



THE SAGINAW BAY NATIONAL WATERSHED INITIATIVE:

Participation And Contributions of NOAA's Great Lakes Environmental Research Laboratory (GLERL)

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SETTING

Saginaw Bay is a southwestern extension of Lake Huron located in the east central portion of Michigan's lower peninsula. The bay has a large surface area of 2,960 km² and is 83 km long. The Saginaw Bay watershed is 22,557 km² comprising about 15% of Michigan's total land area and is home to about 1.4 million people. Major ecosystem management problems relate to water quality (cultural eutrophication and contaminated sediments) and loss of habitat, especially through sedimentation.

In 1991 the Saginaw Bay Watershed was designated as the first project under the National Watershed Initiative Program (USEPA). This designation provided an opportunity to take a new approach to local, state, and federal management of this valuable watershed. The Saginaw Bay National Watershed Initiative is intended to be a forum for local, state and federal agencies and citizens to work together to identify water quality and habitat protection objectives that cannot be accomplished by these same interests individually, and to develop the scientific information needed to implement actions necessary to effectively restore, enhance, and protect the watershed. The Initiative is complementary to and coordinated with the Saginaw River/Bay Remedial Action Plan (RAP) process, which was begun in 1986, and which also incorporates activities in the Saginaw River under the EPA Assessment and Remediation of Contaminated Sediments (ARCS) Program.

CHALLENGE

The challenge is to successfully implement an ecosystem approach to managing the Saginaw Bay watershed. Success is dependent on the active participation, coordination, and cooperation of the public and all relevant program areas at the state, federal and local levels that have environmental activities or authority in the Saginaw Bay watershed. The approach is to use the Watershed Initiative to bring together and coordinate the activities of the various government and private sector programs in the Saginaw Bay watershed in a manner that advances ecosystem management.

ECOLOGICAL APPROACH

The Great Lakes Water Quality Agreement of 1978 between the U.S. and Canada recognized the interrelationships between human activities, land use, water quality, habitat, and species diversity, and called for an ecosystem approach to Great Lakes environmental problems. The Saginaw Bay National Watershed Initiative takes such an approach. It incorporates and coordinates the cooperation of 18 different federal, state, and local government agencies, and the private sector, representing or providing expertise, programs, and/or authority over land use, soil conservation, farming practices, industrial waste effluents, river inputs, agriculture, recreational use, contaminated sediments, and fisheries.

USING BEST SCIENCE

The water quality problems of the Saginaw Bay were the focus of intense studies during the 1970s, resulting in upgraded sewage treatment and phosphorus abatement programs. While phosphorus loads from point sources were decreased, since that time the non-point-source load has increased, toxic organics have contaminated the sediments of the Saginaw River and parts of Saginaw Bay, and the zebra mussel invaded and became established in the Bay. In order to resolve the best ecosystem management practices, the structure and function of the ecosystem has to be reevaluated because of the major infestation by the zebra mussel and the resulting ecosystem changes. Therefore, a major component, and the one in which GLERL is a lead agency, is to study and measure the ecological changes in Saginaw Bay and evaluate the impacts of the zebra mussel on the ecosystem of the Bay. This up-to-date scientific information is being used by the Saginaw Bay Watershed Initiative to recalibrate modified ecosystem models (USEPA)

and to relate lower food web changes to fisheries (Michigan Department of Natural Resources), and reevaluate the present state of Saginaw Bay water quality.

GRASS-ROOTS PARTICIPATION

There has been extensive public participation in planning and identifying major issues, assisting in evaluating possible solution approaches, and in implementing proposed actions, especially via the Saginaw Basin Alliance, which is a grass-roots citizen action group, and the Saginaw Basin Watershed Council, which incorporates local government representatives. Both groups are represented on the various advisory committees that were established.

PARTNERSHIPS

The entire Saginaw Bay Watershed Initiative Program is a partnership between state, federal, and local agencies, and citizen groups, including: Michigan Department of Natural Resources, which is the lead agency, USEPA, USDA Soil Conservation Service, Michigan Extension Service, Saginaw Basin Alliance, Saginaw Bay Watershed Council, East Central Michigan Planning and Development Region, Michigan Association of County Drain Commissioners, Michigan Association of Conservation Districts, Michigan Farm Bureau, Michigan Agribusiness Association, U.S. Fish & Wildlife Service, NOAA (GLERL), U.S. Geological Survey, Michigan Department of Public Health, U.S. Army Corps of Engineers, and several school districts.

PROJECT ACTIVITIES

A major component of the Saginaw Bay Initiative is the development of modified models of the Saginaw Bay ecosystem, and measurements of key ecosystem parameters needed to recalibrate these modified models. NOAA/GLERL, in conjunction with its study of the effects of zebra mussels on the ecosystem, is the major project participant gathering and providing ecological data for the Bay. GLERL scientists started collecting water quality and ecological data in Saginaw Bay in 1990, before the zebra mussel entered the Bay. In 1991 the zebra mussel invaded and began to significantly alter the ecosystem. GLERL scientists have followed the changes in the water quality and ecosystem parameters in the Bay and, as they become available, have provided these data to modelers at the USEPA working in conjunction with the Michigan Department of Natural Resources. For example, total phosphorus in Saginaw Bay decreased by about 35%, chlorophyll a decreased by about 40%, and water clarity approximately doubled, between 1991 and 1993. However, in 1993 and 1994, blooms of toxic algae appeared, and large-leaf aquatic plants fouled beaches. In 1995 GLERL, while continuing to measure water quality and ecosystem parameters of Saginaw Bay, will focus on the causes of the toxic algae blooms (was it the zebra mussel or a weather anomaly leading to large non-point-source inputs of nutrients?).

CHALLENGE AHEAD

The challenge ahead is to keep the Saginaw Bay Watershed Initiative and its multi-agency ecosystem approach viable. Funding from EPA was eliminated in 1994. The State of Michigan is trying to keep the alliances alive, but must depend on participants providing their own funding for the most part. The ecosystem and water quality of Saginaw Bay are still in a state of change due to the zebra mussel - the system remains unstable and may be subject to additional unexpected ecosystem events such as the 1994 blooms of toxic algae. However, our understanding of the system with the zebra mussel firmly established, is incomplete. Continued funding for GLERL's zebra mussel program is critical to continuation of our Saginaw Bay ecosystem work and our ability to participate in and contribute to the Saginaw Bay National Watershed Initiative.

CONTACT

Dr. David F. Reid, Assistant to the Director
NOAA/GLERL
2205 Commonwealth Boulevard
Ann Arbor, MI 48105-1593
Voice: 313-741-2019
FAX: 313-741-2003
InterNet: reid@glerl.noaa.gov