



An Inventory Of EPA Headquarters Ecosystem Tools



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An Inventory of EPA Headquarters Ecosystem Tools

Compiled by

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Notice

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EPA HEADQUARTERS ECOSYSTEM TOOL INVENTORY

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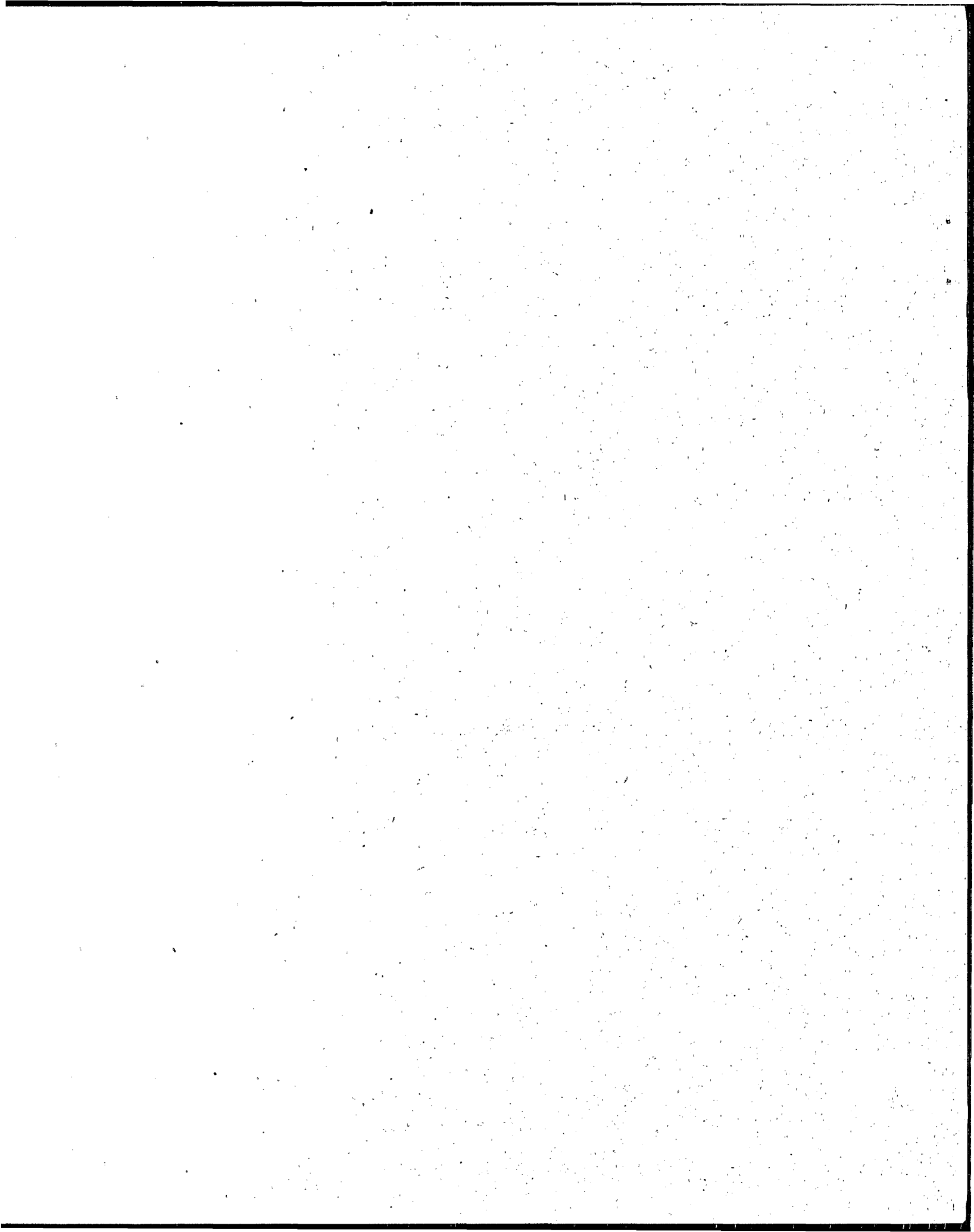
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Introduction

About the Inventory

The purpose of this inventory is twofold: 1) to assist EPA's Ecosystem Protection Task Force in its characterization of the present state of the Agency's ecosystem protection efforts; and, 2) to inform managers and staff throughout EPA about the myriad of ecosystem tools developed by and available from EPA Headquarters offices.

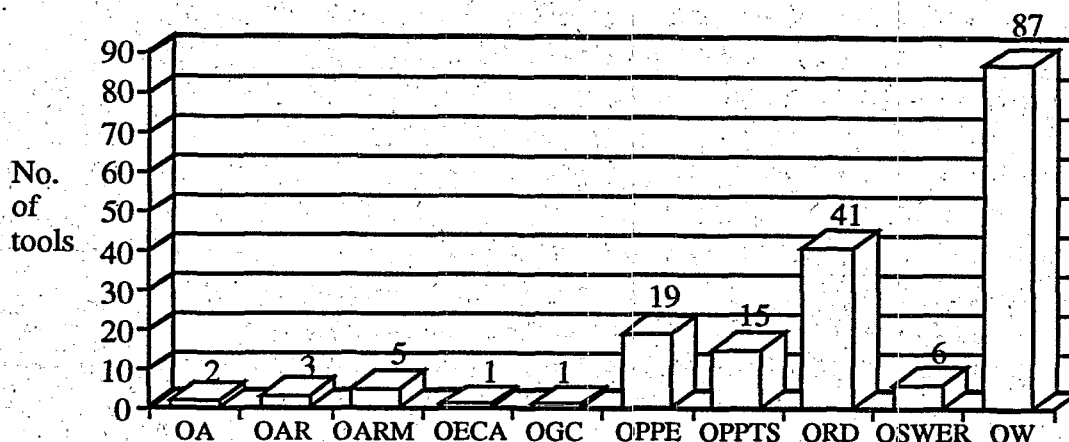
This document consists of an introduction, an inventory of ecosystem tools, and two appendices. The introduction presents a summary analysis of the ecosystem tools submitted by Headquarters program and cross-program offices, project recommendations, and a characterization of the ecosystem needs of three Regions and three Geographic Programs. The introduction also presents background information on methodology, definitions, the project team.

The inventory, which constitutes the bulk of this document, is comprised of 180 EPA Headquarters ecosystem tool descriptions, organized into nine functional categories. The inventory does not contain ecosystem tools developed by EPA Regional Offices, other federal, state or local government agencies, or non-government organizations. Appendix A contains a copy of the survey form/interview guide the project team used to collect HQ tool information. Appendix B contains an index of the inventory of EPA Headquarters ecosystem tools.

Findings: EPA HQ Ecosystem Tools

In summary, there is little understanding of ecosystem protection and no common definition of an ecosystem tool among EPA Headquarters and Regional Office staff and managers. This confusion largely results from the lack of a clearly-articulated, Agency-wide ecosystem approach. Consequently, this inventory comprises a wide range of functions, media, intended users, applications, and scope.

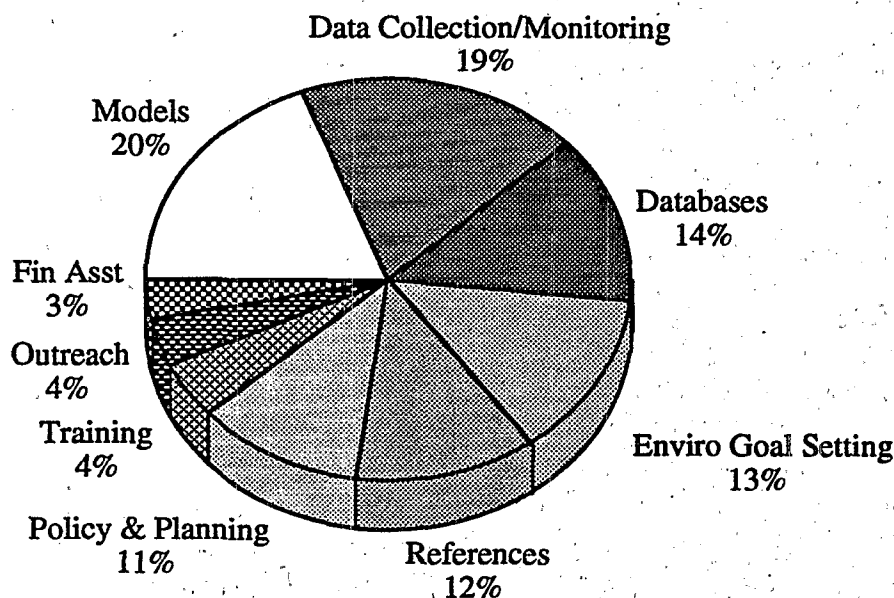
FIGURE 1: HQ ECOSYSTEM TOOLS SUBMISSIONS BY OFFICE



- The Office of Water and the Office of Research and Development submitted the greatest number of tools: OW (48%), ORD (24%).

- Approximately two-thirds (63%) of the ecosystem tools submitted by OW were classified as environmental goal setting, data collection/monitoring/measurement, and policy/planning tools.
- The majority of tools submitted by the Office of Research and Development (70%) were models and data collection/monitoring/measurement tools.
- Rounding out Headquarters submissions include: the Office of Policy, Planning and Evaluation (10%); the Office of Prevention, Pesticides, and Toxic Substances (8%); Office of Administration and Resources Management (3%); the Office of Solid Waster and Emergency Response (3%); the Office of Air and Radiation (2%); the Office of Enforcement and Compliance Assurance (1%); the Office of the General Counsel; and the Office of the Administrator (Office of Regional Operations and State/Local Relations, and the Office of Cooperative Environmental Management) (1%).

FIGURE 2: HQ ECOSYSTEM TOOLS BY FUNCTIONAL CATEGORIES

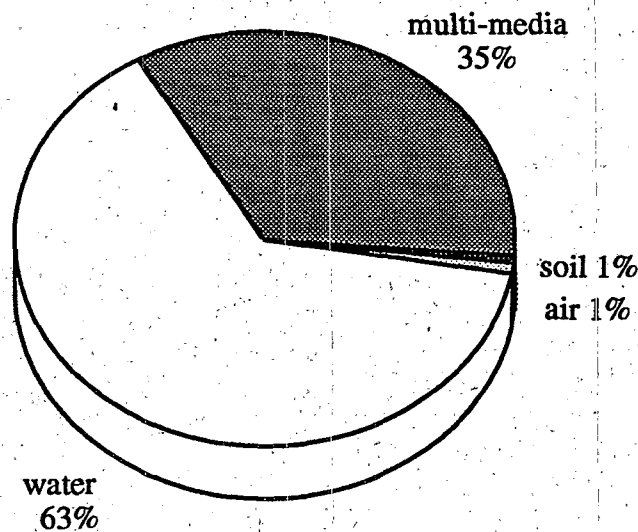


- The largest proportion of tools can be placed into three categories: models (20%), data collection/monitoring (19%), and database (14%) tools.
 - There are very few financial assistance (3%), stakeholder/outreach (4%), and training (4%) tools.
- Models, databases, and policy/planning tools are generally not well-integrated: with one another, by media, or by program.

Status

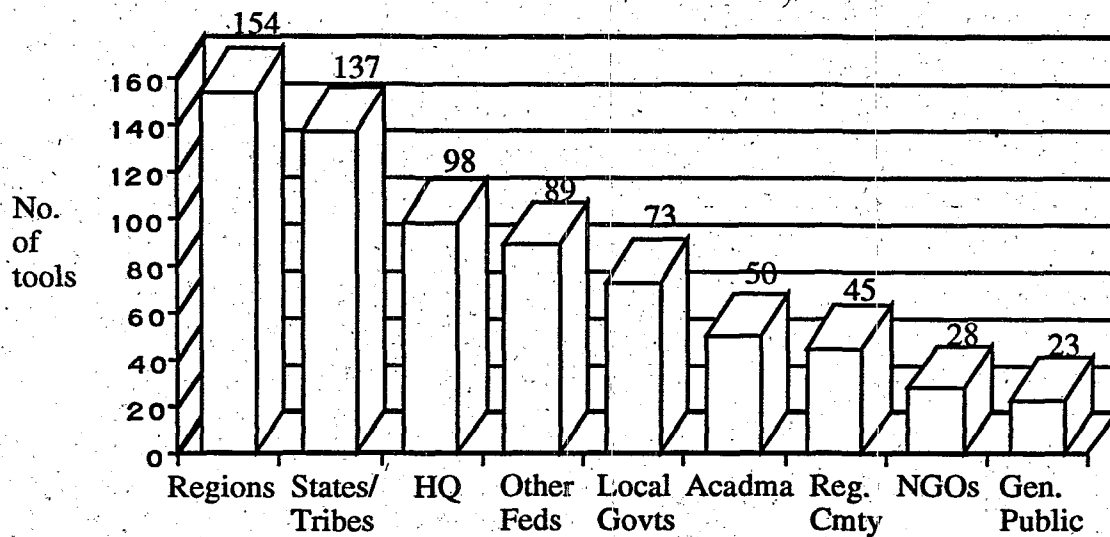
- According to Headquarters Offices, nearly three-quarters of ecosystem tools (73%) are in-use. Slightly more than one quarter of the remaining tools (27%) were characterized as in-development.

FIGURE 3: HQ ECOSYSTEM TOOLS BY MEDIA



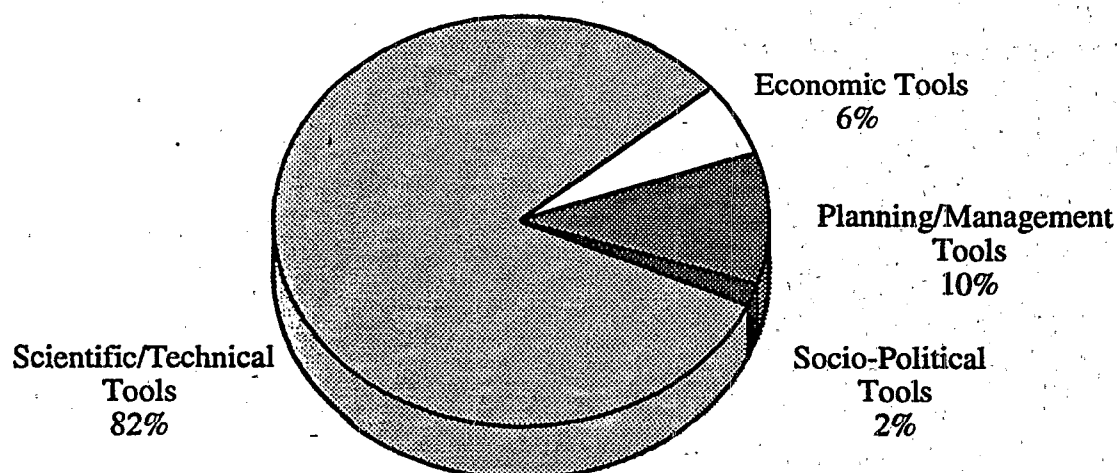
- Although the majority of tools are single-media, about one-third are multi-media tools (34%). Two-thirds of all ecosystem tools have an aquatic basis or application.

FIGURE 4: HQ ECOSYSTEM TOOLS BY USERS



- The most commonly specified users of ecosystem tools by submitters are Regions (85%), States/Tribes (76%), and Headquarters (55%). Rounding out specified users of ecosystem tools are: other federal agencies (49%), local governments (40%), academics (28%), the regulated community (25%), non governmental organizations (15%), and the general public (13%).

FIGURE 5: HQ ECOSYSTEM TOOLS BY SCOPE



- Eighty-two percent (82%) of the ecosystem tools address scientific-technical issues (the remainder focus on planning/management 10%, economic analyses 6%, and socio-political issues 2%).
- Among scientific-technical tools, almost one-half (46%) of the tools address abiotic resources. Also, among scientific-technical tools, the majority of models and databases address chemical stressors having a chemical impact on the environment.

Findings: EPA Regional and Geographic Office Ecosystem Needs/Gaps/Barriers

The project team also collected information from Regional and Geographic Program Offices to gauge the general needs, gaps, and barriers experienced by EPA staff and managers who direct or oversee ecosystem projects, which has been summarized below:

Ecosystem Tools

- EPA needs to develop and promote tools and approaches specifically-designed or modified for ecosystem/place-based management.
 - For example, Regions requested new datasets, maps, and data collection methods to implement ecosystem management.
- Ecosystem management will require a greater investment in tools to: 1) improve ecological risk assessments; and 2) enhance communication among all ecosystem stakeholders (e.g., bulletin boards, Internet access, and EPA's computer resources).

