



U.S. Environmental Protection Agency Great Lakes National Program Office Significant Activities Report

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data set was created. New methods and techniques to improve satellite-based land cover mapping quality were developed. A full set of landscape analyses metrics of ecological conditions will be run and then used as input to environmental risk studies. Further work may include time series data to study landscape change over time. Currently, a 1970s land cover map is being developed to compare with 1990s data. Maps included in this interim report are: 1) Early 1990s land cover (water, urban, forest, agriculture and grasses); 2) Extent to which humans have changed the natural vegetation to crops and urban land cover; 3) Black bear habitat suitability; and, 4) Estimated risk of increased nitrogen export based on composition of land cover.

- The ORD Landscape Ecology Branch in

The View from Space

Two projects for monitoring Great Lakes ecology using remote sensing data from satellites orbiting high above the earth recently produced preliminary data.

- USEPA and the Natural Resource Canadian Centre for Remote Sensing have been cooperating on a research landscape ecology study of the Great Lakes basin. Using proprietary geospatial data from the 1990s, a new synoptic land use/land cover



False-color image of Little Bay De Noc and Big Bay De Noc, Michigan at the northern end of Green Bay from Landsat MultiSpectral Sensor (vegetation appears as shades of red). The spread of invasive plants can be measured by comparing images over time.

Las Vegas is working on landscape-scale monitoring of *Phragmites australis* in Great Lakes coastal wetlands. *Phragmites australis* is a native opportunistic plant that often supplants other wetland taxa. Some consider it a nuisance because it is persistent, produces large amounts of biomass, propagates easily, and is difficult to control with mechanical or chemical means. This study is testing the ecological application of using airborne hyperspectral remote sensing data accurately to detect *Phragmites australis*, map its extent in the Great Lakes, and determine important ecological parameters such as percent cover, and stem density and height. Results so far have demonstrated how a combination of remote sensing and detailed baseline ecological field sampling may improve the accuracy of mapping wetland vegetation. Techniques developed may have potential applicability in other plant community ecosystems and re-

gions.

(Contact: John Schneider, 312-886-0880, schneider.john@epa.gov or Karen Rodriguez, 312-353-2690, rodri-guez.karen@epa.gov)

Summer Lakes Survey

The 2003 Great Lakes Summer Water Quality/Ecology Survey began on August 1st. The *R/V Lake Guardian*, with a crew of chemists and biologists is visiting each of the Great Lakes, taking samples to assess their environmental health. To this point in time the *Lake Guardian* has navigated Lakes Michigan, Huron, Erie, Ontario, and Superior. During Lake Erie and Lake Ontario portions of the survey, five principal investigators from four Universities, Environment Canada, and Region II were provided with time, space and equipment to perform additional work aboard the ship. These included: 1) Dr. Keri C. Hornbuckle (University of Iowa), who collected sediment samples to study the exposure chro-



USEPA GLNPO's 180-foot research ship, R/V Lake Guardian wrapping up Summer water quality monitoring

nology of Synthetic Musk Fragrances in the Great Lakes. Air and water samples were collected to be analyzed for these compounds and others. 2) Dr. Ronald Hites (University of Indiana), whose students collected sediment samples in Lake Erie to study the history of polybrominated diphenyl ethers (PBDEs) in the basin. 3) Mr. Frederick Luckey (USEPA Region 2) Who manages the Lake Ontario Lower Aquatic Foodweb Assessment, studying the current carrying capacity of Lake Ontario to support fisheries and the impacts of exotic species on native communities. Included in the support team were scientists from Cornell University, SUNY Brockport, SUNY College of Environmental Science and Forestry (cyanobacteria), and Environment Canada. (Contact: Glenn Warren, 312-886-2405, warren.glenn@epa.gov; David Rockwell, 312-353-1373, rockwell.david@epa.gov; or Todd Nettesheim, 312-353-9153, nettesheim.todd@epa.gov)

Special Lake Erie Cruise

Researchers from six universities and the U.S. Geological Service, totaling 17 scientists, are working aboard the *R/V Lake Guardian* from August 14th to 19th, sampling Lake Erie, in a continuation of last year's Lake Erie Supplemental Survey. During this second summer of field work, the researchers are investigating the causes of the Lake Erie "dead zone," and of increased phosphorus levels observed by the GLNPO monitoring program, and through Canadian monitoring. Scientists from Ohio State University, DePauw University, Penn State University, Clarkson University, Michigan State University, and Case Western Reserve University are participating in the survey.

