

Subgoal 1

Can we all eat any fish?

What is our target for sustainability?

No lakewide fish consumption advisories.
Possible local condition advisories may exist from time to time.

Why is this important?

Fish are an important part of everyone's diet. In the 1970s steps were taken to ban, regulate, and clean up sources of toxic substances that had entered the aquatic food web. These actions resulted in marked reductions of toxins in the ambient environment and in fish tissue by the 1990s. Reductions have recently slowed which may be attributed to the impact of aquatic invasives on the food web. In addition, there are new or emerging contaminants such as pesticides, flame retardants, pharmaceuticals, and personal care products now found in our aquatic environment that may impact the food web and require monitoring programs to be developed.

What is the current status?

Overall, the status remains mixed, but FY 2005 monitoring shows a slight, but continued decline, in contaminant levels. While progress has been made, fish advisories for PCBs and mercury are still issued in all four Lake Michigan states. Advisories for chemicals other than PCBs and mercury have decreased over the last several years as the chemicals became less prevalent and their releases more controlled.

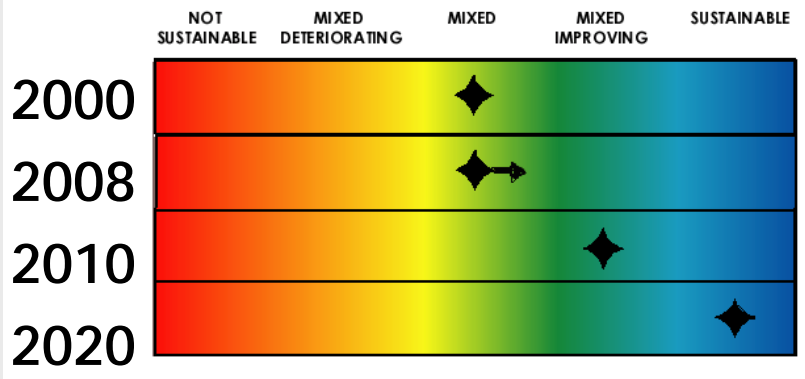
What are the major challenges?

- Climate Change: Intense storms may increase high flow runoff events carrying contaminants and sediment that adversely effect water quality.
- Dealing with the impacts of levels of mercury from local, national, and international sources.
- Eliminating use of remaining PCB equipment and remediating legacy PCB contamination in sediment deposits
- Informing people about important health protection information related to fish advisories through widely accessible, user friendly sources.
- Providing resources for action under the Great Lakes Legacy Act (GLLA).

What are the next steps?

- Develop an Impaired Waters Strategy
- Continue to address sediments and focus more on nearshore contamination
- Support a mercury product stewardship phase-down
- Hold collection events for e-waste and pharmaceuticals

Lake Michigan Target Dates for Sustainability





What are some tools for addressing the challenges?

- State Fish Consumption Advisories
- National Pretreatment Program
- Mercury Programs Database
- The Mercury Challenge

What are the State of the Lakes Ecosystem (SOLEC) indicators used to help assess the status of the subgoal?

[Indicator # 114 - Contaminants in Young-of-the-Year Spottail Shiners](#)

Status: Not Assessed, Trend: Not Assessed

[Indicator # 117 - Atmospheric Deposition of Toxic Chemicals](#)

Status: Mixed, Trend: Improving (for PCBs, banned organochlorine pesticides, dioxins and furans) / Unchanging or slightly improving (for PAHs and mercury)

[Indicator # 118 - Toxic Chemical Concentrations in Offshore Waters](#)

Status: Fair, Trend: Undetermined

[Indicator # 119 - Concentrations of Contaminants in Sediment Cores](#)

Status: Mixed, Trend: Improving/Undetermined

[Indicator # 124 - External Anomaly Prevalence Index for Nearshore Fish](#)

Lake Superior, Lake Huron, and Lake Michigan were unstudied for this indicator and were categorized with a not assessed status and an undetermined trend.