Skills/Training

- Regions need training to enhance ecosystem management capabilities.
 - For example, although EPA has invested in the past on developing ecosystem geographic information systems and related databases, it needs to provide more training to staff on how to analyze such data.

Resources

- Regions would like greater budget flexibility, more consistent funding, and targeted resources for ecosystem-related projects (e.g., seed grants for ecosystem stakeholders).

Data

- Regions, States, and local governments need greater access and skills to use EPA and non-EPA ecological databases.
- Some Regional staff are concerned about the planned funding reduction of ORD's EMAP program.

Communication

- Regional Offices would like help from Headquarters to share information and knowledge about ecosystem projects and activities across Regions.

Policy and Management

- Regional Offices would like flexible policy guidance from Headquarters on how to institutionalize ecosystem management within program offices.

Overall Recommendations

The following recommendations were derived from an analysis of the ecosystem tools submitted by Headquarters and from an analysis of the ecosystem gaps, needs, and barriers expressed by Regional and Geographic Program Offices to the project team.

- EPA should develop an Agencywide ecosystem strategy, with clearly articulated and measurable goals for Headquarters and Regional Offices.
- EPA should select ecosystem tools in accordance with its goals, the problems it wants to solve, and the questions it wants answered.
- HQ should invest in meeting the ecosystem management needs of Regions and Geographic Programs, such as:
 - develop new or modify existing tools specifically for an ecosystem/place-based approach;
 - provide more training;
 - increase budget flexibility;
 - change EPA data/information policies to improve data quality, data integration, and data exchange.
- HQ should conduct a comprehensive Regional and Geographic Program ecosystem needs assessment on a regular basis to track changing ecosystem needs.
- HQ should establish a mechanism or process for Regional and Geographic Program Offices to share ecosystem information and tools.

Background

The Ecosystem Protection Task Force

EPA's Ecosystem Protection Task Force (EPTF), comprised of Jon Cannon (Assistant Administrator, OARM), Chuck Clarke (Regional Administrator, Region 10), David Gardiner (AA, OPPE), John Hankinson (RA, Region 4), Robert Huggett (AA, ORD), and Robert Perciasepe (AA, OW) was established in March 1994 to develop a framework to redirect EPA from a "program-driven" approach to a "place-based", ecosystem approach to environmental protection.

In August 1994, the EPTF asked the Program Evaluation Division (PED) in the Office of Policy, Planning, and Evaluation to assist the Task Force in its characterization of EPA's existing ecosystem protection efforts. Specifically, the goals of this project were to:

- identify, describe, and categorize ecosystem tools developed by or available from EPA Headquarters; and,
- characterize general ecosystem needs of a limited sample of Geographic Programs and Regional Offices.

The EPTF directed the project team to be inclusive in their identification of ecosystem tools in order to gauge the range and variety of efforts underway at Headquarters.

Project Methodology

Data Collection

To collect information on EPA Headquarters ecosystem tools, PED staff worked with EPTF contacts from every HQ program and cross program office to distribute a survey throughout the office or to identify the appropriate program staff to interview. Specifically, the project team asked each Headquarters office to provide the following information for each ecosystem tool submission: **tool name; description of tool use and purpose; intended and/or actual users; tool development and status; special requirements for use; programmatic/media/geographic transferability; and an EPA contact person.**

Since the data collection process was entirely voluntary, the inventory is not a comprehensive compilation of every ecosystem tool developed by or available from EPA Headquarters. Excluding minor editorial changes, PED staff did not alter the tool descriptions contained herein and they appear as submitted.

The project team also interviewed EPA staff in three Regional Offices (Region 3, Region 5, and Region 10), and three Geographic Program Offices (the Chesapeake Bay Program, the Great Lakes National Program Office, and the Gulf of Mexico Program). These locations were chosen to ensure regional diversity and to facilitate the collection of information from EPA's major, national geographic programs.

Data Analysis

The project team first conducted a screening analysis of more than 230 Headquarters submissions for completeness and appropriateness. A significant portion of the original submissions were incomplete or inappropriate and were not included in this compilation. In addition, another group of the original submissions were duplicates and were consolidated. The remaining 180 ecosystem tool summaries were categorized into nine functional groups and prepared for further analysis.

PED staff next convened a technical advisory group, comprised of 5 Regional and 8 Headquarters staff familiar with ecosystem management, to review a sample of ecosystem tool summaries and to provide advice on categorizing and analyzing the submissions. Finally, the project team conducted a qualitative content analysis of the Headquarters ecosystem tool submissions and Regional interviews. The project team did not evaluate EPA's overall ecosystem management capabilities nor did they assess the content of individual tool descriptions or the effectiveness of individual tools.

Project Definitions

Because ecosystem protection is a relatively new direction for the Agency, there is a dearth of information about such activities and a wide range of interpretations of the meaning of an ecosystem protection tool. Therefore, the PED team used relevant documents from EPA's March 1994 Senior Management Retreat on Ecosystem Protection ("the Edgewater Consensus") and EPTF proceedings to develop a working definition of an ecosystem protection tool, listed below:

An ecosystem protection "tool/activity" is defined as a solitary or linked action, mechanism, or capability that directly supports/facilitates the maintenance, protection, or restoration of living resources (e.g., human, plant, and animal species) and non-living resources (e.g., physical or chemical properties/characteristics of an area), integrating air, water, and land protection.

Ecosystem management "tools/activities" can include: ecological or economic models, databases, grants, monitoring efforts, program guidance, policy standards, remediation activities, workshops or training courses. Each "tool" may be expressly designed for use in ecosystem management or -- having been designed for single-media or program use -- is being applied towards ecosystem management.

Project Team

The EPA project team that compiled and analyzed this inventory and wrote this document includes: Evyonne Harris, Gabriella Lombardi, Gwen Wise, and John Moses (Project Manager). Michael Mason served as Project Advisor. Elvira Dixon was the Project Secretary.

Acknowledgements

The project team would like to thank the countless EPA staff and managers in Headquarters, Regional Offices, and Geographic Programs for taking time to speak with us about this project as well as for submitting ecosystem tools for the inventory. We are grateful for your insights and assistance.

In particular, we would like to thank those people who served as technical advisors to the PED team and who facilitated our data collection: Bob April (OW), Anne Barton (OPPTS), Michael Brody (OPPE), Evert Byington (OPPTS), Jon Capacasa (Chesapeake Bay Program/Region 3), Tom DeMoss (Region 3), Gerald Emison (Region 10), Jerry Filbin (OPPE), Bill Franz (Region 5), Tricia Garrigan (Region 1), Eric Ginsburg (OAR), Robert Lackey (ORD), Maurice LeFranc (OPPE), Menchu Martinez (OW), William Matuszeski (Chesapeake Bay Program/Region 3), John Miller (OSWER), Tom Nessmith (Region 4), Bill Painter (OPPE), David Ullrich (Region 5), John Schneider (Region 5), Michael Slimak (ORD), and Arvella Weir (Region 10).

Category Definitions

DATABASE TOOLS - includes databases, datafiles, and tracking systems containing ecological or socioeconomic information which may or may not be integrated with geographic information systems (GIS) or spatial mapping systems.

DATA COLLECTION, MEASUREMENT, AND ASSESSMENT TOOLS - includes data collection/monitoring programs or efforts, assessment methods, measurement tools, evaluation indicators, and test procedures.

FINANCIAL ASSISTANCE TOOLS - includes grants, loan programs, and cooperative agreements.

ENVIRONMENTAL GOAL SETTING TOOLS - includes tools that establish environmental goals in the form of criteria, standards, and indicators.

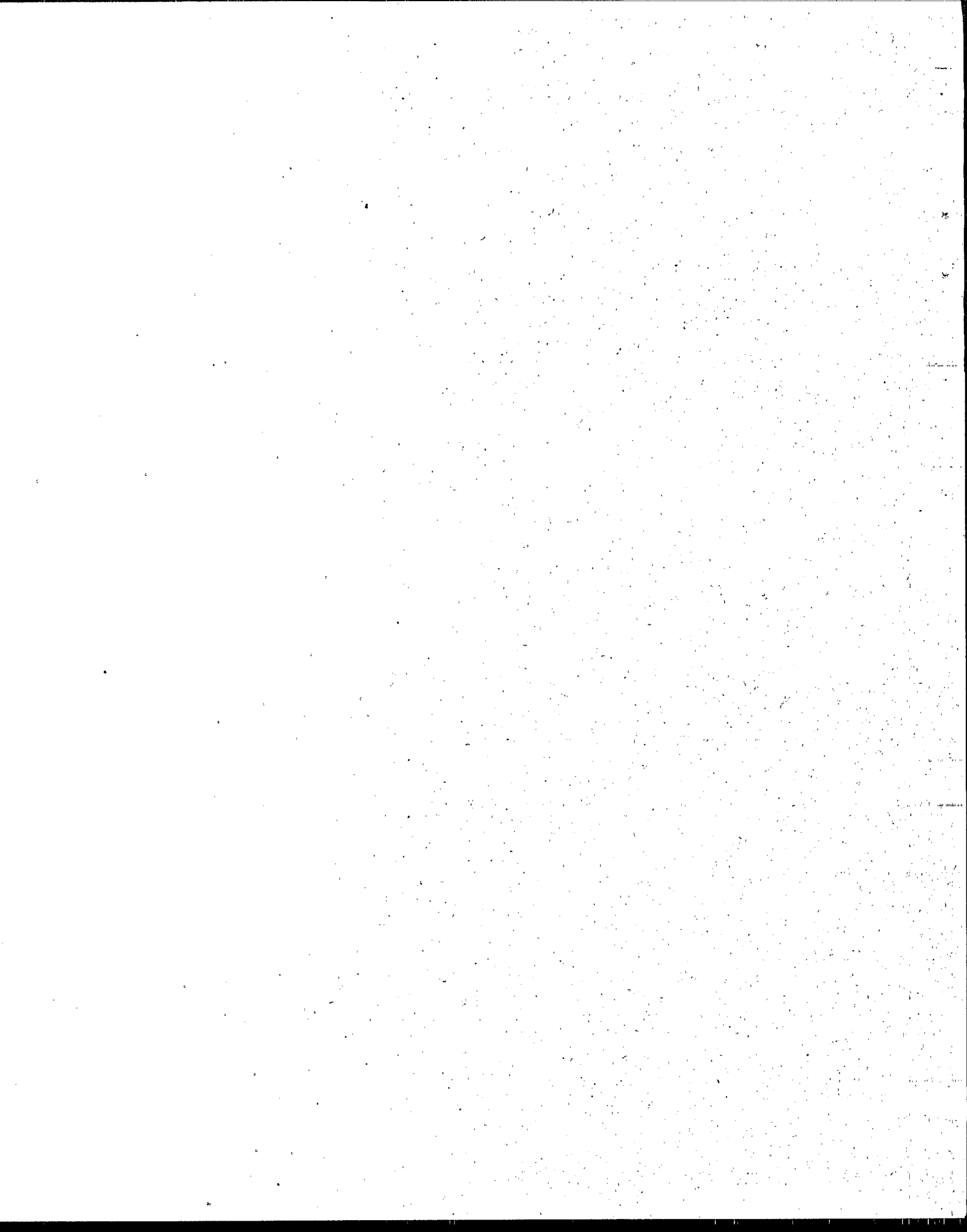
MODELING TOOLS - includes mathematical, conceptual or computer models which analyze data or integrate databases and geographic mapping capabilities in order to predict or measure the impact of policy options on selected environmental and socioeconomic variables, and/or determine the risk, fate, and transport of specific chemicals within the environment.

OUTREACH TOOLS - includes tools which facilitate external stakeholder involvement, communication, compliance assistance, and standing stakeholder committees staffed by EPA.

POLICY AND PLANNING TOOLS - includes general policy statements and related documents, long-range strategic plans, annual program plans, and tools that assist in developing, organizing, and implementing a planning process.

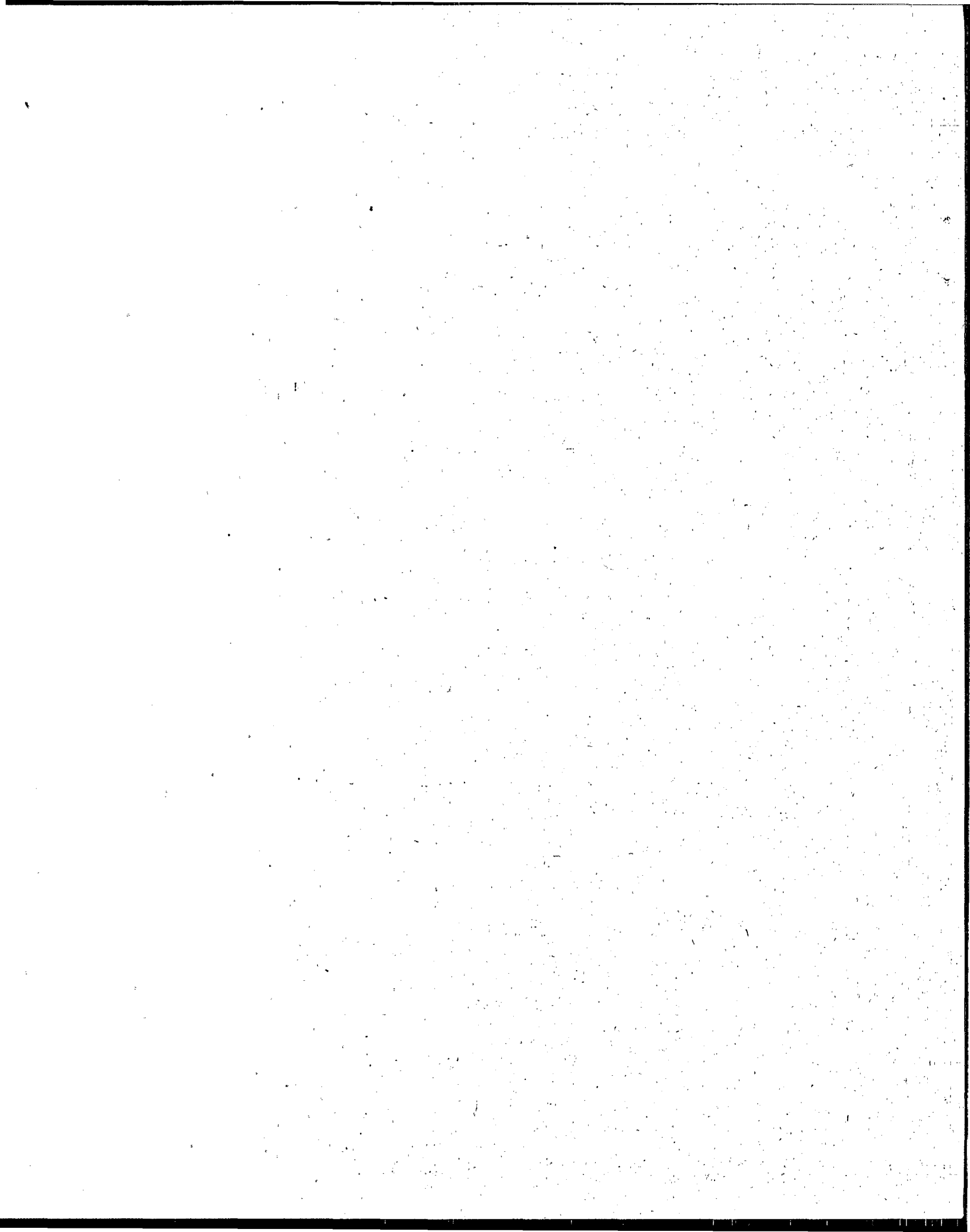
REFERENCE REPORTS AND STUDIES - includes reports and studies on ecological/ecosystem management and other related matters published by EPA and referral and search services (e.g., clearinghouses, hotlines, electronic bulletin boards) developed by EPA staff for use at Headquarters and Regional Offices.

TRAINING TOOLS - includes training courses, workshops, and conferences that involve lectures and/or hands-on experience with various ecological and ecosystem principles and approaches or other related matters.



