

Total Maximum Daily Load (TMDL) Program

DRAFT

TMDL Program Implementation Strategy



U.S. Environmental Protection Agency

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Total Maximum Daily Load (TMDL) Program

Draft TMDL Program Implementation Strategy

Executive Summary

The Clean Water Act (CWA) establishes a national goal of "fishable, swimmable" waters. There are still waters in the nation do not meet this goal, despite the fact that many pollution sources have implemented nationally required levels of pollution control technology. CWA Section 303(d) addresses these remaining waters by requiring States to identify the waters and develop Total Maximum Daily Loads (TMDLs) for them, with oversight from the Environmental Protection Agency (EPA). A TMDL allocates pollution control responsibilities among pollution sources in a watershed, and is the basis for taking the actions needed to restore a waterbody.

This is a Strategy to implement the TMDL program. It explains EPA's vision, priorities and the steps the Agency will take to help States meet TMDL program requirements. The Strategy identifies issues for which EPA may develop guidance and/ or make regulatory changes. The Strategy also describes activities that are currently underway, have been recently initiated, or for which EPA will direct a greater portion of its available program resources.

EPA will use this Strategy to explain the Agency's current plans to fully implement the TMDL program and to facilitate broad-based public discussion on how the TMDL program can be improved. EPA will provide the Strategy as background information for the recently formed TMDL Federal Advisory Committee Act (FACA) Committee. The Committee will develop recommendations concerning needed changes to this Strategy as well as all TMDL related policies, guidance regulations, and priorities.

The bulk of EPA's Strategy to implement the TMDL program is based on the five elements of the water quality-based approach laid out in EPA's 1991 TMDL guidance. These elements include identifying waters requiring TMDLs, priority ranking and targeting, developing TMDLs, implementing control actions, and assessing control actions. More specifically, the draft Strategy will explain how EPA will:

- help States successfully assess, evaluate and identify waters needing TMDLs;

- work with and support States in the priority ranking and targeting process to develop schedules for the completion of TMDLs in a reasonable period of time;
- support State development of high quality TMDLs by defining the elements of an approvable TMDL and by providing for scientific research, technical tools and technology transfer and training;
- develop specific guidance for implementing TMDLs and for measuring success;
- intervene to develop lists and TMDLs when State performance is inadequate;
- build broad partnerships with States, Tribes, Federal agencies and key stakeholder groups to support effective implementation of the program;
- create greater public access to the TMDL program and water quality information in general;
- promote innovative, low cost and equitable approaches to improving water quality; and
- address other EPA oversight issues such as nationwide tracking of TMDL development and activities on Federal and Tribal lands.

EPA plans to issue an interim TMDL Strategy in Spring 1997, following public review and comment. EPA has already begun to implement some of the components of the Strategy and will implement more over the next eighteen months, particularly those related to scientific and technical support. EPA will consider TMDL FACA Committee recommendations as they are developed and will periodically revise the draft Strategy to reflect the Committee's recommendations, other stakeholder feedback, and scientific developments.

Total Maximum Daily Load (TMDL) Program

Draft TMDL Program Implementation Strategy

Part 1 - Introduction

1.1 Purpose of this Strategy

This Strategy explains the Environmental Protection Agency's (EPA's) vision, priorities and the steps the Agency will take to help States meet Total Maximum Daily Load (TMDL) program requirements ¹. It also describes activities that are currently underway, have been recently initiated, or for which EPA will direct a greater portion of its available program resources.

EPA will use this Strategy to explain the Agency's current plans to fully implement the TMDL program and to facilitate broad-based public discussion on how the TMDL program can be improved. The Strategy discusses the substantial role that local governments, public and private groups, citizens and other Federal agencies can play in improving and implementing the TMDL program.

1.2 EPA's vision

EPA envisions a TMDL program that identifies remaining sources of pollution and allocates pollutant loadings in those places where water quality goals are still not being achieved ². EPA envisions the States, Tribes and EPA working as partners with each other and the public to meet the requirements of the TMDL program. More specifically, EPA's vision includes:

Working on a watershed basis. Watershed approaches³ are frameworks for identifying localized threats to a watershed and making priorities and decisions based on risks to the community and to the environment. The TMDL program is the technical backbone of watershed approaches. Lists of waterbodies requiring TMDLs provide a full public accounting of watersheds where current activities are not enough to protect or restore a waterbody. TMDLs are an important part of the water quality-based approach, which leads to more healthy and productive watersheds by effectively targeting pollution control and restoration activities.

Sound Science. EPA envisions significant improvements in the methods and tools used to both identify waters needing TMDLs and to develop actual TMDLs. Development of these tools should be targeted to address the nation's most widespread and difficult environmental problems, for example, pollution associated with wet weather events. EPA is committed to making these analytical methods and tools more widely available to all affected and interested parties.

EPA oversight and expeditious action. EPA envisions a TMDL program where States keep primary responsibility for implementing the program. EPA will help States meet their responsibilities by issuing and revising guidance, policy and regulations, and by providing technical assistance. EPA will tailor its level of support to individual State needs. Finally, EPA will meet its legal responsibility to identify waters needing TMDLs and to develop TMDLs if State performance is inadequate.

EPA envisions a TMDL program that identifies remaining sources of pollution and allocates pollutant loadings in those places where water quality goals are still not being achieved.

Public access and involvement. EPA recognizes that local citizen, organization, and government involvement is the best way to identify waters needing TMDLs and to develop and implement TMDLs. EPA is committed to improving public access to water quality information. EPA believes that access to information makes it easier for more people to become involved in improving local water quality.

Innovative, least cost and equitable solutions. EPA is committed to promoting innovative ways for governments and communities to develop common-sense solutions for water quality problems in their watersheds. When stakeholders work together they can often find cheaper and more equitable ways to control pollution.

1.3 Background

The CWA contains a number of provisions to restore and maintain the quality of the nation's water resources. For example, States establish water quality standards⁴ to describe the desirable conditions for State waterbodies.

At a minimum, the CWA requires major categories of industry to meet national standards for the quality of the effluent they discharge, and municipal sewage treatment plants to provide secondary treatment of sewage. The CWA's National Pollutant Discharge Elimination System (NPDES) program requires EPA or the States to issue enforceable permits for point source discharges such as industrial process wastewater, municipal wastewater treatment plants, or stormwater discharges from urban areas. States also use EPA grant assistance to develop and implement programs to control nonpoint (diffuse) sources of pollution, like agricultural runoff.

Despite the implementation of these CWA provisions, there are still waters in the nation do not meet State water quality standards. CWA Section 303(d) addresses these remaining waters by requiring States to identify the waters and develop TMDLs for them, with oversight from EPA.

The goal of a TMDL is to meet a State's water quality standards. A TMDL is a written,

quantitative assessment of water quality problems and contributing pollutant sources. It specifies the amount of a pollutant or other stressor that needs to be reduced to meet water quality standards, allocates pollution control responsibilities among pollution sources in a watershed, and provides a basis for taking actions needed to restore a waterbody ⁵.

Section 303(d) requires States to develop lists of waters needing TMDLs and to develop TMDLs for the waters on the list. The law also requires States to establish a priority ranking for their lists of waters needing TMDLs, taking into account the severity of the pollution and the uses to be made of the waters. EPA must approve or disapprove State lists of waters and TMDLs within thirty days of final State submission. If States do not submit lists or TMDLs, or if State submissions are inadequate, EPA establishes lists and TMDLs in lieu of the State.

The TMDL program is linked to other CWA programs. A TMDL can identify the need for point source dischargers to implement pollution controls that are based on the quality of the receiving water. These controls are implemented through the point source discharger's NPDES permit.

A TMDL can also identify the need to control nonpoint sources of pollution like agricultural runoff. States receive funds under CWA section 319(h) to implement comprehensive State programs to reduce nonpoint source pollution. Other sections of the CWA, other Federal statutes and programs, State and local laws, and partnerships with citizens groups may also be used to implement portions of the TMDL program.

In April 1991, EPA published guidance ⁶ (EPA 440/4-91-001.) explaining the role of TMDLs in watershed protection. In June 1992, EPA amended its regulations ⁷ to describe in greater detail State submission requirements for lists of waters needing TMDLs. The regulations require States to submit lists every two years and to target those waters for which TMDLs will be developed during the next two years.

1.4 Approach to developing and implementing this Strategy

A TMDL workgroup comprised of EPA, States, Tribes and other Federal agencies recently explored options for improving the TMDL program. The workgroup produced discussion papers and recommendations on a broad array of TMDL program issues, including identifying waters requiring TMDLs, setting priorities, clarifying the definition of a TMDL, implementing and assessing pollution control actions, tracking and reporting the progress of TMDL development, and interstate issues. The TMDL workgroup completed its work in September 1996. EPA is currently revising the Final Report of the TMDL Workgroup and will release it in the very near future.

In addition, EPA is now establishing a Federal Advisory Committee Act (FACA) committee comprised of individuals from a wide range of interests and locales. EPA will provide the TMDL FACA Committee with background information to begin its deliberations, including this draft Strategy and the findings of the TMDL workgroup.

The TMDL FACA Committee will develop recommendations concerning changes to EPA's TMDL policies, guidance and regulations. The Committee will hold a number of meetings over an eighteen to twenty-four month period, beginning in the Fall of 1996. These meetings will focus on the broad issues of listing waters needing TMDLs; criteria for approving TMDLs; State and Federal management of the TMDL program; and science and tools for TMDL development. EPA will form a technical workgroup to support the FACA Committee during its deliberations.

EPA will carefully consider all FACA Committee recommendations. EPA recognizes that the

recommendations could address a wide variety of topics. During the FACA Committee process the States and EPA will continue to implement the TMDL program, including actions identified in this Strategy. This Strategy, as well as EPA's regulations, policy and guidance for the TMDL program, may be revised to reflect FACA Committee recommendations.

¹ "States" refers to States and Territories. For ease of reference, Tribal national are treated equally with States throughout this document and are frequently included within the term "States." ([Back to text](#))

² Even after pollution sources have been implemented required pollution controls ([Back to text](#))

³ See *Watershed Approach Framework*. EPA 840-S-96-001. June 1996. ([Back to text](#))

⁴ Water quality standards have three parts- 1) designated uses, like recreational fishing or navigation; 2) water quality criteria, including numeric expressions like "5 milligrams per liter dissolved oxygen", and narrative statements like "no toxics in toxic amounts"; and 3) an antidegradation provision to maintain the existing uses of a waterbody and to protect high quality waters. [CWA section 303(c). 40 CFR section 131.10-131-12]

([Backx to text](#))

⁵ More specifically, a TMDL is the sum of the individual wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources and natural background, and a margin of safety (MOS). (See [Glossary](#) for definitions of WLA, LA, and MOS). ([Back to text](#))

⁶ See *Guidance for Water Quality-Based Decision: The TMDL Process*. April 1991. ([Back to text](#))

⁷ See 40 CFR 130.7, 130,8, and 130.10 ([Back to text](#))

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Part 2 - The Current TMDL Program

2.1 Development of the program

EPA's 1991 guidance was developed jointly with States. Since publishing the guidance, EPA has worked cooperatively with States to develop State lists of waters needing TMDLs and to develop TMDLs for the States' priority waters.

EPA's guidance on some listing issues provided States with flexibility in meeting CWA requirements. As a result, States have taken different approaches to dealing with two factors - the consideration of activities other than TMDLs that will restore water quality, and the consideration of data quality. The following approaches are consistent with EPA's regulations and guidance to date.

First, some States have decided that many waters do not need TMDLs because other kinds of activities are planned or underway to restore them. These States keep track of the other impaired waters as part of other CWA reporting requirements (discussed further in section 3.1.2). As a result, some State lists of waters still needing TMDLs are relatively short. Conversely, other States have decided to identify all impaired waters on the 303(d) list regardless of whether activities other than TMDLs will be used. The waters where non-TMDL activities will be used to restore water quality have been assigned a low priority on these State lists.

Second, States consider existing and readily available data in different ways when developing their lists. States with more rigorous requirements concerning the appropriate age and quality of data tend to have shorter lists than those with less rigorous requirements.

Most TMDLs developed to date have addressed waterbody segments containing only a single point source discharger. These TMDLs rely on mass balance⁸ and simplified water quality models which assume steady-state conditions (conditions that are constant over time).

However, point source dischargers are not the leading sources of water quality impairment in the nation. EPA's 1994 Water Quality Inventory, or 305(b), report to Congress² identified runoff from agricultural and urban areas as the nation's leading sources of water quality impairment.