(Contact: Glenn Warren, 312-886-2405, warren.glenn@epa.gov)

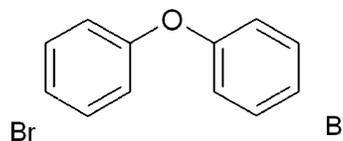
What's Next: Emerging Pollutants

GLNPO staff working on the U.S.-Canada Great Lakes Binational Toxics Strategy were active participants in the Emerging Pollutant Workshop held in Chicago, Illinois on August 11th to 14th. Frank Anscombe discussed two potential emerging pollutants: the metals thallium and platinum, while GLNPO's Ted Smith chaired a panel on brominated flame retardants.

Seldom studied, there are indications that thallium poses risks of the order presented by methylmercury, in that people who consume a lot of fish accumulate potentially unhealthy levels of thallium. Environmental levels of platinum group metals have greatly increased since adoption in catalytic converters for vehicles, although their levels are still way below the levels thought to pose human health impacts.

The brominated flame retardants panel included an overview of the issue (e.g., historical use, basis for concern, regulations, status of research), presence in the environment and people, and the latest information on toxicology and risk. Major panel conclusions included the following: levels of penta-brominated di-phenyl ether (PBDE) are 10-20 times higher in people from North

Polybrominated Diphenyl Ethers (PBDEs)

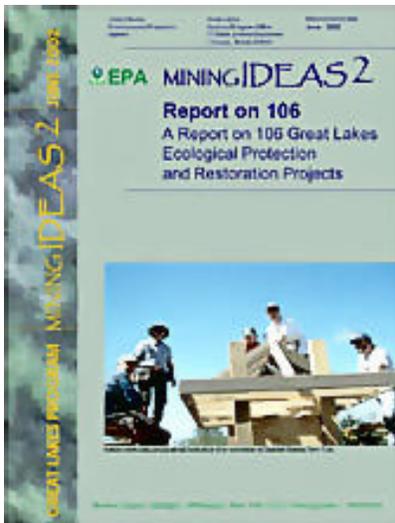


Chemical structure diagram of the widely-used flame-retardant chemical PBDE

America than in Europeans (95% of PBDE is used in North America); world-wide, levels are doubling in 4-5 years; and there is concern that the levels are nearing those thought to pose human health impacts.

Workshop notes will be published shortly, including recommendations for future research needs. Additionally, an article on the Workshop is slated for Fall publication in Science News. Presentations from the Workshop are available on the Web at: <http://www.epa.gov/osp/regions/emerpoll.htm>

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Mining Ideas 2

A report analyzing the final grant reports from 106 habitat protection and restoration projects funded by GLNPO is now on the GLNPO

website at <http://www.epa.gov/glnpo/ecopage/funding/index.html>. Between 1992 and 2001, more than \$17 million was awarded and leveraged for projects to protect, restore, inventory, assess, classify, monitor and study more than 17 million acres of the Great Lakes basin. Projects were supported by 650 federal, state, local, tribal and non-governmental and academic partners. The objectives of the analysis of the final project reports were to determine whether GLNPO financial assistance bene-

fitted the environment, encouraged natural resource stewardship, and contributed to local economies, and to target future funding. Findings include: more than 6,400 acres were protected, more than 7,300 acres were begun to be restored, 1,250 school children and adults were educated about project work, more than 900 people volunteered more than 3,800 hours to protect and restore, and 62 full and part time jobs were created. Conclusions of the analysis are that a small amount of money can act as seed money to jump start or catalyze a project; protection and restoration activities are good for local economies; our understanding of Great Lakes ecosystems is increasing; people are interested in protecting and restoring their environment to the extent that they will spend their free time to support project activities; and, GLNPO funding of projects is money well spent. This analysis will inform GLNPO funding criteria over the next several years. (Contact: Karen Rodriguez, 312-353-2690, rodri-guez.karen@epa.gov)

Tall Ships Chicago 2003

Highlighting Chicago as “The Great Port City” Tall Ships Chicago 2003 from July 30th to August 4th, 25 international sailing vessels were on display docked along Chicago’s Navy Pier, DuSable Harbor, Monroe



Tall Ships Chicago visitors stop at EPA/EC exhibit

Harbor and the Chicago River. The event attracted 2 million visitors.