HEADQUARTERS ECOSYSTEM TOOL INVENTORY

DATABASE TOOLS



AQUIRE (AQUatic toxicity Information REtrieval) Database

I. Tool Description

AQUIRE was designed to provide up-to-date, high quality ecotoxicological information for aquatic organisms to support a wide variety of research and regulatory actions. There are over 1,000 EPA, other Federal, State, local, and international governmental sites that use AQUIRE. The tool's use ranges from permit development, to Superfund site assessments, to ranking of hazardous air pollutants, to basic research, etc.

II. Tool Users

Users include governmental employees and/or governmental contractors or cooperators, who are the intended and actual users. AQUIRE data tapes and software are made available to the private sector through NTIS.

User outreach is on-going. Users can provide input on-line through E-Mail, site visits and user meetings held periodically. Feedback is very positive, AQUIRE is used heavily and meeting the users needs. Expansion of AQUIRE to include sediment bioassays and field studies is commonly expressed. Literature reviews are an on-going process to ensure that AQUIRE provides current information.

It is critical that AQUIRE remain current, which requires a yearly effort to secure funds. Expansion of the database will include sediment/chemical mixture toxicity data and field studies requested by users. EPA's Environmental Research Laboratory - Duluth is developing an action plan to convert the database from a VAX-based system to a UNIX environment.

III. Tool Development

In 1981, AQUIRE was developed to support TSCA decisions for new and existing chemicals. Since that time, AQUIRE has been used by every EPA Program and Regional Office, numerous Federal agencies, and many state and local governments.

Federal staff at ERL-Duluth and ADP contractors developed AQUIRE. Data from countries outside of the U.S. is being gathered through coordinated efforts within the OECD and the European Union. Significant coordination currently with components of Dutch, French, German and Russian governmental laboratories and agencies.

Resources: Since 1981, approximately \$275,000 and 1.25 FTE per year has been required to develop and maintain AQUIRE and provide user outreach.

IV. Special Requirements for Use

AQUIRE is available to all governmental entities at no charge. the data base can be accessed using an EPA network via the VAX system or through a modem and personal computer. International and U.S. users are increasingly using the Internet to access the system. A technical support document is provided with AQUIRE and user outreach provides technical support. AQUIRE is a user-friendly, menu driven program that requires little or no training to use.

V. Program/Media/Geographical Transferability

AQUIRE is used in every EPA Program and Regional office, numerous Federal (e.g., DoD, DoE, DoI, NOAA, USDA, etc.) and state and local agencies and other governmental agencies in North America, Europe, Asia, and Australia as well as the U.N.

VI. Other Information

The research mission of EPA's Duluth environmental research laboratory is focused on ecotoxicology and freshwater ecology, with the goal of advancing the scientific foundation of ecological risk assessments and ecosystem management decisions. The laboratory is also responsible for undertaking and facilitating ecological research within the Great Lakes and Great Plains. As part of its research mission in ecotoxicology, the laboratory develops and supports data bases and predictive models that are used world-wide in ecological risk assessments for chemical stressors.

VII. Program Contacts

Steven Bradbury ORD, Environmental Research Laboratory - Duluth, Predictive Toxicology Branch, (218) 720-5527

Christine Russom ORD, Environmental Research Laboratory -Duluth, (218) 720-5709

ASTER (ASsessment Tools for the Evaluation of Risk)QUatic

I. Tool Description

ASTER (ASsessment Tools for the Evaluation of Risk)QUatic- The purpose of ASTER is to provide an expert system-based integration of the AQUIRE (AQUatic toxicity Information REtrieval) toxic effects data base and the ERL-Duluth QSAR (Quantitative Structure Activity Relationships) modeling system. ASTER is designed to provide high quality data, when available in associated data bases, and QSAR-based estimates when data are lacking to support a wide variety of research and regulatory actions. Intended and actual purpose are identical.

II. Tool Users

There are over 1,000 EPA, other Federal, State, local and international governmental sites that use ASTER. Users include governmental employees and/or governmental contractors or cooperators, who are the intended and actual users. Data tapes and software are made available to the private sector through NTIS.

The model is in-use world-wide since 1989, literature reviews are an on-going process to ensure that AQUIRE provides current information; software maintenance is on-going to meet user needs and update QSAR models. Use ranges from permit development, to Superfund site assessments, to ranking of hazardous air pollutants, to basic research, etc. User outreach is on-going, users can provide input on-line through E-Mail, site visits and user meetings held periodically. Feedback is very positive, ASTER is used heavily and meeting the users needs.

III. Tool Development

The tool was developed in 1989, and was initially developed to support Superfund site assessments and TSCA decisions for new and existing chemicals. Since that time used by every EPA Program and Regional Office, numerous Federal agencies, and many state and local governments for activities that range from permit development, to Superfund site assessments, to ranking of hazardous air pollutants, to basic research, etc.

The model was developed by Federal staff at ERL-Duluth and ADP scientific support through contracts. Collaboration with countries outside of the U.S. to share data and QSAR models. Significant coordination currently with components of the Dutch government and the European Union research center in Ispra, Italy. Since 1989 approximately \$85,000 per year (fiscal year 1995) and 0.25 FTE per year has been required to develop and maintain ASTER and provide user outreach.

IV. Special Requirements for Use

ASTER is available to all governmental entities at no charge. The data base can be accessed using an EPA network via the VAX system or through a modem and personal computer. International and U.S. users are increasingly using the Internet to access the system. A technical support document is provided with ASTER and user outreach provides technical support. ASTER is a user-friendly, menu driven program that requires little or no training to use.

V. Program/Media/Geographical Transferability

ASTER is used in every EPA Program and Regional office, numerous Federal (e.g., DoD, DoE, DoI, NOAA, USDA, etc.) and State and local agencies and other governmental agencies in North America, Europe, Asia, and Australia, as well as the U.N.

VI. Other Information

The laboratory's research mission is focused on ecotoxicology and freshwater ecology, with the goal of advancing the scientific foundation of ecological risk assessments and ecosystem management decisions. The laboratory is also responsible for undertaking and facilitating ecological research within the Great Lakes and Great Plains. As part of its research mission in ecotoxicology, the laboratory develops and supports data bases and predictive models that are used world-wide in ecological risk assessments for chemical stressors.

VII. Program Contacts

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Christine Russom Office of Research and Development, ERL - Duluth, Mn., (218) 720-5709

CLEAN WATER ACT 305(B) NATIONAL WATER QUALITY INVENTORY

I. Tool Description

The biennial National 305(b) Inventory Report compiles state-reported data regarding the attainment of designated uses for waters of the United States, including aquatic life support, fish consumption, shellfish consumption, primary and secondary recreational activities, drinking water supply, and agriculture, as well as causes and sources of impairment to these uses.

II. Tool Users

State 305(b) reports are used to report to the EPA every two years, and are aggregated into the National Report described above.

III. Tool Development

The reporting requirements are stipulated in section 305(b) of the Clean Water Act. A state/EPA/federal agency workgroup of approximately 60 people is responsible for developing specific guidance on improving compatibility and consistency of use support information.

IV. Special Requirements for Use

Guidance for the preparation of state 1996 305(b) Reports is being finalized and will be issued in the spring of 1995. Regional and state training will commence in late spring to inform states of changes.

V. Program/Media/Geographic Transferability

Tools are being developed to assist in 305(b) reporting to include total waters, an enumeration of all rivers, lakes and estuaries in each state.

VI. Other Information

See associated activities for indicators, the Waterbody System, geo-referencing, and GIS.

VII. Program Contacts

Barry Burgan Office of Water, Office of Wetlands, Oceans and Watersheds, Assessment and Watershed Protection Division, (202) 260-7060

ECOSAR DATABASE

I. Tool Description

This database estimates the ecotoxicity of industrial chemicals (how hazardous a chemical can be). Estimates have a wide use in hazardous assessments, ecological risk assessments and general aquatic toxicology.

II. Tool Users

Users of this tool generally are experts with a background in chemistry and toxicity. Users must have a knowledge of the chemical structure of the material to be assessed and adequate knowledge of chemistry to select the appropriate SAR chemical class. Primary users to date have been in OPPTS to estimate the ecotoxicity of industrial chemicals. This tool can also be used by testing laboratories to help establish range-finding levels for aquatic testing and by researchers in the field of aquatic toxicity.

III. Tool Development

ECOSAR was originally developed to estimate the aquatic toxicity of chemicals reviewed by EPA in response to Premanufacture Notices mandated by Section 5 of TSCA. ECOSAR was developed by Environmental Effects Branch in OPPTS.

IV. Special Requirements for Use

None

V. Program/Media/Geographic Transferability

Unknown

VI. Other Information

Further adaptations on ECOSAR may include areas where users will not have to be an expert to use it. Uncertainty factors are an area of concern. The quotient method is crude but effective.

VII. Program Contacts

Maurice Zeeman Office of Prevention, Pesticides and Toxic Substances, Office of Pollution Prevention and Toxics, Health and Environmental Review Division, (202) 260-1237

ECOTOX (ECological TOXicity) DATA BASE

I. Tool Description

Intended & Actual Purpose: The goal of this project is to develop a comprehensive computer-based system that provides chemical-specific toxicity values for aquatic life, terrestrial plants, and wildlife. It is intended that this database will support consistent ecologically-based regulatory and research activities within EPA, DOD, DOE, DOI and other Federal, state, local and international agencies. Release of the ECOTOX system will represent an integration and stabilization of AQUIRE, PHYTOTOX, and TERRETOX, which are three existing EPA databases that contain ecotoxicity information for aquatic life, terrestrial plants, and wildlife, respectively.

II. Tool Users

The tool will be available for use in 1995. Over 1,000 EPA, other Federal, state, local and international governmental sites that will use ECOTOX, based on current users of the AQUIRE system. Users will include governmental employees and/or governmental contractors or cooperators. Data tapes and software will be made available to the private sector through NTIS. Usage will range from permit development, to Superfund site assessments, to ranking of hazardous air pollutants, to basic research, etc.

User outreach is on-going through meetings and limited release of the prototype system; users can provide input on-line through E-Mail. Feedback has been very positive.

III. Tool Development

The AQUIRE, PHYTOTOX and TERRETOX data bases were initially established in the early 1980s. The AQUIRE data base is current; however, until recently no data had been entered into PHYTOTOX and TERRETOX for the last 8 years. Access to these two data bases has been extremely limited. During fiscal year 1994 literature reviews for these two databases was resumed and software modifications were undertaken. A pilot version of ECOTOX was produced in fiscal year 1992 and a prototype was established in fiscal year 1994. The beta-version of ECOTOX is scheduled for release in the spring of 1995. Federal staff at ERL-Duluth, ERL-Corvallis, OPP/ Environmental Fate & Effects Division and associated ADP scientific support through contracts.

Reason for Development: Government agencies, including EPA, are confronted with the need to establish scientifically-defensible hazard assessments, clean-up goals, and permits that provide compliance with environmentally-based regulations. EPA and related agencies are also establishing ecological research approaches to reduce uncertainties in chemical risk assessments. The lack of a comprehensive and current database of ecotoxicological information has hampered efficient and cost-effective collection and evaluation of hazard effect levels that are needed for these activities. The AQUIRE data base, which contains aquatic life toxicity data, is being used by every EPA Program and Regional Office, numerous Federal agencies, and many state and local governments for activities that range from permit development, to Superfund site assessments, to ranking of hazardous air pollutants, to basic research, etc. These users also need toxicity data for plants and wildlife. The ECOTOX effort is designed to re-establish the PHYTOTOX and TERRETOX data bases and to develop the software needed to link these data bases into a single system.

A pilot version of ECOTOX was produced in fiscal year 1992 and a prototype was established in fiscal year 1994. The beta-version of ECOTOX is scheduled for release in the spring of 1995.

Fiscal year 1992/93 seed money (\$450,000) was provided by ORD, OW, and OSWER. During fiscal year 1994/95, one-time funding of \$1,300,000 provided by DOD through the Strategic Environmental Research and Development Program. Approximately 2.5 Federal FTE are involved.

IV. Special Requirements for Use

ECOTOX will be available to all governmental entities at no charge. The data base can be accessed using an EPA network via the VAX system or through a modem and personal computer. It is anticipated that International and U.S. users will increasingly use the Internet to access the system. A technical support document will be provided with ECOTOX and user outreach will provide technical support. The prototype ECOTOX system is a user-friendly, menu driven program that requires little or no training to use.

V. Program/Media/Geographical Transferability

Based on current users of AQUIRE, and feedback from outreach efforts and user-group meetings, ECOTOX will be used in every EPA Program and Regional office, numerous Federal (e.g., DoD, DoE, DoI, NOAA, USDA, etc.) and state and local agencies and international governmental agencies.

VI. Other Information

The laboratory's research mission is focused on ecotoxicology and freshwater ecology, with the goal of advancing the scientific foundation of ecological risk assessments and ecosystem management decisions. The laboratory is also responsible for undertaking and facilitating ecological research within the Great Lakes and Great Plains. As part of its research mission in ecotoxicology, the laboratory develops and supports data bases and predictive models that are used world-wide in ecological risk assessments for chemical stressors.

VII. Program Contacts

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Christine Russom	Office of Research and Development, Environmental Research Laboratory-Duluth (218) 720-5709

ECOVIEW

I. Tool Description

ECOVIEW is an easy-to-use, desktop computer-based, mapping and data visualization tool designed to provide easy access to geographic and environmental data and information. The concept of ECOVIEW is to provide a spatial analysis tool that will promote multi-media, cross program, and ecosystem analyses at variable geographic scales with environmental data.

The primary goal of the ECOVIEW project is to provide communities (public, private, and governmental) with a data access and visualization tool which promotes the creation and use of environmental information in establishing and attaining the goals of sustainable development. This project has two major components: an innovative, desktop mapping technology combined with digital, multi-media information management capabilities and the data and networks necessary to create information sources related to ecosystem and community sustainability. ECOVIEW will increase the opportunities for the integration and access of environmental, economic and social/demographic information, the use of this information in the policy, regulatory, and compliance framework, and the ability of parties involved in environmental analysis and management to use a common information platform for consensus building.

II. Tool Users

The intended users of ECOVIEW would be anyone interested in visualizing geographic and environmental data in a computer mapping system. The initial target clients are EPA and state environmental planners, analysts, and managers that need quick and easy access to environmental indicator data. EPA staff have been using the ECOVIEW prototype since late 1992 and are currently the only users of ECOVIEW.

Staff from OPPE's Environmental Results Branch (ERB) have been conducting focus groups and demonstrations of the ECOVIEW prototype with EPA, state, and other non-governmental groups. The response has always been very favorable and potential clients are eagerly awaiting delivery of an ECOVIEW type system.

III. Tool Development

The development of ECOVIEW was prompted by an exhaustive commercial market review which showed that no off-the-shelf software met the performance requirements of the ECOVIEW functional specifications. These specifications were initially based on the needs of ERB staff for conducting spatial analyses with environmental indicator data. Subsequent focus groups and demonstrations with ERB clients supported and enhanced these specifications.

ECOVIEW is not currently available as a functional tool. The initial design was created by EPA employees and a prototype was developed with contractor support in 1992 from an inter-agency agreement with the Federal Emergency Management Agency. ERB conducts focus groups and demonstrations using this prototype. ERB is currently negotiating a Cooperative Research and Development Agreement (CRADA) with two major GIS vendors to develop a commercial version of ECOVIEW. The Agreement would include the development and pilot testing of a new prototype version of a commercial ECOVIEW product in mid-1995. ERB is currently looking for possible pilot test groups inside and outside EPA. The future versions of ECOVIEW will be developed through the CRADA process and will involve a partnership between EPA and the private sector.

Increased management support and resources are needed for the continual development of ECOVIEW. ERB is developing ECOVIEW on a resource budget of a minor branch project. ERB has submitted an Environmental Technology Initiative proposal for funding which could help this situation.

IV. Special Requirements for Use

One of the primary requirements of ECOVIEW is ease-of-use. The system is being designed for those with limited computer skills or time constraints. The system will need computer technology that is readily available on commercial and government markets (Minimum requirements: high-end 486, 200Mb HD, 8Mb RAM, CD-ROM preferred).

V. Program/Media/Geographic Transferability

The tool is designed to promote multi-media, cross program, and ecosystem analyses at variable geographic scales with all types of data. ERB's initial pilot project worked with data from Ohio EPA and consisted of data on abandoned hazardous waste sites, facility emissions and discharges, facility regulatory compliance, biological monitoring, habitat condition, threatened species and habitats, and geographic base maps of hydrography, streets and highways, political boundaries, and ecoregion and watershed boundaries.