There is widespread recognition that more emphasis needs to be placed on developing TMDLs that address wet weather stormwater discharges and nonpoint source pollution problems, and on finding ways to involve local citizens, governments and organizations. EPA's 1991 guidance encouraged States to develop TMDLs for these more difficult water quality problems, and outlined many of the existing Federal, State and local authorities that are needed to implement TMDLs. The guidance also recognized that TMDLs addressing multiple point and nonpoint source pollutant loads often require greater resource commitments and more complex water quality analysis, including models capable of simulating rainfall events, or water quality conditions that are not constant over time.

The availability of tools to develop TMDLs varies. Water quality models for point source TMDLs predict the fate and transport of chemicals instream, and can be applied with greater confidence than models for TMDLs that address nonpoint sources. Model development is still needed to better predict the delivery of pollutants from nonpoint sources and to link these predicted pollutant loadings to the condition of a waterbody. Other tools such as aquatic classification systems (e.g., Index of Biotic Integrity, or IBI), fluvial geomorphology (the effect of rainfall and runoff on the form and pattern of riverbeds and river channels), and ecosystem classification systems that use landscape information, are also under development and are potentially useful.

2.2 Strengthening the current program

EPA is taking steps to strengthen the TMDL program. During a June 1996 meeting with environmental litigants, EPA committed to develop this Strategy. On August 9, 1996 EPA's Assistant Administrator for Water provided additional direction to EPA Regions for completing Agency action on the 1996 requirement for States to identify waters needing TMDLs. By February 1, 1997, EPA will propose lists of waters needing TMDLs for States that have not done so. To complete the 1996 listing process, EPA Headquarters has provided \$50,000 in additional resources to each EPA Region. EPA is also developing a system that will track State commitments to develop TMDLs for waters that are targeted on the 1996 and future lists.

EPA is also stepping up scientific and technical support for the program. In September, 1996 EPA held a technical meeting of the Regional EPA TMDL Coordinators and selected State staff. Attendees established a plan and schedule to develop TMDL protocols over the next year for selected pollutants and stressors. By January 1997, the draft protocols will reflect existing information and identify information needs.

EPA is also continuing to develop a multipurpose environmental analysis system called BASINS (Better Assessment Science Integrating Point and Nonpoint Sources). BASINS contains an assessment and planning component that allows users to organize and display geographic information for selected watersheds. It also contains a modeling component to examine impacts of pollutant loadings from point and nonpoint sources and to characterize the overall condition of specific watersheds.

Lastly, EPA is expanding and modernizing the information base for making water quality management decisions. EPA is improving Internet access to existing information on the condition of rivers, lakes, and coastal waters in the nation. EPA will add other environmental data such as wetlands loss rates, threats to drinking water, habitat and aquatic species status, modeling predictions, remote sensing data and permit compliance through "Surf Your

Watershed"¹⁰. A key subset of this information will be used to implement the National Watershed Assessment Project (NWAP), which is discussed in section 3.1.2 of this Strategy.

⁸An equation that accounts for the flux of mass going into a defined area and the flux of mass leaving the defined area. The flux in must equal the flux out. [\(Back to text\)](#)

⁹See *The Quality of Our Nation's Water: 1994*. December 1995. EPA 841-S-94-002. [\(Back to text\)](#)

¹⁰The internet address is <http://www.epa.gov/ow>. [\(Back to text\)](#)

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Part 3 - The Strategy

The Strategy

The bulk of EPA's Strategy to implement the TMDL program is based on the five elements of the water quality-based approach laid out in EPA's 1991 TMDL guidance. The development of 303(d) lists and TMDLs is one part of the water quality-based approach, which includes the following elements:

1. Identify waters requiring TMDLs
2. Priority ranking and targeting
3. Develop TMDLs
4. Implement control actions
5. Assess control actions

This Strategy also adds three additional elements:

6. Build partnerships and involve the public
7. Oversee consistent national performance
8. Promote and support innovation

The timeframes for implementing the following components of the Strategy are summarized in the Strategy's Conclusion.

3.1 Identify waters requiring TMDLs

EPA will help States successfully assess, evaluate and identify waters needing TMDLs.

3.1.1 Listing cycle

EPA is evaluating whether the current regulatory requirement for States to identify waters needing TMDLs should be shifted from every two years to every five years. A five year cycle would allow States to determine which waters need TMDLs based on more complete information. It would also allow many States with rotating basin (watershed) schedules to synchronize the TMDL listing process with their basin planning processes. However, EPA still expects States to submit 1998 303(d) lists on April 1, 1998, as required by the current regulations.

3.1.2 Monitoring and assessment

EPA recognizes the need to augment monitoring and assessment efforts at all geographic scales to better identify problem waters, determine appropriate pollution control activities and assess whether the activities result in the attainment of water quality goals. Comprehensive monitoring and assessment will ensure that all waters needing TMDLs are appropriately identified.

EPA will continue to support comprehensive assessment of the nation's waters in five ways. EPA will provide monitoring tools and support, improve information technology, consider consolidating assessment and reporting requirements, conduct communication and education activities and participate in overall collaboration forums with Federal, State and local partners.

EPA will help States successfully assess, evaluate and identify waters needing TMDLs.

First, EPA will continue to provide monitoring guidance, tools and support, including the *Nonpoint Source Monitoring and Evaluation Guide*¹¹, the *Lakes and Reservoirs Bioassessment and Biocriteria: Technical Guidance Document*¹², a revised version of *Rapid Bioassessment Protocols For Use in Streams and Rivers: Periphyton, Benthic Macroinvertebrates, and Fish*, and support for local volunteer monitoring programs.

Second, EPA is improving information technology. By February 1997, EPA's "Surf Your Watershed" will substantially improve Internet access to water quality information. EPA also plans to release the National Watershed Assessment Project (NWAP)¹³ by April 1, 1997. NWAP will measure progress toward the national goal for each watershed to be healthy and productive. It will use geographic data to characterize the relative condition of aquatic systems in over two thousand watersheds in the nation and to identify those at risk. NWAP will characterize both overall watershed condition and the condition specific to certain information categories, like fish consumption advisories.

EPA is also modernizing the information systems that serve as the Agency's primary source of water quality and biological monitoring information. A completely modernized STORET (STOrage and RETrieval) System will be available in late 1997. STORET will better meet emerging data and information needs and facilitate data sharing activities. EPA also supports Geographic Information System (GIS) technology, including developing geographically referenced data (data that can be viewed on maps). All of these tools will improve access to the existing and readily available information needed to develop lists of waters needing TMDLs.

Third, EPA is considering administrative ways to consolidate the various - and slightly different - CWA requirements for States to identify and report on impaired waters. These

requirements include:

Section 305(b) - describe the total number of waters that are impaired and transmit State water quality inventories to Congress every two years;

Section 303(d) - identify waters requiring TMDLs from time to time (interpreted as every two years in regulation);

Section 314 - identify and classify eutrophic condition of all publicly owned lakes every two years; and

Section 319 - identify State nonpoint source water pollution problems (progress reports required every year).

EPA will revisit the definitions of terms such as "assessed," "monitored," "evaluated," "threatened," and "impaired" to determine whether current section 305(b) definitions can be uniformly applied to all CWA assessment and reporting requirements, including the development of section 303(d) lists.

Consolidating the above requirements and establishing a five year reporting schedule would enable States to provide a comprehensive picture of their waters, direct monitoring and pollution control resources most efficiently, and help remedy overlapping reporting requirements. Those States that do rotating basin planning on a five year schedule will also be able to conduct reporting in conjunction with their basin plans. Consolidation would also provide a simpler way for EPA to track national progress.

EPA is already taking administrative steps to reorganize Section 305(b) reporting procedures. The procedures will allow States to report on a 5-year cycle, with annual electronic updates. ¹⁴

Fourth, EPA will continue to conduct communication and outreach and provide needed water quality monitoring data through *The Water Monitor*¹⁵, case studies and the Internet.

Fifth, EPA will continue to participate in forums with Federal, State and local partners to improve water quality monitoring. EPA will be the co-chair of the new National Water Quality Monitoring Council.

3.1.3 List development

Following the 1998 listing process, EPA plans to revise the regulations and/or develop additional guidance for two aspects of list development.

First, EPA will further explain the conditions under which a TMDL is not necessary and when a water does not need to be listed. EPA will consider whether certain circumstances such as pollutant loadings from other media (air), remote sources (from across political boundaries), natural sources, one-time events and banned substances, could be valid reasons to not list waters.

EPA will also explain when and how activities done to meet other Federal, State or local requirements can be used instead of a TMDL to satisfy TMDL program requirements. EPA will develop criteria for assessing the likelihood that the other activities will be implemented, will lead to attainment of water quality standards and will do so in a reasonable time frame. Current examples of such activities include Lakewide Management Plans (LaMPs) and

Remedial Action Plans (RAPs) used in the Great Lakes.

Second, EPA will provide additional guidance on the type, the quality and the quantity of data needed to identify waters needing TMDLs, especially for waters that are not meeting narrative criteria or designated uses. The guidance will explain the conditions for listing waters that need a Use Attainability Analysis (UAA) ¹⁶ or a site-specific criterion. It will also explain how a State should use its previous section 303(d) list when developing a new list, and when it is appropriate to remove a water from the list.

3.2 Priority ranking and targeting

3.2.1 Priority ranking

Determining priorities is a State responsibility, to be done in consultation with the public and EPA. Priority rankings for lists of waters requiring TMDLs are also subject to EPA approval. EPA will consider developing additional criteria for States to use in establishing priorities.

3.2.2 Targeting and pace for TMDL development

EPA will consider modifying the regulatory requirement for States to target waters for which TMDLs will be initiated during the next two years to include State schedules for completing TMDLs for all 303(d) listed waters in a reasonable period of time.

At a minimum, the States and EPA will work together to agree on a pace for completing TMDLs. This pace should correspond to each State's basin planning process and/or water quality management planning process, the relative complexity of water quality problems and availability of State, Federal or other resources. By Summer 1997, EPA will develop additional guidance on establishing EPA-State agreements on the appropriate pace for TMDL development. This guidance will also address the development of TMDLs by EPA when a State's TMDL development pace is inadequate or where State TMDLs are inadequate.

The States and EPA will work together to agree on a pace for completing TMDLs.

Resources are a central consideration for establishing TMDL program priorities, including schedules for TMDL development. EPA understands that resources can significantly constrain the pace of TMDL development, as well as the quality of TMDLs. States may be able to complete large numbers of TMDLs in a relatively short timeframe if they are based on existing data and simple analytical methods. However, these types of TMDLs are not appropriate in all cases. More complex water quality problems often require TMDLs based on more recent and extensive data and more complex water quality analysis. In many situations, therefore, States may have to choose between speed and technical rigor. EPA will work with each State to agree on the appropriate way to balance these tradeoffs while continuing to meet program requirements.

By Summer 1997, EPA will publish an analysis of the costs associated with implementing the TMDL program, including identifying waters needing TMDLs, developing TMDLs, and financing TMDL development. EPA will study various State programs as well as TMDLs of different geographic distribution, pollutants, scale and level of complexity. This analysis will expand on a recent study¹⁷ that estimated development costs for fourteen TMDLs and observed patterns that helped explain costs.

3.3 Develop TMDLs

EPA will support State development of high quality TMDLs.

3.3.1 Approvable TMDLs

EPA will define the elements of an approvable TMDL in revised regulations and/or guidance. Many of these elements already exist in draft form as a result of the TMDL workgroup process described in section 1.4 of the Strategy. The definition will address the implementation and assessment of pollution control activities, which are also discussed in sections 3.4 and 3.5 of this Strategy.

3.3.2 Technical tools and transfer

EPA will increase its support for improving the technical tools for developing TMDLs and for transferring the information to States. This support covers four major areas.

First, EPA will support the development of TMDL protocols for chemical and nonchemical stressors for which many States do not have numeric criteria. Draft protocols will be available in January 1997. The protocols will help States identify and address water quality problems that might not be addressed relying on existing numeric water quality criteria alone.

For example, the Nutrient Task Force established by EPA in 1993 (now known as the Nutrient Assessment Workgroup) will continue working to identify and develop a full range of nutrient overenrichment endpoints, including early warning indicators, assessment methodologies and models, as well as ways to apply nutrient assessment tools across various waterbody types, geographical areas and ecoregions. The TMDL program is coordinating with the Nutrient Assessment Workgroup to establish TMDL protocols for nutrient enrichment problems.

EPA is also beginning to develop TMDL protocols for clean sediment, bacteria and variable flow dissolved oxygen. Each protocol will include a template that can be recreated for particular waterbody types, pollution source types and pollutants. EPA will develop TMDL protocols for additional stressors as more resources become available.