Environment Canada and USEPA manned an information exhibit in a tent near the entrance to Navy Pier (Chicago's most popular tourist attraction). The exhibit featured information about the Great Lakes Binational Toxics Strategy, the Lake Michigan Lakewide Management Plan, a groundwater demonstration model, a Pollution Prevention Puzzle. Great Lakes Binational Toxics Strategy visitors were a popular giveaway, especially during the hot, sunny weather of the festival. Along with Environment Canada's staff, GLNPO's E. Marie Phillips, Ted Smith, Judy Beck, and George Ison were kept busy answering questions about the Great Lakes and efforts to monitor and protect them from throngs of interested visitors. The effort was an opportunity to demonstrate the close partnership between the United States and Canada for protecting the international treasures that are the Great Lakes.

(Contact: E. Marie Phillips, 312-886-6034, phillips.emarie@epa.gov)

Acting Geographically

On July 8th to 11th, GLNPO staff participated in the Geographic Programs—Moving Into the Future workshop sponsored by the Canaan Valley Institute at Davis, West Virginia. The Institute drafted a report on governance of geographic programs, with particular attention to the Great Lakes and Chesapeake Bay USEPA programs. GLNPO staff spoke about GLNPO's history and roles in Great Lakes environmental governance and the added value of geographic programs to accomplishing USEPA mission and goals. Staff from the Chesapeake Bay office also spoke. Discussions ensued regarding a possible governance framework for the Highlands region, which

encompasses parts of Virginia, Maryland, Pennsylvania, and West Virginia. (Contact: Karen Rodriguez, 312-353-2690, rodriguez.karen@epa.gov)

Making Lake Michigan Great 2003

The Grand Valley State University's "Making Lake Michigan Great" 2003 Boat Tour was sponsored in Milwaukee, Wisconsin by a USEPA Lake Michigan Lakewide Management Plan grant and the Milwaukee Community Service Corps. There were two boat tours of the river and harbor aboard the *W.G. Jackson* with a press conference in between on August 13th. The *Jackson* is a 65-foot vessel operated by the Annis Water Resources Institute of Grand Valley State University's Lake Michigan Center in Mus-



W.G. Jackson enters Milwaukee Harbor, Wisconsin
(Photo courtesy of Janet Vail)

kegon, Michigan.

The first tour took the Community Corps members out to see the Lake that their restoration work is protecting. GLNPO's Judy Beck, Lake Michigan Team Manager provided a good overview of the Lake's problems and the importance of their work. Alderman Angel Sanchez provided comments at the press conference and a full commentary as the boat went down the river into the harbor. Remarks about beach closings were made by representatives from the University

of Wisconsin-Milwaukee, the U.S. Fish and Wildlife Service, and the Wisconsin Department of Natural Resources. Judy Beck also spoke about the Great Lakes Legacy Act of 2002 and the Lakewide Management Plan. Two television crews took the hour-long cruise and covered the event in stories on the evening news.

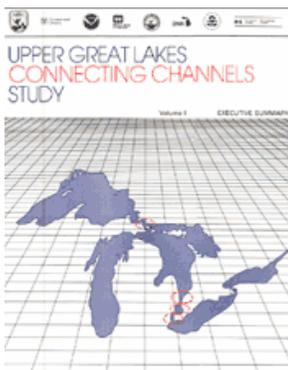
(Contact: Judy Beck, 312-353-3849, beck.judy@epa.gov)

Preserving History

In an effort to preserve historical scientific documents and to make them available to researchers and the public, GLNPO has begun to electronically archive these documents online. One of

the first such documents to be put online is the Upper Great Lakes Connecting Channels Study.

