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EPA

Water Quality Criteria and Standards

Newsletter

BASINS

The Office of Water has developed and released a PC-based tool called BASINS. The acronym stands for **B**etter **A**ssessment **S**cience **I**ntegrating point and **N**onpoint **S**ources. BASINS has been designed and developed specifically to support development of total maximum daily loads (TMDLs) as mandated by Section 303(d) of the Clean Water Act. This further supports our belief that the technical backbone of the watershed management program lies in the development of TMDL calculations which identify the maximum amount of pollutants that can be assimilated by a watershed without impairing the designed use of the waterbody. BASINS combines a Geographic Information System (GIS) with environmental fate and transport models to provide analytical capabilities that exceed any we have had before. The BASINS software provides the user with a multitude of data sources to facilitate the prediction of point and nonpoint source impacts on water quality. One especially valuable feature of this system to States and local communities is its flexibility to incorporate local data to supplement or replace the nationally available data layers.

BASINS is suitable for many other applications beyond simply developing formal TMDLs. Its extensive variety of spatial data layers and modeling tools along with its ability to query the underlying databases and then to display the results on a map, gives it broad applicability for anyone involved in community-based environmental protection.

Supplied databases include general geographic and locational data including land use, roads, county and urban area boundaries, and major streams (Reach File 1 stream network). Location and facility information are provided for Toxic Release Inventory (TRI) and Industrial Facilities (IFD) sites, Superfund sites, drinking water treatment facilities, U.S. Geological Survey (USGS) gage stations and National Oceanic and Atmospheric Administration (NOAA) weather stations. Other databases supply environmental data; for example Storage and Retrieval of Water Quality Data (STORET) provides selected water quality; the Permit Compliance System (PCS)

provides pollutant-specific point source loading data, and the National Sediment Inventory (NSI) provides data on pollutant concentrations in bed sediments.

BASINS has three major modules - targeting and assessment, nonpoint source modeling to estimate loads to receiving waters, and modeling to integrate point and nonpoint source loads and route the pollutants downstream. The *targeting and assessment* module helps the user characterize a watershed by examining monitoring data. This facilitates identification of potential sources and causes of water quality problems. *Target* screens a large geographic area, such as a state, and identifies cataloging units which exceed a given threshold for a chosen parameter. *Assess* then screens selected cataloging units and identifies specific monitoring stations or discharge locations, categorized by their ambient water quality or pollutant loadings. Results are automatically displayed on a map, to which any of the other themes may be added, in order to identify potential causes, sources, or land use practices which may contribute to water quality problems.

The *nonpoint source model* is used to estimate nonpoint source loadings of nutrients, sediment, bacteria and toxic substances using data provided by BASINS. The model, Hydrological Simulation Program--Fortran (HSPF), predicts loadings in mixed land use watersheds, including agricultural, forested and urban areas. At a cataloging unit level, all data required for modeling are provided; however, the user has the option to add or modify input data.

ToxiRoute, a screening level stream routing model that performs simple dilution calculations under mean and low flow conditions for entire watersheds, *integrates nonpoint and point source loadings*. ToxiRoute integrates the nonpoint source loadings described above with point source loadings obtained from permit limits stored in PCS. It calculates the resulting concentrations of the pollutant in each stream reach, and then, returning to the GIS environment, displays the results on the watershed map. In this way a user can evaluate alternative water pollution control strategies by predicting where water quality standards violations would occur under different scenarios. Some pollution problems require a more detailed modeling approach than used by ToxiRoute. Where excessive loading of nutrients and organic material may occur, the EPA water quality model QUAL2E may be used; it is included within BASINS.

Because of the tremendous amount of geographic and environmental data contained within BASINS, the databases have been divided by EPA Region. Distribution packages contain the CD-ROM(s) for a given Region, including the executable programs to run BASINS, the underlying geographic and environmental attribute data, a data extraction tool to move the specific information the user desires from the CD to the PC's hard disk, and pre-recorded scripts to assist the user to explore the system and evaluate the watersheds of interest. A user's guide provides installation instructions, details on minimum and recommended hardware requirements, examples of how to navigate and use the various BASINS modules, and background information on the supporting databases. BASINS requires a 486 or better IBM-compatible PC with a CD-ROM and ArcView 2 software.

