



## ECOLOGICAL RESEARCH PROGRAM

### EMAP: TOOLS TO IMPROVE PROTECTION OF OUR NATION'S WATER

#### ***What science is EPA doing to protect streams, rivers, and lakes?***

The Environmental Monitoring and Assessment Program (EMAP) in the U.S. Environmental Protection Agency's Office of Research and Development is providing the critical science needed to evaluate the ecological condition of our nation's streams, rivers, lakes, wetlands, and estuaries. Using the EMAP approach, environmental managers can make more informed environmental decisions to protect our water and EPA can use this scientific information to determine effectiveness of its policies.

EMAP scientists and managers work in partnership with their colleagues in EPA's regional and program offices, states, tribes, non-governmental organizations, and other federal agencies to establish the effectiveness of the

approach and to transfer the tools and technologies to our partners.

#### ***How does EMAP perform this monitoring?***

EMAP uses unbiased statistical designs -- similar to census bureau surveys -- and sensitive biologic indicators such as plants, invertebrates, and fish to estimate the condition of the nation's waters. These biological indicators are used because they are critical parts of freshwater and marine ecosystems, and because they are particularly good at responding to stressors in the surrounding environment.

Using an EMAP approach, the initial assessment establishes a baseline condition for a given type of water ecosystem (e.g., lakes, streams). That baseline can then be compared to follow-up assessments, allowing for the detection of changes and trends in the environment over time. This approach helps EPA to determine

if its programs and policies are effective.

#### ***What are the benefits of EMAP?***

The EMAP approach has led to faster, cheaper, and better monitoring of aquatic ecosystems in support of the Clean Water Act requirements. It also allows the value of EPA policies and programs to be demonstrated in response to the Government Performance and Results Act of 1993.

In addition, EMAP is helping to provide answers to these key questions:

How much of our state/national aquatic ecosystems are healthy?

Are we targeting the right problems to make a difference?

How do we measure trends in the condition of aquatic ecosystems?

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How do we determine this in a cost-effective, scientifically-defensible, and credible way?

How do we aggregate this information from the local to the state to the national levels?

### **How is EMAP being used?**

At least half of the states currently use an EMAP approach to improve their state environmental policies. EMAP has significantly influenced the direction of monitoring in countries in the Baltic, the Gulf of Mexico, the Yellow Sea, the European Union, Canada, and New Zealand.

In partnership, EMAP and EPA's Office of Water have developed the first scientifically defensible assessments of the condition of the nation's streams and coastal ecosystems for inclusion in several environmental reports:

Heinz Center's update to its State of the Nation's Ecosystems:  
<http://www.heinzctr.org/ecosystems/index.shtml>

EPA's second Report on the Environment:  
<http://www.epa.gov/indicate/>

National Geographic, (July 2005)  
"Loving Our Coasts to Death."

### **Recent Accomplishments:**

#### ***National Coastal Assessment***

EMAP has produced three comprehensive assessments of the condition of the nation's estuaries for the 2001, 2005, and 2007 National Coastal Condition Reports, developed in partnership with EPA regions and Office of Water, 24 marine coastal states, U.S. Geological Survey and the National Oceanic and Atmospheric Administration. The reports are available at:  
<http://www.epa.gov/owow/oceans/nccr/>.

#### ***Western Streams and National Stream Assessment***

This comprehensive, cooperative effort has produced the first estimate on the condition of wadeable streams in the Western United States, leading to a national stream monitoring plan -- the first National Wadeable Streams Assessment (EPA 2005). This establishes a baseline against which future changes and trends in national and regional stream condition can be measured. The

assessment is available at:  
<http://www.epa.gov/owow/streamsurvey/>.

#### ***Temporally Integrated Monitoring of Ecosystems/Long Term Monitoring (TIME/LTM) of Acid Sensitive Lakes and Streams***

EMAP's TIME/LTM research has been critical in demonstrating that acidity levels in acid-sensitive lakes and streams have been significantly reduced since the 1990 Clean Air Act Amendments. The results stemming from this monitoring approach have allowed EPA's Office of Air to establish that related programs and policies are improving the condition of these systems. The report is available at:

[http://epa.gov/nheerl/publications/files/acid\\_rain\\_report.pdf](http://epa.gov/nheerl/publications/files/acid_rain_report.pdf).

#### **References:**

EMAP web site: [www.epa.gov/emap](http://www.epa.gov/emap)

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June 2007