

United States
Environmental Protection
Agency

Great Lakes
National Program Office
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Chicago, Illinois 60605



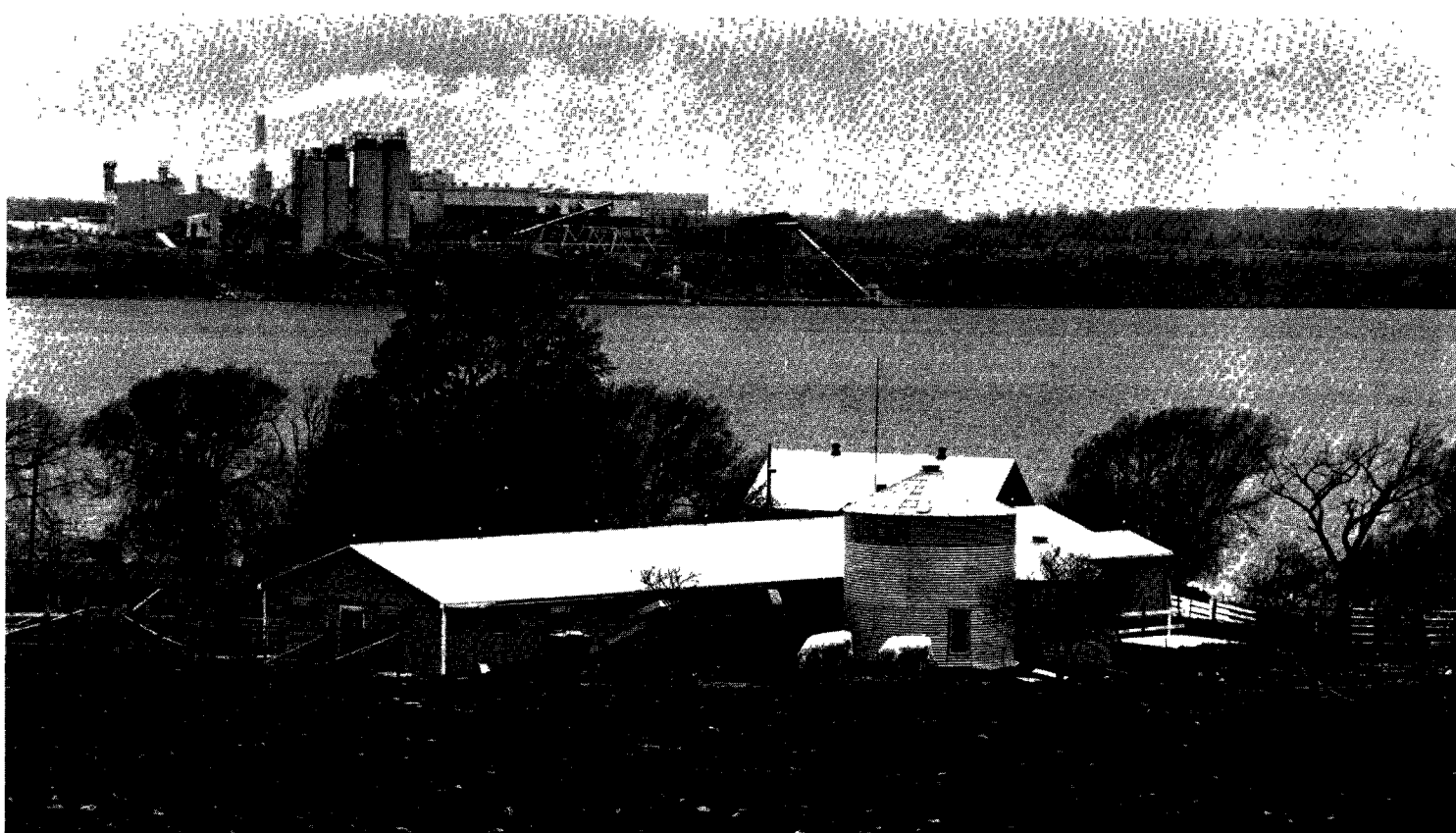
The Great Lakes National Program Office



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A B King



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The U. S. EPA **Great Lakes National Program Office** (GLNPO) is concerned with the Great Lakes as an ecosystem, focusing on the health of humans and aquatic life within the system. GLNPO studies the state of the ecosystem and trends in its condition. Simply stated, GLNPO asks: Are the fish healthy? Are they safe to eat? Is it safe to swim? Is the water safe to drink? If not, why not? What will it take to fix it? From this perspective, GLNPO reviews progress made by pollution control programs, assesses their adequacy and the need for further control. Most of GLNPO's functions are related to the United States-Canada Great Lakes Water Quality Agreement and progress made by the United States in meeting its terms.