Recognizing that many enhancements can be made to this tool, we already have initiated some of them. Furthermore, use of a tool as powerful as this one requires some education. To help meet this need we are planning a comprehensive training course to be offered in 1997. Our effort in this first year will focus on providing training to the EPA Regions and States. We will be working with each of the Regions on the logistics of this; the Regions will coordinate the training opportunities with the States. We encourage all users to maintain an open dialogue with

the developers of BASINS so that EPA can benefit from your experiences and so that our future development efforts may be closely coordinated with your needs.

Requests for user guides and CD-ROMs for specific EPA Regions should be sent to U.S. Environmental Protection Agency, National Center for Environmental Publication and Information, 11029 Kenwood Road, Building 5, Cincinnati, Ohio 45242 (513-489-8190), or via the Internet to Waterpubs@epamail.epa.gov. Please refer to the EPA document number for the specific EPA Region(s) you are requesting (see the accompanying table). For more information call Jerry LaVeck at 202-260-7771 or Marjorie Coombs at 202-260-9821 (or via the Internet: laveck.jerry@epamail.epa.gov or coombs.marjorie@epamail.epa.gov).

BASINS Users Guide		EPA-823-R-96-001
Region I	CT, ME,MA,NH,RI,VT	EPA-823-C-96-001
Region II	NJ,NY *	EPA-823-C-96-002
Region III	DE,DC,MD,PA,VA,WV	EPA-823-C-96-003
Region IV	AL,FL,GA,KY,MS,NC,SC,TN	EPA-823-C-96-004
Region V	IL,IN,MI,MN,OH,WI	EPA-823-C-96-005
Region VI	AR,LA,NM,OK,TX	EPA-823-C-96-006
Region VII	IA,KS,MO,NE	EPA-823-C-96-007
Region VIII	CO,MT,ND,SD,UT,WY	EPA-823-C-96-008
Region IX	AZ,CA,NV *	EPA-823-C-96-009
Region X	ID,OR,WA *	EPA-823-C-96-010

* Currently BASINS data layers are available only for the contiguous states.

Elizabeth Southerland

ELIZABETH SOUTHERLAND
ACTING DIRECTOR, STANDARDS
& APPLIED SCIENCE DIVISION

JAMES A. HANLON
ACTING DIRECTOR, HEALTH &
ECOLOGICAL CRITERIA DIVISION

PLEASE NOTE: THIS NEWSLETTER IS NOW AVAILABLE ON THE INTERNET

WATER QUALITY STANDARDS BRANCH/SASD
FRED LEUTNER
(202) 260-1542)

WATER QUALITY STANDARDS REGULATION: INTERIM DRAFT ANPRM - UPDATE

- On February 27, the Office of Water released for comment an interim draft of its Advance Notice of Proposed Rulemaking on the water quality standards regulation (ANPRM). Copies were sent in early March to representatives in each State and Territory, more than 100 Indian Tribes, and numerous environmental advocates, industry and municipal representatives and interested parties.

- The draft document contained discussions on numerous issues that have arisen out of the collective experiences of EPA, State and Tribal water quality agencies, environmental advocates, municipalities and industry and is organized around the key elements of the water quality standards regulation: uses, criteria, antidegradation, and general policies.

- In making this interim draft available, EPA provided the opportunity for all interested parties to become involved in the development of the ANPRM at an early stage. This winter EPA will publish in the Federal Register the revised ANPRM that reflects this input. EPA with help from the public will try to identify possible amendments to the regulation and new guidance or policy that may be needed to address three objectives:

  1) facilitate State and Tribal implementation of holistic and integrated watershed-based water quality planning and management;

  2) enhance State and Tribal capability to incorporate current criteria and water quality assessment science into their water quality standards programs, and;

  3) improve the regulation so that it may be implemented more effectively.

  Through this review and any resulting changes to the regulation, and/or its supporting policy and guidance, EPA expects to facilitate further water quality improvements locally and nationally.

- EPA requested comments by May 15 on the scope of the document and the characterization of the issues and we received 70 sets of comments from 73 respondents. The comments, for the most part, suggested additional issues that should be addressed in the ANPRM as well as additional detail and examples on issues already in the draft. When the actual ANPRM is published in the *Federal Register*, EPA will request substantive comments that reflect commenter's positions on the ANPRM issues.

