

Michigan Sea Grant, the Great Lakes and the Detroit River

Monitoring Lake St. Clair:

Using satellite data and a meteorological buoy to track water quality

Although the St. Clair River, Lake St. Clair, and the Detroit River provide drinking water to more than four million people, Lake St. Clair's water quality has become degraded to the point of posing a health risk on some occasions. University of Michigan researcher, Guy Meadows, from the Department of Naval Architecture and Marine Engineering, will develop an Environmental Monitoring Network (EMN) valuable to lake managers, policy-makers, and the general public about local water quality conditions on Lake St. Clair. Michigan Sea Grant College Program, and the City of St. Clair Shores, fund this project.

Contact: Guy Meadows, University of Michigan Department of naval Architecture and Marine Engineering at (734) 764-5235 or email at gmeadows@engin.umich.edu

Students Discover the Great Lakes:

Michigan Sea Grant's Great Lakes Education Program (GLEP)

GLEP is designed to stimulate interest in the Great Lakes and help students understand their role as stewards of our Great Lakes resources. Since 1991, more than 28,000 fourth-grade participants have been introduced to the chemical, physical, biological and cultural aspects of the Great Lakes through GLEP, which combines classroom and vessel-based learning. Students learn about concepts such as the aquatic food web, the water cycle, the role of oxygen, and the effects of exotic species. Educational cruises on Lake St. Clair and the Detroit River provide an opportunity for students throughout southeast Michigan to examine plankton samples, test water clarity, practice marine knot-tying, and take temperature readings.

See GLEP on the Web at <http://www.miseagrant.org/glep>.

Contact: Steve Stewart, Michigan Sea Grant Southeast Michigan Extension Agent, at (810) 469-7431 or email at stewart@msue.msu.edu

Detroit River:

American Heritage River Project

The Detroit River is an American Heritage River and a Canadian Heritage River, selected by the governments of the United States and Canada in 1998 and 2000, respectively. Michigan Sea Grant led Detroit area communities in preparing their successful applications, and Sea Grant Extension Agent Mark Breederland co-chairs the steering committee that is implementing action plans for the environment, economic development and culture/history. River Navigator John Hartig, chosen by the steering committee, is helping riverside communities obtain federal assistance on such efforts as conserving and enhancing the Detroit River's ecological habitat; improving public recreational access to the river and linking waterfront access/recreation with development projects through greenways; encouraging mixed use opportunities in downtown and waterfront centers; and preserving and interpreting Detroit's rich cultural legacy through Detroit 300, the city's tricentennial celebration in 2001.

Contact: Mark Breederland, Michigan Sea Grant, Southeast Extension Agent at (810) 989-6323 or email: breederm@msue.msu.edu

Michigan Sea Grant's Strategic Initiatives:

- Anticipating Great Lakes Trophic Change
- Aquatic Nuisance Species
- Great Lakes Education
- Great Lakes Coastal Wetlands
- Sustainable Coastal Development

A Bridge to Great Lakes Research, Education and Information

Michigan Sea Grant is a cooperative program of the University of Michigan and Michigan State University in Great Lakes and marine research, education and outreach. Michigan Sea Grant is funded by the National Sea Grant College Program at the National Oceanic and Atmospheric Administration, a division of the U.S.

Department of Commerce. **Contact Michigan Sea Grant: at 734-764-1118, email: msgpubs@umich.edu or**

Web: at <http://www.miseagrant.org>



Contaminated Sediment

Contaminated sediment is a long-standing problem in lakes and rivers, and contributes to many forms of environmental degradation. From 1985-1989 over 15 million m³ were dredged for more efficient navigation through rivers and harbors of the Great Lakes; 51% of this material had to be placed in confined disposal facilities due to high contaminant levels.

From an environmental cleanup perspective, there are currently few ecologically-based decision-making tools available for pinpointing the most effective contaminated sediment management strategies, and often decisions become overwhelmed by regulatory complexity. Sediment contaminants still represent a major factor limiting our ability to reach a healthy, sustainable environment and economy.