This cooperative study of the Upper Great Lakes boundary waters (St. Marys, St. Clair, and Detroit Rivers and Lake St. Clair) was initiated in late 1983 by the USEPA. The Study became a full binational multi-agency investigation in July 1984, with a partnership of Federal State, and Provincial scientists from the United States and Canada. The report is available online at: <http://www.epa.gov/glnpo/uglcc/vol1.html>



You may wish to check the Recent Additions link (<http://www.epa.gov/glnpo/whatis.htm>) on GLNPO's Homepage often for future installments of historical documents, as well as other new items of interest.

(Contact: Pranas Pranckevicius, 312-353-3437, pranckevicius.pranas@epa.gov)

Staying Ahead of Carp

Asian carp have been found in the Illinois River, which eventually connects to Lake Michigan. Due to their prodigious appetites, rapid growth, and size, it's feared that if Asian carp were to reach Lake Michigan, they would wreak havoc on the Lake's ecology. To prevent this, the U.S. Army Corps of Engineers, USEPA, the State of Illinois, the International Joint Commission, the Great Lakes Fishery Commission, and the U.S. Fish and Wildlife Service have worked together to install and maintain an electric dispersal barrier on the Sanitary and Ship Canal (part of the linkage between the Illinois River and Lake Michigan). For more information on the dispersal barrier and Asian carp, see the May 2002, September-October 2002, December 2002, and February 2003 editions of the Significant Activities Report for more details on the Asian carp and the electric dispersal barrier.

Ongoing monitoring efforts have not turned up any Asian carp within 21 miles of the electric dispersal barrier, but the agencies have decided to do contingency planning on how they could stop Asian carp from getting closer to Lake Michigan if they should somehow get through the dispersal barrier. To this end, they held an Asian Carp Rapid Response Plan Meeting in Chicago, Illinois on July 1st. Discussion focused on the most effective sampling protocols, monitoring frequencies and locations under various scenarios, permit requirements to be satisfied should a response action be necessary, treatment options and costs, advanced purchase and storage requirements, and public relations aspects of a response. The Illinois Department of Natural Resources will have the lead on a response action with input from the other organizations involved in rapid response planning.

(Contact: Duane Heaton, 312-886-6399, heaton.duane@epa.gov)

Aquatic Nuisance Species Panel

On July 22nd to 24th, the Great Lakes Panel on Aquatic Nuisance Species held its Biannual Meeting and a Rapid Response Workshop in Ann Arbor, Michigan. The Great Lakes Panel serves as the primary coordinative organization to bring together federal, state, tribal, industry, non-governmental organization and Canadian representatives to discuss key invasive species issues facing the Great Lakes. Specific Great Lakes initiatives discussed at the meeting included: predicting nonindigenous fish invasions; update on the dispersal barrier project at the Chicago Sanitary and Ship Canal; and discussion of the ruffe expansion into Lake Michigan. A special session was also convened to examine the role of the media on aquatic nuisance species issues. Dr. Roger Eberhardt of the Michigan Department of Environmental Quality was elected as the new Chair of the Panel and GLNPO's Dr. Marc Tuchman was elected to serve as the Vice Chair.

Meanwhile, the Rapid Response Workshop focused on the seven key components of a Rapid Response Plan for Great Lakes Aquatic Invasions including: communication and organizational structure; outreach; detection and monitoring; decision support and rapid scientific assessment; management options for eradication/control; implementation; and adaptive management. Based on the input received from the workshop, a draft rapid response plan will be developed and disseminated to the group by October for review. It is anticipated that a final model plan will be available by the summer of 2004. The goal of the plan is to increase capacity to anticipate, prevent and respond to new aquatic invasions of non-indigenous

species. The development of this rapid response plan is being supported by a grant awarded in FY 2001 from GLNPO to the Great Lakes Commission.

(Contact: Marc Tuchman, 312-353-1369, tuchman.marc@epa.gov)

Mudpuppy on the Move

GLNPO's 32-foot boat, the *R/V Mudpuppy*, is specially-outfitted for sampling bottom sediments in Great Lakes harbors and rivers and is often found sampling Great Lakes Areas of Concern to help define the degree of sediment cleanup needed or to document the success of cleanups that have already been done. In August, the *Mudpuppy* busy at both the North and South ends of the Great Lakes.