Second, EPA will continue to address the complexities and challenges associated with predicting the water quality impacts of runoff from nonpoint sources during wet weather events. Many nonpoint sources discharge intermittently, depending upon weather conditions. This rainfall-runoff relationship makes wet weather impacts difficult to model, particularly when there are a number of sources.

There are two evolving methods for conducting predictive wet weather modeling: 1) continuous simulation and 2) probabilistic simulation. Continuous simulation models use input values at a particular time interval (e.g., one hour, daily, weekly) to predict receiving water conditions. The model generates output for the same time step as the input variables. For example, if a daily time step is chosen, the model will predict receiving stream quality for each day of the year.

The main disadvantage of continuous simulation models is that they are very data intensive. They require continuous rainfall and stream flow data, and several decades of data are considered ideal. If adequate data are unavailable, values can be estimated, but these estimations will increase the uncertainty in the model predictions. BASINS¹⁸ incorporates

HSPF, one of the most widely-used continuous simulation models. EPA will continue to enhance BASINS and will link the monitoring and assessment activities described in section 3.1.2 of the Strategy to improve data availability for continuous simulation models.

Given the data needs of continuous simulations, the analysis of wet weather impacts is often based on probabilistic simulations. In probabilistic modeling, the input values for the model are expressed statistically, and the model predictions are also expressed in terms of a statistical distribution.

Beginning in 1997, EPA will work to validate probabilistic analytical techniques so that they can be applied with more confidence. Validation means comparing model results with actual field data. EPA will look at existing sources of field data such as the section 319 National Monitoring Program¹⁹ and the Rural Clean Water Program (RCWP). The section 319 National Monitoring Program was established in 1991 to intensively monitor water quality and nonpoint source pollution controls in designated watershed projects. The RCWP²⁰ was an experimental effort to address agricultural nonpoint source pollution problems that produced water quality monitoring data from twenty-one projects. Five projects were selected to receive additional federal funding for more extensive monitoring and evaluation. These projects are referred to as the Comprehensive Monitoring and Evaluation Projects.

EPA will increase its support for improving the technical tools for developing TMDLs and for transferring the information to States.

EPA will also continue to develop interactive computer tools. In addition to BASINS, EPA is currently supporting the development of a Geographic Information System (GIS)-based erosion prediction model that will enable water quality managers to estimate current sediment production and delivery mechanisms to streams as well as potential changes in sediment associated with proposed management options. Development of this model will continue throughout 1997.

By December 1996, EPA will also publish an updated version of the *Compendium of Watershed-Scale Models*, which identifies and summarizes water quality models and helps water quality managers decide which model best suits their needs and available resources. The updated version will include new chapters on biological assessment tools and ecological models.

Third, EPA will increase its support for technical transfer and training to States and other parties developing TMDLs. EPA will continue to develop TMDL case studies and provide a standing team of experts to help with individual TMDL development.²¹ EPA is also looking at the feasibility of creating a Modeling Center. The Center would maintain a hotline to answer questions on what model is appropriate for a site-specific situation, how to design monitoring programs for model calibration and how to apply a model and interpret results. EPA will also use available resources to develop and conduct training on water quality modeling for States.

Fourth, EPA will seek opportunities to lead the development of selected interstate TMDLs. For example, EPA recently provided funding to support the development of the interstate Red River TMDL for Minnesota and North Dakota, and for the Illinois River in Arkansas and Oklahoma. An interstate TMDL may also be appropriate for the Mississippi River watershed as a component of EPA and State strategies to address hypoxia²² problems identified in the Gulf of Mexico.

3.4 Implement control actions

Implementation of a TMDL depends on other programs and activities; a TMDL alone does not create any new or additional implementation authorities. The States, Tribes and EPA are partners within the TMDL program, and together they work with Federal, State and local authorities as well as other public and private organizations to implement TMDLs.

TMDLs that allocate pollutant loads to point sources regulated by the NPDES permit program carry the best assurance that they will be implemented. Point source dischargers are subject to direct Federal and State regulatory requirements. Backed by the opportunity for citizen lawsuits, this complete enforcement authority provides strong assurance that pollution control activities will be implemented.

Implementation is more complex for TMDLs that allocate pollutant loads to nonpoint sources because it does not rely on direct Federal regulation. Instead, implementation must typically rely on State law, local ordinance or programs administered by Federal agencies that are voluntary or incentive-based in nature. The implementation of many nonpoint source controls also depends upon Federal, State or local funding sources such as cost share programs.

States can use a variety of mechanisms to address nonpoint sources of pollution, including backup enforceable authorities like enforceable water quality standards, bad actor laws²³, tax incentives, or zoning laws.

EPA will establish additional, national criteria for determining whether there is reasonable assurance that TMDL load allocations for nonpoint sources will actually be implemented in a reasonable time period.

Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) require States to have Federally approved programs to implement and enforce nonpoint source controls. This provision applies only to the coastal zones of the twenty-nine coastal States and Territories that have approved Coastal Zone Management Act (CZMA) Programs.²⁴

EPA will establish additional, national criteria for determining whether there is reasonable assurance that TMDL load allocations for nonpoint sources will actually be implemented in a reasonable period of time. These criteria will address the application of State and local regulatory and voluntary programs, as well as Federal environmental activities apart from the Clean Water Act. In order to maximize reasonable assurance, the criteria will carefully consider the strength of potential consequences to a pollution source in the event that implementation does not occur, for example, administrative, civil or criminal penalties under existing State law or local ordinance.

EPA will also consider establishing a national requirement to include implementation plans and schedules with individual TMDL submissions to EPA. As part of the Great Lakes Water Quality Initiative, EPA explained that an implementation schedule for specific voluntary or non-voluntary nonpoint source controls specific to the pollutant of concern provides a reasonable assurance that a TMDL will be implemented in a reasonable time period. A national requirement for plans and schedules would provide reasonable assurance to the public and EPA that the necessary pollution reductions would occur. EPA will consider linking a requirement for such plans and schedules to CWA section 303(e), under which States describe their Continuing Planning Processes.²⁵

EPA will also provide information on how to access programs and resources that can support TMDL implementation. These may include private party resources as well as CWA section 319, State Revolving Funds and Farm Bill conservation programs. For example, the 1996 Farm Bill's Environmental Quality Incentives Program (EQIP) calls for the identification of priority areas for protecting aquatic resources and reducing water pollution from agriculture. If appropriately directed, the over two billion dollars available annually for agricultural conservation and cost-sharing will be of major assistance in implementing TMDLs.

3.5 Assess control actions

Assessing water quality conditions after pollution controls are implemented is essential for determining the success of a TMDL. This is especially true for situations of high uncertainty, for example, in watersheds that are polluted due to nonpoint source pollution, urban stormwater discharges, etc.

First, EPA will issue further guidance on the phased approach to TMDL development. The phased approach allows nonpoint source controls to be implemented in uncertain situations without waiting for new data collection and analysis.

EPA will issue further guidance on the phased approach to TMDL development.

The success of this type of TMDL depends upon collecting additional data after the TMDL has been implemented to assess whether the anticipated controls have reduced pollution by the required amount. The guidance will address monitoring and assessment of control actions for these highly uncertain situations as well as when and how to make TMDL revisions for EPA approval.

Second, EPA will consider whether monitoring plans should be developed for TMDLs.

3.6 Build partnerships and involve the public

EPA will continue to develop partnerships with Tribes, Federal agencies and key stakeholder groups. EPA will also improve public access to water quality information and encourage States to expand public involvement in the TMDL program.

First, EPA will work on a government-to-government basis with Tribes to meet the requirements of the TMDL program on Indian lands. EPA recognizes Tribal governments as the primary party for implementing and managing the TMDL program on Indian lands. Beginning in 1997, EPA will take steps to encourage and assist Tribes in assuming TMDL program management responsibilities. In keeping with EPA's Indian Policy²⁶, EPA will assure that Tribal concerns and interests are considered whenever EPA's actions and/or decisions might affect reservation environments.

EPA will also encourage cooperation among Tribal, State and local governments and other Federal agencies to resolve water quality problems of mutual concern. As one example, Federally recognized Tribes in the State of Washington recently entered into a partnership with EPA and Washington State to co-manage the TMDL program, beginning in 1998.

Second, EPA will seek opportunities to cooperate with other Federal land managers and States to meet the requirements of the TMDL program on Federal lands. EPA will promote a national scale framework to consistently implement TMDL program requirements on Federal lands. Beginning in 1997, EPA will work to establish a Memorandum of Understanding/Agreement with selected, priority Federal agencies. EPA will also work with other Federal agencies to integrate TMDLs with other applicable Federal activities, for example Habitat Conservation Plans²⁷ developed by individual landowners in consultation with the National Marine Fisheries Service and U.S. Fish and Wildlife Service.

EPA will seek opportunities to cooperate with other Federal land managers and States to meet the requirements of the TMDL program on Federal lands.

EPA will also facilitate cooperation between other Federal agencies and States regarding the objectives of individual State water quality programs. Current EPA nonpoint source program guidance²⁸ directs States to identify Federal lands and activities which are not managed consistently with State nonpoint source program objectives. Where appropriate, EPA will help resolve issues that arise between State and Federal agencies regarding Federal consistency with a State's TMDL program.

Third, EPA will continue to build partnerships with key stakeholder groups. Over the last year, for example, EPA initiated the Watershed Academy²⁹ to provide training for watershed managers based on local, State, Tribal and Federal experiences in implementing watershed approaches. EPA itself offers only a few courses, however, the Watershed Academy maintains an Internet Catalogue of Watershed Training Opportunities to spread information about dozens of other watershed-oriented training courses offered by local, State and Federal agencies and private organizations.

Fourth, EPA will improve public access to water quality information by developing environmental data on a geographic basis and by developing Internet tools such as "Surf Your Watershed" and NWAP (described in sections 2.3 and 3.1.2 of this Strategy). EPA will also continue to provide guidance, policies, regulations and technical support documents in both hard copy and electronic format. Finally, information on the TMDL FACA Committee's activities will be available on the Internet.

Fifth, EPA will continue to encourage States to involve local citizens, governments and organizations in identifying waters needing TMDLs and establishing priorities. EPA will also encourage States to involve public and private entities in developing and implementing TMDLs because it is essential to have local commitment when implementing pollution control measures.

3.7 Oversee consistent national performance

EPA will oversee consistent nationwide implementation of the TMDL program in two ways. First, for States, EPA will intervene when necessary to identify waters needing TMDLs. By Summer 1997, EPA will establish criteria to determine when EPA will intervene to develop TMDLs if a State's performance is inadequate.

Second, EPA will use all means available to assure that it oversees State performance in a consistent manner. These include more efficient information management, Performance

Partnership Agreements between EPA Headquarters and Regions, Performance Partnership Grants between EPA and the States.³⁰ EPA will also consider an audit of each EPA Regional TMDL program. The relationship between States and EPA continues to favor more State autonomy. EPA will strive to respect this evolving relationship and at the same time meet statutory and regulatory requirements as well as responsibilities imposed by the courts.

EPA will intervene when necessary to identify waters needing TMDLs. EPA will also establish criteria to determine when EPA will intervene to develop TMDLs if a State's performance is inadequate.

By Spring 1997, EPA will develop a method to track the development of TMDLs nationwide, including those planned, in progress or completed. This will allow EPA to track the progress of State commitments to develop TMDLs and to facilitate information exchange between EPA, States and Tribes for new or creative TMDL approaches.

3.8 Promote and support innovation

EPA will promote and support innovative approaches linked to developing and implementing TMDLs, such as watershed-based trading, instream monitoring by NPDES point source dischargers and ecological restoration.

3.8.1 Watershed-based trading

Trading means that pollution sources can sell or barter their ability to reduce pollution with other sources that are unable to reduce their pollutant loads as economically. TMDLs provide a basis for successful trading because they can be adapted to incorporate trades, and because the data and analyses generated in TMDLs allow water quality managers to better understand and predict the effects of proposed trades.

EPA will continue to support watershed-based trading as a way to meet water quality standards more quickly and at less overall cost.

The success of trading will rely on reasonable assurance that a TMDL will actually be implemented. Future EPA guidance on watershed-based trading will reflect additional TMDL implementation guidance.

EPA will continue to support watershed-based trading as a way to meet water quality standards more quickly and at less overall cost.³¹ EPA will use available resources to encourage trading by holding information exchange workshops, supporting trading programs, tracking the success of trades and providing case studies.