All 42 Areas of Concern identified by the International Joint Commission in the Great Lakes Basin have contaminants in sediment that exceed chemical guidelines, but their effects on the ecosystem are only partially quantified. However, there are clear linkages to restrictions on fish and wildlife consumption, fish tumors or other deformities, loss of fish and wildlife habitat, degraded natural communities, and other ecosystem effects identified in Annex 2 of the Canada-U.S. Great Lakes Water Quality Agreement.

In most Areas of Concern, the sediment problem has not been quantitatively coupled to ecological impairments. Therefore, deciding on volumes of sediment to be cleaned up, why, and what ecological improvements can be expected over time has been challenging. It is important not only to know the existing degree of ecological harm associated with sediment contaminants, but also the circumstances under which those relationships and threats might change, making contaminants more bioavailable or detrimental under different environmental conditions. The ability to forecast the expected degree of recovery and the ecological improvements from sediment cleanup must be demonstrated.

A better understanding of the relationships between contaminated sediment and ecosystem quality would provide stronger justification for a particular sediment management strategy. It would help in making management decisions among the following options: source control and natural recovery; removal and containment; removal and treatment; *in situ* capping, and *in situ* treatment. If relationships between contaminated sediment and beneficial uses were better understood, more compelling cases could be made to fund sediment cleanup. Better public support for sediment management decisions would result, and more corporate involvement could be expected.

From 1986-1999, over \$580 million have been allocated for 38 remediation projects in 19 Areas of Concern. In addition, the rate of increase has accelerated in recent years. Unfortunately, of these projects, only three (thus far) have produced information on ecological effectiveness gained by monitoring the recovery of environmental quality after a cleanup has taken place. Measuring ecological effectiveness of sediment cleanup is also important where a new environmental technology has been tested, in order to improve innovative approaches. In cases where sediment remediation was undertaken as a result of regulatory action, the projects were designed to remove the worst masses of contaminants to reduce environmental risks. These projects were very effective in meeting the regulatory requirements, and are consistent with a step-wise incremental approach to management of contaminated sediment called for by the Great Lakes Water Quality Board of the International Joint Commission. After remediation of the worst sites, an integrated evaluation of all sources, including sediment, must be undertaken to determine whether or not further remediation is required and to ensure that remediation is sustainable.

Much more effort should be placed on forecasting and measuring the extent and pace of ecological recovery. This will help in future efforts to make decisions on the most appropriate sediment management strategy, thereby advancing restoration of beneficial uses in Areas of Concern.

Addressing contaminated sediment in the Detroit River requires both a short- and long-term approach. In the short term, there are plans for sediment cleanup at Black Lagoon (State and Federal funding) and Conner Creek (City of Detroit funding). Remediation of these sites can serve as an example for future cleanups. However, the initiation of sediment remediation activities at these sites has been delayed due to disposal liability and regulatory issues. This situation illustrates the need to address barriers to contaminated sediment cleanup. The least expensive option is disposal in the U.S. Army Corps of Engineers confined disposal site at Point Mouillee, MI. This facility is currently used for the disposal of sediments dredged from the deep draft navigation channels in the Detroit and Rouge Rivers, as well as disposal of sediments dredged from marina operators and other similar permittees. The CDF was not originally intended to accept remedial dredged material (i.e., contaminated sediment). This issue is now being addressed in the court system.

In the long term, there is a need to develop a comprehensive contaminated sediment cleanup strategy for the entire Detroit River (as well as the other tributaries in Southeast Michigan). This strategy must be targeted at restoring impaired beneficial uses. Further, this must be a coordinated interagency effort among federal, state, county, and local interests.

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Linked Riverfront Greenways

The greenway movement has arrived. Embraced by communities across the country as the public place of choice, they have redefined what a quality community resource is all about. No other resource serves a community in so many tangible ways. It is no wonder that the identity of so many communities is tied so closely to the quality of their waterfronts and greenways. This recognition of the importance of greenways has not gone unrecognized along the Detroit riverfront. Greenways are helping communities and businesses redefining themselves and their relationships to the Detroit River.