VI. Other Information

ERB is currently working with the Chemical Emergency Preparedness Program to use their mapping product, LANDVIEW, as an interim ECOVIEW prototype. This system is oriented toward impacts of toxic releases on human populations, but could have some very basic functionality to ecosystem analysis.

VII. Contact Person

Nathan Wilkes Outreach and User Support, Office of Policy, Planning and Evaluation, Office of Strategic Planning and Environmental Data, Strategic Planning and Management Division, 202-260-4910

Elizabeth Porter Technical Design and Implementation, Office of Policy, Planning and Evaluation, Office of Strategic Planning and Environmental Data, Strategic Planning and Management Division, 260-6129

EMAP INFORMATION MANAGEMENT (IM) SYSTEM

I. Tool Description

The purpose of the EMAP Information Management System is to provide support to the Program by providing the capability to assess and manipulate EMAP and external data for analysis and dissemination.

II. Tool Users

The tool has been designed to be of use to scientists doing analysis within and outside of EMAP, policy makers and the public.

III. Tool Development

Development of the System began in April 1992 and is on-going. Some groups started utilizing the EMAP IM System in 1994. The development effort has been set up as a continuous improvement process. And a great deal of feedback has been received and used to improve the system. The IM System is being managed by EPA under contractor support; to date, approximately 5 FTE and 4 million dollars have been devoted to development and implementation of this tool.

IV. Special Requirements for Use

There are training and equipment costs for using the tool.

V. Program/Media/Geographic Transferability

The EMAP databases can be assessed by other Programs within and outside the Agency. Development of the tool has been performed using Agency standard Information resource management (IRM) approaches allowing it to be part of the Agency IRM infrastructure enabling access to Regions, states, universities, and other EPA programs.

VI. Other Information

There are numerous additional hardware and software products that could improve the tool. A detailed equipment list can be provided upon request.

VII. Program Contacts

Robert Shepanek Office of Research and Development, Environmental Monitoring and Assessment Program, (202) 260-3255

EMAP MULTI-RESOLUTION LANDSCAPE CHARACTERIZATION

I. Tool Description

The Environmental Monitoring and Assessment Program (EMAP) has organized an interagency partnership called Multi-Resolution Land Characteristics (MRLC) to address the Federal need for land cover information and satellite imagery. The intended purpose is to provide the Federal government and the public with current land cover information derived from Landsat Thematic Mapper satellites. The land cover data can be used for a wide range of applications including ecosystem protection, modeling, risk assessment and sustainable development.

II. Tool Users

The intention of EMAP's role in MRLC is to provide the data to as many users as possible. This includes the EPA Regions, Program Offices and laboratories. MRLC currently provides data to researchers in each of these areas.

III. Tool Development

The need for this activity grew from the lack of data and adequate resources by any one Federal agency or program to provide this type of data. The program is well underway; the imagery has been collected and processed; an information management system is in place to support it and we are projecting completion of land cover data for the US by the end of 1997.

MRLC was initiated by EMAP and is an interagency consortium consisting of the following agencies: the Environmental Protection Agency, the US Geological Survey, the National Oceanic and Atmospheric Administration and the National Biological Survey. MRLC was initiated in March of 1993.

The data are used to provide a spatial context for environmental and natural resource activities and research. The data (remotely sensed digital imagery) has been used for 20 years.

IV. Special Requirements for Use

Efficient use of the tool would require the training of at least 1 full time person in each site in which it was utilized. Dollar investment for each site would be about \$20 thousand.

V. Program/Media/Geographic Transferability

The "tool" we provide can be used with any Geographic information System software or hardware. The raw imagery requires more sophisticated remote sensing software.

VI. Other Information

VII. Program Contact

Denise M. Shaw Office of Research and Development, EMAP - Landscape Characterization, (919) 541-2698

FISH TISSUE DATA BASE

I. Tool Description

This database identifies waters with State-issued fish consumption advisories. The data are on a GIS-data base management system. Location, chemicals and species are identified for each advisory.

II. Tool Users

A broad spectrum of individuals that are involved with developing, issuing, communicating and evaluating information on fish tissue contamination.

III. Tool Development

In 1989, the American Fisheries Society at the request of EPA conducted a survey of State fish and shellfish consumption advisory practices. The survey documented that monitoring and risk assessment procedure used by States in their fish and shellfish advisory programs varied widely. The survey also report on State requested Federal assistance including providing consistent approaches for State agencies to use in assessing health risks from consumption of chemically contaminated fish and shellfish, guidance on sample collection procedure and uniform, cost-effective analytical methods for quantification of contaminants.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

Applicable to other media and a wide range of ecosystems.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contact

Tom Armitage Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-5388

GATEWAY/ENVIROFACTS

I. Tool Description

EnviroFacts is an assembly of EPA databases (CERCLIS, RCRIS, TRI, PCS, etc.) which can be accessed through any standard query language to provide answers to specific questions (eg: what are the major chemicals in town X...). However, these query languages are difficult to use. Gateway is a graphics user-interface which enables easy access to Envirofacts, as well as provides the capability to transport data between other software applications (eg: import into Wordperfect, relational databases, etc.), answer queries such as "what is the demographic profile of city Y", and to bundle data for transmission.

II. Tool Users

All agency personnel, as well as interested members of the public, are the intended users. The Great Lakes Program has been using their regional version for the past nine months. Feedback has been good so far; only minor modifications have been suggested. Other users are anticipated in upcoming months.

III. Tool Development

Two years ago, the need for data integration (easily accessed, centralized source of information) prompted its development. The work has been done through a combination of in-house and contractor effort. The Great Lakes has been using a regional version for the past nine months; a national version, which will include new features and Internet access, is under development and will be made available in 1995.

IV. Special Requirements for Use

A high-end PC with good graphic capabilities, Windows, and Internet access are required.

V. Program/Media/Geographic Transferability

It is designed for use by all program offices. This tool will help with ecosystem management by helping people define, locate, and target important regional stressors. It should also help produce readable, understandable information products which are more digestible by managers.

VI. Other Information

The system would greatly benefit from consistent national data and improved locational data for facilities (latitude/longitude coordinates).

VII. Program Contacts

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INTERAGENCY TAXONOMY INFORMATION SYSTEM (ITIS)

I. Tool Description

The Interagency Taxonomy Information System (ITIS) is a relational database of nomenclatural and taxonomic information that is easily accessible, scientifically credible, and ensures continuous improvements in data quality. The ITIS will track basic taxonomic information for all categories of botanical and zoological taxa from aquatic and terrestrial habitats. The tool's intended purpose is to facilitate the storage of biological data, and the sharing of these data among agencies by providing a common framework for taxonomic data that is scientifically credible, consistent, accessible, and regularly updated. The database will enable agencies that might not be able to afford to maintain a taxonomic database on their own, to have access to high quality taxonomic information.

II. Tool Users

Field biologists and natural resource managers will use the ITIS as a reference of the current nomenclature for organisms when recording biological data collected in ecosystem management activities. Use of the ITIS will facilitate data exchange and data sharing among agencies.

III. Tool Development

The tool is still under development. Planning for the ITIS began two years ago when agencies came together to address the common need for a taxonomic database. The ITIS is being developed through a partnership of the following agencies: The Department of Interior's National Biological Survey (NBS) and U.S. Geological Survey (USGS), the U.S. EPA, the U.S. Department of Agriculture's Agriculture Research Service (ARS) and Soil Conservation Service (SCS), the National Oceanic and Atmospheric Administration's National Oceanographic Data Center (NODC) and National Marine Fisheries Service (NMFS), and the Smithsonian Institution's Museum of Natural History. Two OIRM Program Systems Division personnel serve as co-chairs on working groups that are overseeing the development of the database and ensuring scientific credibility of its contents. Implementation of the prototype ITIS is scheduled for August 1995.

IV. Special Requirements for Use

Special requirement for using ITIS are a high-end PC with internet connection. Future plans include CD-ROM and diskette distribution where applicable.

V. Program/Media/Geographic Transferability

ITIS will be available to all EPA programs. Geographic coverage for the ITIS is world-wide with a North American emphasis.

VI. Program Contacts

Barbara Lamborne Office of Administration and Resource Management, Office of Information Resource Management, Program Systems Division, 703/235-5609

LANDSCAPE PATTERN TYPES (LPT) MAPPING

I. Tool Description

The purpose of LPT mapping is to systematically classify and map zones of consistent landscape pattern and composition at intermediate scales (across tens to thousands of square kilometers), for subsequent use as strata in a variety of ecological monitoring, landscape or watershed analysis, environmental planning, or ecosystem management activities.

Any mapping process delineates units at a chosen scale ranging from the very localized scale to broad, regional or continental scales. LPT mapping delineates landscapes at a scale intermediate between localized land cover mapping and large scale ecoregion mapping; LPT units may range from 5 to 100+ km. in size.

LPTs are based on the widely accepted Forman and Godron definition of "a heterogeneous, kilometers-wide mixture of interacting ecosystems consistent in form and pattern throughout." The LPT classification first identifies pattern (undisturbed matrix, matrix with patches, mosaic) and then classifies the dominant ecological components forming the pattern (e.g., forest matrix; agricultural matrix with forest patches; agricultural/suburban/forest mosaic). The LPT units are delineated on 1:500,000 scale Landsat scenes by conventional photo-interpretation methods with use of supporting ground data for verification. LPTs are then digitized into GIS, where they can be composited with other factors (e.g. watershed boundaries, population density, landownership, species distribution) as needed.

II. Tool Users

EMAP Landscape Ecology program, Desert Research Institute, EMAP Landscape Characterization program, OWOW/AWPD Watershed Branch.

III. Tool Development

Developed, applied and published by the EMAP Landscape Characterization group during the period 1991-1994. LPT mapping methods are operational and published in Landscape Ecology spring 1994 issue (Wickham and Norton, "Mapping and Analyzing Landscape Patterns"). Methods were developed and tested on a 40,000 square mile study area in the Southeast, around which the published paper is based.

IV. Special Requirements for Use

The publication provides sufficient directions for use. This is a pattern recognition and visual classification process that can be carried out without advanced training; however, better results would be obtained by an experienced photointerpreter who would be familiar with identifying consistent "signatures" and delineating a boundary around them. Either the ability to recognize gross categories of land use/land cover (e.g. forests, agriculture, urban, open water) or a source of current land use information for the study area is needed. Photographic reprints of satellite images can be purchased from Eros Data Center, USGS.

V. Program/Media/Geographic Transferability

Broadly applicable in a variety of federal, state and local programs. The method for classifying and mapping landscape types can be used, with regional modification, anywhere in the nation and presumably in other countries since over 40 non-US scientists have requested reprints of the method article. Method is adaptable to use with small-scale aerial photography as well as satellite imagery.

VI. Other Information

VII. Program Contact

Doug Norton Office of Water, Office of Wetlands, Oceans and Watersheds, Assessment and Watershed Protection Division, (202) 260-7017.

MOSAIC - GULF OF MEXICO DATAFILE

I. Tool Description

MOSAIC is a graphic-based, menu-driven (windows) electronic platform which is accessible through Internet. A communication tool for the Gulf of Mexico Program has been developed by creating a datafile on the MOSAIC platform containing information about the Program.

The Gulf of Mexico datafile's purpose is to provide information and interactivity to federal, state, local and citizenry partners. The system contains a great diversity of information about the effort of EPA, federal and state partners in managing the Gulf including organizational and activity information, indicators information, pollution and environmental degradation data, monitoring data, etc. It enables the pictorial viewing of GIS sessions, incorporating data from agency databases such as STORET, CERCLIS, etc. It will also enable users to access the raw data behind graphs and charts.

As it is a networking tool, it will enable multiple users to simultaneously access information; for example, Stennis Lab, Region 4, the state of Florida, and HQ could all participate in a conference call, looking at the same document on screen.

II. Tool Users

The MOSAIC Gulf of Mexico datafile's intended users are the Agency's various federal, state, local and citizenry partners, including scientific and academic users, policy makers and regulatory personnel, advocacy groups, interested members of the public. It is to be used as a means of providing a centralized source of on-line information about EPA programs (presently focusing on the Gulf of Mexico).

Anyone with Internet access and the appropriate computer equipment will be able to access the datafile. There are also interactive features which permit user-feedback about the system. Within the agency, the tool will be supported by the National Data Processing Division Service Agreement; all LAN administrators are supposed to be internet proficient, and they should be able to set up Agency computers to access MOSAIC at the user's request.

III. Tool Development

Development of the tool was prompted by the Gulf of Mexico Program, which expressed an interest in the development of such a program or tool for communication. The idea was conceived in January, 1994; funds were committed in May of the same year. The Program Systems Division in OIRM did half of the programming required to tailor MOSAIC for the Gulf Program tool, and then contracted out the remainder of the development to a contractor, Science Applications International Corporation (SAIC). Development costs are estimated at 1 FTE and \$300,000 - \$400,000.

Some information about the Gulf Program and its various partners is still being uploaded, but the MOSAIC Home Page is essentially complete and is now available for mass distribution. It is important to note that one of the program's essential features is that new information can be continually and easily be uploaded through the system administrators.

IV. Special Requirements for Use

An Internet account is necessary to access information, as well as high-end PC equipment with graphics capabilities and MOSAIC software (free). The system is icon-driven (click on an icon to call up additional text information/ information options about a particular topic) to facilitate use.

V. Program/Media/Geographic Transferability

The platform can be used for similar purposes by anyone who is interested - in fact, another group is undertaking the same type of effort for the Great Lakes Program.

VI. Other Information

As additional information is generated about the Gulf Program (eg: newsletters, program summaries), it would facilitate uploading if this information can be transmitted to the system administrator in digital form.

VII. Program Contacts

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EPA REACH FILE (VERSION 3.0)

I. Tool Description

The Environmental Protection Agency's (EPA) Reach File (Version 3.0), known as RF3, is a national hydrologic database that interconnects and uniquely identifies the 3.2 million stream segments or "reaches" that comprise the nation's surface water drainage system.

RF3 is being developed by the EPA's Office of Water from the U.S. Geological Survey (USGS) 1:100,000 scale hydrography data. The RF3 production process assigns a unique reach code to each stream segment contained within the USGS hydrography and determines the upstream/downstream relationships of each reach, allowing them to be connected together to form a national hydrologic transport network. The reach codes provide a common nomenclature that provides a geographic framework for Federal and State reporting of surface water conditions as required under the Clean Water Act. In addition the hydrologic transport network defined within RF3 enables the modeling of water borne pollution associated with both point and non-point sources.

RF3 production is a two-step process: (1) initial compilation of spatial and attribute data from a variety of different sources; and (2), the subsequent validation of the resulting file to ensure the integrity of the reach numbers and hydrologic connectivity that defines RF3. RF3 compilation is complete for the conterminous United States and Hawaii, except for the Pacific Northwest region. As part of the RF3 validation processing, EPA is coordinating closely with USGS to synchronize RF3 feature definitions and linework with the hydrologic component of the new USGS Digital Line Graph Enhanced (DLG-E) product. RF3 Version 3.0 will be available for use in fiscal year 1995.

II. Tool Users

The intended and actual users of this tool are EPA Headquarters and Regional Offices, and States. An important use of this tool will be to index waterbodies identified in a State's Clean Water Act 305(b) reports to RF3 data using GIS. Once this is done, States will have the capability to tie-in monitoring data (e.g., STORET, TRIS) and begin modeling ambient water quality. Several States have already completed this step, including South Carolina, New Hampshire, and Virginia. Other secondary uses for RF3 include flood modeling, Coast Guard navigation, and linking wetlands with other hydrologic data. Feedback on RF3 has been fairly positive to date. There is no current mechanism, however, about how EPA should deal with local corrections/enhancements to RF3 although several options are being considered.

III. Tool Development

The Reach File system began its development in the mid 1970's prompted by a need to link water quality data together. RF3 Version 3.0 is being developed with contractor assistance through partnership among USGS and EPA's OW, ORD, and OIRM. Initial resources for development of RF3 is approximately \$800,000. It is projected that incorporation of the Northwest data and quality assurance/quality control may cost another \$800,000.

IV. Special Requirements for Use

The only special requirement for using RF3 are access to an IBM mainframe computer. OW is in the process of piloting its use on Internet.