[Indicator # 4177 - Biological Markers of Human Exposure to Persistent Chemicals](#)

Status: Not Assessed, Trend: Undetermined

[Indicator # 4201 - Contaminants in Sport Fish](#)

Status: Mixed, Trend: Improving

[Indicator # 8135 - Contaminants Affecting Productivity of Bald Eagles](#)

Status: Mixed, Trend: Improving

For more information on status of indicators, see <http://www.epa.gov/solec/sogl2007/>

Fish Consumption Advisories

Consumers should know that fish and shellfish can be important parts of a healthy and balanced diet. They are good sources of high quality protein and other essential nutrients.

Women of child-bearing age, fetuses, and children are more susceptible to the effects of contaminants in fish. State fish consumption advisories include advice specifically targeted to these sensitive populations.

Fishing is one of the most popular forms of outdoor recreation in the Midwest, and Americans are eating more fish as diets shift toward more low-fat foods.

Over 43 percent of all Great Lakes fishing in the U.S. is done in Lake Michigan, and both commercial fishing and sport fishing are significant contributors to the economies of the states in the basin. Commercial fish production (both nontribal and tribal) reaches over 14.6 million pounds of fish annually. The commercial fishery is valued at more than \$270 million and the recreational fishery at \$4 billion.

Fish consumption, however, has been shown to be a major pathway of human as well as wildlife exposure to persistent toxic substances, such as polychlorinated biphenyls (PCBs) and mercury. Contaminants released from many sources are transported through the environment and are carried into streams and lakes. Small organisms absorb these contaminants and are, in turn, eaten by other organisms and small fish. Some of these contaminants bioaccumulate in the fish –and in humans who eat them – to levels that can pose health risks.

Great Lakes Fish Monitoring Program

The Great Lakes Fish Monitoring Program (GLFMP) began in 1980 as a cooperative effort by USEPA, U.S. Food and Drug Administration (no longer participating), U.S. Fish and Wildlife Service (now the Biological Resources Division of U.S. Geological Survey), and the eight Great Lakes States to monitor and better define the fish contaminant problem in the Great Lakes. The program consists of two separate elements to monitor contaminants in whole predator fish and in game fish fillets.

The GLFMP currently collects samples, for both elements of the program, from a set number of sites per lake. Collections alternate on a yearly basis, with even and odd year collections. Element 1 samples consist of 5 whole fish composites for a total of 50 fish collected per site. Element 2 samples consist of 5 skin-on fillets for a total of 15 fish collected per site. All samples are provided to analytical laboratory (currently a university grantee) as approximately 10 grams of frozen homogenate. The GLFMP currently utilizes an established chemical parameter list for analysis, though in recent years emerging contaminants of concern, such as polybrominated diphenyl ethers (PBDEs) and perfluorinated compounds (PFOS, PFOA), have been added.

More information is available at: www.epa.gov/glnpo/glindicators/fish.html

State fish consumption advisories are issued to protect people from potential adverse health effects associated with contaminants found in fish. These advisories recommend amounts and types of fish that are not safe to eat. Fish consumption advisories may also include information to educate the public on how to minimize exposure to certain contaminants through proper fish preparation and cooking. The advisories are viewed as a temporary measure to



The Lake Michigan Toolbox State Fish Consumption Advisories

Illinois: www.idph.state.il.us/envhealth/factsheets/fishadv.htm

Indiana: www.in.gov/isdh/programs/environmental/fa_links.htm

Michigan: www.michigan.gov/mdch/0,1607,7-132--13110--00.html

Wisconsin: dhfs.wisconsin.gov/eh/fish/

A consolidated source for Great Lakes fish consumption advisories as well as information on other standards applicable to the lakes is available on a Great Lakes Information Network site:

www.great-lakes.net/envt/flora-fauna/wildlife/fishadv.html

Sport Fish Advisory Example Illinois Lake Michigan Fish Advisory

Cook and Lake Counties (Illinois)
Species and Meal Frequency

<p>Chinook Salmon</p>  <p>All Waters Less than 32" 1 meal/month - or - Larger than 36" 6 meals/year Contaminant - PCBs</p>	<p>Coho Salmon</p>  <p>All Waters All Sizes 1 meal/month Contaminant - PCBs</p>	<p>Rainbow Trout</p>  <p>All Waters Less than 22" 1 meal/week -or- Larger than 22" 1 meal/month Contaminant - PCBs</p>	<p>Brown Trout</p>  <p>All Waters Less than 22" 1 meal/month - or - Larger than 25" 6 meals/year Contaminant - PCBs</p>
<p>Channel Catfish</p>  <p>All Waters All Sizes Do Not Eat Contaminant - PCBs</p>	<p>Lake Trout</p>  <p>All Waters Less than 23" 1 meal/month - or - 23" to 27" 6 meals/year - or - Larger than 27" Do Not Eat Contaminant - PCBs</p>	<p>Yellow Perch</p>  <p>All Waters All Sizes 1 meal/week Contaminant - PCBs</p>	<p>Carp</p>  <p>All Waters All Sizes Do Not Eat Contaminant - PCBs</p>

Figure 1-2. Illinois Lake Michigan Fish Advisory

Source: www.idph.state.il.us/envhealth/factsheets/fishadv.htm

protect the public while control measures and site cleanups reduce contamination to safe levels.

PCBs are the primary contaminant behind the fish consumption advisories published by all four Lake Michigan states. Mercury advisories are also issued by each Lake Michigan state for fish of inland lakes and some select Lake Michigan sites. As a rule, mercury is the dominant contaminant behind fish consumption advice from inland lakes due to atmospheric deposition and the lack of elimination of water through streams and or rivers. Dioxins, chlordane, DDT, and many other contaminants are also present in fish but are not in high enough quantity to warrant advice beyond PCB levels.

States frequently use fish consumption advisories (See opposite page) as indicators of whether their waters are meeting requirements for designated uses. If a fish consumption advisory is issued, this triggers the need for a state to investigate and set a total maximum daily load (TMDL) for contaminants. TMDLs for PCB and mercury are currently required for Lake Michigan. The fish consumption advisories are updated annually and updates are published on state fish consumption advisory web pages. Locations of specific required TMDLs related to fish advisories are listed in the watershed fact sheets (See Chapter 12).

Process by which USEPA evaluates Chemicals for Human Risk

USEPA utilizes the Integrated Risk Information System (IRIS) to evaluate the health effects of individual substances. IRIS provides hazard identification and dose-response assessment information. The information in IRIS can be used in combination with exposure information to characterize the public health risks of a given substance in a given situation. These risk characterizations can form the basis for risk-based decision-making, regulatory activities, and other risk management decisions designed to characterize and protect public health. EPA's process for developing IRIS assessments consists of: (1) an annual Federal Register announcement of EPA's IRIS agenda and call for scientific information from the public on the selected substances, (2) a search of the current literature, (3) development of a draft Toxicological Review (other support document) and IRIS Summary, (4) internal peer consultation, (5) Agency Review, (6) Interagency Review, (7) external peer review and public comment, (8) final Agency Review, Interagency Review and ORD management approval, and (9) posting on the IRIS database. For more information on the chemicals currently being evaluated by IRIS go to <http://cfpub.epa.gov/ncea/iris/index.cfm>.

Sources of Exposure of PBDEs

Although use of flame retardants saves lives and property, there have been unintended consequences. There is growing evidence that Polybrominated Diphenyl Ethers (PBDEs) persist in the environment and accumulate in living organisms, as well as toxicological testing that indicates these chemicals may cause liver toxicity, thyroid toxicity, and neurodevelopmental toxicity. Environmental monitoring programs in Europe, Asia, North America, and the Arctic have found traces of several PBDEs in human breast milk, fish, aquatic birds, and elsewhere in the environment. Particular congeners, tetra- to hexabrominated diphenyl ethers, are the forms most frequently detected in wildlife and humans. The mechanisms or pathways through which PBDEs get into the environment and humans are not known yet, but could include releases from manufacturing or processing of the chemicals into products like plastics or textiles, aging and wear of the end consumer products, and direct exposure during use (e.g., from furniture). Some research has evaluated PBDE levels



The Lake Michigan Toolbox Mercury Programs Database

The Mercury Reduction Programs Database was developed and maintained by Region 1 and 2's Northeast Waste Management Officials' Association (NEWMOA) with support and assistance from the Environmental Council of the States (ECOS) and the Pollution Prevention Resource Exchange (P2Rx).