Despite their size, the lakes are especially sensitive to environmental insult. Only 1 percent of the water entering the Great Lakes system flows out the St. Lawrence River in any one year, leaving toxic pollutants to accumulate in bottom sediments and fish. Municipal wastes, toxicants, industrial wastes, and agricultural runoff have all contributed to the dramatic decline of the lakes. The most obvious problems were clearly apparent during the 1960's, when rotting fish, bobbing debris, and algae-choked waters shocked the international community into action.

Since then, EPA has worked to restore the Great Lakes to their original grandeur. GLNPO, working closely with Region V's Water Division, tracks compliance with the 1972 and 1978 United States-Canada Great Lakes Water Quality Agreements. Those agreements mandate cooperative pollution control and research efforts. The U.S. and Canada have spent more than \$7.6 billion since 1972 to construct and upgrade municipal sewage treatment facilities in the Great Lakes Basin. Three hundred and ninety plants in the basin are now effectively treating 97 percent of the sewage, with a corresponding improvement in water quality.

Industrial discharges into the lakes are now limited and monitored by the States and GLNPO, which established a comprehensive data-gathering network to measure pollutants in the water, fish, sediments, and air of the Great Lakes ecosystem. GLNPO also uses its research vessel, the Roger R. Simons, to assist in gathering data. EPA scientists sample water and biota, using the on-board laboratory to check biological activity and water chemistry. Guided by a surveillance plan developed by the International Joint Commission (IJC), GLNPO is regularly using the Roger R. Simons to assess conditions in the lakes and to detect year-to-year changes. The IJC is a six-member board established by the United States and Canada in 1909 to protect the waters shared by the two countries. As is required by the United States-Canada Great Lakes Water Quality Agreement of 1978, EPA keeps an inventory of dischargers into the lakes and reports annually on their compliance records.

Areas of Concern

■ LAKE MICHIGAN

Fox River/Southern Green Bay, Wisconsin
Milwaukee Estuary, Wisconsin
Waukegan Harbor, Illinois
Grand Calumet River and Indiana Harbor Canal, Indiana

■ LAKE ERIE

St. Clair, Michigan / Ontario
Detroit River, Michigan
Rouge River, Michigan
Raisin River, Michigan
Maumee River, Ohio
Black River, Ohio
Cleveland, Ohio
Ashtabula, Ohio

■ LAKE ONTARIO

Buffalo River, New York
Niagara River, New York
Hamilton Harbor, Ontario
Cornwall, Ontario and
Massena, New York

● LAKE SUPERIOR

St. Louis River, Minnesota
Thunder Bay, Ontario
Nipigon Bay, Ontario
Jackfish Bay, Ontario
Peninsula Harbour, Ontario

● LAKE MICHIGAN

Menistigue River, Michigan
Menominee River, Michigan
Sheboygan, Wisconsin
Muskegon Lake, Michigan
White Lake, Montague, Michigan

● LAKE HURON

Spanish River Mouth, Ontario
Penetary Bay to Sturgeon Bay, Ontario
Collingwood Harbour, Ontario