V. Program/Media/Geographic Transferability

It is expected that RF3 will be useful to other programs, especially the Superfund program's NPL ranking system.

VI. Other Information

VII. Program Contacts

Thomas G. Dewald Office of Water, Office of Wetlands, Oceans, and Watersheds, Assessment and Watershed Management Division, Monitoring Branch, (202) 260-2488

NATIONAL FISH TISSUE DATA REPOSITORY

I. Tool Description

The data base can be used in the development of fish consumption advisories or for studies related to the ecological effects of contaminants. The data base includes levels of fish tissue contaminants in many different species taken from many sites across the country.

II. Tool Users

A broad spectrum of individuals that are involved with developing, issuing, communicating and evaluating information on fish tissue contamination.

III. Tool Development

In 1989, the American Fisheries Society at the request of EPA conducted a survey of State fish and shellfish consumption advisory practices. The survey documented that monitoring and risk assessment procedure used by States in their fish and shellfish advisory programs varied widely. The survey also report on State requested Federal assistance including providing consistent approaches for State agencies to use in assessing health risks from consumption of chemically contaminated fish and shellfish, guidance on sample collection procedure and uniform, cost-effective analytical methods for quantification of contaminants.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

Applicable to other media and a wide range of ecosystems.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contact

Tom Armitage Office of Water, Office of Science and Technology, Standards and Applied Science
Division, (202) 260-5388

NATIONAL SEDIMENT INVENTORY

I. Tool Description

The National Sediment Inventory (NSI) contains geo-referenced, site-specific data on sediment quality and pollutant source information for the United States. This information is being used to assess the nature and extent, including causes, of sediment contamination in the nation's freshwater and estuarine ecosystems. The results of this effort will be presented in a biennial Report to Congress required by Section 503 of the Water Resources Development Act of 1992.

The NSI contains over 1.5 gigabytes of data from national and regional databases around the country, including the National Oceanic and Atmospheric Administration (NOAA) S&TP and COSED databases and EPA's STORET, ODES, EMAP, Gulf of Mexico Inventory, Region IV, V, VI and X Sediment Quality Inventories. Also included is 1992 point source release data from EPA's TRI and PCS databases. Additional data, including non-point source data will be added to the NSI within the next two years. Specific data types include sediment chemistry data, toxicity data, fish tissue contaminant levels, benthic community data, fish histopathology data as well as point source loadings data. The information is currently being evaluated to identify chemicals, geographic areas and industrial categories of concern for the nation, EPA Regions, and States. Several reports describing the compilation of this data and the results of the analyses are currently available. The data and evaluation tools will be available on EPA's mainframe in SAS files and on CD-Rom in dBase 3+ format.

II. Tool Users

Managerial and technical federal, State, local and tribal personnel.

III. Tool Development

Development of the NSI was initiated several years ago through a series of pilot inventories in Regions IV, V and VI. A national interagency workshop was held in March 1993 to finalize the plan for developing the NSI database. Individuals from NOAA, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and the U.S. Geological Survey, several Regions and States attended the workshop. After the data was compiled, we held a second, well attended interagency workshop to identify a methodology for evaluating the NSI. This methodology has been refined over the past year and is about to be applied to the data. In addition, a preliminary evaluation of the data, along with the data, was distributed to State and regional sediment quality experts for review. Their comments are currently being integrated into the NSI. It is anticipated that the Report to Congress will be completed sometime this fiscal year. The report will undergo extensive review by scientists and engineers both inside and outside the Agency before it is released to the public.

IV. Special Requirements for Use

The reports themselves have no special requirements for use. Decision-makers interested in using the detailed monitoring data will need to have a system capable of handling a large amount of data.

V. Program/Media/Geographic Transferability

The NSI is useful to many water and waste programs and is transferable across media. The NSI data contains latitude and longitude information on each sample (though the reliability of this information has not been verified). Geographic coverages are currently being added to the data. Consequently, the data can be used for geographic analyses on many levels.

VI. Other Information

VII. Program Contacts

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ESDB LINK with REACHSCAN

I. Tool Description

A database obtained by Exposure Assessment Branch, Exposure and Technology Division/OPPTS, from the US Fish and Wildlife Service, modified to include state and county identification codes, and 'linked' with the Reachscan Model/database. Lists all US Endangered and threatened species with relevant data on that species. Permit identifies potential impacts from the release of chemical to surface water.

II. Tool Users

Exposure Assessment Branch (OPPTS)

III. Tool Development

OPP made minor changes to the database and linked it to facilities at the county level to search/identify a specific facility the user needs on NPDES facility, name, as an input.

IV. Special Requirements for Use

IBM AT Compatible PC with sufficient storage space.

V. Program/Media/Geographic Transferability

No limit.

VI. Other Information

Fish and Wildlife Service can be contacted to identify an endangered species for specific location ie., what river and mile segment along the river an endangered species is located. This source of information may be limited to the extent the protection plan has been developed.

VII. Program Contacts

Sid Abel Office of Prevention, Pesticides and Toxic Substances, Office of Pollution Prevention and Toxics, Economics, Exposure and Technology Division, (202) 260-3920

NONPOINT SOURCE MANAGEMENT SYSTEM

I. Tool Description

Annually, each EPA region sets aside 5% of its entire Section 319 Grant Program allocation to support more intensive, long-term water quality monitoring of selected projects, based upon requirements described by EPA's "Watershed Monitoring and Reporting for Section 319 National Monitoring Program Projects," August, 1991. The Nonpoint Source Management System (NPSMS) is a PC-based system developed to facilitate data input and reporting for these long-term Nonpoint Source Watershed Monitoring projects.

NPSMS provides states with the ability to enter, track, and transfer the required watershed project information to EPA where the data is managed on a central PC also using the NPSMS software. NPSMS allows EPA and states to view, update, generate reports and graphics, and export project data to EPA's mainframe computer for statistical analysis using SAS.

II. Tool Users

Copies of the software have been distributed to all EPA Regional Offices and States. While this software is targeted for use with the National Monitoring Programs Projects, copies of the software have been made widely available by the EPA.

III. Tool Development

The Office of Water (OW) developed the NonPoint Source Management System, NPSMS Version 3.01, in 1992 to support OW's guidance, "Watershed Monitoring and Reporting for Section 319 National Monitoring Program Projects." The NPSMS is funded by the 5% Regional set-aside.

The software package and user's guide were developed by a contractor, with oversight provided by EPA personnel.

IV. Special Requirements for Use

The software is PC-based and requires a computer with at least an 80286 chip, and some level of technical familiarity with water quality and monitoring on the user's part.

V. Program/Media/Geographic Transferability

The software package could be used by anyone conducting long-term monitoring of water quality.

VI. Program Contacts

Steve Dressing Office of Water, Office of Wetlands, Oceans and Watersheds, Assessment and Watershed Protection Division, (202) 260-7110

POPULATION ESTIMATE CHARACTERIZATION TOOL (PECT)

I. Tool Description

This tool is a spatially-based computer program which allows the user to select a facility of interest (eg: a TRI facility) and query about user-defined demographic characteristics (eg: population density, % minority, % above/below the poverty line) in rings around the facility site with radii up to 4 miles. Additional data sets can also be incorporated into the program (eg: TRI; CERCLIS; NPL).

II. Tool Users

The tool is intended for use by anyone interested in demographic information; it has especially powerful analytic capabilities for application to environmental justice issues.

III. Tool Development

The Superfund Program sponsored (eg: funded) the tool's development, spurred by recurring Congressional interest in Census demographics. It is being developed through a combination of in-house and contractor efforts.

A PC-based prototype/pilot has been developed for the state of New Jersey and delivered to the Superfund program; the program is slated for availability throughout the agency in the third quarter of FY '95. The program will be available through RTP when it goes nation-wide; a partnership with program offices (the Office of Pesticide Programs (OPP) and the Office of Enforcement and Compliance Assistance (OECA) is making this broader distribution possible. The feedback has been good; OECA, especially, has been very pleased with the capabilities.

IV. Special Requirements for Use

A high-end PC, windows, and LAN connectivity are required.

V. Program/Media/Geographic Transferability

The program is applicable to anyone with an interest in demographic information or in characterizing the proximity of populations to sources of chemical exposure.

VI. Other Information

Nationally consistent data processing formats and data standards are essential. Additional data is also key (eg: the agency does not have accurate lat/long for many facilities). Key data elements (similar to the WENDB data elements for NPDES/PCS) must be identified and the data collected consistent with standard protocols.

VII. Program Contacts

Andy Battin Office of Administration and Resource Management, Office of Information Resource Management, Program Systems Division, (703) 235-5591

David Wolf Office of Administration and Resource Management, Office of Information Resource Management, Program Systems Division, (703) 235-5592

PERMIT TRACKING SYSTEM

I. Tool Description

The Wetlands Research Program at ERL-Corvallis has developed a data management system to simplify the process of entering and analyzing ecological information about wetlands and mitigation projects involved in wetland permitting. The Permit Tracking System is user-friendly, PC-based program, designed to track information from three types of wetland permit systems, Section 404 and Section 410 of the Clean Water Act and state permit systems. The program includes an option to track data from other permit systems or wetland projects.

II. Tool Users

Several state agencies and EPA Region II are considering using the tool.

III. Tool Development

The Approach was developed based on pilot studies in California, Texas, Louisiana, Alabama, Arkansas, Washington, and Oregon. A number of State agencies and EPA Region II are considering adopting it. It was released in 1991. The Permit Tracking System was field-tested and the manual and software was widely reviewed and accepted.

IV. Special Requirements for Use

A PC with a hard drive and adequate memory is required. Someone familiar with installing and running software on a PC could use it or teach someone totally unfamiliar with PC's to use it. A user's manual and software are available. The only costs are for the hardware and the person to do the data entry and queries.

V. Program/Media/Geographic Transferability

Transferability unknown.

VI. Other Information

VII. Program Contacts

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Corvallis, (503) 754-4478.

PESTICIDE ECOTOXICITY DATABASE

I. Tool Description

The Ecological Effects Pesticide Toxicity Database is expected to provide a rapidly accessible source of ecotoxicity data for all registered pesticides in active use nationwide. Most of the thousands of studies presently contained in OPP's Ecological Effects Branch files have never been stored electronically and now exist only as hard copy. The database will effectively track, record, and summarize this vast library of toxicological data. It will be the most comprehensive and current database of its kind in the world.

In keeping with many of the reduced risk initiatives presently favored by the Administrator, the database will prove to be an extremely valuable tool in enabling the EPA, other federal agencies, state and local governments, and the agricultural community to more quickly assess the risks associated with various alternative pesticide uses. The use of the database within the OPP Ecological Effects Branch will allow increased efficiency in completing registration and reregistration actions.

II. Tool Users

The database has been and is being utilized effectively in numerous OPP division projects in EFED and SRRD. Within the Agency, requests for information from the database have been received from offices in OPPTS, ORD, OW, Region 3 (Chesapeake Bay Program Office), Region 5, Region 6 and Region 7. All have indicated the need for such a database. In keeping with the policy initiatives expressed by the Office Director the database will provide the outside customers with rapid access to information regarding pesticides. The existing database has already provided users with rapid access to toxicity data on hundreds of pesticides of interest.

Outside customers have included USDA's Agricultural Research and Soil Conservation Services, U.S. Fish and Wildlife Service, natural resource and agricultural agencies in over 10 different states, agricultural departments of universities, and private landscape consulting firms. The United Nation's Environmental Program Office has expressed interest in incorporating this data into the International Register of Potentially Toxic Chemicals(IRPTC) databank.

III. Tool Development

In 1991 initial plans were developed with the Chesapeake Bay Program to create a computerized database of acute and chronic toxicity values contained within OPP ecological effects data files. The terrestrial and aquatic organism data includes plant data as well as vertebrate and invertebrate studies. The pesticides were originally prioritized according to the most recently collected pesticide use surveys for Pennsylvania, Virginia, and Maryland counties within the Chesapeake Bay watershed.

The need for such a comprehensive and current source of scientifically reviewed toxicity studies has become readily apparent with increased requests from state, federal, and international agencies for information contained within the database. As a result, the Ecological Effects Branch sought and has received additional funding to continue this effort. OPP's Environmental Fate and Effects Division has allocated 0.1 FTE for oversight of the project. Actual data entry is performed by personnel obtained through the Agency's AARP program.

IV. Special Requirements for Use

The program requires a standard personal computer equipped with DBase III+ software. Other than some familiarity with this program no other special training is required. A guidance booklet describing the

fields contained in the database and pertinent abbreviations used in these fields will accompany any diskette copy of the database.

V. Program/Media/Geographic Transferability

The database is easily transferred using standard postal networks. The database has been developed in DBase III+ dialect. This database program is readily available software. The data is transferable to DBase IV if a windows type program is preferred. Due to the size of the database it is preferred that it be compressed using PKZIP. It presently contains over 2 megs of data. Eventually this database will be incorporated into at least 2 internet type platforms, the Pesticide Information Network and the ECOTOX database under development by EPA's Environmental Research Lab in Duluth, Mn.

VI. Other Information

It is estimated that the database saves OPP scientists an average of 2-3 manhours of research needed to extract the toxicity data contained in one pesticide file, summarize it, and then incorporate it into a single document. The same task can be completed in 11 seconds using a 486 computer and the present database. The time savings for a multiple pesticide comparative analysis will be even more notable. Multiply this time savings by the number of yearly actions or special projects requiring this type of data nationwide and the savings can be multiplied in thousands of manhours saved. The present database contains over 7000 individual study reports on over 290 registered pesticides which comprise a major component of the nation's present agricultural and industrial pesticide use. Eventually the database is expected to expand to over 12000 toxicity records for up to 600 pesticide active ingredients

VII. Program Contacts

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Doug Urban Program Oversight, Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, Environmental Fate and Effects Division, (703) 305-5746.

THE PESTICIDE INFORMATION NETWORK

I. Tool Description

The Pesticide Information Network (PIN) is a computerized collection of files each containing current and historic pesticide information. The PIN was designed to: enhance the Office of Pesticide Programs' data gathering efforts; aid States agencies and others in obtaining needed information on a timely basis, thereby improving their ability to respond to local pesticide situations and Federal requirements; save EPA resources through automated dissemination and updating of public information; and enhance cooperative efforts between EPA and other Federal Agencies through a convenient method of information sharing. The following types of information are now or will soon be available on the PIN.

Monitoring

The PIN contains a compilation of pesticide monitoring projects and ecological incidents caused by exposure of a non-target species to a pesticide. This information is supplied to OPP by Federal, State, and local governments and private institutions. Information in the PIN includes a short synopsis of each project or incident, chemicals and substrates monitored or involved in the incident, location, species, sexes, ages and numbers affected, route of exposure, analysis of tissue and environmental residue, dates of occurrence and contact person information. Some ground water monitoring projects also include well description and location information and results of sample analysis.

Regulatory Status

A regulatory status is provided, which may include: Active, Canceled, Suspended, Restricted Use, Special Review and Reregistration. Additional information includes the Pesticide identification (name and various ID numbers), EPA Product Manager number, criteria for classification, formulations and uses acted upon, final decisions, references, the EPA actions that led to classification and effective dates. An EPA Registration number and product name list is included for active ingredients that have Restricted Use Products.

Other regulatory datasets include the Pesticide Applicator Training Bibliography (PAT) and the Biological Pesticides Dataset (BPD). PAT provides a listing of the educational materials available for pesticide handling. BPD contains information that States require concerning biotechnology and biological pesticide decisions, rules, documents, meetings etc.

Miscellaneous Pesticide Information

CAS Numbers, PC Codes and synonym names; Chemical classification and pesticide use categories; Lifetime Health Advisory level and Maximum Contaminant Level.

Pesticide Properties (Under development)

Environmental Fate and Ecological Effects Data will contain the results of studies submitted to OPP/Environmental Fate and Effects Division to support the registration or reregistration of pesticides including physical/chemical characteristics of pesticides; environmental fate, mammalian, avian, and aquatic toxicological end points. This dataset will be available in 1996.

II. Tool Development

The Network began operation in April of 1987 with a single file, the Pesticide Monitoring Inventory (PMI), and was expanded through the addition of two more files to become the PIN in November of 1989. The original PMI file was developed to encourage states and other Federal agencies to share pesticide

monitoring information with EPA and each other. The current PIN is being expanded again to accept multi-users and to include the above list of expanded information. The new PIN will be available in early 1995.