Greenways are corridors of linear open space established for recreation and/or conservation. Greenways follow natural and cultural corridors, such as rivers, streams, scenic roads, and railroad corridors. Greenways may be held on public land, voluntarily retained on private land, or conserved through public-private partnerships.

The Greater Detroit American Heritage River Initiative is a dynamic multi-stakeholder process designed to promote economic development, encourage environmental stewardship, and celebrate our history and culture. To date, over 100 organizations have signed on and work to support the initiative's mission. Through this Initiative stakeholders have adopted the following vision statement:

"We are filled with pride for our magnificent River and have a shared vision for its regeneration. Our vibrant international waterway inspires a community brimming with fun and excitement, rest, and relaxation. A broad diversity of jobs, housing, historic interpretation, recreation, and culture breathe life into a 24 hour a day waterfront. Industry, commerce, and tourism growing in harmony with the environment sustain fish, bird, animal, and plant habitats. The River has become the region's front door, with access to all inland communities. Its beauty and integrity have been restored, and we thrive within its ecosystem."

The President of the United States recognized the Detroit River in 1998 as one of 14 nationally significant rivers. The Detroit River nomination competed with 125 other nominations of rivers from 46 states to be designated as an "American Heritage River." This designation provides incentive, coordination, and attention to our wonderful, but often overlooked, international waterway.

It should be no surprise that stakeholders in the Greater Detroit American Heritage River Initiative have identified linked greenways as one of their six priorities. People want to increase access to the Detroit River, incorporate trails and walkways to it, improve the aesthetic appearance of the shoreline, and reap recreational, ecological, and economic benefits from it. Our Detroit River has been rediscovered as an incredible asset and a key ingredient in achieving quality of life.

Given the choice, most people who live in cities would prefer to live near parks or greenways because of the obvious recreational, aesthetic, social, and ecological benefits. This is reflected in the recent economic studies undertaken on Windsor's greenways that have shown how property values generally increase with proximity to greenways (Source: *Environment Canada – Community Greenspaces are Worth Money*). These higher property values will result in increased tax revenues for communities to help offset the costs of the "quality of life" improvements.

The industrial heritage of the area presents particular challenges and opportunities in establishing greenways. Historically, communities have been physically and emotionally separated from the river by a nearly continuous wall of commercial activity. The challenges of brownfield redevelopment are offset by the realization that one of the country's greatest resources can once again be part of the community. The idea of a nearly continuous greenway along the Detroit River seemed pure fantasy just a few years ago. Community and business leaders are now championing linked greenways along the entire length of the Detroit River from Lake St. Clair to Lake Erie, across to Canada, and up key tributaries like the Rouge, Ecorse, and Huron Rivers.

The Greater Detroit American Heritage River Initiative is not alone in working towards these goals. Key partners include: all communities throughout the watershed; businesses; the Community Foundation of Southeast Michigan's Greenways Initiative; the Automobile National Heritage Area; and the Canadian Heritage River Initiative.

All of these partners share the goal of greenways along the Detroit River that explore the regions rich natural and cultural heritage. Individual corporations and landowners are stepping up to the plate to host and help finance greenways along their waterfront properties. The Greater Detroit American Heritage River Initiative looks forward to working in partnership with these many organizations and individuals to help bring our shared vision to fruition.

A total of 15 greenways projects have either been initiated or completed in the last two years. These greenway projects are key linkages and unique destinations that provide open space, protect natural and cultural resources, and improve the quality of life throughout our region. These greenways are also important because they bring people down to the shoreline and give them first hand experiences with the river. Such first hand experiences are essential to build support for further brownfield redevelopment, contaminated sediment remediation, pollution prevention, and habitat rehabilitation and conservation. These greenways also provide for alternative modes of transportation that further sustainable communities.