3.8.2 Instream monitoring by NPDES dischargers

Point source dischargers could provide a great deal of valuable ambient (instream) data to help

make better watershed management decisions. Although the NPDES program has authority to require instream monitoring to assure that water quality standards are being met, in most cases NPDES dischargers are required to monitor the condition of their effluent, rather than the condition of the receiving waterbody.

EPA currently provides a voluntary incentive for NPDES dischargers to conduct ambient monitoring. Current NPDES guidance³² allows eligible dischargers to reduce reporting and monitoring requirements based on a demonstration of excellent historical performance. If eligible permittees volunteer to collect or provide additional ambient monitoring information, permitting authorities may consider granting additional reductions in compliance reporting and monitoring, over and above the reductions granted based on good performance. EPA will continue to encourage point source dischargers to take advantage of this opportunity.

3.8.3 Ecological restoration

Many water quality impairments stem from degraded habitat in a watershed. Ecological, or habitat, restoration helps support diverse, productive communities of plants and animals. Restoration techniques can be implemented as part of a TMDL to meet a water quality standard. For example, in a watershed where elevated sediment loadings damage fish spawning habitat, a TMDL can establish a desirable percentage of fine sediment on the stream bottom as a measurable endpoint and identify instream, streambank or upland techniques to restore spawning habitat.³³

EPA will continue to support ecological restoration activities. EPA recently supported the development of a model to quantify the relationship between riverbank shade and water temperature. The model supports the development of a TMDL for the Upper Grande Ronde River in Oregon.³⁴ Control actions include streambank stabilization and revegetation to provide shade and reduce temperature.

¹¹ The document is currently being prepared for review outside the Agency. EPA plans to issue the final documents before June 1997, following review. [\(Back to text\)](#)

¹² To be released by October 1997. [\(Back to text\)](#)

¹³ See Appendix A - NWAP fact sheets [\(Back to text\)](#)

¹⁴ EPA will continue to provide the required updates to Congress every two years if the law is not changed. [\(Back to text\)](#)

¹⁵ A bi-monthly monitoring newsletter that is available on EPA's Internet home page. [\(Back to text\)](#)

¹⁶ A UAA assesses the physical, chemical, biological and economic factors which affect the attainment of a designated use. If a UAA shows that attaining a designated use is not feasible, a State can modify it to make the use less stringent, provided that existing uses are maintained. 40 CFR section 130.10. [\(Back to text\)](#)

¹⁷ See *TMDL Development Cost Estimates: Case Studies of 14 TMDLs*. May 1996. EPA-R-96-001. [\(Back to text\)](#)

¹⁸ See Appendix B - *Fact Sheet. Basins: A powerful tool for managing watersheds*. See also *Better Assessment Science Integrating Point and Nonpoint Sources. BASINS Version 1.0. User's manual*. May 1996. EPA-823-R-

96-001. [\(Back to text\)](#)

¹⁹ See *Section 319 National Monitoring Program: An Overview*. Prepared for US EPA by the North Carolina Cooperative Extension Service. North Carolina State University College of Agriculture and Life Sciences. March 1995. [\(Back to text\)](#)

²⁰ See *Evaluation of the Experimental Rural Clean Water program. Abbreviated Version*. National Water Quality Evaluation Project. North Carolina State University Water Quality Group, in cooperation with U.S. Department of Agriculture and US EPA. August 1993. [\(Back to text\)](#)

²¹ Also known as the TMDL "SWAT" Team. [\(Back to text\)](#)

²² Extended periods of low dissolved oxygen that causes extreme stress if not death to aquatic organisms. [\(Back to text\)](#)

²³ State bas actor laws authorize the state to take increasingly stringent steps where voluntary measures fail. [\(Back to text\)](#)

²⁴ See *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*. US EPA and U.S. Department of Commerce. EPA 841-B-93-003. January 1993. Also *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*. EPA 840-B-92-002. January 1993. [\(Back to text\)](#)

²⁵ See 40 CFR 130.5, 6, 7, and 10. [\(Back to text\)](#)

²⁶ See *EPA Policy for the Administration of Environmental Programs on Indian Reservations*. November 8, 1984, reaffirmed March 14, 1994. [\(Back to text\)](#)

²⁷ See Glossary [\(Back to text\)](#)

²⁸ See *Nonpoint Soure Program and Grants Guidance for Fiscal Year 1997 and Future Years*. May 1996. [\(Back to text\)](#)

²⁹ See Appendix C - The Watershed Academy: EPA Training in the watershed Approach. [\(Back to text\)](#)

³⁰ Performance Partnerships Agreements (PPAs) are agreements between EPA Headquarters and Regional Offices on how to manage environmental programs. Performance Partnership Grants (PPGs) provide states with the option to combine funds from two or more grant programs into one grant. See *Performance Partnership Grants for State and Tribal Environmental Programs: Revised Interim Guidance*. July 1996. [\(Back to text\)](#)

³¹ See Appendix D - *Effluent Trading in watersheds policy Statement*, January 25, 1996. See also *Draft Framework for Watershed-Based Trading*. May 1996. EPA 800-R-96-001. [\(Back to text\)](#)

³² See *Interim Guidance For Performance-Based Reduction of NPDES Permit Monitoring Frequencies*. EPA 833-R-96-001. April 1996. [\(Back to text\)](#)

³³ See *Ecological Restoration: A Tool To Manage Stream Quality*. November 1995. EPA-F-95-007. [\(Back to text\)](#)

³⁴ See *Upper Grande Ronde River Riparian Characterization and Temperature Modeling Projects: Project Summary*. EPA 841-S-94-001. 1994. [\(Back to text\)](#)

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Part 4 - Conclusion

Tables 1 and 2 on the following pages provide a summary of this Strategy, including timeframes for implementation. Table 1 describes future EPA activities; Table 2 describes possible activities.

Table 1: Summary of Future EPA Activities		
Activities	Timeframes	Descriptions
Current program requirements for listing and TMDLs	By February 1, 1997	EPA-proposed 1996 303(d) lists for States that have not done so
	As appropriate	Develop future 303(d) lists and TMDLs for States when State performance is inadequate
Regulatory and/or Guidance Revisions - 303(d) LISTING	April 1998	Determine whether definitions of terms such as "threatened", "assessed", "evaluated", "monitored" and "impaired" should be revised so they can be uniformly applied to develop 303(d) lists and other CWA reporting requirements
	Post-FACA	Clarify the conditions under which a water does not need to be listed on the 303(d) list
	Post-FACA	Clarify the type, quality and quantity of data needed to develop 303(d) lists
	Summer 1997	Develop guidance on establishing EPA-State agreements on the appropriate pace for TMDL development

Regulatory and/or Guidance Revisions - TMDLs	Summer 1997	Develop criteria for when and how EPA would intervene to develop TMDLs for the State
	Summer 1997	Publish an analysis of the costs associated with implementing the TMDL program, including identifying waters needing TMDLs and developing TMDLs
	Ongoing	Provide information on how to access other Federal, State local and private programs and resources that can support TMDL implementation
	Post-FACA	Further define the elements of an approvable TMDL
	Post-FACA	Establish national criteria for determining whether there is reasonable assurance that a TMDL will be implemented
	Post-FACA	Clarify the requirement that TMDLs be developed to meet water quality standards in a "reasonable time period"
	Post-FACA	Issue further guidance on the phased approach to TMDL development, including how to make TMDL revisions for EPA approval
Regulatory and/or Guidance Revisions -OTHER	Ongoing	Allow comprehensive characterization of State waters every five years with annual electronic updates (State 305(b) reports)
Support for Water Quality Assessment and TMDL Development	December 1996	Update <i>Compendium of Watershed-Scale Models</i>
	January 1997	Evaluate draft protocols for TMDLs for nutrients, clean sediment, variable flow dissolved oxygen, and bacteria
	To begin in 1997	Validate probabilistic analytical techniques to address wet weather water quality impacts
	April 1, 1997	Publicly release the National Watershed Assessment Project (NWAP)
	Late 1997	Complete STORET modernization
	Ongoing	Further develop Better Assessment Science Integrating Point and Nonpoint Sources (BASINS)
	Ongoing	Provide standing team of experts to help with individual TMDL development - also known as the "TMDL SWAT Team"

Partnerships, Outreach and Public Access	To begin in 1997	Establish Memoranda of Agreement/Understanding with selected, priority Federal agencies laying out a national scale framework to consistently implement the TMDL program on Federal lands
	February 1997	Substantially improve Internet access to watershed information through "Surf Your Watershed"
	Ongoing	Work on a government-to-government basis with Indian Tribes to meet the requirements of the TMDL program on Indian lands
	Ongoing	Work with other Federal agencies to integrate TMDLs with other applicable Federal activities
	Ongoing	Facilitate cooperation between other Federal agencies and States regarding a State's water quality program objectives
	Ongoing	Build on the Watershed Academy by working with other Federal, State and local parties to provide a catalogue of watershed-oriented trading courses offered by local, State and Federal organizations
	Ongoing	Co-chair the National Water Quality Monitoring Council
National Oversight	Spring 1997	Develop a method to track the development of TMDLs nationwide, including those planned, in progress or completed
Innovative Approaches (Watershed-Based Trading)	December 1996	Provide Internet access to public comments on the <i>Draft Framework for Watershed-Based Trading</i>
	Ongoing during 1997	Issue "Questions and Answers" regarding issues raised in the public comments on the <i>Draft Framework for Watershed-Based Trading</i>
	To begin in 1997	Conduct information exchange workshops for EPA Regions, States and key stakeholders
	To begin in 1997	Support trading projects/programs where appropriate

Table 2: Summary of Possible EPA Activities

Activities	Timeframes	Descriptions
Regulatory and/or Guidance Revisions - 303(d) LISTING	Post-FACA	Consider changing the 303(d) list cycle from every two to every five years
Regulatory and/or Guidance Revisions - TMDLs	Post-FACA	Consider establishing a national requirement to include implementation plans and schedules with individual TMDL submission to EPA
	Post-FACA	Consider establishing guidance linking implementation of TMDLs to CWA section 303(e)
	Post-FACA	Consider whether monitoring plans should be required for TMDLs other than those using the phased approach
Regulatory and/or Guidance Revisions - OTHER	Post-FACA	Consolidate the CWA reporting requirements, including CWA sections 305(b), 314, 303(d), 319
Support for water Quality Assessment and TMDL Development	1997	Evaluate the feasibility of creating a Modeling Center
	As appropriate	Conduct water quality modeling training for States
	As appropriate	Lead the development of interstate TMDLs, e.g., the Mississippi River watershed
National Oversight	1997	Consider conducting an audit of EPA Regional TMDL programs

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Glossary

Aquatic classification system. Assigns a classification to a waterbody reflecting the water quality and the biological health (integrity). Classification is determined through use of biological indices (see IBI). Examples of classifications include oligosaprobic (cleanest waster quality) and polysaprobic (highly polluted water).

Assessed waters. Waters that States, Tribes, and other jurisdictions have assessed according to physical, chemical, and biological parameters to determine whether or not the waters meet water quality standards and support designated beneficial uses (305(b) definition).

TMDL guidance refers to assessments as a mechanism to evaluate whether or not control actions based on the TMDL protect or improve the environment and can meet changing water quality standards and sources of pollution.

Bacteria. Single-celled microorganisms. Bacteria of the coliform group are considered the primary indicators of fecal contamination and are often used to assess water quality.

Bad actor law. State bad actor laws authorize the State to take increasingly stringent steps where voluntary measures fail.

Basin planning process. Also known as a statewide watershed management approach, it is a method for integrating and coordinating watershed protection throughout a state.

BASINS (Better Assessment Science Integrating Point and Nonpoint Sources). A computer-run tool that contains an assessment and planning component that allows users to organize and display geographic information for selected watersheds. It also contains a modeling component to examine impacts of pollutant loadings from point and nonpoint sources and to characterize the overall condition of specific watersheds.

Chemical stressor. A chemical, such as an industrial discharge chemical, that negatively impacts the aquatic ecosystem.

Clean sediment. Sediment that is not contaminated by chemical substances. Pollution caused by clean sediment refers to the quantity of sediment, as opposed to the presence of pollutant-contaminated sediment.

Clean Water Act (CWA). The Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972), Public Law 92-500, as amended by Public Law 96-483 and Public Law 97-117, 33 U.S.C. 1251 et seq. The Clean Water Act (CWA) contains a number of provisions to restore and maintain the quality of the nation's water resources. One of these provisions is section 303(d), which establishes the TMDL program.

Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). Section 6217 of CZARA requires States to have Federally approved programs to implement and enforce nonpoint source controls. This provision applies only to the coastal zones of the twenty-nine coastal States and Territories that have approved Coastal Zone Management Act (CZMA) Programs.

