

US EPA ARCHIVE DOCUMENT



Regional EMAP (REMAP) Overview (ECO MYP)

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How can EPA ORD work in partnership with EPA Regional Offices and the States in improving environmental monitoring and assessment of aquatic resource conditions?

(1) Agency Problem

Approximately \$650 M/yr is spent on environmental monitoring by the Federal Government, mostly targeted to individual chemicals at physical conditions at specific sites. As a consequence, point source problems have been greatly reduced. The Agency needs a better approach to address unanswered questions such as:

- How much of our state / national aquatic ecosystems are healthy?
- What indicators would be useful for comparison among ecosystems?
- How do we measure trends in the condition of aquatic resources?
- Can these questions be addressed in a cost-effective and scientifically-defensible way?
- How do we aggregate this information from the local to the state to the national levels?

Methods/Approach

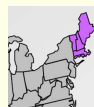
EMAP is being used to develop and test new indicators of aquatic resource condition, compare methods used in national assessments with state and EPA Regional methods, and ultimately to engage the States (who actually do the monitoring and develop the restoration or protection plans called for in the Clean Water Act) in using scientifically and statistically defensible methods.

EMAP is identified by EPA Regions

- Probability surveys are used in all REMAP Projects
- Approach varies by Project

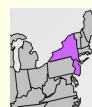
Region 1 (Boston)

2002: Assessment of New England Wadeable Streams
2009: Assessment of New England Lakes and Ponds



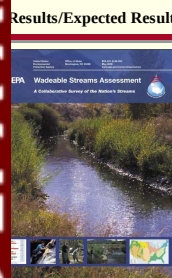
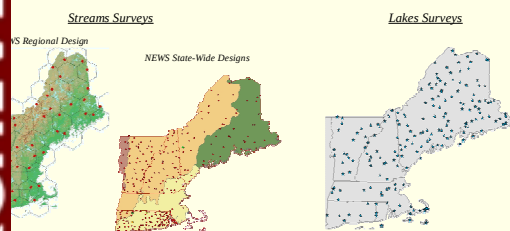
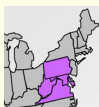
Region 2 (New York City)

1999 – 2000: Cohamsey-Maurice-Salem Rivers Watershed Assessment
2001 – 2002: Barnegat Bay Estuary Assessment
2003 – 2004: Tread Assessment of the NY/NJ Harbor System
2006 – 2008: New Jersey Coastal Benthic Indicators

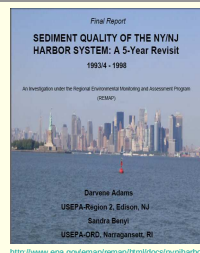


Region 3 (Philadelphia)

2000 – 2001: Watershed-based Monitoring of West Virginia Streams
2002 – 2003: Assessment of Hydrophobic Dissolved Trace Contaminants in Non-tidal Streams and Rivers in VA
2003 – 2004: Validation and Sensitivity Analysis for Rapid Wetland Assessments



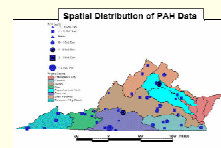
- Development and testing of a Regional "multi-habitat" Method for streams
- Comparison of Regional Method with State Methods
- Comparison of Regional and State Methods with National Methods
- Testing of innovative Lake Assessment methods for Region
- Comparison with State and National Methods
- Support both:
 - National Lakes Assessment
 - State Wide Assessments in VT and NH



<http://www.epa.gov/emap/remap/ctr/eboca/ny/njharbor08.html>

- Sediment chemistry results show the Harbor is still extensively contaminated but the mean values for cadmium, chromium and chlordane have declined.
- In the upper Harbor the mean total DDT has a statistically significant decrease but still exceeds ERM.
- Harbor means for mercury still exceed ERMs.
- Newark Bay is still the most highly affected sub-basin but mean values for silver and chlordane showed a significant decrease.
- In Barnegat Bay, 40% of the area had poor water quality (<10% light at 1m).
- Watershed restoration plans are in place.
- TMDLs are being established for point source loading.
- An assessment of the health of NJ coastal benthic communities is expected in 2008.

- Increasing recognition of the value of EMAP - REMAP methods for:
 - Characterization of extent of environmental problems
 - Helping in allocation of resources for corrective action
 - Methods are being adapted for use in State Wide Assessments, and National Surveys
- State of Virginia uses Probability Monitoring (ProbMon) for all aquatic resource surveys.
- REMAP project using Semi-Permeable Membrane Devices (SPMDs) allowed them to monitor ProbMon sites for toxics.
- For PAHs, all sites were below state water quality standards except for PCBs



(5) Impact and Outcomes

There is increasing recognition of the value of using biological indicators (e.g. fish and benthic community structure) as integrators of aquatic ecosystem condition to establish baselines for assessing the health of aquatic ecosystems. A 1998 review by the Ecological Society of America, and the American Statistical Association stated that REMAP demonstration projects helped put EMAP at the forefront of having scientifically defensible data based on probability based sampling. There is increasing recognition of the importance of the approach in EPA Regional Offices, and improvements in States understanding and use of probability survey data in more effective and efficient reporting under section 305b of the Clean Water Act. Solid baseline data can be used to determine if there are trends over time, or changes in outcomes in relation to management action. A remaining need is to better illustrate how probability survey data can be more effectively used in: (1) the development of criteria and standards designed for protection of aquatic life, (2) support of 303d listing of impaired waters, and (3) restoration efforts.

For example, the State of Delaware is currently developing a program to begin assessing the condition of wetlands throughout the state. To meet the goals of improved resource management and the requirement of the settlement agreement, tools, assessment design and implementation methods are being tested in the Nantuxet River watershed as part of projects funded by REMAP and EPA Wetland Program Development Grants. The State of West Virginia Stream Monitoring Strategy includes probability monitoring based on their REMAP experience, as does the Maryland Streams Survey.