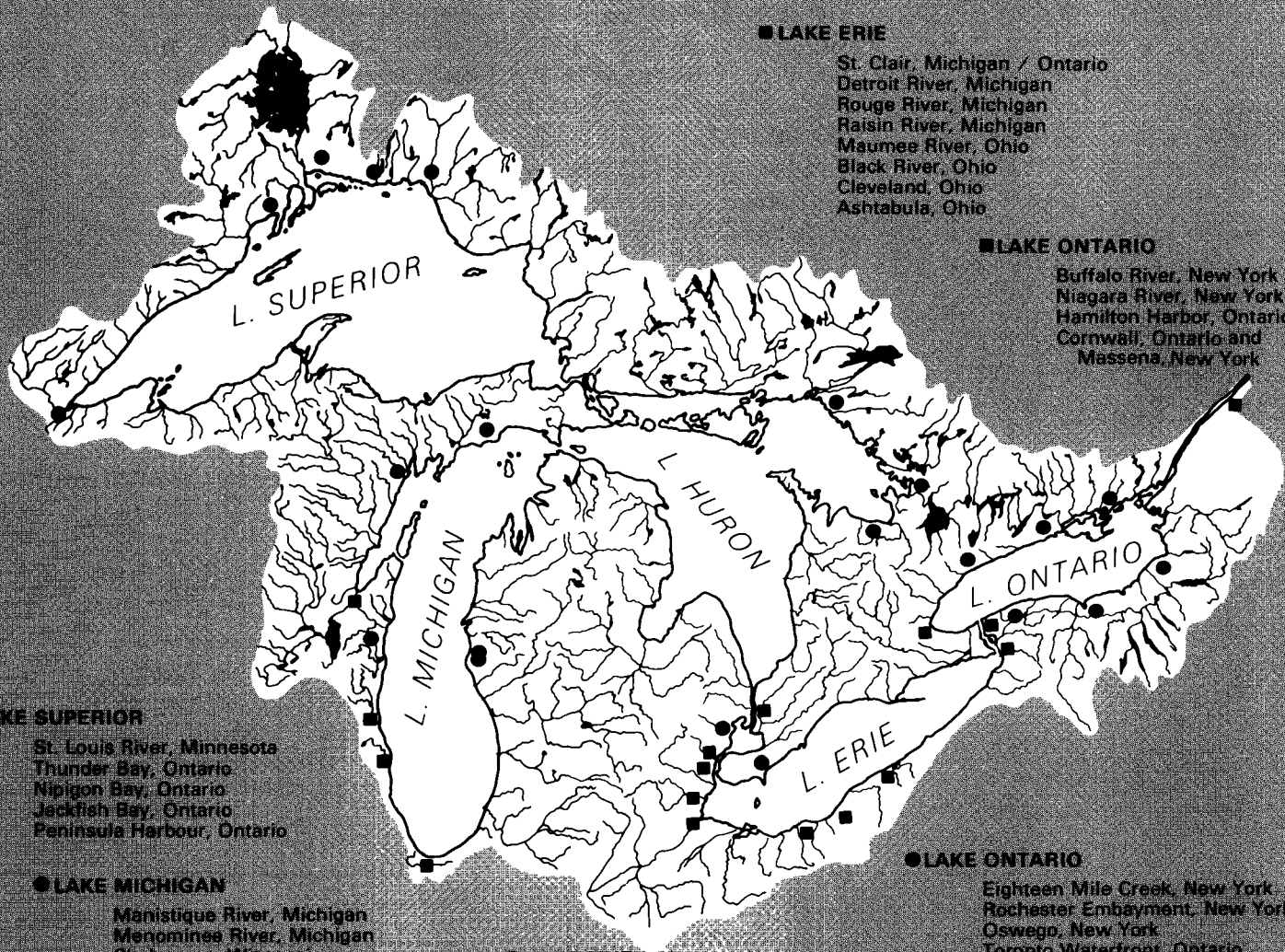
● LAKE ERIE

Clinton River, Michigan
Wheatley Harbour, Ontario

● LAKE ONTARIO

Eighteen Mile Creek, New York
Rochester Embayment, New York
Oswego, New York
Toronto Waterfront, Ontario
Port Hope, Ontario
Bay of Quinte, Ontario

- Class A — environmental degradation an impairment of beneficial uses is severe
- Class B — some environmental degradation is obvious and uses may be impaired