Comprehensive assessment. The EPA Monitoring Program goal to assess one hundred percent of State waters.

Consolidated assessment. Using one assessment process for all CWA reporting requirements to determine waterbody status, i.e., attainment or nonattainment of State water quality standards.

Consolidated reporting. Describing waterbody status, i.e., attainment or nonattainment of State water quality standards, in one report for all CWA reporting requirements. May or may not be based on a consolidated assessment process.

Continuing Planning Process. State plans for all navigable waters within a State. These plans are required by CWA section 303(e), and include, but are not limited to, effluent limitations and schedules for compliance, elements of areawide waste management plans, TMDLs, and adequate implementation, including schedules of compliance, for revised or new water quality standards.

Dissolved oxygen (DO). The amount of oxygen that is dissolved in water. It also refers to a measure of the amount of oxygen available for biochemical activity in water body, and as indicator of the quality of that water.

Ecological restoration. The reestablishment of chemical, physical, and biological components of an aquatic ecosystem that have been compromised by stressors such as point and nonpoint sources of pollution, like habitat degradation, hydromodification, and others.

Ecoregion. A physical region that is defined by its ecology, which includes meteorological factors, elevation, plant and animal speciation, landscape position, and soils.

Environmental Quality Incentives Program (EQIP). The Environmental Quality Incentives Program was created as part of the Federal Agriculture Improvement and Reform (FAIR) Act of 1996. EQIP has \$130 million in 1996 and \$200 million annually thereafter for cost-sharing conservation practices. It allocates half for crop production and half for small-to medium-size livestock operations and requires that the participants implement a conservation plan to control

agricultural pollution.

Federal Advisory Committee Act (FACA). Provides for the establishment of an advisory committee by the President or a Federal Agency to obtain advice or recommendations.

Federal land managers. Federal lands are managed by the Department of Interior (Bureau of Land Management, National Park Service, and U.S. Fish and Wildlife Service), Department of Agriculture (U.S. Forest Service), and the Department of Defense.

Fluvial geomorphology. The effect of rainfall and runoff on the form and pattern of riverbeds and river channels.

Geographic Information Systems (GIS). An organized collection of computer hardware, software, and geographic data designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information.

Great Lakes Water Quality Initiative (GLI). As part of the GLI, EPA explained that an implementation schedule for specific voluntary or non-voluntary nonpoint source controls specific to the pollutant of concern provides a reasonable assurance that a TMDL will be implemented. *NOTE: The final document is named the U.S. Great Lakes Water Quality Guidance.*

Habitat Conservation Plans (HCPs). As part of the Endangered Species Act, Habitat Conservation Plans are designed to protect a species while allowing development. HCPs gives the U.S. Fish and Wildlife Service the authority to permit "taking" of endangered or threatened species as long as the impact is lessened by conservation measures. It allows a landowner to determine how best to meet the agreed-upon fish and wildlife goals and helps conserve the species.

Hypoxia. Extended periods of low dissolved oxygen that cause extreme stress if not death to aquatic organisms.

Impaired waters. The sum of waterbodies partially supporting uses and not supporting uses (305(b) definition).

TMDL guidance identifies *water quality-limited waters* (similar in meaning to impaired) as waters that require TMDLs when certain pollution control requirements are not stringent enough to implement water quality standards.

Index of Biotic Integrity (IBI). The IBI uses measurements of the distribution and abundance or absence of several fish species types in each waterbody for comparison. A portion of a waterbody is compared to a similar, unimpacted waterbody in the same ecoregion.

Indian lands. Also know as "Indian Country", Indian lands include all of the land within the limits of any Indian reservation under the jurisdiction of the United States, all dependent Indian communities within United States borders, and all Indian allotments (land titles).

Lakewide Management Plans (LaMPs). Annex 2 of the Great Lakes Water Quality Agreement (GLWQA) calls for the development of Lakewide Management Plans for Critical Pollutants. These LaMPs are to assess impairments of 14 beneficial uses and are expected to be submitted at four stages: (1) when a definition of the problem is complete, (2) when chemical load reduction schedules are complete, (3) when remedial measures are selected, and (4) when monitoring indicates that the contribution of critical pollutants to impaired uses has been

eliminated and uses restored.

Load Allocation (LA). The portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources. Load Allocations are best estimates of the loading, which may range from reasonably accurate estimates to gross allotments, depending on the availability of data and appropriate techniques for predicting the loading. Wherever possible, natural and nonpoint source loads should be distinguished (40 CFR 130.2(g)).

Margin of Safety (MOS). The required component of the TMDL that accounts for the uncertainty about the relationship between pollutant loads and the quality of the receiving waterbody (CWA section 303(d)(1)(C)).

Mass balance. An equation that accounts for the flux of mass going into a defined area and the flux of mass leaving the defined area. The flux in must equal the flux out. **Memorandum of Agreement (MOA).** A binding agreement of obligation between two or more parties intended to affect mutual goals or support. Memorandum of Agreement and Memorandum of Understanding are interchangeable terms.

Memorandum of Understanding. See Memorandum of Agreement. National Pollutant Discharge Elimination System (NPDES). The national program for issuing, modifying, revoking and reissuing, terminating, monitoring, and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318, and 405 of the Clean Water Act.

Nonchemical stressors. A nonchemical substance that negatively impacts the aquatic ecosystem. For example, negative impacts can occur when levels of nutrients or sediment become elevated.

Nonpoint source. Pollution that is not released through pipes but rather originates from multiple sources over a relatively a large area. Nonpoint source can be divided into source activities related to either land or water use including failing failing septic tanks, improper animal-keeping practices, forest practices, and urban and rural runoff.

National Watershed Assessment Project (NWAP). Measures progress toward the national goal for each watershed to be healthy and productive. It will use geographic data, including waters needing TMDLs, to characterize the condition of aquatic systems in each of over two thousand watersheds in the nation and to identify those at risk. NWAP will create indices of relative watershed condition and also create maps showing overall watershed condition.

Performance partnership agreement (PPA). An agreement between EPA Headquarters and Regional offices on how to manage environmental programs.

Performance partnership grant (PPG). Provides states with the option to combine funds from two or more grant programs into one grant.

Remedial Action Plans (RAPs). A plan designed to restore beneficial uses to a Great Lakes Area of Concern (area of localized toxicity).

State Revolving Fund (SRF). Revolving funds are financial institutions that make loans for specific water pollution control purposes and use loan repayment, including interest, to make new loans for additional water pollution control activities. Under the State Revolving Fund program, States and municipalities are primarily responsible for financing, constructing, and

managing wastewater treatment facilities. The SRF program is based on the 1987 Amendments to the Clean Water Act, which called for replacement of the Construction Grants program with the SRF program.

Surf Your Watershed. EPA program that provides Internet access to existing information on the condition of rivers, lakes, and coastal waters in the nation. EPA will add other environmental data such as wetlands loss rates, threats to drinking water, habitat and aquatic species status, modeling predictions, remote sensing data and permit compliance.

Threatened waters. Water quality supports beneficial uses now but may not in the future unless action is taken (305(b) definition).

TMDL guidance specifies that "Where all water quality problems cannot be addressed immediately, EPA and the States will...set priorities and direct efforts and resources to maximize environmental benefits by dealing with the most serious water quality problems and the most valuable and *threatened* resources first."

Total Maximum Daily Load (TMDL). The sum of the individual wasteload allocations (WLAs) for point sources, load allocations (LAs) for nonpoint sources and natural background, and a margin of safety (MOS). TMDLs can be expressed in terms of mass per time, toxicity, or other appropriate measure that relates to a state's water quality standard.

Total Maximum Daily Load development (Phased approach). Under the phased approach to TMDL development, LAs and WLAs are calculated using the best available data and information recognizing the need for additional monitoring data to more accurately characterize sources and loadings. The phased approach is typically employed when nonpoint sources dominate. It provides for the implementation of interim load reduction strategies while collecting additional data.

Total Maximum Daily Load (TMDL) protocols. TMDL protocols are under development and will provide a process and selected procedures for developing TMDLs for impaired waters. They will include the following six elements: (1) problem statement, (2) endpoints, (3) source assessment, (4) endpoint and source linkage, (5) allocation, and (6) monitoring.

Use Attainability Analysis (UAA). Assesses the physical, chemical, biological and economic factors which affect the attainment of a designated use. If a UAA shows that attaining a designated use is not feasible, a State can modify it to make the use less stringent.

Wasteload Allocation (WLA). The portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution. WLAs constitute a type of water quality-based effluent limitation (40 CFR 130.2(h)).

Water quality model. A water quality model is a series of mathematical statements that are used to simulate the processes that occur within a waterbody system based on external and internal inputs and reactions.

Water quality standards. State-adopted and EPA-approved ambient standards for water bodies. The standards cover the use of the water body and the water quality criteria that must be met to protect the designated use or uses.

Watershed-based trading. Watershed-based trading is an efficient, market-driven approach that encourages innovation in meeting water quality goals but remains committed to enforcement and compliance responsibilities under the Clean Water Act. It involves trading

arrangements among point source dischargers, nonpoint sources, and indirect dischargers in which the "buyers" purchase pollutant reductions at a lower cost than what they would spend to achieve the reductions themselves. Sellers provide pollutant reductions and may receive compensation. The total pollution reduction, however, must be the same or greater than what would be achieved if no trade occurred.

Total Maximum Daily Load (TMDL) Program

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Appendix A

National Watershed Assessment Project (NWAP) - Fact Sheets

EPA's Office of Water and its many public and private partners are using our joint information to characterize the condition of the 2150 watersheds in the continental United States. The initial condition will be characterized in a continuum of six categories ranging from "better" to "worse" with a seventh category depicting watersheds with insufficient data to allow characterization.

NWAP will proceed in two phases. In the first phase, EPA will take the lead in acting as a catalyst with States, Tribes, and other partners to use existing data from multiple sources to characterize the condition of watersheds.

In the second phase, States and Tribes, working with EPA and other partners, will take the lead in using NWAP and other information to undertake the Fiscal Year 1998 planning processes and develop performance partnerships. They will also gather information where needed for individual watersheds.

Also in Phase 2, EPA working with States, Tribes and others, will continue to improve the national assessment, add important information that is missing -- biological integrity, habitat, groundwater, coastal condition, and air deposition -- and add information on the degree to which a watershed may contribute to pollution in other watersheds downstream.

Draft products including an overall national map characterizing each watershed and an individual profile showing the 15 data layers for individual watersheds will be ready for State and Tribal review by January 3, 1997. Comments are due back to Regions by February 14, 1997, and EPA will complete NWAP Phase 1 products by April 2, 1997. Working together, EPA, States, Tribes, and their public and private partners will refine the NWAP

characterization in the succeeding years.

The objectives of this project are fourfold:

- Characterize the condition of our 2150 watersheds and identify watersheds at particular risk using key information from multiple sources
- Stimulate and empower citizens to know about and work to preserve their watershed
- Provide a baseline for a dialogue on management priorities among EPA, States, Tribes and the many public and private partners who help assess and improve watershed conditions
- Measure progress towards our goal that all watersheds will be healthy and productive places

The process for NWAP includes:

1. **Choose a key subset of the broad range of data available to characterize each watershed.** NWAP has chosen 15 key data subsets, a majority of which are the indicators EPA and its multiple partners published in June 1966 in Environmental Indicators of Water Quality in the United States, the first national water indicators report.

The data are arrayed in three categories. The first, data characterizing the condition of the watershed, contains the State and Tribal 305(b) data that portrays whether the waters are meeting their uses as designated in State or Tribal water quality standards. This data is given the greatest weight in the process of characterizing watersheds.

The second category also contains data that describes watershed condition, including fish consumption advisories; drinking water quality related to source water; contaminated sediments; ambient water quality data, both toxics and conventionals; and wetlands loss. All data in this category is weighted equally.

The third category includes data that describes the vulnerability of the watershed to pollutant loadings and other stressors, including aquatic species at risk (data from the State Heritage Programs working with The Nature Conservancy); pollutant loads over limits, both toxics and conventionals; population change, hydrologic modification; nonpoint impacts, both urban and agricultural; and estuarine pollution susceptibility. This data is also weighted equally.

2. **Create Procedures for Characterizing Watershed Condition** that outline the process to portray the overall condition of each watershed based on an aggregation of the key data subsets. The characterization procedures must also include the data display

intervals used for each data layer, and the threshold of occurrence below which the data will not be deemed robust enough to use in the assessment. For NWAP, EPA has done extensive research with States and other organizations that have designed multi-information indices to portray condition, and hosted a meeting of invited State and National experts to peer review the proposed index. The characterization procedures take the weighted data layers and score them in a process that results in an overall characterization for each watershed based on the condition and vulnerability expressed by the 15 data layers.

