; and opportunities to exchange current science information, innovative assessment tools, or updates on pollution reduction achievements. The GLBTS provides a niche where public and private sector stakeholders can maintain long-term partnerships to pursue specific toxics reduction goals.

Great Lakes United (GLU), an international coalition of labor, environment, health, and indigenous groups from across the Great Lakes, has been a voice in the Strategy's Integration Workgroup since its inception. Our organization's work has benefited from the wealth of knowledge around the table and the diverse perspectives of stakeholders. GLU contributed to GLBTS mercury reduction goals through partnerships such as the Clean Car Campaign mercury switch removal project by hosting binational workshops and web conferences for stakeholders. GLU also held a



workshop in 2004 in Toronto on Extended Producer Responsibility and clean production strategies. Much of this work overlapped or complemented the work of the GLBTS substance workgroups, and participation in the GLBTS has allowed GLU to foster ongoing working relationships on GLBTS reduction projects and other related PBT reduction work.

Since 2004 GLU has focused on the future direction of the GLBTS. The 10-year anniversary marks an exciting and critical time to explore and promote cutting-edge science and technology focused on long-term sustainability and rich opportunities to enhance pollution prevention in the region. To this end, GLU has worked to educate stakeholders on innovative preventative strategies for toxics use reduction and elimination, particularly green chemistry/green engineering science and applications. GLU presented an introduction to green chemistry principles in February 2006. Subsequently, GLU worked with US EPA, EC, and industry to organize a panel of green chemistry practitioners in May 2006. Building on these presentations, GLU co-organized a SOLEC workshop with fellow GLBTS stakeholders and other Basin stakeholders to explore the idea of a Great Lakes Green Chemistry Network. The GLBTS Integration Workgroup provided an incubator to launch this exciting initiative. The perspectives and participation of GLBTS agency, industry, and non-governmental organization (NGO) stakeholders were essential to scoping this project from all angles and ensuring the most cooperative and informed approach moving forward.

From GLU's standpoint, the Strategy has the potential to address additional emerging toxic threats to the Basin. The GLBTS framework could potentially affect a greater rate of reductions of persistent and bioaccumulative substances such as brominated compounds and perfluorinated compounds while preventing future inputs. The GLBTS should also contribute to correcting the legacy of past pollution by taking an aggressive role in working for the cleanup of contaminated sediments. We look forward to participating in these efforts and to continuing in the spirit of meaningful regional collaboration across borders to achieve a toxic-free future.



**Sailboat at Sunset on Lake Michigan, South Manitou Island
Photo by Dan Tomaszewski,
courtesy of the Michigan Travel Bureau**



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. Significant progress has been achieved in reducing the use and release of Strategy substances. In recognition of the 10-year anniversary of the GLBTS, this edition of the progress report features reflections on the past 10 years of efforts to implement the Strategy. The perspective of the EC and US EPA co-chairs of the GLBTS is presented in the opening letter. Stakeholders were invited to submit their perspectives on the GLBTS as well, including reflections on their individual organizations' contributions, the process for implementing the Strategy, its achievements, and its future. Stakeholder perspectives are presented following the letter from the GLBTS co-chairs.

About This Report

This report contains a compilation of activities and progress achieved under the GLBTS for the year 2006. 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 four Integration Workgroup meetings and two semi-annual Stakeholder Forums held in 2006. Chapter 6 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 7 describes examples of efforts to evaluate the contribution and significance of the long-range transport of Strategy substances. A biennial tradition in recent years, Chapter 8 presents a report of environmental indicators of progress, including monitoring data for GLBTS substances in the air over the Great Lakes and in Great Lakes fish, herring gull eggs, and sediment. Chapter 8 also discusses environmental trends in emerging chemicals of concern to the Great Lakes Basin, such as polybrominated diphenyl ethers (PBDEs). Appendix B includes a timeline of activities related to the GLBTS that have been undertaken from 1997 to 2006. Appendix C presents a summary of a GLBTS assessment of Level 1 substances.

Highlights of each chapter are presented below.