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Conserving Detroit River Habitats

The Detroit River is one of North America's great rivers in the heart of the Great Lakes Basin. It connects the Upper Great Lakes to the Lower Great Lakes. It also links Canadians and Americans through an inseparable border. The Detroit River is an invaluable, multifaceted resource that serves as the foundation of our economies, provides numerous recreational opportunities and ecological values, and enhances "quality of life."

The Detroit River Remedial Action Plan (RAP) notes that over 95% of the historical, coastal wetlands along the river have been lost to development. As a result, the RAP identified "loss of fish and wildlife habitat" as one of nine impaired uses. Therefore, it is urgent to protect the remaining coastal wetlands and other ecological features before they are lost to further development, and to rehabilitate degraded ones.

The Detroit River is an important waterfowl migration corridor situated at the intersection of the Atlantic and Mississippi Flyways. An estimated three million ducks, geese, swans, and coots migrate annually through this region. In 1960, the international importance of this area was manifested in the U.S. Congressional designation of the 460-acre Wyandotte National Wildlife Refuge in the lower river. The Canada-United States North American Waterfowl Management Plan has identified the Detroit River as one of 34 Waterfowl Habitat Areas of Major Concern in the United States and Canada. Marshes along the Lower Detroit River and Northwest Ohio have been declared part of a Regional Shorebird Reserve by the Western Hemispheric Shorebird Reserve Network. In 1998, the Canada-U.S. State of the Lakes Ecosystem Conference identified the Detroit River-Lake St. Clair ecosystem as one of 20 Biodiversity Investment Areas in the Great Lakes Basin because it supports an exceptional biological diversity and requisite habitats.

The Michigan Department of Natural Resources and Ontario Ministry of Natural Resources recognize the Detroit River as having one of the highest diversities of wildlife and fish in all of the Great Lakes. More than 29 species of waterfowl and 65 kinds of fish make their home in the Detroit River. The Detroit River is also a major migration corridor for hundreds of fish, butterfly, raptor, neo-tropical bird, and waterfowl species. The Detroit Audubon Society has documented over 300 species of birds in the Detroit-Windsor area. About 150 bird species nest near the river.

The diversity of biota and habitats in the Lower Detroit River provides numerous benefits to the over 5 million people who live near it. The Lower Detroit River has an international reputation for duck hunting. In 1991, retail sales related to waterfowl hunting in Michigan were estimated at \$20.1 million. During the same year, bird watching, photography, and other non-consumptive uses of waterfowl contributed an additional \$192.8 million to Michigan's economy.

Over 800,000 pleasure boats are registered in Michigan and about half of those are used on the Detroit River and Lake St. Clair, in part to fish for the estimated 10 million walleye that ascend the Detroit River each spring from Lake Erie to spawn. These walleye have helped create an internationally renowned sport fishery. It is estimated that walleye fishing alone brings in \$1 million to the economy of communities along the lower Detroit River each spring.

Despite increased awareness and science supporting their importance, habitats in the Lower Detroit River continue to be destroyed and degraded. There is a sense of urgency and a unique opportunity to protect the remaining high quality habitats before they are lost to further development and to rehabilitate and enhance degraded ones.

The Biodiversity Conservation Strategy for the Essex Region, developed by Essex Region Conservation Authority and its partners in Southwestern Ontario, and the U.S. Geological Survey-Great Lakes Science Center have inventoried significant ecosystem features. These efforts have provided the information needed to establish priorities to conserve and rehabilitate habitat. The scientific rationale for action now exists, however, any action must be guided by and remain true to a conservation vision.

Canada-United States agreement has been achieved on the following conservation vision:

In 10 years the Lower Detroit River Ecosystem will be an international conservation region where the health and diversity of wildlife and fish are sustained through protection of existing significant habitats and rehabilitation of degraded ones, and where the resulting ecological, recreational, economic, educational, and "quality of life" benefits are sustained for present and future generations.