3. **Create screening maps** that show the occurrence of the key data subsets according to the data display intervals and thresholds outlined in the index of watershed condition.

4. **Create the final product -- maps showing overall watershed condition** in seven categories ranging from "better" to "worse" or "insufficient data" based on the agreed-upon characterization procedures.

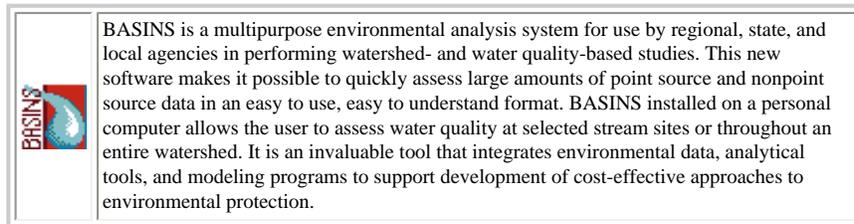
5. **Provide additional data by watershed over Internet** through an easily accessible program called "Surf Your Watershed". Surf serves as an electronic index to provide data, maps and text to users on a thematic as well as geographic (national, state, and watershed) basis. This program is already operating, and data will be added by many public and private groups. States and others will have important additional information to add to the NWAP characterization, and putting this information on Surf will make it readily accessible to users -- both citizens who want to know more, and managers who need more detail to pursue prevention and remediation programs.

NWAP is a significant step forward for the characterization of water quality in the nation, as it aggregates a wide range of data from a variety of public and private partners to clearly portray watershed condition. Data used comes from States and Tribes as input into six of EPA's data systems; and from the National Oceanic and Atmospheric Administration; US Department of Agriculture - Natural Resources Conservation Service; US Fish and Wildlife Service; Census Bureau; Federal Emergency Management Agency; and The Nature Conservancy.

Total Maximum Daily Load (TMDL) Program

Fact sheet

BASINS: A powerful tool for managing watersheds

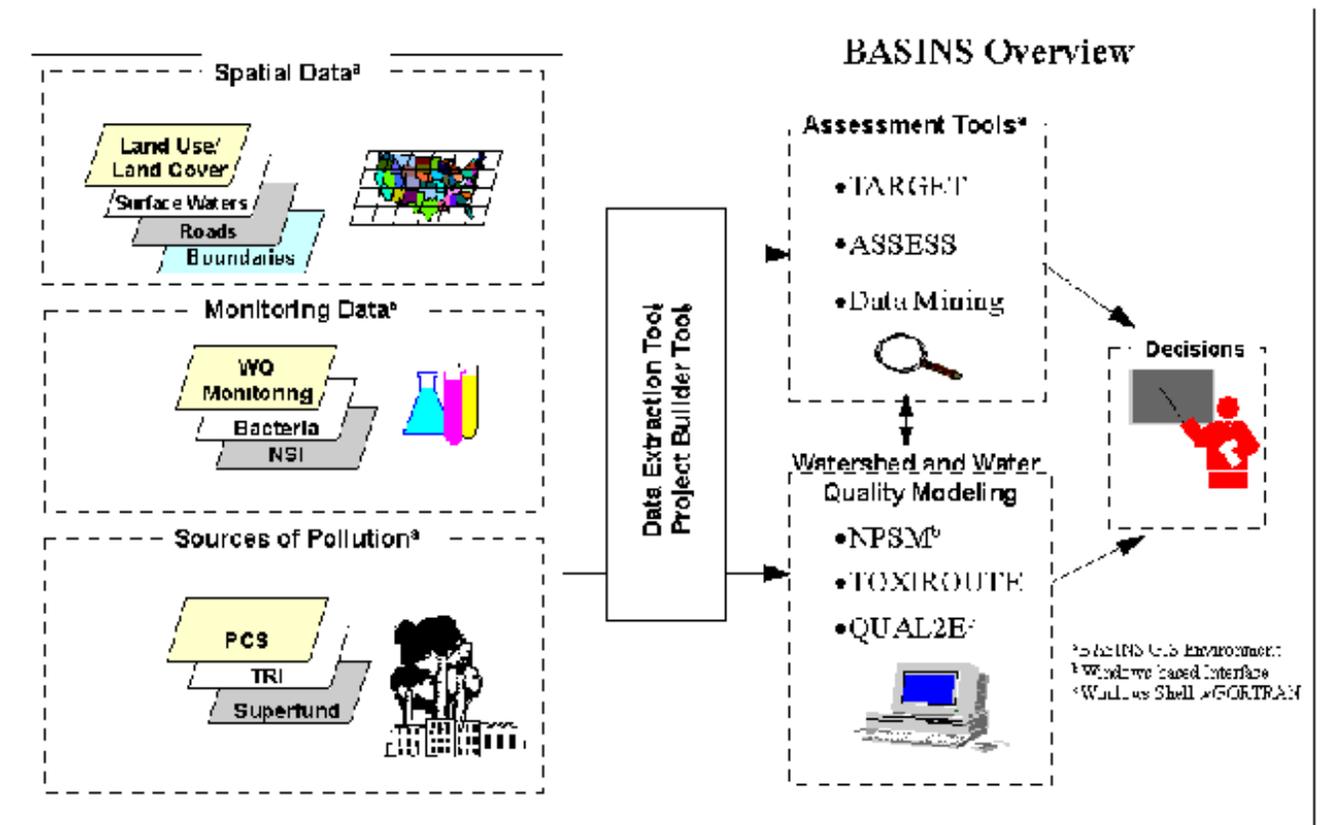


The U.S. Environmental Protection Agency's water programs and their counterparts in states and pollution control agencies have increasingly emphasized watershed- and water-quality-based assessment and integrated analysis of point and nonpoint sources. Better Assessment Science Integrating Point and Nonpoint Sources (BASINS) is a system developed to meet the needs of such agencies. It integrates a geographic information system (GIS), national watershed data, and state-of-the-art environmental assessment and modeling tools into one convenient package.

BASINS addresses three objectives: (1) To facilitate examination of environmental information; (2) To provide an integrated watershed and modeling framework; and (3) To support analysis of point and nonpoint source management alternatives. It was also conceived as a system for supporting the development of total maximum daily loads (TMDLs). Developing TMDLs requires a watershed-based approach that integrates both point and nonpoint sources, and BASINS can support this type of approach for the analysis of a variety of pollutants. It can also support analysis at a variety of scales, using tools that range from simple to sophisticated.

Overcoming the lack of integration, limited coordination, and time-intensive execution typical of more traditional assessment tools, BASINS makes watershed and water quality studies easier by bringing key data and analytical components together "under one roof."

The heart of BASINS is its suite of interrelated components essential for performing watershed and water quality analysis. These components are grouped into three categories: (1) national databases with Data Extraction tool and dynamic Project Builder tool; (2) assessment tools (TARGET, ASSESS, and Data Mining) that address needs ranging from large-scale to small-scale; and (3) watershed and water quality models including NPSM (HSPF (ver. 10)), TOXIRoute, and QUAL2E (ver. 3.2). BASINS' databases and assessment tools are directly integrated within an ArcView 2.1 GIS environment. By using GIS, a user can fully visualize, explore, and query to bring a watershed to life. The simulation models run in a Windows environment, using data input files generated in ArcView.



BASINS DATA AND COVERAGES

Spatially Distributed Data

- Land use/land cover
- Urbanized areas
- Populated place location
- Reach File, version 1 (RF1)
- Major roads
- USGS hydrologic unit boundaries (accounting unit)
- USGS hydrologic unit boundaries (cataloging unit)
- Drinking water supply sites
- Dam sites
- EPA region boundaries
- State boundaries
- County boundaries

Environmental Monitoring Data

- Drinking water supply sites
- Water quality monitoring station summaries
- Bacteria monitoring station summaries
- Weather station sites
- USGS gaging stations
- Dam sites

Point Source Data

- Permit Compliance System (PCS) sites and computed loadings
- Industrial Facilities Discharge (IFD) sites
- Toxic Release Inventory (TRI) sites, 1992 release
- Superfund National Priority List sites

BASINS ANALYTICAL TOOLS

TARGET is a watershed targeting tool that allows environmental managers to make a broad-based evaluation of a watershed's water quality and/or point source loadings. It operates on a larger scale, addressing an area such as a region or a state.

ASSESS operates on a single watershed (cataloging unit) or a limited set of watersheds and focuses on the status of specific water quality stations or discharge facilities and their proximity to waterbodies.

Data Mining dynamically links different data elements using a combination of tables and maps. This unique linkage adds significant informational value to the raw data on water quality and loadings. This process makes Data Mining a powerful tool that can assist in the integration and environmental interpretation of both geographic and historical information simultaneously.

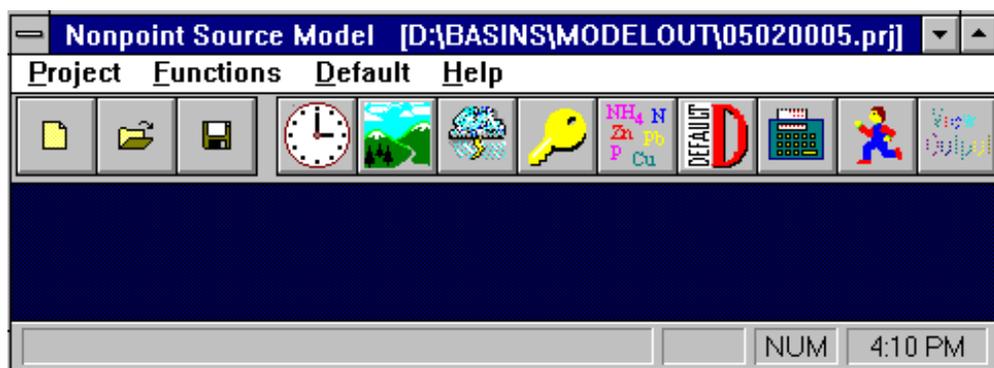
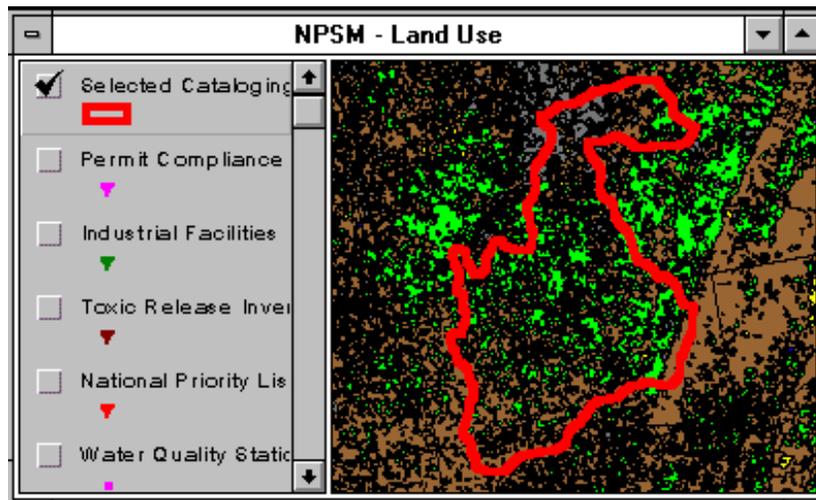
BASINS MODELING SYSTEM