GLNPO Lake Monitoring Programs

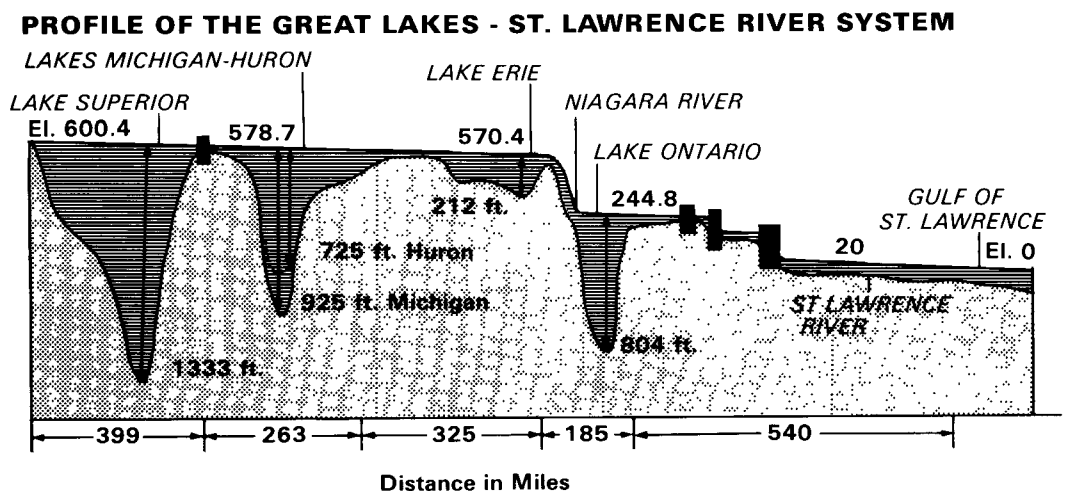
One of GLNPO's three major functions is monitoring conditions and trends in the lakes. A description of these monitoring efforts follows:

- a. **Lake-wide intensive surveys** were conducted on a lake-by-lake basis to gather large amounts of limnological information throughout each lake over a 1- or 2-year period. The principal data gathered in intensive surveys were on water chemistry and micro biota. The cycle of intensive surveys was completed with a study of Lake Superior in 1983.
- b. **Lake-wide annual water sampling** is replacing the 9-year cycle of intensive surveys. This annual sampling of key locations is based on knowledge gained during the intensive studies and will give a better picture of year-to-year changes in the lakes.
- c. **Migratory open-lake fish** tissue sampling is conducted to monitor contaminants and trends and to determine pollutant levels in sport fish.
- d. **Nonmigratory fish** tissue samples from near-shore, harbor estuary areas are collected to identify locations where toxic chemicals are concentrated. The fish sampled are typically carp, but shiners will be sampled where possible because their short lives and limited range (they typically live and die within a range of 300 yards) give a better indication of change within a small area.
- e. **Harbor and estuary sediments** sampling is conducted to identify toxic hot spots.
- f. **Connecting channels surveys** are conducted as special studies of both ambient conditions and pollution sources, with special emphasis on toxicants. A study of the Niagara River is being completed in 1984, and a 3-year study of the St. Clair and Detroit Rivers will begin this year. Both studies are joint Canadian -U.S. projects with full Provincial and State participation.