Mercury

Canada has made significant progress toward the Canadian challenge goal of a 90 percent reduction in mercury releases, achieving an estimated 85 percent reduction as of 2003 (from a 1988 baseline). The U.S. is estimated to have met the challenge goals of a 50 percent reduction in mercury use nationwide and a 50 percent reduction in national mercury emissions. Mercury collection programs continue to be held in the Basin. The Mercury chapter of this report contains details on these activities, which include household mercury collection programs and collection programs for schools. Also, in August 2006, a National Vehicle Mercury Switch Recovery Program was established in the U.S. in an effort to remove mercury from auto scrap.

PCBs

Canada has achieved an approximate 90 percent reduction of high-level PCBs in storage in Ontario. Based on preliminary analyses, nearly 70 percent of high-level PCBs in service or in use have been eliminated. However, new PCB inventory data for 2006, which are expected to become available in 2007, will provide updated information on progress toward Canada's challenge goals. New Canadian PCB regulations, which were published in the Canada Gazette 1 on November 4, 2006, will impose mandatory phase-out dates. These regulations will facilitate achievement of Canada's challenge goal of a 90 percent reduction of high-level PCBs in service. The U.S. has made progress in reducing the



amount of equipment containing >500 ppm PCBs, as evidenced by industry efforts to identify and remove PCB-containing equipment from service. US EPA continues to gather information with which to assess the status of progress toward the U.S. challenge goal of a 90 percent national reduction of high-level PCBs used in electrical equipment.

Dioxin & Furans

Canada and the U.S. have each reduced dioxin/furan emissions by approximately 89 percent, compared to reduction targets of 90 percent (Canada) and 75 percent (U.S.). The largest remaining source of dioxins/furans in both countries is backyard burning of household waste. The Burn Barrel Subgroup of the Dioxin Workgroup continues to be active in promoting outreach activities in the Great Lakes Basin. The Dioxin Workgroup continues to: explore pathway intervention opportunities, investigate opportunities to reduce agricultural waste burning, track ambient air concentrations, continue source characterization work, and seek reductions from top sources.

HCB & B(a)P

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 68 percent and 49 percent, respectively, compared to 90 percent reduction targets. The U.S. has reduced B(a)P emissions by approximately 77 percent in the Great Lakes States from 1996 to 2001, achieving the Strategy's goal, which was to achieve reductions in releases. Actions to reduce B(a)P have focused on residential wood combustion, scrap tires, coke ovens, and diesel engines. U.S. emissions of HCB have also declined (from a 1990 baseline), thereby meeting the U.S. challenge of unspecified reductions. US EPA has commissioned an HCB inventory study to obtain better estimates of HCB releases.

Integration Workgroup Meetings/ Stakeholder Forums

Four Integration Workgroup meetings were held in 2006: one in Windsor (February 16), one in Toronto (May 18), and two in Chicago (September 19 and December 7). During 2006, the Integration Workgroup kept abreast of GLBTS substance workgroup activities, the Great Lakes Water Quality Agreement review, workshops held at the 2006 State of the Lakes Ecosystem Conference (SOLEC), the Canadian Environmental Protection Act (CEPA) review of the Domestic Substances List, and other

efforts related to substances of concern to the Great Lakes Basin. The Integration Workgroup also discussed the human health effects of toxic chemicals in the Great Lakes, Green Chemistry and the potential role of the GLBTS in establishing a Great Lakes Green Chemistry network, and the value of Traditional Ecological Knowledge and how it can be incorporated into the GLBTS.

During 2006, semi-annual Stakeholder Forums were held in Toronto (May 17) and Chicago (December 6). These events featured presentations by Cam Davreux, Vice President, CropLife Canada, on programs for the management of obsolete products and pesticide container recycling; Art Dungan, Chlorine Institute, on mercury reduction accomplishments in the chlor-alkali sector; and Marta Panero of the New York Academy of Sciences on "Industrial Ecology, Pollution Prevention, and the New York/New Jersey Harbor," or the Harbor Project.

Sediment Challenge

Over 400,000 cubic yards of contaminated sediment were remediated from nine U.S. sites in the Great Lakes Basin in 2005. Since 1997, over 4 million cubic yards of contaminated sediment have been remediated in the U.S. Great Lakes Basin. In 2006, with the assistance of the Research Vessel Mudpuppy, US EPA conducted integrated sediment assessment surveys at nine sites in the Great Lakes. Since 1997, approximately 46,000 cubic metres of contaminated sediment have been remediated from Canadian sites in the Great Lakes. In 2005, Canada made significant progress on Great Lakes sediment remediation investigations and evaluations, including the completion of sediment assessments for the Niagara River, Peninsula Harbour, and Thunder Bay AOCs. Evaluations are being conducted for the Bay of Quinte, Wheatley Harbour, Detroit River, St. Clair River, and St. Marys River AOCs.