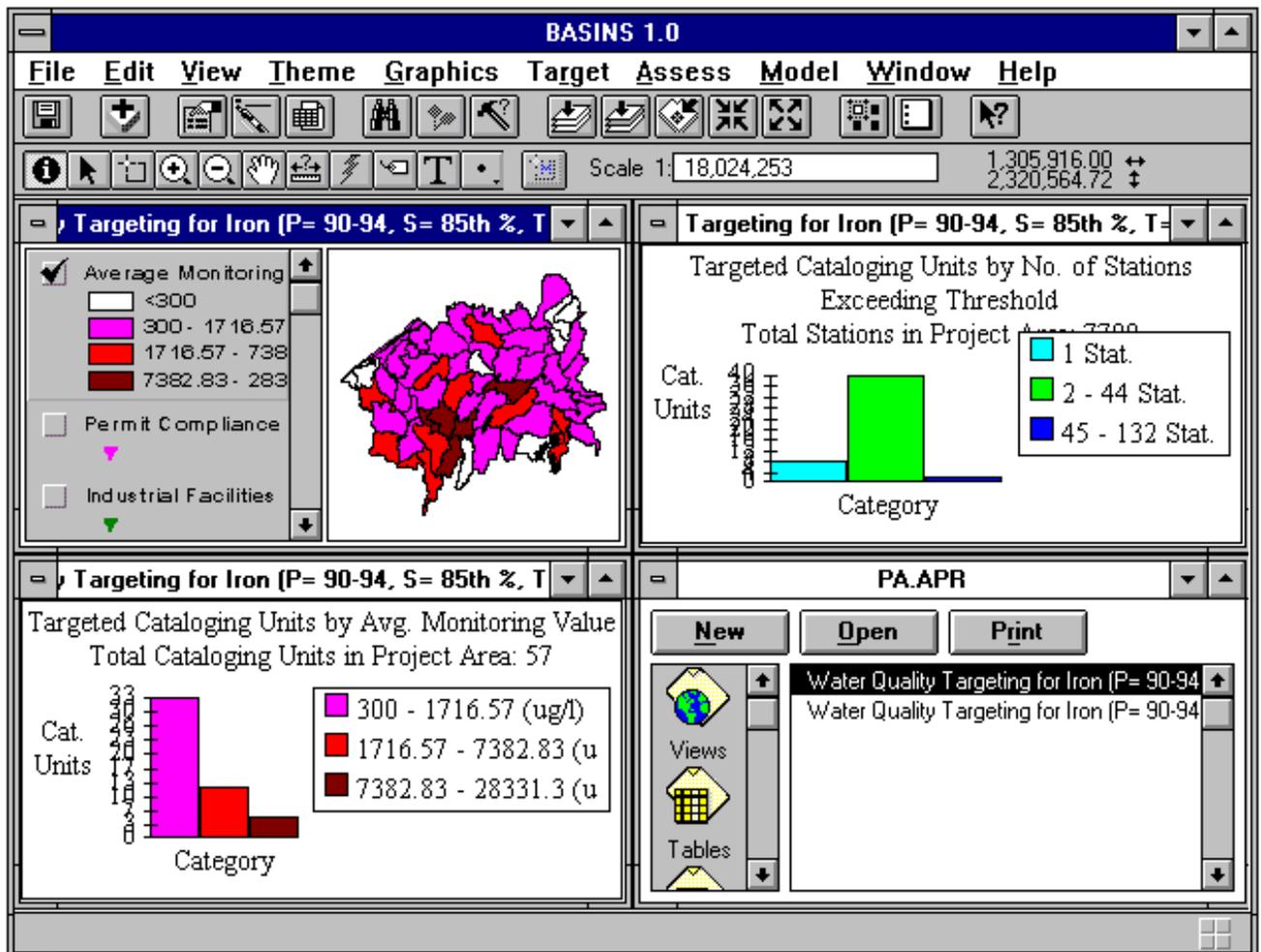
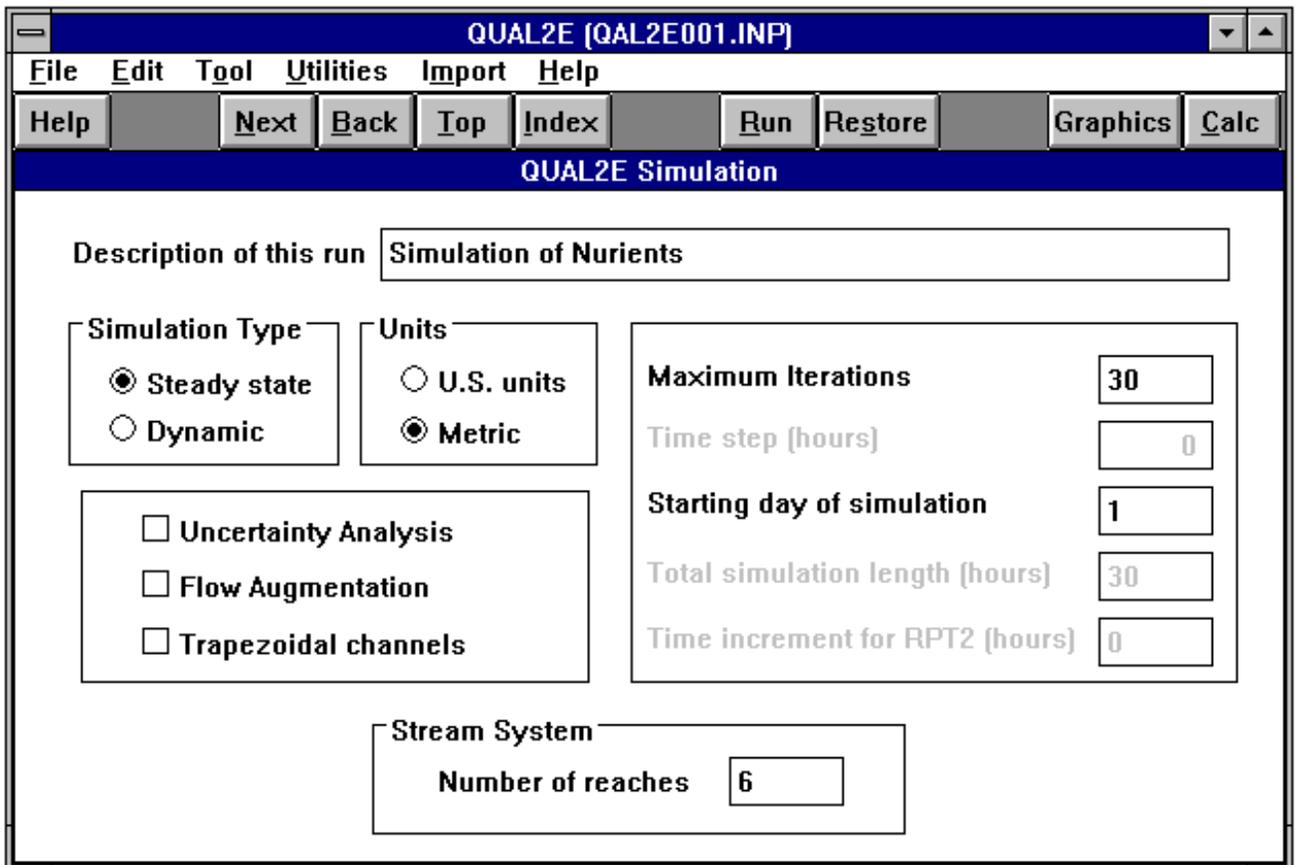
Three models are integrated into BASINS within an ArcView GIS environment. This allows the user to assess watershed loadings and receiving water impacts at various levels of complexity. ArcView geographic data preparation, selection routines, and output visualization streamline the use of the models.

Nonpoint Source Model (NPSM) estimates land use nonpoint source loadings for selected pollutants at a watershed (cataloging unit) scale. The model uses landscape data such as watershed boundaries and land use distribution to automatically prepare many of the input data it requires. The NPSM combines a Windows-based interface with EPA's Hydrologic Simulation Program-FORTRAN model, and is linked to ArcView.

QUAL2E model is a one-dimensional, steady-state water quality and eutrophication model. It is integrated with ArcView through a Windows-based interface. It allows fate and transport modeling for both point and nonpoint source loadings. Nonpoint source loadings can be generated by NPSM and then fed into QUAL2E through an internal procedure.

TOXIROUTE is a screening-level stream routing model that performs simple dilution/decay calculations under mean or low flow conditions for a stream system within a given watershed (cataloging unit). TOXIROUTE can also integrate nonpoint source loadings calculated by NPSM within ArcView, as well as point source loadings computed from the effluent monitoring data.





FUTURE REVISIONS AND ADDITIONAL INFORMATION

Following the initial release of BASINS, EPA is planning annual updates to the system by adding new data, new databases, expanded state coverage, and enhanced modeling capabilities. EPA will maintain a mailing list to notify users of system and data updates as they are developed. Updates will also be made available through the Internet.

System Requirements

Minimum:

486 IBM-compatible PC, 33-MHz; 75 mb hard disk space; 16 mb RAM plus 16 mb of permanent virtual memory swap space; dual-speed CD drive, MS-DOS 5.0 or better; Windows 3.1 or later; ArcView 2.1.

Preferred:

Pentium IBM-compatible PC, 133-MHz; 235 mb hard disk space; 32 mb RAM plus 16 mb of permanent virtual memory swap space; quad-speed CD drive, MS-DOS 5.0 or better; Windows 3.1 or later; ArcView 2.1.

Obtaining BASINS

A limited number of BASINS ver.1 CD-ROMS will be distributed free of charge upon request beginning September 15, 1996 through the National Center for Environmental Publications and Information (NCEPI), P.O. Box 42419, Cincinnati, OH 45242. Tel: (513) 489-8190. Fax: (513) 891-6685. The package includes:

- User's Manual - Better Assessment Science Integrating Point and Nonpoint Sources. BASINS Version 1.0, May 1996 (EPA Document No.: EPA - 823-R-96-001).
- A compact disk specific to one of 10 regions of interest within the conterminous U.S. (Be sure to indicate the EPA region of your choice in your request.)

For more information on content, availability, and training please contact either Jerry LaVeck or Marjorie Wellman of EPA's Office of Science and Technology at:

Jerry LaVeck	Telephone: (202) 260-7771
	Fax: (202) 260-9830
	email: laveck.jerry@epamail.epa.gov
Marjorie Coombs Wellman	Telephone: (202) 260-9821
	Fax: (202) 260-9830
	email: wellman.marjorie@epamail.epa.gov
Exposure Assessment Branch Standards and Applied Science Division Office of Science and Technology U.S. Environmental Protection Agency 401 M Street, SW Washington, DC 20460	

Total Maximum Daily Load (TMDL) Program

Draft TMDL Program Implementation Strategy

Appendix C

The Watershed Academy: EPA Training in the Watershed Approach

Update -- August 1996

The EPA Office of Water initiated the Watershed Academy to provide training for watershed managers based on local, state, tribal, and federal experiences in implementing the watershed approach throughout the past decade. The Watershed Academy includes core courses and related EPA reference materials about watershed processes, functions, and management techniques, as well as a series of co-sponsored, special training events on different aspects of the watershed approach. The target audience includes water resource/watershed managers and technical staff in local, state, and federal agencies and tribes, EPA regions, and other public or private sector practitioners of watershed management. Although EPA itself offers only a few courses, the Watershed Academy maintains an Internet Catalogue of Watershed Training Opportunities to spread information about dozens of other watershed-oriented training courses offered by local, state, and federal agencies and private organizations. We work with an interagency watershed training workgroup as another source of joint course planning, shared training materials, and expertise. As funding permits, the Watershed Academy's training courses are offered through special arrangement, usually in EPA regional office cities and other central locations. Requestors can customize their training sessions by varying the length (up to a week) and course selection. Regional, state and local staff often participate actively as case-study presenters along with our instructors.

NEW DEVELOPMENTS:

- The Watershed Academy's *Statewide Watershed Management Training Course* was

offered in EPA Region 9 (San Francisco, CA) in May 1996 and Region 6 (Dallas, TX) in August 1996.

- The Watershed Academy is cost-sharing three special offerings of the ***Ground Water/Surface Water Interactions Training Course*** taught by Dr. Jack Stanford in Flathead Lake, MT. Co-sponsors include the EPA Office of Ground Water and Drinking Water, National Park Service, and several EPA Regions and Tribes. One course is scheduled for September 1996, and two additional offerings are scheduled for spring 1997.
- The Watershed Academy is sponsoring a special offering of Dr. David Rosgen's ***Applied Fluvial Geomorphology Short Course*** in the Washington, DC area in August 1996, for staff in EPA and several cooperating agencies.
- The Watershed Academy is co-leading the ***Interagency Watershed Training Workgroup***'s effort to develop a strategy for shared inter-agency watershed training. This working group will meet in August and September to design the training strategy and proposed curriculum for introductory watershed training and more advanced stream corridor restoration.

STATUS OF TRAINING COURSES (EPA AND NON-EPA): Our current plans call for three levels of training courses, coded as 100-level, 200-level, and 300-level training. The 100-level consists of a central code of "mainstream" courses that cover the fundamentals of watershed protection. The 200-level includes specialized courses that target key parts of the watershed approach in greater depth. The 300-level courses are not only specialized topics, but are likely to involve advanced training and experience requirements. The 100-level series now under development, is the priority for 1996. Development of new 200- or 300-level courses is not anticipated this year, so the **Catalogue of Watershed Training Opportunities** is the main source for existing advanced training courses. The 100-level core courses and their development status appears below.