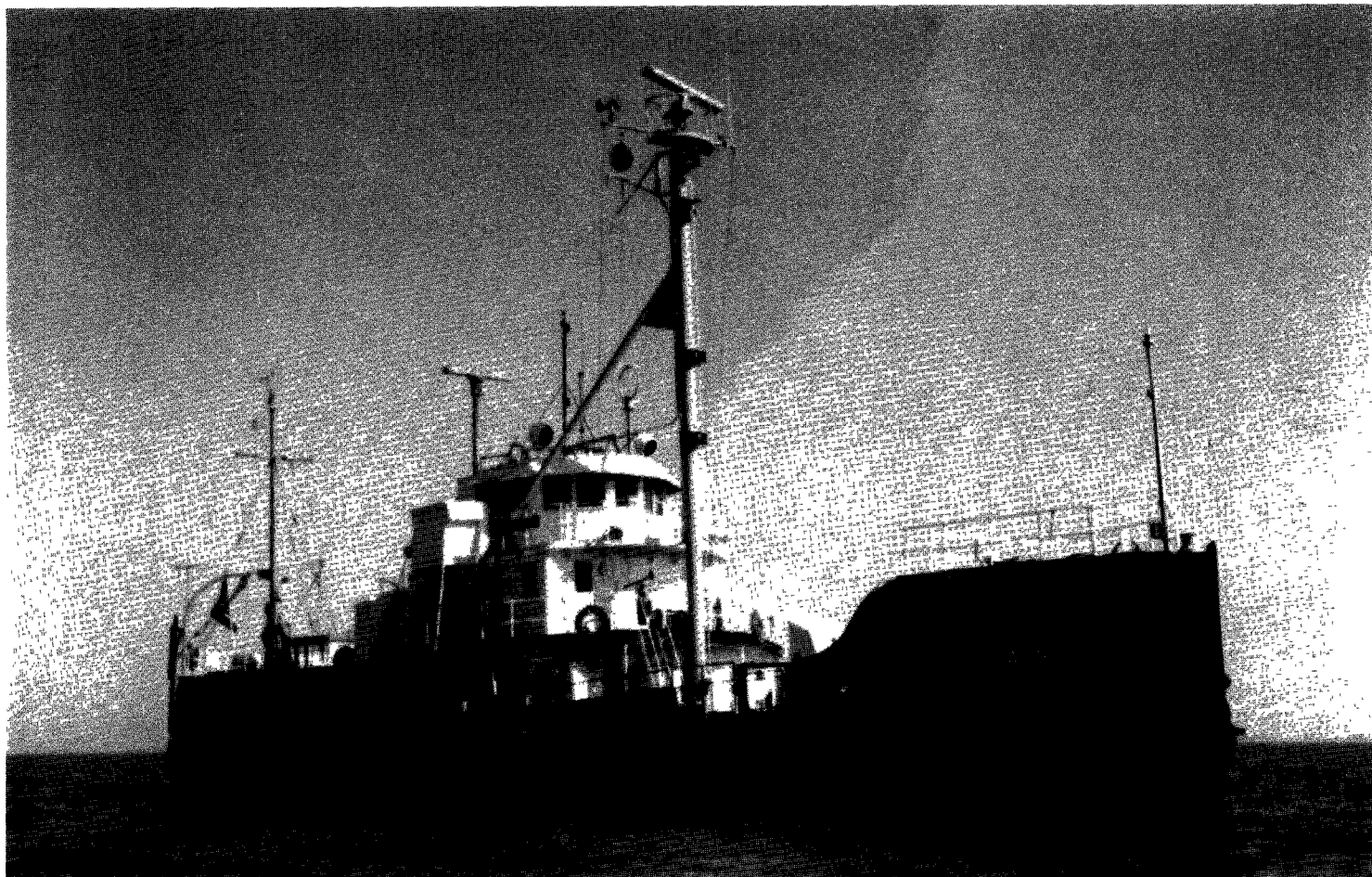
- g. **Atmospheric deposition** is monitored by the Great Lakes Atmospheric Deposition network of 36 monitoring stations to determine pollutant loadings. Both wet and dry deposition is measured at stations around the Great Lakes and analyzed for 39 parameters, including PCB's and other toxicants.
- h. **Focused reviews of problems and program progress** are conducted in key areas of concern throughout the Great Lakes Basin.

Another major function of GLNPO is supporting the EPA Regional Administrator in his role as national program manager of EPA's Great Lakes program and as U.S. cochairman of the United States-Canada Water Quality Board. Much of this function is intertwined with the first two, but it also includes assisting in various IJC/Water Quality Board activities and preparing the Annual Water Quality Board report for the IJC.

From the standpoint of attaining environmental results, GLNPO focuses on three subjects: toxicant impact on biota and human health, eutrophication as it affects biota and human welfare, and geographic areas of concern that have suffered intense degradation.



The Research Vessel (R/V) Roger R. Simons



The Mission

The R/V Roger R. Simons continues to serve as the key element in EPA's monitoring of the open waters of the lakes. She also supports EPA's program for sampling water and sediments in near-shore problem areas.