The database can be searched by program, state, and agency to find out what mercury reduction programs are taking place nationally. Programs can also be added by organizations.

More information is available at:
www.p2rx.org/Networking/MercuryDB.cfm

Auto Mercury-Recovery Programs Up and Running in All 50 States

EPA and eight organizations—representing states, nongovernmental organizations, steelmakers, vehicle manufacturers, automobile recyclers, and scrap metal recyclers—launched a program in August 2006 to recover mercury containing light switches from end-of-life vehicles manufactured prior to 2002 before they are dismantled, crushed, shredded, and melted to make new steel.

In its first year where all 50 states are participating in auto mercury-recovery programs, more than 635,000 mercury-based switches were removed from vehicles about to be scrapped. This represents 1,400 pounds of mercury which is more than the average coal-fired power plant emits in a year. The Mercury Switch Removal Program has the potential to recover 80 to 90 percent of available mercury switches, leading to commensurate reductions in air emissions.

A second goal for the first year--developing a way to measure overall progress in the program in future years--has also been achieved. Progress will be measured by determining the percentage of switches that are recovered each year compared to the number of available end-of-life autos from which switches can be recovered.

Approximately 5,900 automobile recyclers have already agreed to remove and recover the switches before sending vehicles to scrap recyclers, who in turn send the clean cars to steel mills. The mills can then use the cars to make recycled steel without worrying about releasing toxic mercury emissions.

More information is available at:
www.epa.gov/mercury/switch.htm

Fish Contaminant Trends

The 6 adjoining diagrams represent general contaminant trends in Great Lake Sport fish. These data were collected by the Great Lakes National Program Office (GLNPO) under the fish monitoring program. This program annually collects and composites 15 salmon filets into three composites in the small, medium, and large size categories from a variety of sites from each of the Great Lakes. Data shown in the graphs above reflect the changing nature of the Sport Fish Fillet Monitoring piece of the fish monitoring program. Sites have been continuously added and removed over the life of the program and samples themselves have varied from year to year according to collection, location, size etc. For that reason, only general trends can be gathered from this data.

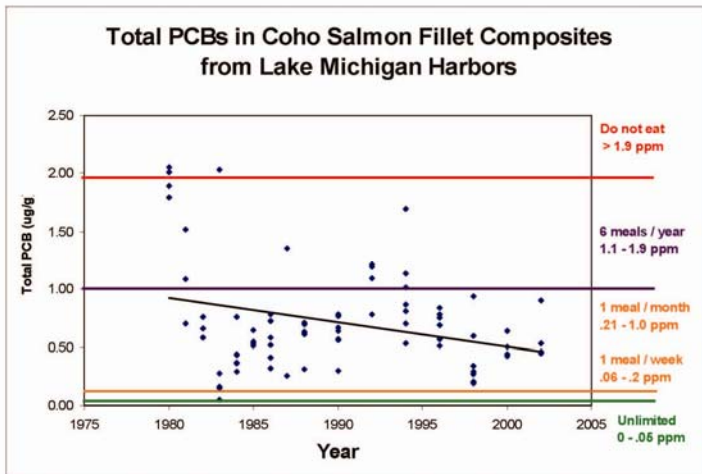
In general, concentrations of select Persistent Bioaccumulative Toxic (PBT) chemicals in Lake Michigan Coho and Chinook Salmon fillets are declining, although very slowly. Without remediation of contaminated sediments or restriction of contaminated atmospheric deposition, tissue concentrations will continue to warrant fish consumption advisories. It is important to note that U.S. EPA does not issue fish consumption advice, the Great Lakes States and Tribes are responsible for this task. However, concentrations of GLFMP sportfish can be compared to the Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory categories (see figure 1-7).

Current concentrations of total PCBs in Lake Michigan coho and chinook salmon fillets range between the one meal per week and the one meal per month consumption advice categories (see figures 1-1 & 1-2). Total PCBs are a summation of all PCB congeners analyzed.

No DDT protocols exist to compare Lake Michigan coho and chinook salmon fillets concentrations to consumption advice categories (see figures 1-3 & 1-4).