101 **The Principles of Watershed Protection and Management (1 day)**

draft curriculum developed but being reworked with increased participation by interagency training workgroup

102 **The Statewide Approach to Watershed Management (1 day) available upon request**

103 **The Watershed Approach (1-hour loaner module) draft module undergoing review**

104 **Executive Overview (2 day senior manager's course) available upon request**

105 **Watershed Management Tools Primer (1 to 2 days) currently under development**

After these courses' materials are completed, training sessions can be scheduled by mixing and matching 101 through 105 (and eventually, the 200- or 300-level courses) to fit the specific interests of the requesting organization.

CORE ELEMENTS OF THE WATERSHED APPROACH: The Watershed Academy's message and courses center on those elements of the watershed approach that have been demonstrated to be critically important to the success of watershed management on local, state, and national levels. These can be generally grouped as communications-related, scientific, and organizational elements:

Communications

- Goal setting; establishing common direction; watershed values and assessment endpoints; water quality standards as goals
- Public education and outreach
- Issuing results; turning data into public information
- Getting key parties together; roles and depth of public involvement
- Priority setting; risk-based decision making; resource targeting

Science

- Hydrologic management units; watershed delineation; geographic focus; groundwater/surface water interactions
- Characterization of watershed and its condition; watershed analysis; current vs. reference conditions; state of the watershed
- Water quality standards and criteria
- Watershed modeling
- Critical area; related critical actions
- Problem formulation; characterization problems, sources, and effects
- Monitoring; use of indicators; feedback for evaluation; maintenance monitoring; monitoring design; prediction
- Technical report development; characterization/analysis reports on condition; assessment/prescription reports on causal mechanism and options

Management

- Coordination; integrated management; management option development; leveraging resources
- Regulatory program requirements (e.g., CWA, ESA) in a watershed context
- Multi-disciplinary watershed team development
- Management schedules; management cycles
- Information management
- Management plan development; strategy development
- Program self-evaluation and improvement

REFERENCES:(for copies contact NCEPI at 513-489-8190 or fax 489-8695)

USEPA. 1995. *Watershed Protection: A Project Focus*. EPA841-R-95-003. Office of Water (4503F), U.S. EPA, Washington, DC.

USEPA. 1995. *Watershed Protection: A Statewide Approach*. EPA841-R-95-004. Office of water (4503F), U.S. EPA, Washington, DC.

Catalogue of Watershed Training Opportunities, a cumulative listing of approximately 70 courses, is accessible at the following internet address:

<http://www.epa.gov/ow/watershed/wacademy/catalog.html>

FOR MORE INFORMATION CONTACT:

Don Brady (Chief, Watershed Branch AWPD)
EPA Office of Wetlands, Oceans, and Watersheds
202-260-7074, fax 260-7024,
Brady.Donald@EPAMAIL.EPA.GOV

Doug Norton (Watershed Academy Project Leader)
EPA Office of Wetlands, Oceans, and Watersheds
202-260-7014, fax 260-7024,
Norton.Douglas@EPAMAIL.EPA.GOV

Greg Curry (Statewide Approach Training)
EPA Office of Wastewater Management
202-260-1718, fax 260-1460,
Curry.Gregory@EPAMAIL.EPA.GOV

Total Maximum Daily Load (TMDL) Program

Draft TMDL Program Implementation Strategy

Appendix D Effluent Trading in Watersheds Policy Statement

[Federal Register: February 9, 1996 (Volume 61, Number 28)]
[Notices]

[Page 4994-4996]

From the Federal Register Online via GPO Access [wais.access.gpo.gov]

ENVIRONMENTAL PROTECTION AGENCY

[FRL-5419-9]

AGENCY: Environmental Protection Agency.

ACTION: Notice of intent.

SUMMARY: EPA's Assistant Administrator for Water, Assistant Administrator for Enforcement and Compliance and Assurance and General Counsel hereby give notice of an Effluent Trading in Watersheds Policy Statement. This Policy Statement is a result of President Clinton's "Reinventing Environmental Regulation" (March, 1995), which listed effluent trading

in watersheds as one of the twenty-five high priority action items. The Policy Statement discusses the benefits of trading, presents an explanation of different types of effluent trading, and outlines how EPA will encourage trading.

DATES: This action is effective February 9, 1996.

ADDRESSES: Environmental Protection Agency, Office of Water (4102), 401 M Street SW., Washington, DC 20460.

FOR FURTHER INFORMATION CONTACT: Mahesh Podar, Director, Policy and Budget Staff, Office of Water, at the address given above; telephone 202/260-7818; Email address podar.mahesh@epamail.epa.gov@in. The Policy Statement may also be accessed on the EPA Office of Water Home Page on the Internet at the following address: <http://www.epa.gov/OWOW>.

SUPPLEMENTARY INFORMATION:

Authority: Clean Water Act, 33 U.S.C. 1251 et. seq.
Robert Perciasepe,
Assistant Administrator for Water.

Effluent Trading in Watersheds Policy Statement

Purpose

In response to President Clinton's Reinventing Environmental Regulation (March 1995), EPA strongly promotes the use of effluent trading to achieve water quality objectives and standards. This statement communicates EPA's policy on effluent trading in watersheds, discusses the benefits of trading, presents an explanation of several types of effluent trading, and outlines how EPA will be encouraging trading. This policy is Agency guidance only and does not establish or affect legal rights or obligations. It does not establish a binding norm and is not finally determinative of the issues addressed. Agency decisions in any particular case will be made by applying the law and regulations on the basis of specific facts when permits are issued.

Policy

EPA will actively support and promote effluent trading within watersheds to achieve water quality objectives, including water quality standards, to the extent authorized by the Clean Water Act and implementing regulations. EPA will work cooperatively with key stakeholders to find sensible, innovative ways to meet water quality standards quicker and at less overall cost than with traditional approaches alone. EPA will assure that effluent trades are implemented responsibly so that environmental progress is enhanced, not hindered.

Benefits

EPA's support of watershed-based trading is anchored to a strong commitment to achieve and maintain water quality standards. EPA believes that trading is an innovative way for community stakeholders (e.g., regulated sources, non-regulated sources, regulatory agencies and the public) to develop more "common sense" solutions to water quality problems in their watersheds. Effluent trading potentially offers a number of economic, environmental and social benefits:

Economic Benefits:

--Reduces costs for individual sources contributing to water quality problems.

--Allows dischargers to take advantage of economies of scale and treatment efficiencies that vary from source to source.

--Reduces overall cost of addressing water quality problems in the watershed.

Environmental Benefits:

--Achieves equal or greater reduction of pollution for the same or less cost.

--Creates an economic incentive for dischargers to go beyond minimum pollution reduction and also encourages pollution prevention and the use of innovative technologies.

--Can reduce cumulative pollutant loading, improve water quality, accommodate growth and prevent future environmental degradation.

--Can address the broader environmental goals within a trading area, e.g., ecosystem protection, ecological restoration, improved wildlife habitat, endangered species protection, etc.

Social Benefits:

--Encourages dialogue among stakeholders and fosters concerted and holistic solutions for watersheds with multiple sources of water quality impairment.

Explanation of Different Types of Effluent Trading

Trading supplements the current regulatory approach. It is a method to attain and/or maintain water quality standards, by allowing sources of pollution to achieve pollutant reductions through substituting a cost-effective and enforceable mix of controls on other sources of discharge. As the Agency improves its understanding of the opportunities afforded by watershed-based decision making, EPA will provide information for additional forms of trading.

To take advantage of trading, a point source must be in compliance, and remain in compliance, with applicable technology-based limits. Intra-plant trades must also have a technology-based floor, while the technology floor for pretreatment trading is determined by the categorical standards. EPA expects that most trades will be covered by Total Maximum Daily Loads (TMDL) or similar watershed-based analysis.¹

The items to be traded are the pollutant reductions or water quality improvements sought. Under trading, a source that can more cost-effectively achieve greater pollutant reduction than is otherwise required would be able to sell or barter the credits for its excess reduction to another source unable to reduce its own pollutants as cheaply. To ensure that water quality

standards are met throughout a watershed, an equivalent or better water pollutant reduction would need to result from a trade. Below are proposed definitions for several different types of effluent trading approaches. These definitions are preliminary and do not reflect the full range of feasible trades:

Intra-Plant Trading: A point source is allocated pollutant discharges among its outfalls in a cost-effective manner, provided that the combined permitted discharge with trading is no greater than the combined permitted discharge without trading in the watershed.

Pretreatment Trading: An indirect industrial point source(s) that discharges to a publicly owned treatment works arranges, through the local control authority, for additional control by other indirect point sources beyond the minimum requirements in lieu of upgrading its own treatment for an equivalent level of reduction.

Point/Point Source Trading: A point source(s) arranges for other point source(s) in a watershed to undertake greater than required control in lieu of upgrading its own treatment beyond the minimum technology-based treatment requirements in order to more cost-effectively achieve water quality standards.

Point/Nonpoint Source Trading: A point source(s) arranges for control of nonpoint source discharge(s) in a watershed in lieu of upgrading its own treatment beyond the minimum technology-based treatment requirements in order to more cost-effectively achieve water quality standards.

Nonpoint/Nonpoint Source Trading: A nonpoint source(s) arranges for more cost-effective control of other nonpoint sources in a watershed in lieu of installing or upgrading its own control.

How EPA Will Be Encouraging Trading

EPA is developing a framework for watershed-based effluent trading, as well as information exchange workshops, and limited technical assistance for trading projects in specific areas. Watershed-based trading will be implemented on a voluntary basis under existing Clean Water Act (CWA) authorities. There will be substantial public outreach effort to obtain stakeholders' recommendations and insights on draft portions of the framework prior to implementation.

Finally, while EPA believes that the potential of trading is largely untapped, the usefulness of trading will depend on the site-specific water quality conditions in any given situation. The framework will describe situations which EPA believes are most appropriate for watershed-based trading, and those that are generally inappropriate.

EPA plans to distribute a draft trading framework in February, 1996 and hold a series of stakeholder meetings. For more information call Mahesh Podar at (202) 260-7818, fax (202) 401-3372 or send an Email message to herzi.hawa@epamail.epa.gov or tuano.theresa@epamail.epa.gov.

Experience to Date

Trading is being explored, developed or implemented in a number of watersheds throughout the country. Some examples are below:

Project/Location	Focus	Type of trading
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Fox River, WI	BOD, nutrients	Point/point
Dillon Reservoir, CO	Phosphorus	Point/NPS; nonpoint/NPS
Boulder Creek, CO	Ammonia, nutrients	Point/NPS
Tar-Pamlico, NC	Nitrogen, phosphorus	Point/NPS
Arkansas Nature Conservancy	Wetlands	Nonpoint/NPS
Maryland Nontidal Wetlands	Wetlands	Nonpoint/NPS
Iron and Steel	BOD, TSS, zinc, and lead	Intra-plant
Rhode Island electroplaters	Metals	Pretreatment
Chehalis River Basin, WA	BOD	Point/NPS
Boone Reservoir, TN	Nutrients	Point/NPS
Wicomico River, MD	Phosphorus	Point/NPS
Honey Creek Watershed, OH	Phosphorus	Point/NPS
South San Francisco Bay, CA	Copper	Point/point
Long Island Sound, NY	Dissolved oxygen	Point/NPS
Cherry Creek, CO	Phosphorus	Point/NPS; point/point
Tampa Bay, FL	Nitrogen, TSS	Point/point; point/NPS; nonpoint/NPS
Chatfield Basin, CO	Phosphorus	Point/NPS

¹ A TMDL provides the water quality analysis and planning process for determining the specific pollution reduction that are necessary to attain or maintain water quality standards. Under section 303(d) of the CWA, States establish TMDLs for impaired waters. The TMDL process includes legal requirements for public participation and implementation through NPDES permits. [\(Back to text\)](#)

[FR Doc. 96-2920 Filed 2-8-96; 8:45 am]

BILLING CODE 6560-50-P

Total Maximum Daily Load (TMDL) Program

DRAFT

TMDL Program Implementation Strategy



U.S. Environmental Protection Agency

December 20, 1996

How to Offer Comments

EPA welcomes your comments and suggestions through **April 1997** on the *Draft TMDL Program Implementation Strategy*. Please submit your comments to the address below. If possible, please refer to the section of the Strategy on which you are commenting.

Theresa Tuano
Watershed Branch (4503F)
US EPA
401 M Street, SW
Washington, DC 20460

You may also submit your comments via Internet to the following address: OW-OWOW-Internet-comments@epamail.epa.gov in ascii or Word Perfect 6.1 format. Please specify **TMDL Strategy Comments** in the subject field of your email.