III. Tool Users

The largest PIN users groups are state agencies, EPA Regional Offices and the pesticide industry. Other users include other Federal agencies, universities, environmental groups, and private companies. The monitoring information has been used as a reference by state agencies and universities who are planning new projects. The regulatory information is used largely by EPA Regional Offices and State pesticide agencies who are responsible for pesticide enforcement or pesticide user education.

IV Special Requirements for Use

The PIN is a free service offered by the Environmental Protection Agency, Office of Pesticide Programs (OPP). It is accessible to anyone who has a computer, modem and any communications software that will emulate a VT100 terminal. It is operational 24 hours/day seven days/week. It is completely menu driven and very easy to use. Set communication software to dial 703-305-5919, Databits=8, Parity=None, Duplex=Full, StopBit=1, Emulation=VT100.

V. Program/Media/Geographic Transferability

The PIN was designed as an information tool for environmental management and would be of interest to environmental managers, regulators, and scientists in a national and international arena.

VI. Other Information

User support is available by calling (703) 305-7499 from 7am-4pm EST. Leave a message after hours.

VII. Program Contact

Constance Haaser Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs,
Environmental Fate and Effects Division, (703) 305-5455

PESTICIDES IN GROUND WATER DATABASE

I. Tool Description

The Pesticides in Ground Water Database (PGWDB) was created to provide a more complete picture of ground-water monitoring for pesticides in the United States. It is a collection of ground-water monitoring studies conducted by federal, state and local governments, the pesticide industry and private institutions. It consists of monitoring data and auxiliary information in both computerized and hard-copy form.

II. Tool Development

The Office of Pesticide Programs (OPP) began collecting ground-water studies for the PGWDB in the early 1980s. In 1988, an effort was made to review and catalog these data. Summary results of this effort were computerized and then published in the *Pesticides in Ground Water Database: 1988 Interim Report*. Since the 1988 Interim Report was issued, many things have changed. State-sponsored projects, initiated in the late 1980s, have been completed and digitized, monitoring methodologies and computer technology have improved, and the quality and quantity of data have increased. Based on extensive use of the 1988 database by OPP's Ground Water Technology Section and the comments received from other users, both within and outside of OPP, the computerized database and the hard-copy report were restructured. The new computerized structure is more appropriate for the quality and quantity of the information currently available, as well as for that expected in the future. The new structure is both well and sample specific; that is, it contains description and location information for each well sampled and the results of each analysis. This structure allows ground-water monitoring data to be sorted in a variety of ways, such as by well depth, well location, and sampling date. The new report, *Pesticides in Ground Water Database -- A Compilation of Monitoring Studies: 1971 - 1991*, also has an improved structure. It provides national, regional, state and county summaries so that readers can select the resolution appropriate for their needs.

III. Tool Users

The PGWDB and its new report are being used routinely by OPP to reassess the impact that registered pesticides have on the quality of ground-water resources. The database is used to support ongoing regulatory activities, such as ground-water label advisories, monitoring studies required for pesticide re-registration and special review activities. In addition, combining the information in the PGWDB with other environmental fate data and usage data will assist OPP, at an early stage in the regulatory process, in refining criteria used to identify pesticides that tend to leach to ground water.

State and local governments can use the PGWDB as a reference so that a state may access data from neighboring states. Evidence that pesticide residues occur in ground water can be used to target a state's resources for future monitoring and to re-assess pesticide management practices to prevent future degradation of ground-water quality. The information presented in this report will also be useful to state and regional agencies when implementing two pollution-prevention measures being developed by EPA; the *Restricted Use Rule* and the *State Management Plans* outlined in the *Pesticides and Ground Water Strategy*.

IV. Special Requirements for Use

None

V. Program/Media/Geographic Transferability

The *Pesticides in Ground Water Database -- A Compilation of Monitoring Studies: 1971 - 1991* was prepared to summarize and share the results of the studies in the PGWDB. It consists of 11 volumes: a National Summary and ten EPA regional summaries. Each volume provides a detailed description of the computerized PGWDB and a guide to reading and interpreting the data.

The National Summary contains summary results of the data collection effort for all states and a discussion of the data. The regional volumes contain data from the individual states in each EPA Region. Each regional volume contains state summaries, which consist of: 1) a short overview of the state's philosophy and pertinent regulations concerning ground-water quality and pesticides, 2) a summary or abstract of each study or monitoring effort sent to OPP, and 3) summary data for each state presented in tables, graphs and maps.

To make this information available to as many decision makers in state and other federal agencies as possible, all of the study descriptions and the computerized portion of the monitoring data will become a part of the Pesticide Information Network (PIN).

VI. Other Information

The *Pesticides in Ground Water Database -- A Compilation of Monitoring Studies: 1971 - 1991* is available from the National Technical Information Service.

VII. Program Contact

Constance Haaser Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs,
Environmental Fate and Effects Division, (703) 305-5455

RELATIVE RISK INDEX

I. Tool Description

This index provides information about the risk posed to a variety of human health (dietary, worker exposure, chronic and acute exposure) and environmental (avian, aquatic, groundwater) endpoints by the pesticides associated with specific crops. The index is designed to be coupled with usage data about the amount of pesticide used in a particular community. The goal is to be able to determine whether, over time, patterns of pesticide usage associated with particular commodities are leading to reductions in risk exposure. Information on environmental endpoints has presently been developed for potatoes and apples; it is hoped that human health information for these crop pesticides will be available in the fall of '94. An assessment will also be conducted in the fall to determine whether the index is providing useful information, whether the correct endpoint are being used, etc. Eventually, data will be included for additional commodities.

II. Tool Users

The index is intended for internal agency use, as well as for the preparation of summary report for release to Congress and the public.

III. Tool Development

The index has been developed as part of the agency's coordinated pesticide use reduction initiative, announced in June 1993, involving the Agency, The Department of Agriculture (USDA) and the Food and Drug Administration (FDA). Although the Agency has always stressed pesticide risk reduction as its goal, traditional programs have focused on individual chemicals that present risks to humans or the environment that exceed Agency-determined levels. This chemical-by-chemical approach has not enabled the Agency to develop an overall strategy designed to prioritize and focus its regulatory activities on reducing pesticide use and its associated risk.

IV. Special Requirements for Use

To be useful, one must have information about the quantity of pesticide being used. However, usage data is difficult to come by. The US Department of Agriculture and various marketing services do provide some usage data, typically in large, complex databases.

V. Program/Media/Geographic Transferability

The risk index can be useful to other media/program offices. The Office of Solid Waste has expressed an interest in using the index to help determine how to control for the safest use mix.

VI. Other Information

The Agency will be required to maintain annual usage data for all chemicals used on the selected use sites. This data will be obtained from relevant sources including USDA, States and proprietary sources. Usage information necessary for incorporation into the measurement scales will include acre treatments by chemical, pounds of active ingredient applied by chemical, base acres treated by chemical and, where available, volume, acre treatments and base acres treated by application method. Where base acre information is not available, the Agency will be required to provide supportable estimates. It is important to note that additional sources of pesticide usage data will need to be developed for particular use sites where currently no reliable usage data exists before that site can be included in the program.

VII. Program Contacts

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REACHSCAN DATABASE

I. Tool Description

Reachscan is an OPPT model/database containing an inventory of river flows, industrial dischargers, and drinking water utilities. Program reports in stream chemical concentrations and chemical concentration at drinking water intakes from releases by upstream industrial dischargers. Concentrations can be determined by simple dilution or an environmental fate model can be accessed to determine concentrations after removal. This system 'links' with the probabilistic Dilution Model (which estimates the number of days an aquatic concern concentration is exceeded) and the endangered species database.

II. Tool Users

EPA Headquarters (OPPTS, OPPT, EETD, Exposure Assessment Branch).

III. Tool Development

The Exposure Assessment Branch acquired the data elements used to develop the system from standard OW mainframe databases and the U.S. Geological Survey's database.

IV. Special Requirements for Use

IBM AT Compatible PC with sufficient storage space.

V. Program/Media/Geographic Transferability

No limits.

VI. Other Information

VII. Program Contacts

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THREATENED AND ENDANGERED SPECIES COUNTY LOCATION REFERENCE

I. Tool Description

It is EPA policy that Programs and Regions comply with the letter and spirit of the Endangered Species Act (ESA) (refer to Administrator Browner memos of October, 1993 and 1994). In order for EPA to comply with ESA Section 7, staff and management must know whether listed species exist within the effective range of any given action. This tabular database, maintained by the Office of Pesticides Programs, was updated in 1994 in cooperation with Office of Policy, Planning and Evaluation and the Endangered Species Coordinating Committee. The revision is complete and is being distributed to Regions and Headquarters Program Offices.

II. Tool Development

The project was completed in 1991/92 by a contractor to meet an agency need and support ecological objectives within OPPE and the Agency (e.g. Habitat Cluster). The project's EPA manager initially identified the need for this reference.

III. Tool Use

This reference is complete and has been "sold out" since soon after its availability; 50 completed copies and 150 summaries have been distributed, many to EPA Regions. This is a ready reference which has seen successful use in many applications both within EPA and at state and private levels. Much positive feedback; requests still being made.

IV. Special Requirements for Use

Technical/legal familiarity with the ESA.

V. Program/Regional Transferability

In its current form, this tool is directly usable by all programs, Regional Offices, and across all media.

VI. Other Information

This dataset will be continually updated by OPP and verified by the U.S. Fish and Wildlife Service; appropriate use is cautioned due to legal constraints.

VII. Contact Persons

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Larry Turner Office of Prevention, Pesticides and Toxic Substances, Office of Pesticides Programs, (202) 305-5007

HEADQUARTERS ECOSYSTEM TOOL INVENTORY

DATA COLLECTION, MEASUREMENT AND ASSESSMENT TOOLS

ADVANCE IDENTIFICATION OF DISPOSAL AREAS (ADID)

I. Tool Description

Advance Identification of Disposal Areas (ADID) is an advance planning process under which EPA, in cooperation with the Army Corps of Engineers and after consultation with the State, may identify wetlands and other waters which are either generally suitable or unsuitable for the discharge of dredged or fill material prior to the receipt of a Section 404 permit application.

The ADID process generally involves the collection and distribution of site-specific information on the functions and values of wetlands areas. This information provides the local community with information on the wetland areas that may be affected by their activities as well as a preliminary indication of the factors which are likely to be considered during review of a Section 404 permit application.

The ADID process is intended to add predictability to the wetlands permitting process as well as to better account for the impacts of wetlands losses from multiple projects within a geographic area. The process also informs the local population of the values and functions of wetlands in their area, and generates information valuable for other purposes. As of December 1992, there were 35 completed ADID projects, and 36 are ongoing.

II. Tool Users

States and localities. This process is most useful in the preparation of local development plans.

III. Tool Development

Under Section 230.80 of the Section 404 (b) (1) Guidelines, EPA and the Section 404 permitting authority can act jointly to identify aquatic sites likely to be generally suitable or unsuitable for all or certain types of discharge.

IV. Special Requirements for Use

Selection of sites for ADID should take into account the ecological and societal values associated with the site, and the threat(s) to the site.

V. Program/Media/Geographic Transferability

Data collected through the ADID process can be useful in more comprehensive watershed/regional planning efforts.

VI. Other Information

ADID development can be resource intensive, and funds available for the process are limited.

VII. Program Contacts

John Ettinger

Office of Water, Office of Wetlands, Oceans and Watersheds, Wetlands Division, (202) 260-1190

ADVANCED TECHNIQUES SUPPORT FOR USING SATELLITE AND AERIAL EARTH OBSERVATION DATA

I. Tool Description

OPPE has been playing a major role in interagency efforts for developing new techniques for applying satellite and aerial-based remote sensing data to a variety of ecological studies. The project involves a detailed comparative analysis of a variety of current civilian, military and commercial aerial and satellite sensor systems and their potential applicability for use in terrestrial and aquatic ecosystems. The project is also conducting research to determine the recommended spatial and spectral resolution, and temporal parameters such as optimal data acquisition time(s) for making measurements. Programmatic links through the conduct of this project provide an interface to the technology agencies such as NASA Commercial Remote Sensing Program, the DOE Advanced Remote Sensing Research Office, and DOD Environmental Program, and to the remote sensing applications groups within the mission agencies such as EPA, USGS, USFS, NBS, COE, SCS and USFWS.

II. Tool Users

The actual techniques identified or developed under this effort are intended for use by ecosystem or resource managers who need to map or monitor ecosystems. The results of the investigations are intended for use by policy analysts, ecosystem project managers and decision makers to augment their ground data collection efforts. The results are also useful for any ecosystem manager contemplating the use of wide-area assessment tools such as satellite imagery or aerial photography.

III. Tool Development

This work was initiated in FY94 and is slated to continue beyond FY95. The initial major sponsor of this effort is the DOD Environmental Program, in support of studying the de-classification issue of intelligence system data. DOD funded the effort for FY94 only; an Environmental Technology Initiative proposal is pending to continue the funding of this effort. ETI funding would link the results from the FGDC study, the DOD study and add a commercial component via the NASA Commercial Remote Sensing Program. If ecosystem managers are to use the new generation of high resolution "smallsats" that various international and commercial entities have proposed to launch within the next 2-5 years, it is necessary that we conduct our feasibility studies to determine their value to ecosystem analyses.

IV. Special Requirements for Use

The most difficult requirement for the use of remote sensing data is the need for skilled personnel to process and interpret the data. While the cost of image processing software now is very reasonable (under \$10K for "turn key" systems) and the cost of obtaining data is getting more affordable with increased competition and miniaturization of sensor systems. However, the technical skills required in this area typically take years to acquire. Ecosystem managers should learn the basics so that they can be an informed buyer of contracted support. Also, it is useful to work with other agencies to share the critical personnel resources and defray the costs of the study.

V. Program/Media/Geographic Transferability

The remote sensing techniques identified or developed in these projects can be used for making terrestrial and aquatic earth observations anywhere. Specific observables include vegetation and surface geomorphological (including hydrological) characterization, soil moisture and microtopography (very high precision terrain relief mapping). Atmospheric and oceanographic sensing techniques are NOT within the scope of these investigations.

VI. Other Information

VII. Program Contacts

Elizabeth D. Porter

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AERIAL PHOTOGRAPHY

I. Tool Description

When analyzed by skilled photo interpreters yields information on the location and distribution of natural and cultural resources on the earth's surface, and the change in these resources over time due to natural or man-made impacts. The tool is in continuous use in support of on-going EPA programs including: water, hazardous waste, and environmental assessment programs; enhancements to this tool by converting it to digital format are planned. This will make the tool suitable for use in Geographic Information Systems (GIS) and other spatial data analysis systems.

II. Tool Users

The intended and actual users of this tool and products/services derived from the use of the tool are EPA regional and program offices, particularly the water, hazardous waste management, and EMAP program offices.

The tool is used to provide the EPA offices the following products and services: fully-illustrated, site-specific photo analysis reports containing aerial photographs and image analysis overlays; emergency response through the documentation of events and conditions using new aerial photographs; enforcement support in the form of expert image analyst witness testimony to support EPA cases; courtroom documents in the form of aerial photos illustrating site conditions; thematic maps made from aerial photo analysis showing the location and distribution of topographic maps; accurate measurements (using photogrammetry) of dimensions of features such as heights, depths, volumes of material, etc..

Within the EPA the tool has been used for the past twenty years. Regular feedback has been received from our EPA customers both formally and informally. With each aerial photo analysis report we include a return addressed critique sheet requesting the customer to rate the product on quality, and timeliness of delivery for meeting their needs.

III. Tool Development

This tool was originally developed back in the mid-1800's, but has undergone substantial improvements over the years. Initially available as a black & white image only, natural color, and b&w infrared, and color infrared have also come into use and increased the ability of man to see beyond the visible spectrum seen by the naked eye.

The tool, originally developed by private industry, has evolved substantially through the needs of the military for reconnaissance, mapping, and military intelligence gathering purposes. Within EPA the tool is used by EPA and support contractor staff who are multidisciplined natural resource scientists. These scientists are involved in enhancing the use of the tool through the acquisition and use of new equipment for making accurate measurements on aerial photographs (photogrammetry), and for converting the tool to digital form for use in computerized spatial data analysis systems.

Within EPIC, approximately 10 government FTE, and 30 contractor staff use the tool and related technology, and about \$4,000,000 is spent annually to develop and apply the tool to EPA's needs.