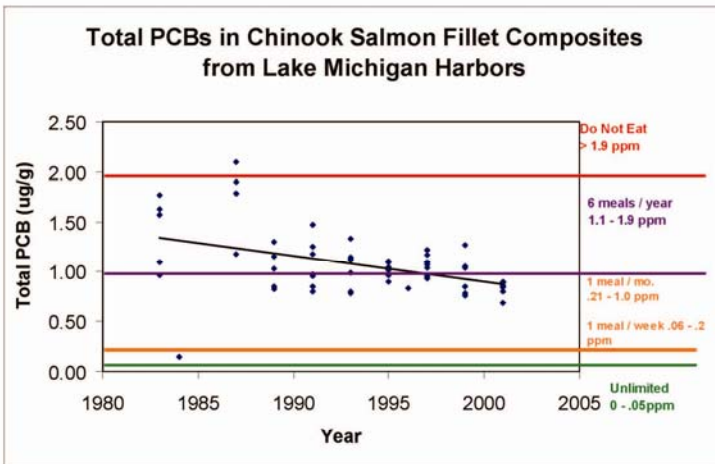
Current concentrations of Total Chlordane in Lake Michigan coho and chinook salmon fillets fall into the unlimited consumption category of the draft chlordane addendum to the protocol (see figures 1-5 & 1-6). Total chlordane is a summation of cis and trans chlordane, cis and trans nonachlor, and oxychlordane.

More information is available at the following:
 PCB Protocol - <http://fn.cfs.purdue.edu/anglingindiana/HealthRisks/TaskForce.pdf>
 Hg Protocol - http://dhfs.wisconsin.gov/eh/Fish/FishFS/2007Hg_Add_Final_05_07.pdf



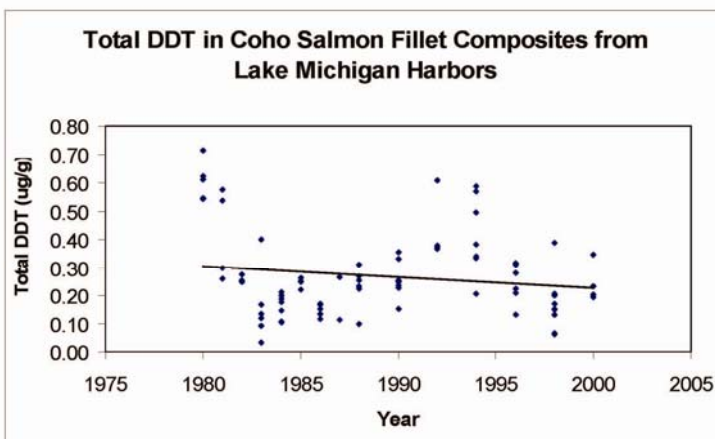
Source: EPA Great Lakes National Program Office, 2008.

Figure 1-1 Total PCBs in Coho Salmon Fillet Composites from Lake Michigan Harbors



Source: EPA Great Lakes National Program Office, 2008.

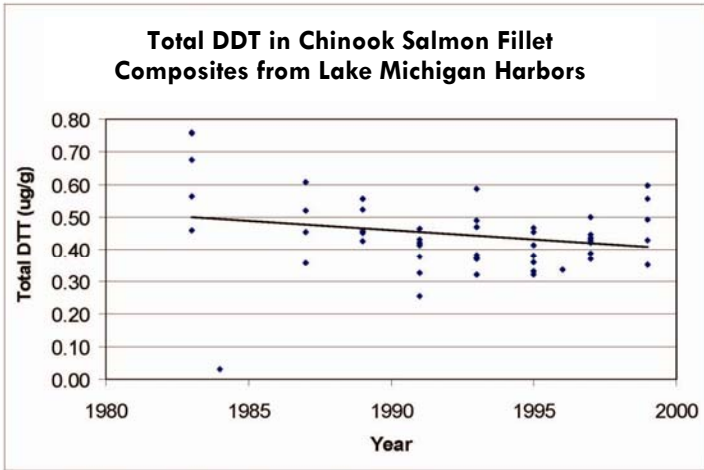
Figure 1-2 Total PCBs in Chinook Salmon Fillet Composites from Lake Michigan Harbors



No Protocol for DDT exists for sport fish to consumption advice.

