



**Environmental
Monitoring
and
Assessment Program**

**Surface Waters
Component**



EMAP

April 1992

How Healthy are our Nation's Lakes and Streams?

Each year the United States spends billions of dollars reducing the input of pollutants to the environment which often end up in our lakes and streams. Government agencies carefully monitor potential polluters to ensure that they comply with environmental regulations. Although this country has conducted detailed studies of a few systems, such as Lake Tahoe or the Ohio River, we have little information about the overall success of these pollution control efforts in protecting the health and integrity of the thousands of lakes, reservoirs, streams and rivers.

What Is Ecosystem Health and Integrity?

Ecosystems are defined by scientists as the combination of populations of plants and animals, the interactions between them and their non-living surroundings. Freshwater ecosystems include the water along with the resident plants and animals, ranging from the microscopic plankton to large fish, amphibians, reptiles, birds, and mammals of our lakes, reservoirs, streams and rivers. When these systems are healthy, they contain well balanced populations of plants and animals, and appropriate physical and chemical conditions to support their growth and reproduction. This ecological balance enables the lakes, streams and their populations of plants and animals to resist or recover from changes brought on by adverse weather conditions, disease, or man-induced stress.

What Is EPA Doing?

The U.S. Environmental Protection Agency (EPA), in cooperation with other federal agencies with resource management, monitoring, and research responsibilities, is implementing a long-term program that will provide the public, scientists, and Congress with information that can be used to evaluate the overall health of the Nation's ecological resources. This program within EPA is called the Environmental Monitoring and Assessment Program (EMAP).

What Is EMAP?

EMAP is being designed as a nationwide, interagency environmental monitoring program, that will focus on determining the health of the following ecosystems: estuaries, the Great Lakes, forests, surface waters (lakes and streams), agroecosystems, wetlands, and arid ecosystems (deserts and grasslands). As currently planned, EMAP will conduct annual surveys to measure indicators of the health of plants and animals, the quality of their surroundings, and the presence of pollutants. The program is intended to be a long-term monitoring activity, operating into the next century, that will provide information on the overall health of our environment and the net effectiveness of all of our efforts to protect the environment.

For the surface water component of EMAP (EMAP-SW), the question of ecosystem health will be addressed by investigating the regional distribution of fish, bottom dwelling plants and animals as well as plants and other animals found in the water. EMAP-SW will also

determine what portions of the lakes and streams can support these resources, and will investigate why certain areas do not support them.

As important as stating what EMAP can do is stating what it cannot do. Because of the large-scale approach used, the information collected is not intended to answer questions concerning the health of individual systems such as Lake Champlain. To intensively study every lake and stream segment nationwide would be too expensive to conduct at this time. EMAP is designed only to look at ecosystem health on a "regional scale."

How Will EMAP Accomplish Its Task?

The EMAP-SW approach is to divide all the Nation's lakes, reservoirs, streams and rivers into regions. The first of these regions to be studied encompasses the New England states, New York and New Jersey. This study began in lakes in this region in the summer of 1991 and will continue in 1992 and into the future. Sampling of streams will begin with small pilots across the country in 1992 with a regional pilot scheduled for the mid-Appalachian region in 1993. Sampling of other regions will be phased in over the next several years, until a representative sample of all of the Nation's lakes, reservoirs, streams and rivers are being sampled each year.

Within each region, scientific measurements will be made every year at randomly selected lakes or streams. Teams of State, Federal or University scientists from that region will be on the water every day during the summer, from July through August,

collecting important information that will help to characterize the status of our Nation's lakes and streams.

What Information Will be Collected?

Scientists will collect waters samples and bottom sediment samples to determine the number and type of organisms present. Sediments will be tested to see if they contain harmful chemical pollutants. The water will be analyzed for chemicals and the amount of algae present.

Fish collected with various traps will be counted, identified to determine the species present, and examined for disease. Some fish will be preserved for later chemical contaminant analysis.

How Will This Information be Used?

Information collected by this program will be used to determine the health of our Nation's lakes and streams on a regional and national scale. Looking collectively at all indicators will provide information on the extent of problems and possible causes of those problems. For example, the consistent absence of certain types of animals in a region might indicate a problem. Such a problem could be due to chemical pollutants or low dissolved oxygen. Information collected by EMAP-SW would allow scientists to explore this link.

The long-term nature of EMAP-SW will allow environmental managers to determine if conditions are improving or getting worse, and thereby to evaluate the effectiveness of pollution control practices designed to protect

our Nation's waters.

Eventually the information gathered by EMAP for all ecosystems will be used to generate annual reports on the well-being of the Nation's environment. An environmental report card, if you will. This information will also be used for more comprehensive study of how the ecosystems interact and, therefore, how activities in one ecosystem may affect others. Priorities for attacking environmental problems can be better made when we know the relative magnitude of problems in our environmental resources. Priorities based on need and risk will allow decision makers to make the most efficient use of our limited financial resources in attacking environmental problems.

Who Will Benefit From This Program?

In one way or another, everyone will benefit from this program. Scientists will have access to environmental data on a scale never before available. Managers and legislators will have the means to determine the effectiveness of pollution control measures. They will also have the information to determine which problems pose the greatest threat to the Nation's lakes and streams, thereby allowing them to prioritize pollution control activities. Every American, from fishermen to businessmen, will benefit because characterizing the true health of our environment is a critical step in developing a sound, long-term plan to protect it. We can then assure an environment that future generations can enjoy.

Where Can Additional Information Be Obtained?

Additional information on all components of EMAP can be obtained by writing to:

Director, Office of Modeling, Monitoring
Systems, and Quality Assurance
Office of Research and Development, RD 680
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Additional information on the Surface Water
Component and related 1992 sampling
activities in the northeast can be obtained from:

Dr. Steven G. Paulsen
EMAP Surface Waters
Environmental Research Laboratory
U.S. Environmental Protection Agency
200 SW 35th Street
Corvallis, OR 97333
(503) 754-4428 or 4452
Don Porteous
New England Regional Laboratory
U.S. Environmental Protection Agency
60 Westview Street
Lexington, MA 02173

Rollie Hemmett
Environmental Services Division
U.S. Environmental Protection Agency
2890 Raritan Depot Building 10
Edison, NJ 08837

Information on 1992 sampling activities can be
obtained by calling:

1-800-288-3171