Long-Range Transport Challenge

Canada and the U.S. continue to investigate the impact of long-range transport on the Great Lakes Basin. Chapter 7 describes a study in which EC used the Canadian Model for Environmental Transport of Organochlorine Pesticides (CanMETOP) to identify a statistically significant relationship between air concentrations of toxaphene in the southern U.S. and the Great Lakes region. Chapter 7 also describes the activities of an international Task Force on Hemispheric Transport of Air Pollutants, created by



the Executive Body of the Convention on Long-range Transboundary Air Pollution.

Environmental Indicators of Progress

Monitoring environmental indicators offers a way to measure progress in reducing releases of Level 1 and Level 2 substances to the Great Lakes Basin. Monitoring efforts in the U.S. and Canada routinely collect data on concentrations of substances of concern in the environment of the Great Lakes Basin. Results indicate that concentrations of Level 1 substances in ambient air tend to be lower over Lakes Superior and Huron than over Lakes Michigan, Erie, and Ontario, which are more impacted by human activity. However, because their surface area is larger, atmospheric inputs of the Level 1 substances tend to have greater relative importance for Lakes Superior and Huron. While concentrations in ambient air are very low at rural sites, they may be much higher in “hotspots” such as urban areas.

Concentrations of historically regulated contaminants such as PCBs, DDT, and mercury have generally declined in most monitored fish species since the late 1970s. Concentrations of other contaminants, both currently regulated and unregulated, have demonstrated either slowing declines or, in some cases, increases in selected fish communities. Changes in concentrations are often lake-specific and relate to the characteristics and sources of the substances involved and the biological composition of the fish community. While concentrations of most persistent organic pollutants in top predator fish have declined, concentrations of polybrominated diphenyl ethers (PBDEs) have increased exponentially since the 1980s. Concentrations of another emerging chemical, perfluorooctanesulfonate (PFOS), in Great Lakes fish have also been shown to increase since the 1980s.

Concentrations of Level 1 substances in herring gull eggs at sites on the Great Lakes have declined from the 1970s, most notably PCBs, DDE, HCB, and octachlorostyrene (OCS). Concentrations of dioxins, furans, and mercury have not declined by as much as the compounds listed above, and an increase in furan gull egg concentrations was observed on the Niagara River from 1979 to 2005. An increase was also noted in PBDE concentrations on Gull Island, Lake Michigan, from 1981 to 2005.

Water and sediment contaminant monitoring programs provide data with which to assess trends in Great Lakes waters and sediments. Dieldrin concentrations in the open waters of the Great Lakes

are higher in the lower lakes (Lakes Erie and Ontario) than in the upper lakes (Lakes Superior and Huron). Bottom sediment contaminant concentrations in the Great Lakes have generally decreased over the past 25 years, in some cases by as much as 70 to 80 percent. Mercury concentrations in suspended sediments in the Niagara River have decreased from 1984 to 2003 but appear to be leveling off. Concentrations of PFOS collected in a screening-level survey of recently deposited sediments in Canadian Great Lakes tributaries indicated relatively low PFOS concentrations that appear to be indicative of land use (i.e., elevated levels are generally found in more populated watersheds).

Looking Ahead

The year 2007 marks the 10th anniversary of the signing of the GLBTS. To signify this anniversary, a special Stakeholder Forum Event will be held in Chicago in May 2007. In conjunction with the 10-year anniversary event, a workshop on the sound management of chemicals in the Great Lakes Basin will consider broadening the current structure and mandate of the GLBTS. The recommendations resulting from the Great Lakes Water Quality Agreement review, conducted during 2006, will impact the discussions concerning the future of the GLBTS. The emerging chemicals workshop will begin a new era for the GLBTS as it moves forward into issues of emerging concern yet continues its efforts to virtually eliminate the original GLBTS Level 1 and Level 2 substances.



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