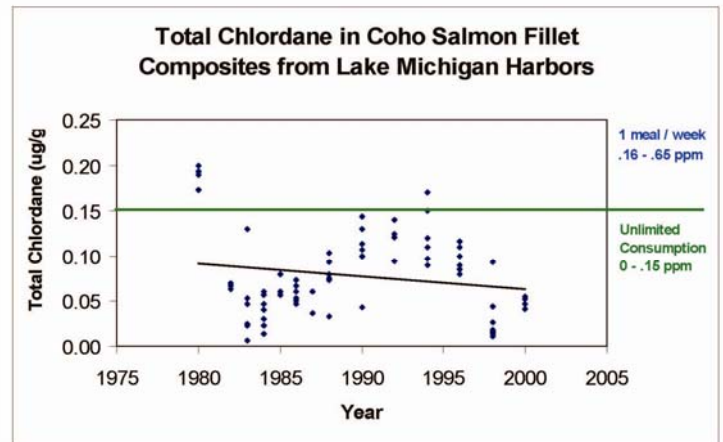
Source: EPA Great Lakes National Program Office, 2008.

Figure 1-3 Total DDT in Coho Salmon Fillet Composites from Lake Michigan Harbors



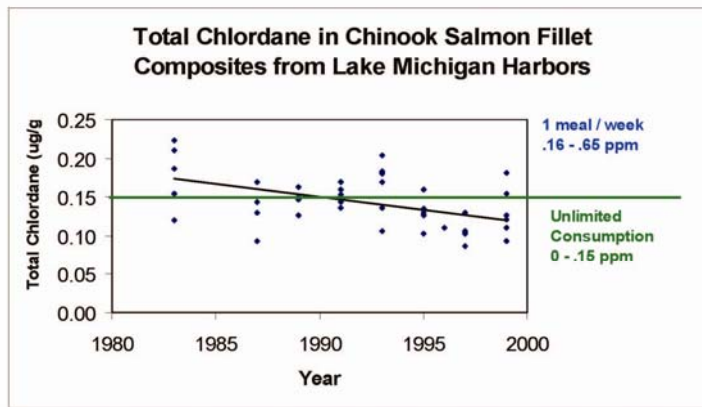
Source: EPA Great Lakes National Program Office, 2008.

Figure 1-4 Total DDT in Chinook Salmon Fillet Composites from Lake Michigan Harbors



Source: EPA Great Lakes National Program Office, 2008.

Figure 1-5 Total Chlordane in Coho Salmon Fillet Composites from Lake Michigan Harbors



Source: EPA Great Lakes National Program Office, 2008.

Figure 1-6 Total Chlordane in Chinook Salmon Fillet Composites from Lake Michigan Harbors

Consumption limits for sensitive populations created for the Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory**

Consumption Advice Groups*	Concentration of PCBs (ppm)	Concentration of Hg (ppm)*	Concentration of Chlordane (ppm)**
Unrestricted Consumption	0 – 0.05	0 <= 0.05	0 - 0.15
2 meals/ week		> 0.05 <= 0.11	
1 meal/ week	0.06 – 0.2	>0.11 <= 0.22	0.16 - 0.65
1 meal/ month	0.21 – 1.0	>.22 <= 0.95	0.66 - 2.82
6 meals/ year	1.1 – 1.9		2.82 - 5.62
Do not eat	>1.9	>0.95	>5.62

Women of childbearing age and children under 15

**Chlordane protocols is draft

Source: Great Lakes Sport Fish Advisory Task force. <http://fn.cfs.purdue.edu/anglingindiana/HealthRisks/TaskForce.pdf>

Figure 1-7. Consumption Limits for Sensitive Populations Created for the Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory



The Lake Michigan Toolbox The Mercury Challenge

The National Partnership for Environmental Priorities' (NPEP) Mercury Challenge promotes the voluntary, systematic elimination of mercury-containing equipment from industrial sites. Mercury is a highly toxic chemical designated as one of 31 priority chemicals that USEPA wants to reduce in our nation's products and wastes.

Mercury is a documented contaminant of air, land, water, plants, and animals, and exposure to mercury can cause serious health problems.