On August 4th and 5th, the *R/V Mudpuppy* sampled bottom sediments in the St. Marys River Area of Concern outside of Sault Ste. Marie, Michigan. Sediment cores were collected in both the Little Rapids area and in Lake Munuscong to better define the nature and extent of sediment contamination in these areas. The work was conducted in



St. Marys River viewed from "Aqua" satellite
(photo courtesy of NASA)

conjunction with Lake Superior State University as part of a grant awarded to the University in 2002.

Later, from August 19th to 21st, the *Mudpuppy* was in Monroe, Michigan to collect sediment samples from the River Raisin Area of Concern. This sampling was conducted as part of a collaborative effort between GLNPO and the Michigan Department of Environmental Quality to determine the levels of PCB contamination in sediments underlying the federal navigation channel. The results of this sampling will assist in filling in one of the remaining data gaps regarding PCB levels in the sediments and inform the decision on how to best remediate sediments within the AOC. The *Mudpuppy* crew collected 18 sediment cores that will be analyzed for PCBs and total organic carbon. Results of the sampling effort are expected in November 2003.

To learn about the *Mudpuppy*, tune your Web Browser to: <http://www.epa.gov/glnpo/sediment/mudwork/mudpup.html> (Contact: Marc Tuchman, 312-353-1369, tuchman.marc@epa.gov)

New River Raisin Sediment Report

In August 2003, GLNPO completed a summary report documenting the results of a contaminated sediment survey on the River Raisin near Monroe, Michigan. Sediment sampling for the project took place in 2001 and 2002. The report summarizes the results of sediment chemistry, whole sediment bioaccumulation, and caged fish studies conducted in collaboration between GLNPO, the U.S. Army Corps of Engineers, and the Michigan Department of Environmental Quality. Some of the findings: significant levels of PCBs remain in the AOC (up to 200 parts per million total PCBs in the surface sediments), and that these PCBs are

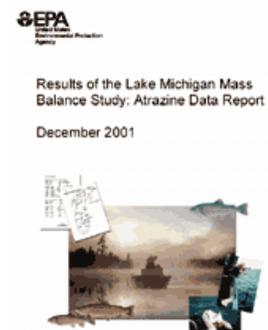
potentially bio-available. The full report is available online at: <http://www.epa.gov/glnpo/sediment/raisin/index.html> (Contact: Scott Cieniawski, 312-353-9184, cieniawski.scott@epa.gov)

How We Monitor

The manual, Sampling and Analytical Procedures for GLNPO's Open Lake Water Quality Survey of the Great Lakes, March 2003 - Revised June 2003, EPA 905-R-03-002 has been finalized for GLNPO's web site. GLNPO staff, with assistance from DynCorp, made many significant improvements to the manual this year and worked hard to tie up loose ends in order to finalize the document prior to the spring survey. This document details all the collection and analytical methods used during the surveys, as well as sampling locations, and other logistical information. The manual can be viewed online at: <http://www.epa.gov/glnpo/monitoring/procedures/index.html> (Contact: Lou Blume, 312-353-2317, blume.louis@epa.gov)