The primary function of the Simons is twofold:

1. to determine the effectiveness of the multibillion-dollar clean-up programs that have been started to protect the Great Lakes from pollution; and
2. to improve our understanding of the processes that affect the lakes so that our cleanup dollars can be used most efficiently.

The Simons, operated under the auspices of the U.S. EPA's Great Lakes National Program Office in Chicago, is part of an international monitoring effort on the Great Lakes, required by the 1972 and 1978 United States-Canada Great Lakes Water Quality Agreement.

Each year the Simons gathers information for studies of water quality in the Great Lakes or connecting waterways. From her home port in Milwaukee, Wisc., she cruises the lakes, stopping at designated points to collect water, microbiological, biological, and other samples.

From 1975 to 1983, the central focus of Great Lakes monitoring was on a series of lake-by-lake intensive surveys as called for in the Great Lakes International Surveillance Plan (GLISP). With completion of sampling in Lake Superior during 1983, field work for the series was finished. Based upon the results of the intensive surveys, it has been concluded that future surveys of the open lakes should concentrate on monitoring year-to-year changes at a reduced number of locations. In response to this, the Simons began conducting seasonal sampling cruises on Lake Michigan, Huron, and Erie in 1983, while a Canadian vessel gathered Lake Superior intensive survey samples.

Three primary cruises are now conducted each year to determine spring conditions, summer stratification, and fall conditions.



In addition to EPA's programs, the Simons supports a number of research projects in cooperation with other agencies. The Simons is working with the Argonne National Laboratory and the University of Wisconsin to collect radioactivity samples. The Simons is also helping the Governors State University (Park Forest South, Ill.) with studies of atmospheric fallout to the lakes.

The Simons has worked with the National Aeronautics and Space Administration (NASA) to develop methods of using satellites to monitor Great Lakes and ocean water quality. The research vessel has also provided support for special studies by university and Canadian scientists.

Background. The Simons is a sturdy product of the Midwest, built in Duluth, Minn., in 1939. She was acquired from the U.S. Coast Guard in 1974 and converted from a buoy tender to an EPA research vessel. The ship is named after an EPA biologist who lost his life in the line of duty, drowned while taking samples in the Mississippi River in 1970.

Vital Statistics. The steel-hull Simons is 122 feet long, 28 feet wide, has a draft of 7 feet, and weighs 342 tons. Four twin-propeller, 230-horsepower GM engines can generate speeds up to 12.5 knots. Cruising range is approximately 1,000 miles. Fuel capacity is 4,300 gallons, consumed at 35-40 gallons per hour, depending on cruising conditions. Navigation and communications equipment includes various marine radio, radar, and loran systems. The Simons also has two depth-sounding systems and special winches and cranes capable of lifting as much as 4,000 lbs. She carries one 16-ft. Boston whaler.



The Crew. It presently consists of 12 professional seafarers provided by a contractor and 8 scientists, although the Simons can accommodate a total of 28 persons: 14 of the ship's crew and 14 of the scientific crew. Some of the scientists are also under contract, with the sample collection and analyses supervised at all times by one of the EPA scientists on board.

Lab Equipment. Chemistry, microbiology, and physical laboratories, with standard as well as sophisticated equipment (including computerized data processing), allow scientists to complete many analyses while out on the lakes. Concentrations of phosphorus, silica, chloride, alkalinity, ammonia, conductivity, chlorophyll, and many other characteristics can be accurately determined right on board. Many of these measurements must be done immediately because bacteria levels change with time and the environment. Studies are conducted on a 24-hour basis during each cruise period.

Technical equipment on board allows scientists to collect many different samples, including water, plankton, sediment, radioactivity, and air contaminants. Special winches take water and biological samples and measure temperature and light profiles at various depths; meters and buoys can be dropped and recovered for research specimens.

The Future. Now that cities and industries have largely cleaned up the visible kinds of pollution, such as oil and floating debris, the Simons will continue to check the impacts of toxic chemicals and other pollutants on this surprisingly fragile freshwater world. The Simons will be able to tell the public how well our strong national commitment to save the Great Lakes has been progressing. Her ultimate purpose echoes the goals of the Clean Water Act — fishable and swimmable waters throughout the Great Lakes Basin.