More information on mercury resources is available at the following sites:

- USEPA's mercury program at: www.epa.gov/mercury/
- The Take the Mercury Challenge program at: www.epa.gov/npep/mercchal/mc_join.htm#take
- "Building a Mercury Reduction Plan" www.epa.gov/epaoswer/hazwaste/minimize/npep/mercchal/mc_redplan.htm
- Mercury-Free Success Stories: www.epa.gov/epaoswer/hazwaste/minimize/npep/mercchal/mc_success.htm
- "Mercury: Serious Problem, Practical Solutions" Brochure at: www.epa.gov/npep/mercchal/mercbrchr.pdf



in market basket foods. This research suggests that dietary exposure does not account for high body burden that have been observed in people. Dust and air from the indoor environment may play a role in PBDE body burden levels in addition to food.

More information is available at:
<http://www.epa.gov/oppt/pbde/>

Source: Schecter A, Päpke O, Harris TR, Tung KC, Musumba A, Olson J, and Birnbaum L. 2006. Polybrominated Diphenyl Ether (PBDE) Levels in an Expanded Market Basket Survey of U.S. Food and Estimated PBDE Dietary Intake by Age and Sex Environmental Health Perspectives Volume 114, Number 10.

Is there a Human Health Risk?

VHS. Viral hemorrhagic septicemia (VHS) virus is a serious fresh and saltwater fish pathogen that is increasingly observed in the Great Lakes region of the United States and Canada. VHS virus is a rhabdovirus that affects fish of all size and age ranges. It does not pose any threat to human health because it is not a human pathogen. Therefore, it cannot infect humans if they eat fish with the pathogen.

More information is available at:
<http://www.dec.ny.gov/animals/25328.html> and
http://www.aphis.usda.gov/publications/animal_health/content/printable_version/sa_vhsfo_vs.pdf

Botulism. Type E botulism poisoning of fish and wildlife has recently increased in the Great Lakes with the most recent example in Michigan near the Sleeping Bear Dunes National Lakeshore where shore birds died from eating contaminated fish. Many people are concerned not only of the ecological impacts of this type botulism but also of the human health impacts.

In the past, a few Type E botulism cases have been reported in humans. However, this was due to improperly prepared smoked or cooked fish and these cases were rare. Most media reports of botulism issues in humans are from Type A and B botulism. These types of botulism occur in food as a result improperly canned or jarred food. Cooking food to proper temperatures will destroy bacteria, including botulism.

When fishing or hunting water fowl in the Great Lakes, take steps to choose healthy fish and discard fish or waterfowl that are sick or act abnormally because improper cooking may not destroy the botulism Type E toxin.

Collaborative Lake Michigan Strategy to Address Impaired Waters

The purpose of this strategy is reduce and virtually phase out impairments caused by contaminants such as mercury, PCBs, and certain banned pesticides that have resulted in fish consumption advisories, into the Lake Michigan ecosystem.



The Lake Michigan Toolbox National Pretreatment Program

USEPA Region 5 developed a pretreatment program for the NPDES Permit Pollutant Minimization Program (PMP) for Mercury.

The new National Pretreatment Program controls and minimizes the loading of pollutants to publicly owned treatment works from industrial, non-domestic sources to protect against operational, water quality, biosolids quality, and worker health and safety problems. The goal is to aid in meeting the Great Lakes Initiative water quality standards the states adopted for mercury in permits. Tools and fact sheets on wastewater pretreatment are also available on the website.

More information is available at the Pretreatment Website at:

www.epa.gov/r5water/npdestek/npdprta.htm.

The states have primary responsibility for preparing Total Maximum Daily Loads (TMDL) for impaired water bodies and USEPA agrees to provide resources, technical assistance, and facilitation to support the states' TMDL development efforts on interstate waters like the Great Lakes. Furthermore, recent changes to USEPA 303(d) list guidance allow the states to address impaired waters that are being remediated by other means in a manner that could delay or possibly eliminate the need for TMDL development.