Examples of recent actions to conserve and rehabilitate Detroit River habitats include: purchase of Stony Island with Michigan Natural Resources Trust Fund dollars; receiving Mud Island as a gift from National Steel Corporation and incorporating it into the Wyandotte National Wildlife Refuge; securing resources through Water Resources Development Act for ecological restoration of Grassy Island; demonstrating shoreline soft engineering techniques at Trenton street ends, the Solutia site located on the Trenton Channel, and at BASF Corporation; and protecting coastal wetlands in Gibraltar Bay by Grosse Ile Nature and Land Conservancy.

Examples of proposed projects that should be supported include: obtaining resources through Section 206 of Water Resources Development for ecological restoration of Hennepin Marsh and Black Lagoon; securing resources through the North American Wetlands Conservation Act to purchase Calf Island; protecting Humbug Island and Marsh via the conservation easement defined by the U.S. Army Corps of Engineers; working with BASF Corporation on ecological restoration of Point Hennepin on Grosse Ile; providing technical assistance to Wayne County Parks for soft engineering of the northern shoreline of Elizabeth Park along the Trenton Channel; and securing Sugar Island for recreation and conservation purposes.

Congressman John D. Dingell has introduced legislation to create a Detroit River International Wildlife Refuge. This legislation is currently under consideration by the House Resources Committee.

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Monitoring the Impact of Aquatic Nuisance Species in the Great Lakes

Great Lakes Sea Grant Network:

Cooperation throughout the Great Lakes Basin

The Great Lakes Sea Grant Network is comprised of university-based programs in Illinois-Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin. The Sea Grant Network was among the first to react to the zebra mussel invasion. Within a month of the first confirmed sighting in Lake Erie, Sea Grant scientists were researching ways to control the mussel. Network programs are coordinating research and working closely with federal and state agencies to avoid duplication of effort and maximize the value of every dollar spent. Since 1991, the National Sea Grant College Program has funded research to address this growing national problem. Most of this work has been conducted by scientists associated with Great Lakes Sea Grant programs. Many projects are still under way. Great Lakes Sea Grant Network programs conduct Great Lakes and marine research, education and outreach and are funded by the National Sea Grant College Program of the National Oceanic and Atmospheric Administration, an agency of the U.S. Department of Commerce.

<http://www.seagrant.wisc.edu/greatlakes/glnetwork/>

Citizen Monitoring for Zebra Mussels

Zebra mussels, first found in the Great Lakes near the Detroit River in the late 1980s, have significantly altered the ecosystem. Dozens of Michigan citizens have documented the spread of zebra mussels from the Great Lakes to more than 150 of Michigan's 11,000 inland lakes during the past decade. Michigan Sea Grant produced and provided instructional videos and manuals and plankton sampling kits for the volunteers who collected water samples periodically and sent them to a laboratory to be analyzed for the presence of zebra mussel veligers (larvae). In cooperation with the Michigan Department of Environmental Quality and the Michigan Lake and Streams Association, Michigan Sea Grant launched Zebra Mussel Brickwatch in 2000. Through this project, hundreds more volunteers have used bricks to test for the presence of adult zebra mussels in inland lakes across the state.

See the exotic species section on the Michigan Sea Grant web site at <http://www.miseagrant.org/exotic.html>.

Partnerships on Purple Loosestrife

Colorful, invasive purple loosestrife become a dominant plant in many Michigan wetlands, crowding out native cattails and other vegetation that provide important habitat for fish and wildlife. Michigan Sea Grant has been an integral partner in the Purple Loosestrife Project at Michigan State University which is using biological control methods to stifle the spread of this aquatic nuisance species. **See the Purple Pages Web site at <http://www.msue.msu.edu/seagrant/pp/>**. The project has trained more than 100 classroom teachers and more than 25 community organizations throughout the state to use *Galerucella* spp. beetles as a management tool, providing the teachers and other cooperators with nearly 11,000 beetles in 2000. Detroit area science teachers participated in a field workshop as part of efforts to restore a degraded wetland in the Romulus area. Monitoring of a beetle-treated wetland at Pointe Mouillee in 2000 showed that purple loosestrife was completely absent from seven of the nine quadrats where it had occurred in 1997.

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