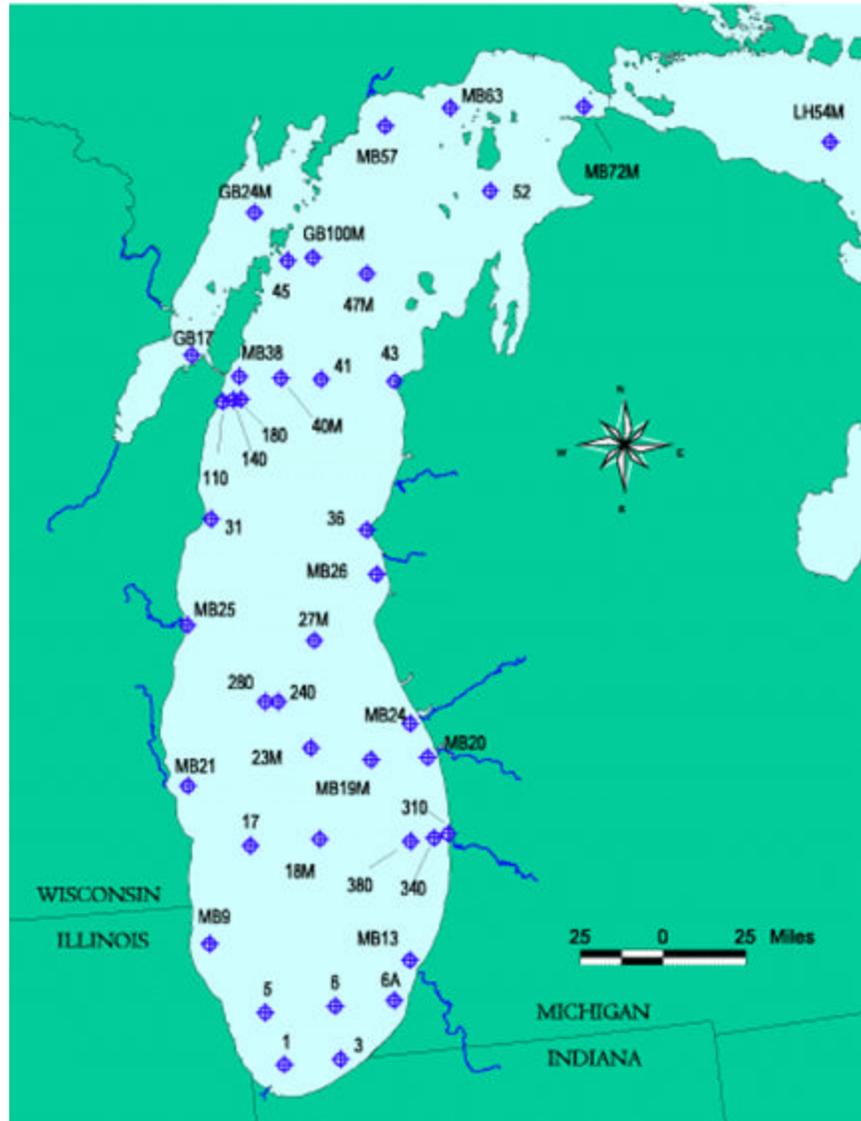
Atrazine Report Online

Atrazine is a herbicide that is widely used to control broadleaf weeds in the production of corn and sorghum. Approximately 64 to 75 million pounds of atrazine are applied per year in the U.S., much of which is used in the "Corn Belt" region that includes the upper midwest surrounding Lake Michigan. Atrazine is generally applied to soil pre-planting or pre-emergence, but is sometimes also applied to the foliage post-emergence. Atrazine can enter surface waters, including Lake Michigan, through runoff, spray drift, discharge of



contaminated groundwater to surface water, wet deposition (dissolution of atrazine vapor in rainfall and washout of particulate bound atrazine), dry deposition (dry settling of particulate bound atrazine), and sorption from the vapor phase.

The Lake Michigan Mass Balance Study measured atrazine and atrazine metabolites in atmospheric, tributary water column, and open-lake water column samples. From March 1994 through October 1995, over a thousand samples were collected and analyzed by gas chromatography/mass spectrometry. Atmospheric vapor, particulate, and precipitation samples were collected from eight stations surrounding Lake Michigan and three background stations outside the Lake Michigan basin. Tributary water column samples were collected from 11 tributary rivers that flow into Lake Michigan. Open-lake water column samples were collected from 35 sampling stations in Lake Michigan, 2 stations in Green Bay, and 1 station in Lake Huron.



Open-water water sampling stations of Lake Michigan Mass Balance Study

The atrazine report is available online at: http://www.epa.gov/glnpo/lmmb/results/atra_datarpt.html.
(Contact: Lou Blume, 312-353-2317, blume.louis@epa.gov)

We welcome your questions, comments or suggestions about this month's Significant Activities Report. To be added to or removed from the Email distribution of the Significant Activities Report, please contact Tony Kizlauskas, 312-353-8773, kizlauskas.anthony@epa.gov.