A strategy to address the impaired waters of Lake Michigan will take time to develop and implement and needs to provide opportunities for the parties to work collaboratively towards air quality reductions in mercury that lead to perceptible reductions in state waters and related fish tissues. This raises the question of what a strategy to address the impaired waters of Lake Michigan should be? Any strategy will take time to develop and implement. It should provide opportunities for the parties to work collaboratively and avoid duplication of effort. Such a strategy would be useful to divide the development and possible products from the discussion into stages aligned with the LaMP publications from 2006 through 2010. The stages could include activities and milestones tracked over time to ensure that progress is being made to remediate Lake Michigan. Any strategy would need to be reviewed and mid-course changes considered at each two year interval. If

sufficient progress is not made by 2010, work on standard TMDLs for Lake Michigan would need to begin and be completed by 2013 per the current 303(d) schedule and USEPA regulation.

To implement this approach, the following activities should be conducted over the next two years:

- Continue discussion of the Strategy concept in LaMP 2008.
- Finalize the 2005 Intensive Lake Michigan Monitoring Plan and GLNPO Open Lake Organics monitoring with Lake Michigan Mass Balance models.
- Develop and share matrix of successful state programs.
- If developed, publish the Strategy in LaMP 2010.

The Lake Michigan LaMP 2000, Appendix E, provided an overview of issues and information needs for a full TMDL Strategy for Lake Michigan. LaMP 2002 and 2004 summarized the dialogue and meetings since LaMP 2000 and provided an early draft of a Mercury Phase Out Proposal and also provided data from the Lake Michigan Mass Balance Study and Enhanced Tributary Monitoring Project.

Status of Mercury TMDLs in the Basin

Based on state submittals of the 2004 303(d) impaired waters lists, there are 217 waters in the Lake Michigan basin listed as impaired for mercury. The 217 impaired waters are located in the Lake Michigan states of Illinois (2), Indiana (81), Michigan (88), and Wisconsin (46). With every 303(d) list submittal, states are required to identify waters targeted for TMDLs in the next two years. In 2004, the Lake Michigan states did not include any mercury-impaired waters on their two-year schedule for TMDL development. However, Michigan did submit a long-term TMDL development schedule that included development of mercury TMDLs beginning in 2011.

There are efforts underway by states outside of the Lake Michigan Basin to address waters impaired by atmospheric mercury. Minnesota recently developed a statewide TMDL for mercury-impaired waters. The TMDL addresses 512 TMDLs across the state, excluding Lake Superior.

In 2007, EPA Region 1 approved a regional mercury TMDL for the seven-state Northeast Region. The regional TMDL outlines a strategy for reducing fish

tissue mercury concentrations using smallmouth bass as the target fish. The current 90th percentile mercury concentration in smallmouth bass in the Region is 1.14 ppm. To meet a target fish tissue concentration of 0.3 ppm, the TMDL calls for a mercury load reduction of 2,055 kg/yr in the Region and a reduction of 2,738 from out-of-Region sources for a total load reduction of 98.2%. The reductions will be achieved through a variety of point, nonpoint, and air emission controls.

Sources of Mercury

Air deposition is the dominant mercury pathway for most water bodies. Sources of mercury in the atmosphere are divided roughly at 1/3 natural, 1/3 from past human activity, and 1/3 from current human activity around the world. The current human activity in the U.S. Mercury emissions are shown in Figure 1-8 (See preceding page).

The Great Lakes Regional Collaboration (GLRC) is one potential vehicle for developing a basin-wide mercury product stewardship strategy and basin-wide mercury phase-down program, including a mercury waste management component. The states and the tribes

are putting together a workgroup to develop a common strategy.

In February 2008, the Michigan Department of Environmental Quality (MDEQ) released a comprehensive strategy to eliminate the use and release of mercury to Michigan's environment. The DEQ's Mercury Strategy Staff Report contains specific recommendations and a comprehensive approach to controlling mercury, including environmental monitoring, inventory development, collaborations and partnerships, education and outreach, and regulatory controls. It also provides an overview of the mercury problem, identifies current sources that contribute to mercury releases, and identifies various methods for reducing and eliminating the sources. It outlines Michigan's rules, regulations, policies, and monitoring activities for mercury and chronicles various actions undertaken thus far to prevent the use and release of mercury. More information is available at www.michigan.gov/deq/0,1607,7-135--184041--00.html

Sources of Other Pollutants

See Chapter 7 for a detailed discussion.