- After FR publication of the ANPRM, EPA plans to hold several public meetings to discuss the ANPRM issues. After these meetings and after reviewing the comments on the ANPRM, EPA will decide whether to propose changes to the Water Quality Standards Regulation.

Contact Rob Wood, (202) 260-9536
or Wood.Robert@epamail.epa.gov

NEW VIDEO RELEASED

A new video titled "Wetlands Water Quality Standards" is available on loan. The 28 minute production shows, through a series of interviews, how States and Indian Tribes are using water quality standards to protect wetlands within their jurisdictions. The video may be obtained from the following:

Wetlands Hotline - 1-800-832-7828
Water Resource Center (202) 260-7786

EPA's Regional Offices:

Region 1 (617) 565-3539
Region 2 (202) 637-3807
Region 3 (215) 566-5717
Region 4 (404) 347-3555, Ex. 6633
Region 5 (312) 353-9024
Region 6 (214) 665-6643
Region 7 (913) 551-7441
Region 8 (303) 312-6943
Region 9 (415) 744-1997
Region 10 (206) 553-1834

EPA PROMULGATES FEDERAL WATER QUALITY STANDARDS IN ARIZONA

On May 7, 1996, EPA established federal water quality standards in the State of Arizona (61 FR 20686). This federal rule contains a requirement for implementation of a monitoring program for mercury levels in fish, and designates the fish consumption use for specific waterbodies. The intent of the monitoring program is to assess both the extent and magnitude of mercury contamination in the prey base of the bald eagle and other piscivorous birds in Arizona. EPA also added the fish consumption use for 14 waterbodies where that use was not applied. The rule satisfies an order by the U.S. District Court in Arizona (in Defenders of Wildlife v. Browner) which directed EPA to publish new or revised water quality standards to supersede certain provisions in Arizona's water quality standards which were previously disapproved by EPA in 1993 and 1994.

Since EPA's earlier publication of the proposed rule for Arizona on January 29, 1996 (61 FR 2766), the State has worked aggressively to adopt revised water quality standards. In fact, the State adopted revised provisions in its water quality standards regulations which eliminated the need for Federal promulgation of several provisions contained in the proposed rule. Should EPA approve the remaining documentation submitted by the State, EPA will withdraw the appropriate portions of the Federal rule. Contact: Karen Gourdine (202) 260-1328, or email: gourdine.karen@epamail.epa.gov

EPA PROPOSES FEDERAL WATER QUALITY STANDARDS IN PENNSYLVANIA

On August 29, 1996, EPA published proposed Federal water quality standards for the Commonwealth of Pennsylvania to comply with a court order in Raymond Profitt Foundation v. Browner. The proposed standards address aspects of Pennsylvania's antidegradation policy that were disapproved by EPA in 1994. The proposed federal water qualtiy standards will establish a three-tiered antidegradation policy consistent with federal minimum requirements (contained in 40 CFR Part 131.12) for State water quality standards.

The public comment period for this proposed rule closed on October 16, 1996. EPA is

currently reviewing the comments received and preparing to publish a final rule. However, if the Commonwealth adopts revisions to its antidegradation policy that are consistent with the Federal requirements, EPA will withdraw this Federal rule. For additional information, contact Bob Shippen at (202) 260-1329 or at Shippen.Robert@epamail.epa.gov..

ECOLOGICAL RISK ASSESSMENT BRANCH/HECD
ALAN HAIS
(202) 260-0658

BIOLOGICAL CRITERIA

PILOT REGIONAL TECHNICAL ASSISTANCE CENTER PROJECT

States have consistently stated that impediments to developing Biological criteria for water resource management include insufficient funds and a lack of technical assistance. Although the EPA Biological Criteria program provides grant funds to the EPA Regions for State/Tribal use in biocriteria development, and produces technical guidance manuals for each surface water body type, there is still a need for regional specific applied technical assistance as the States and Tribes use these manuals to develop biocriteria programs.

In an effort to better promote biological criteria development, EPA has initiated a pilot center for technical assistance in Region III. EPA staff with specialized training and experience in taxonomy, defining reference conditions, designing survey plans, and analyzing data will offer assistance to help the States and Tribes with environmental problems and biological criteria development. Cooperating local federal agencies will be asked to provide resources and staff specialists who have technical know-how useful in biocriteria development and implementation. The centers will help States and Tribes not only implement biocriteria, but will help them address other environmental concerns as well. The benefit for the involved agencies is mutually cost-effective assistance and enhanced cooperation between the States, Tribes and the agencies involved.