The use of this tool is continually being improved, i.e., improved hardware and software for maximizing the information which can be extracted from the photographs and improved derivation products and services to meet changing customer needs. There is a need to upgrade and/or evaluate new technology

when it comes on line, to ensure that the use of the technology is maximized for meeting EPA's requirements.

IV. Special Requirements for Use

The use of this tool requires skilled professional scientists trained in the field of remote sensing and image analysis. Natural resources scientists in the fields of biology, botany, geology, geography, ecology, and other fields normally provide a multi-disciplined approach to the use of the technology. They are natural resources scientists first, who require special academic and professional training in the field of remote sensing including image processing and image analysis, specifically aerial photo interpretation. The tool also requires the use of specialized equipment such as variable illumination light tables, zoom stereoscopes, and photogrammetric measuring devices. If converted to the digital realm the use of the tool can be maximized through the application of image processing software and hardware, and integration of the tool into spatial analysis systems such as GIS. Also, related professional and technical skills needed to maximize the use of the technology include photogrammetrists, cartographers, computer scientists, and GIS specialists, as well as those knowledgeable of global positioning and georectification.

V. Program/Media/Geographic Transferability

The tool is especially a cross-media tool which has broad application to water, land, and air program needs. The tool has traditionally and is currently used to support a wide variety of EPA programs. Being a spatial (geographic) tool with variable scale it has use from very detailed site-specific applications to the broader regional and even global applications.

VI. Other Information

The aerial photograph has great flexibility as an ecosystem management tool. It is one of the few tools and may be the only tool available) which show ecosystems as they exist today, and through historical records, how they looked up to fifty years in the past. For this reason it is an excellent change detection tool for illustrating both natural and man-made impacts on environments and ecosystems, and for documenting baseline conditions at a specific point in time and space and to assess future change.

VII. Program Contact

Donald Garofalo ORD, EMSL-LV/Environmental Photographic Interpretation Center (EPIC),
environmental monitoring and assessment programs (703) 342-7503

ASSESSMENT OF UNCERTAINTIES AND VARIABILITY IN WILDLIFE TOXICITY DATA

I. Tool Description

This assessment of the uncertainty and variability in wildlife toxicity data will be prepared so that it can be consulted to determine appropriate extrapolation factors when the effects of chemicals on wildlife species are an important stressor to consider in carrying out an ecological risk assessment.

II. Tool Users

EPA Program offices (e.g. OW, OSWER, OPPT); other Federal Agencies (U.S. Fish and Wildlife Service, Department of Defense, Department of Energy, Department of Commerce); State, local, and Tribal governments

III. Tool Development

The Office of Water began this effort in FY 92 with limited funds and is currently seeking approximately \$40K in additional funding to complete the project and prepare a guidance manual.

It is hoped that a guidance document (and a scientific paper prepared for publication in a peer-reviewed journal) will be prepared by the end of FY95. If adequate funds can be found, the guidance manual can include separate chapters describing its use within the Agencies different program offices.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

This tool has no programmatic or geographic limitations in its application.

VI. Other Information

VII. Program Contacts

Cynthia L. Nolt Office of Water, Office of Science and Technology, (202) 260-1940

COMPUTER APPLICATIONS FOR ENFORCEMENT TARGETING FOR ECOSYSTEM PROTECTION

I. Tool Description

This set of tools consist of several different computer applications for geographic targeting to focus pollution prevention and enforcement activities on the protection of ecologically sensitive areas. The purpose of these tools is to geographically assess the potential impacts of EPA regulated facilities on sensitive ecological areas. These computer applications will help identify facilities for source reduction, technical assistance, multimedia inspections, and compliance activities.

The tool consist of three types of computer applications:

- use of ARC/INFO GIS computer software for mapping and spatial analysis;
- the retrieval and formatting of EPA program data sets for use in GIS applications;
- air and water diffusion modeling to determine the extent of dispersion of key contaminants within the environment.

II. Tool Users

This enforcement targeting tool will be used by EPA Regional Office and perhaps State enforcement staff to assist in developing an enforcement and compliance assistance agenda. Once the tool is developed, Regional Office staff will be able to log on from their PCs and retrieve information from EPA's program databases on the agency's mainframe computer. This information will be automatically reformatted into a spatial/mapping configuration for use with currently available ARC/INFO software.

Once the computer applications are all in place EPA will sponsor one or more application development workshops to obtain feedback on the quality of the applications and map products.

III. Tool Development

This set of tools is in the process of being developed. The idea for the tool originated from the Edgewater Consensus meeting in March 1994 as a way to focus EPA problems and activities in geographic places.

The tool is being developed by a contractor (contract #68-W1-0055; delivery order #65) through a joint funding project between the Office of Policy, Planning and Evaluation (OPPE) and the Office of Enforcement and Compliance Assistance (OECA). Cost for development of the tool and map production is currently at \$260,000.

IV. Special Requirements for Use

There are no special requirement for use for this tool. Currently all EPA Regional Offices have ARC/INFO application software. There will be no cost to users.

V. Program/Media/Geographic Transferability

Since these tools are being designed for multi-media analysis, it can be used by any EPA program, for any media, or any geographic area.

VI. Program Contacts

Tom Born Office of Policy, Planning and Evaluation, Office of Strategic Planning and Environmental Data, Strategic Planning and Management Division, (202) 260-4905

CONSTRUCTION OF AQUATIC-BASED FOOD WEBS

I. Tool Description

Ecological risk assessments are becoming more widely accepted and incorporated into the programs of EPA and other Federal agencies. As Agencies and offices attempt to extrapolate the impacts of contaminants to higher-trophic level consumers, quantification of exposures of higher-level consumers is an essential element in assessing the impacts of chemical stressors on wildlife species. This tool provides a compilation of the quantitative exposure parameters of wildlife species and estimations of their trophic levels and the variability associated with these estimates.

II. Tool Users

EPA Program offices (e.g. OW, OSWER, OPPT); other Federal Agencies (U.S. Fish and Wildlife Service, Department of Defense, Department of Energy, Department of Commerce); State, local, and Tribal governments.

III. Tool Development

This Office of Water effort grew out of the joint OW, ORD, OSWER preparation of the EPA document: *Wildlife Exposure Factors Handbook* (EPA/600/R-93/187a&b).

It is hoped that a guidance document will be prepared by the end of FY95 which will present the information compiled and appropriate extrapolation techniques. If adequate funds can be found, the guidance manual will include separate chapters describing its use within the Agencies different program offices.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

This tool provides some of the essential information to derive wildlife criteria appropriate for different geographic areas.

VI. Other Information

VII. Program Contacts

Cynthia L. Nolt Office of Water, Office of Science and Technology, (202) 260-1940

CULTURE AND TEST METHODS

I. Tool Description

A variety of culture and test methods have been developed for representative bay and estuarine fish and invertebrates species. Most, but not all, have been published in ASTM, official EPA methods manuals that support the NPDES Permitting process, the California Water Plan methods manual, and others are published in scientific journals.

II. Tool Users

Intended and actual users are mainly government and industry representatives. The tools are used to determine (a) if an effluent may pose an environmental risk, (b) what concentrations of toxic chemicals/pesticides may be harmful to individual organisms, populations, and/or communities, (c) determine the cause of environmental deterioration, etc.

Feedback has been positive.

Additional test methods/procedures are needed to determine effects of effluents on reproductive processes in fish and invertebrates. Indicator species should be available, along with testing protocols for Arctic/sub-arctic estuaries and near shore environments; e.g., Prince William Sound, Alaska; Barents Sea, Russia.

III. Tool Development

This is an on-going process. These tools were/are developed mainly in-house with assistance from university cooperators.

IV. Special Requirements for Use

Needs depend on the specific method(s) and organism(s) used.

V. Program/Media/Geographic Transferability

Transferrable to the extent that the test species are representative of the area of interest, or interspecies correlations exist.

VI. Other Information

EPA's Gulf Breeze laboratory studies ecosystem processes in order to understand and solve near-coastal environmental problems resulting from toxic chemicals, pesticides, pathogens, and introduced organisms.

VII. Program Contact

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ORD, Office of Environmental Processes and Effects Research; ERL - Gulf Breeze, FL., (904) 934-9310

CWA SECTION 106 GUIDANCE FOR WATER QUALITY MONITORING

I. Tool Description

The CWA Section 106 Guidance for Water Quality Monitoring was developed to promote and support EPA's multi-year State monitoring strategy. The overall monitoring strategy includes monitoring for the purposes of 1) determining status and trends, 2) identifying causes and sources of problems and ranking them in priority order, 3) designing and implementing water management programs, 4) determining compliance and program effectiveness, and 5) responding to emergencies. The multi-year State monitoring strategy called for in the Section 106 guidance will bring the agency's State partners into this multi-scale framework.

The Section 106 Guidance is a key tool in OW's efforts to work with agency partners to improve the water quality monitoring across the country and meet a number of monitoring program goals, including:

- monitoring more of our waters, but do so more cost-effectively by employing monitoring techniques appropriate to the condition of and goals for the water;
- greater comparability in monitoring parameters and methods;
- reporting of water quality using common indicators to measure our progress toward meeting our agreed-upon water quality goals;
- working more closely and share information more easily with our many public and private monitoring partners.

The 106 guidance supports all these efforts, and is a tool that can be effectively used in working with States to revitalize monitoring programs and report core information in a comparable fashion.

II. Tool Users

State and Regional monitoring agencies.

III. Tool Development

The Assessment and Watershed Protection Division (AWPD) in the Office of Wetlands, Oceans and Watersheds, has worked on this guidance with members of the Intergovernmental Task Force on Monitoring Water Quality, whose framework for water quality monitoring programs this incorporates, and also with members of the Association of State and Interstate Water Pollution Control Administrators. AWPD has worked with individual State staff, with Regional Monitoring Coordinators, Water Quality Branch Chiefs and Field Branch Chiefs, and members of various water programs within the Office of Water.

IV. Special Requirements for Use

Regions will need to work with States; States will need to have personnel available to develop the strategy and implement it.

V. Program/Media/Geographic Transferability

Transferable nationwide; aspects of it can be used for all water monitoring activities.

VI. Other Information

VII. Program Contacts

Mary Belefski

Office of Water, Office of Wetlands, Oceans and Watersheds, Assessment and Watershed Protection Division, (202) 260-7061

EMAP'S ECOLOGICAL INDICATORS FOR AQUATIC SYSTEMS

I. Tool Description

Ecological Indicators for Aquatic systems of biological integrity for lakes, streams, and wetlands are being developed as part of the EMAP Surface Waters program. These indicators have their basis in the concepts of the RBPs developed by the Office of Water and are refinements of the same approach. Reference conditions will be defined for ecoregions across the country as a yardstick against which to compare results of monitoring efforts by the regions and states.

II. Tool Users

The indicators have been evaluated in EPA Regions I & II for lakes and Regions III, IV, VII, VIII, IX, and X for streams. Wetland indicators are being developed for the Prairie Pothole area in the upper midwest.

III. Tool Development

The total cost to develop the protocols to date has been approximately 2 million dollars.

IV. Special Requirements for Use

Minimal training in field biology is required to use the field protocols.

V. Program/Media/Geographic Transferability

Intentions are to define the indicators for each region but have them available for the entire United States.

VI. Other Information

VII. Program Contacts

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ECOREGIONS

I. Tool Description

A hierarchical framework of ecological regions has been developed for the continental United States. Two hierarchical levels have been mapped for the U.S., and more detailed maps depicting a third level of regions, boundary transition widths, and locations of sets of regional stream "reference sites" have been prepared for some States and ecoregions. These ecoregions are based on patterns of combinations of geographic characteristics that cause or reflect spatial differences in the quality and quantity of ecosystems and their components. The approach is similar to that developed in Canada to compile a small-scale map of Ecological Areas of the two countries. Development of a complete map of North American Ecological Areas (to include Mexico) is underway.

The intended use is to provide spatial structure for the research, assessment, management, and monitoring of ecosystems and their components. Need for the framework exists at all scales. Immediate applications of the North American Ecological Areas map include regionalizing North American Free Trade Agreement (NAFTA) decisions that may have an effect on environmental quality, and evaluating the representativeness of "protected areas" internationally, particularly in ecological regions that cross international boundaries.

II. Tool Users

This tool was originally developed to provide a mechanism to allow state and regional water quality resource managers to structure their regulatory programs more effectively, (in tune with the regional tolerances and resiliency of the environment), the maps provide a critically needed means to effectively set goals and strategies for managing ecosystems at all scales.

Continued collaboration with state and regional resource management agencies in development and refinement of the regions at all scales, and clarification of ecoregion boundary transition widths, is necessary to meet the programmatic needs of state and national resource management agencies.

III. Tool Development

The underlying scientific basis for the EPA ecoregion approach has been widely reviewed and accepted. The original ecoregion map and explanatory text appeared in the Annals of the Association of American Geographers in 1987. More than fifteen papers on the approach and its evaluation and application have appeared in the peer review literature. The EPA Science Advisory Board reviewed the program in the 1991 Report on Evaluation of the Ecoregion Concept and strongly endorsed the approach stating, "The Ecoregion Concept is a defensible classification technique for large areas that is superior to the classification methods that are currently being used by most environmental managers". They added that it is "one of the few techniques available to address ecological issues on a broad regional and global scale that is needed to reduce ecological risk". The total cost (EPA salary and extramural support) to develop the ecoregion maps to their current state is approximately \$1,500,000.

IV. Special Requirements for Use

No special requirements required for use.

V. Program/Media/Geographic Transferability

There are existing and potential uses for this tool on an international, national, regional, and local level.

VI. Other Information

One of the strengths of the ecoregion framework lies in the spatial consistency in its development, and therefore, usefulness across political boundaries. This allows management agencies to share one another's ecoregional reference site information and to calibrate sampling methods by natural rather than political region. Because the regions are based on spatial coexistence in a combination of landscape characteristics, with the relative importance of each characteristic varying from one region to another, careful coordination in the development of the framework is imperative. ERL-Corvallis has coordinated the effort to prevent creation of a less useful patchwork quilt-type map, such as those developed by multiple authors each with their regional and subject bias.

VII. Program Contacts

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ENVIRONMENTAL MONITORING AND ASSESSMENT PROGRAM (OVERALL PROGRAM)

I. Tool Description

The Environmental Monitoring and Assessment Program (EMAP) is an innovative multiagency monitoring assessment and research program designed and organized to provide decision-makers with reliable, scientifically-sound data and integrated ecological risk assessments on which to base environmental and risk management decisions. EMAP provides a framework for collaboration among 17 Federal agencies.

II. Tool Users

EPA Regional offices, states, local agencies, public, NGOs, and other Federal agencies. EMAP has been providing reports and scientific techniques since FY 1991. States and National Estuary Programs for instance have adapted our monitoring design and methods to save themselves time and money. The scientific community has reviewed our accomplishments. For instance, the American Statistical Association's (ASA) Section on Statistics and the Environment presented Distinguished Achievement Awards to three EMAP statisticians for their environmental monitoring design and statistics efforts.

III. Tool Development

EMAP's development responds directly to the Agency's Science Advisory Board's 1988 and 1990 recommendations that the Agency initiate a program to monitor and assess ecological status and trends, develop ecological indicators and provide data and analytical methods that support comparative ecological risk assessment.

EMAP continues to conduct research through demonstration projects across the nation to monitor and assess the condition of biogeographic provinces and ecosystems. The Program is participating in an integrated ecological assessment of the Mid-Atlantic Highlands region. Intensive research efforts to refine the use of biological and ecological indicators, information management, methods, sampling design and other integrating components of the program continue. The Agency is maintaining the quality of EMAP science as the Program proceeds.

The EMAP was developed by EPA's Office of Research and Development in conjunction with participating Federal agencies (from the Departments of Agriculture, the Interior, Energy and others). EMAP's budget in Fiscal Year 1994 was 39.3 FTE and \$37.1 million extramural.

IV. Special Requirements for Use

EMAP products are available to resource managers, decision makers and the scientific community and are designed for these clients, with consideration of their background and needs. No special requirements are needed.

V. Program/Media/Geographic Transferability

This tool is highly transferable.

VI. Other Information

Most notable FY 1994 accomplishments of value to the states and regions:

- Assisted the Tampa Bay National Estuary Program (NEP) and the Galveston Bay National Estuary Program in the design of monitoring systems using EMAP technology. This saved them from the costly task of developing a monitoring design.