Two projects have been incorporated in the pilot effort: a watershed investigation involving the Chester River on Maryland's Eastern Shore; and a coastal marine project investigating the effect of sewage effluent on marine organisms at Ocean City, Maryland and Bethany Beach, Delaware.

THE CHESTER RIVER PROJECT

This pilot project is evaluating the use of the biocriteria process to define the effect of nonpoint source and nutrient loadings on riverine water quality. This relatively small watershed with discrete agricultural and municipal land uses is particularly appropriate not only for this evaluation, but to initiate a community-based water quality enhancement effort involving State and County governments and joint Federal agency cooperation. Participants include: Maryland Department of Natural Resources (DNR), EPA, U.S. Fish and Wildlife Service (USFWS), and the Natural Resources Conservation Service, U.S. Department of Agriculture (USDA) as well as faculty at Washington College in Chestertown, Maryland.

Ten mainstem stations were established on the Chester River and measurements of N, P, DO, pH, conductivity, pesticides, metals, benthic inverterbrates, and fish were taken during the Spring and Summer of 1994 and 1995. Maryland DNR collected the samples and they were analyzed at the joint Maryland-National Oceanic and Atmospheric Administration cooperative laboratory in Oxford and the EPA Central Regional Laboratory in Annapolis, Maryland.

PRELIMINARY RESULTS

A parallel has been observed between high N and P in the agricultural headwaters of the river and diminished diversity indices of benthic invertebrates. A similar response is not yet evident in fish populations. Just below Chestertown and its municipal sewage discharge, the same effect is noted. A third nutrient peak has also been detected just above the river's convergence with the Chesapeake Bay and shows an increase in Chlorophyll-a. Metals and poly-aromatic hydrocarbons are still being evaluated, but appear to be high in sediments at all stations.

NEXT STEPS

The sediment chemistry will be further analyzed and biological reference conditions for the upper and middle Chester will be established using data from rivers in the region. The mainstream stations will continue to be surveyed and potentially diagnostic tributary stations will also be established. The State of Maryland has declared the Chester a "Priority Watershed" project.

THE COASTAL OCEAN OUTFALL PROJECT

EPA surveyed a nine station transect extending from above Bethany Beach, Delaware to below Ocean City, Maryland. This near field-far field transect parallels the Atlantic coast and includes the sewage outfall discharge sites for both of the above ocean resort cities. Three years of measurements of the benthic macro invertebrate community have produced information which clearly define the impact zones of both outfalls. This project is of interest to EPA Region III for their National Pollutant Discharge Elimination System (NPDES) permit evaluations. It has also attracted the interest of NOAA and the USFWS because the Army Corps of Engineers is assessing the possibility of a beach replenishment program in the area.

PRELIMINARY RESULTS

An EPA candidate biological monitoring method has been established suitable for both NPDES Permits and other coastal discharge assessments. The process appears to be more responsive than traditional water column chemical tests and will help determine sewage treatment plant efficiencies for both municipalities. Summer benthic macroinvertebrate communities at both outfall stations show a marked decline in species richness and diversity relative to the other reference sites of the transect. Winter benthos are not as responsive, and fish survey results are inconclusive so far.

Next Steps

Efforts will now shift to cost reductions including the use of larger sieve sizes for the

benthos, surveys of epibenthos, and a searach for indicator taxa among both invertebrates and fish. Staff at the EPA Region 3 lab are also participating in training sessions using these sites and samples to improve their analytical proficiency as part of the pilot project.

Future Steps For The Project

The Chester River project, in particular, is intended to proceed from data gathering to land use coordination investigations, and then to a recommended management approach. A report of the project will be prepared and distributed to all EPA Regions. The Regions can then use these results as input in designing similar joint agency, community-based cooperative watershed management efforts. For more information, contact George Gibson at (410) 573-2618 or Gibson.George@epamail.gov or write him at Biological Criteria Program, Health & Ecological Criteria Division (4304), Office of Science and Technology , U.S. Environmental Protection Agency, Washington, DC 20460

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MICKI TREACY
USEPA
STANDARDS & APPLIED SCIENCE DIVISION (4305)
401 M STREET, S.W.
WASHINGTON, DC 20460
treacy.micki@epamail.epa.gov