- Aided the Alabama Department of Environmental Management in developing a state-wide estuarine monitoring plan. Their plan is based on the EMAP-Estuaries Louisianian Province design.
- Assisted and acted as a catalyst for the development of a collaborative and cooperative effort that created a regional monitoring partnership in the Southern California Bight.
- Three of the ten EPA Regions have used EMAP-Estuaries protocols and its design to evaluate estuarine condition under projects in the Regional EMAP.
- Six of the ten EPA Regions have used EMAP protocols and its design to evaluate lake and stream condition under projects in the Regional EMAP.
- The State of Delaware conducted a survey of streams using EMAP-Surface Waters biological protocols and probability design and obtained new and different results by using the EMAP design.

Most notable FY 1994 accomplishments of value to the Agency's Regulatory Program Offices:

- EMAP-Estuaries and Surface Waters conduct analyses for pesticidal, organic, and metal compounds. Data is provided on pesticides found in sediments, fish and shellfish tissue. EMAP activities provide aquatic effects monitoring data and information, such as describing conditions of Northeastern lakes and evaluating responses of Northeastern lakes and Mid-Atlantic Highlands streams to acidic precipitation.
- EMAP developed indicators of ecological condition and indicator protocols for aquatic life use support and fish and shellfish consumption. Data was provided for the 1994 305(b) Report to Congress. Guidance was provided on designing cost-effective projects for sampling procedures and monitoring techniques of ambient conditions in lakes, streams, and wetlands.
- EMAP is making the most of available resources through partnership agreements. We continue to refine the usage of indicators, biological and chemical methods, information management, and statistical sampling design to improve the monitoring and assessment of terrestrial and aquatic ecosystems capabilities.

VII. Program Contact

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EQUILIBRIUM PARTITIONING APPROACH FOR THE DEVELOPMENT OF SEDIMENT QUALITY CRITERIA FOR METALS: Lead, Nickel, Zinc, Copper, Cadmium

I. Tool Description

This tool outlines the theory, research, assumptions, and uncertainties behind the equilibrium partitioning theory as it applies to divalent cationic metals evaluating sediments and deriving sediment quality criteria. The method provides for the evaluation of any sediment for its potential impact on benthic organisms by the five divalent cationic metals: lead, nickel, zinc, copper, and cadmium.

The methodology is applicable to the five metals (lead, nickel, zinc, copper, cadmium) in any sediment. It allows the comparison of sediment toxicity due to these metals across sediment types by accounting for the bioavailability of the metals in the sediment.

II. Tool Users

This methodology is designed for use by Region and State surface water regulators in the NPDES program. Is also being used by industry, public, and environmental groups to evaluate sites.

III. Tool Development

The methodology is being presented to the EPA Science Advisory Board in January, 1995. Their recommendations will be incorporated and research needs addressed before advancing the method to draft criteria document(s).

Resources: Development of the proposed method required the involvement of five EPA Environmental Research Laboratories, two contractors and several subs, and four universities over approximately 7 years. EPA (Headquarters and Labs) FTE's: 2/year
Extramural: 300K/year

IV. Special Requirements for Use

V. Program/Media/Geographic Transferability

The method has been picked up by Superfund and RCRA to assist with site evaluation and determination of remediation alternatives. It is intended for use in the Dredging Program as well.

VI. Other Information

VII. Program Contacts

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Division, (202) 260-9456

EQUILIBRIUM PARTITIONING APPROACH FOR THE DEVELOPMENT OF SEDIMENT QUALITY CRITERIA FOR NON-IONIC ORGANIC CONTAMINANTS FOR THE PROTECTION OF BENTHIC ORGANISMS

(TECHNICAL BASIS DOCUMENT)

I. Tool Description

This tool outlines the theory, research, assumptions, and uncertainties behind the equilibrium partitioning theory and how it applies to evaluating sediments and deriving sediment quality criteria. The method provides for the evaluation of any sediment for its potential impact on benthic organisms by non-ionic organic contaminants.

This ecological risk assessment methodology is broadly applicable to non-ionic organic contaminants in any sediment with total organic carbon greater than 0.2%. It allows the comparison of sediment toxicity across sediment types by accounting for the bioavailability of the contaminant of concern in the sediment.

II. Tool Users

The tool is designed for use by Region and State surface water regulators in the NPDES program. It is also being used by industry, the general public, and environmental groups to evaluate sites.

III. Tool Development

Status: The method was made available for public comment in January, 1994. Public comment ended in June 1994; comments have been compiled and responses are being prepared. Anticipate final document in approximately 1 year.

Development of the method required the involvement of five EPA Environmental Research Laboratories, two contractors and several subs, and four universities over approximately 7 years. EPA (Headquarters and Labs) FTE's: 2/year Extramural: 200K/year.

IV. Special Requirements for Use

V. Program/Media/Geographic Transferability

The method has been picked-up by the Superfund and RCRA programs to assist with site evaluation and the determination of remediation alternatives. The tool also is intended to be used in the Dredging Program as well.

VI. Other Information

VII. Program Contacts

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Division, (202) 260-9456

GUIDANCE FOR STATE WATER MONITORING AND WASTELOAD ALLOCATION PROGRAMS, EPA 440/4-85-031, October 1985.

I. Tool Description

The first part of the document outlines the objectives of the water monitoring program to conduct assessments and make necessary control decisions. The second part describes the process of identifying and calculating total maximum daily loads and waste load allocations for point and nonpoint sources of pollution.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof. Since 1983, the primary impetus for developing the guidance is the need to provide the technical and management tools for States to use in meeting statutory requirements and Agency programmatic priorities. Thus the guidance focused first on conventional pollutants, then toxics and now nonpoint sources and other wet weather discharges.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, nonpoint sources and background loadings (from non-controlled sources such as atmospheric deposition and sediment). The TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. The TMDLs maximize real environmental gains and minimize the need for unnecessary regulation.

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied Science
Division, (202) 260-1330

GULF OF MEXICO ESTUARINE ASSESSMENT TOOLS

I. Tool Description

A variety of diagnostic tools have been used during the past two years to assess the ecological condition of estuaries in the Gulf of Mexico. Tools include a combination of laboratory and field assessment methods that monitor the responses of single species, populations and communities of plants, animals and invertebrates to point and non-point source pollutants. Standard and innovative structural and functional community end-points are being evaluated, as well as biochemical, histopathological, and immunological biomarkers. The diagnostic techniques and assessment protocol developed in this research program will be used by State, Federal and U.S.EPA regional offices to manage the natural resources associated with Gulf of Mexico nearshore areas.

II. Tool Users

The ecological assessment tools and associated protocol will be used by U.S.EPA Regional and Program Offices and regional state environmental departments to conduct watershed and regional risk assessments for coastal nearshore areas. An advisory committee has been assembled which provides annual input on research progress, results and future direction. The Committee consists of Federal, state, academic and industrial representatives.

III. Tool Development

Ecological assessment of several geographic areas in the Gulf of Mexico has been in progress for two years. This research was initiated due to the belief that the ecological condition of Gulf of Mexico estuaries is deteriorating although scientific evidence for this conclusion is scattered and sometimes inconsistent. The usefulness of the protocol would be enhanced by applying it to additional geographic areas, particularly reference estuaries. The lack of a validated and pragmatic estuarine assessment protocol for these estuaries contributes to the uncertainty of the extent and cause(s) of the deterioration. A combination of in-house expertise, contract personnel, and cooperative research has been used to assess and develop the diagnostic techniques. Approximately \$1,000,000 per year is used to fund this project. The number of FTE's conducting research range from 3 to 8. Continued funding at current rate is needed for next 3 years to fulfill goals.

IV. Special Requirements for Use

Goal is to provide a protocol that requires minimal technical expertise. Familiarity with standard biological and sediment collecting equipment is necessary.

V. Program/Media/Geographic Transferability

The diagnostic tools and protocol developed can be used by several EPA programs and for several coastal areas. For example, the assessment protocol can be used for any shallow bay or estuary.

VI. Other Information

The goals of this program are: 1) to define a set of ecological assessment methods to describe the condition of Gulf of Mexico estuaries; 2) to identify, characterize and determine cause of observed problems and; 3) to develop a diagnostic protocol and field test its applicability and predictive value in Gulf of Mexico demonstration sites.

VII. Program Contact

Dr. Michael Lewis ORD, Office of Environmental Processes and Effects Research; ERL - Gulf Breeze, Fl., (904) 934-9382

**HANDBOOK - STREAM SAMPLING FOR WASTE LOAD ALLOCATION APPLICATIONS,
EPA 625/6-86/013, September 1986.**

I. Tool Description

Provides guidance on the development of wasteload allocations, including the design of stream surveys to support modeling applications for waste load allocations. It describes the data collection process for model support, and it shows how models can be used to help stream surveys. In general, the handbook is for field personnel on the relationship between sampling and modeling requirements.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof. Since 1983, the primary impetus for developing the guidance is the need to provide the technical and management tools for States to use in meeting statutory requirements and Agency programmatic priorities. Thus the guidance focused first on conventional pollutants, then toxics and now nonpoint sources and other wet weather discharges.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, nonpoint sources and background loadings (from non-controlled sources such as atmospheric deposition and sediment). The TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. The TMDLs maximize real environmental gains and minimize the need for unnecessary regulation.

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-1330

THE HAZARD RANKING SYSTEM (HRS) AND SENSITIVE ENVIRONMENTS

I. Tool Description

The Hazard Ranking System (HRS) is the primary screening tool for determining whether a site is to be included on the National Priorities List (NPL). An HRS score for a site is determined by evaluating four pathways (e.g., ground water migration, surface water migration, soil exposure, and air migration). The HRS was published as a Federal regulation on December 14, 1990 (55 *Federal Register* 51532).

The HRS evaluates environmental threat in all pathways except ground water for a specified set of sensitive environments that meet certain criteria. Sensitive environments include: those defined by statute (e.g., National Parks, Designated Federal Wilderness Areas); and those sites that meet a particular classification (e.g., spawning areas critical for the maintenance of fish/shellfish species, habitat known to be used by a proposed Federal endangered species) or statutory definition (e.g., wetlands) but are not delineated by statute.

II. Tool Development

The Federal Register rule resulted from the Superfund Amendments and Reauthorization Act (SARA) of 1986.

III. Tool Users

People who prepare or review HRS packages.

IV. Special Requirements for Use

HRS course training.

V. Program/Media/Geographic Transferability

Transferability unknown.

VI. Other Information

The Hazard Ranking System Guidance Manual (EPA540-R-92-026/OSWER Directive 9345.1-07) provides general and technical guidance for individuals involved in determining HRS scores and preparing HRS scoring packages. Appendix A of this Manual pertaining to sensitive environments contains working definitions of all the sensitive environments listed in HRS Tables 4-23 and 5-5, as well as wetlands.

VII. Program Contacts

Youlanda Ting Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response, Hazardous Site Evaluation Division, (703) 603-8835

Sharon Frey Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response, Hazardous Site Evaluation Division, (703) 603-8817

INLAND TESTING MANUAL FOR EVALUATION OF DREDGED MATERIAL

I. Tool Description

This document provides guidance on evaluating contaminated dredged material for discharge in open water. The tiered testing framework provided in the document is designed to evaluate both the human health and ecosystem impacts of discharging contaminated dredged material into fresh water bodies, estuaries, and near coastal waters. Mixing zone models are also provided for instantaneous discharge of dredged material. The final guidance is expected to be completed by April, 1995.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel.

III. Tool Development

More than ten Federal statutes provide authority to many EPA program offices to address the problem of contaminated sediment. This resulted in fragmented, and in some cases contradictory or duplicative efforts to evaluate and manage contaminated sediments. EPA developed the Contaminated Sediment Management Strategy to streamline decision-making within and among EPA's program offices by promoting and ensuring the use of consistent sediment assessment practice, consistent consideration of risks posed by contaminated sediment, the use of consistent approaches to management of contaminated sediment risks, and the wise use of scarce resources for research and technology development.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

Applicable to other media and a wide range of ecosystems.

Contaminated sediment poses ecological and human health risks in many watersheds throughout the United States. Sediments serve as a contaminant reservoir from which fish and bottom dwelling organisms can accumulate toxic compounds and pass them up the food chain until they accumulate to levels that may be toxic to humans. Significant ecological impacts are also reported at contaminated sediment sites, including impairment of reproductive capacity, and impacts to the structure and health of benthic and other aquatic communities.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Tom Armitage	Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-5388
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INTEGRATED ATMOSPHERIC DEPOSITION NETWORK

I. Tool Description

The Integrated Atmospheric Deposition Network is designed to assess the status and trends of atmospheric deposition on the Great Lakes. To collect this data, the project establishes a series of atmospheric deposition monitoring stations in the Great Lakes, with one master station assigned to each lake. The United States is responsible for operating three master monitoring stations and Canada operates two stations in the remaining lakes. Data from all five stations will then be combined for an overview of the entire Great Lakes area.

II. Tool Users

Users of this information include EPA's Great Lakes National Program Office (GLNPO) and State officials.

III. Tool Development

This network was mandated by the US - Canada Great Lakes Water Quality Agreement (Annex 15) and a deadline was set for the first site on each lake in the Clean Air Act Amendments of 1990 (CAA).

In fiscal year 1993, the Office of Air Quality Planning Standards (OAQPS) devoted \$900,000 to this project (this project was a specific budget item for OAR and GLNPO in 1993). In fiscal year 1994, OAQPS devoted \$300,000 in CAA Section 105 funds and \$265,000 in AC&C funds on this project. OAQPS estimates that it will spend approximately \$600,000 in CAA Section 105 funds in fiscal year 1995.

IV. Special Requirements for Use

No special requirements for use.

V. Program/Media/Geographic Transferability

Transferability unknown.

VI. Program Contacts

Jackie Bode Great Lakes National Program Office (312) 886-4064.

METHOD TO DERIVE WILDLIFE CRITERIA

I. Tool Description

Wildlife criteria are an essential tool for determining impacts of chemical stressors in ecological risk assessments, including impacts on endangered species. The purpose of the methodology is to provide guidance for deriving acceptable water or tissue concentrations of bioaccumulative chemicals to protect higher-trophic levels of aquatic and terrestrial food webs.

A wildlife criteria method for deriving water concentrations of bioaccumulative pollutants safe for higher-trophic level consumers which feed out of the aquatic food web will be applied to derive wildlife criteria in the Great Lakes Water Quality Initiative (GLWQI). The GLWQI will be promulgated in March 1995.

II. Tool Users

Program offices, states, other Federal agencies and tribal governments can apply method to determine potential for impacts of bioaccumulative chemicals on higher trophic levels in a food web.

III. Tool Development

Approximately \$500,000 in contractor resources and a minimum of 1 FTE at the Headquarters level, as well as fractions of FTE in the Office of Research and Development are needed to continue development of national guidance for derivation of chemical-specific criteria for protection of higher-trophic level consumers from bioaccumulative chemicals.

IV. Special Requirements for Use

V. Program/Media/Geographic Transferability

This tool can be used by other program offices to derive water concentrations and with slight modifications applied to other media such as tissue concentrations or soil concentrations to protect ecosystems. Application to other geographic areas can also be easily incorporated into the proposed method by modifying the specific species whose exposures are considered in applying the method.

VI. Other Information

The Office of Water has a small effort to provide national guidance for the derivation of wildlife criteria at the Federal level.

VII. Program Contacts

Cynthia L. Nolt Office of Water, Office of Science and Technology, (202) 260-1940

Steve Bradbury Office of Research and Development, Environmental Research Laboratory-Duluth,
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METHODS FOR EVALUATING THE ATTAINMENT OF CLEANUP STANDARDS

I. Tool Description

The tool is a three-volume set of documents describing Statistical Methods for Evaluating the Attainment of Cleanup Standards. These methods are intended to assist address the question of whether a Superfund site has been cleaned to the required level. Volume I gives procedures for soil samples compared to a fixed standard, volume II does the same for ground water samples, and volume III returns to soil samples compared to a reference-based standard.

II. Tool Development

The three documents were developed over a period of about three years by several different contractors. The series originated from queries that would be received by phone from regional offices inquiring how sampling could be employed to determine if cleanup had been attained. Currently an effort is underway by Battelle Northwest Labs to develop an executive summary with case studies. This executive summary will be ready in early 1995, and will be issued in both paper and CD-ROM format.

III. Tool Use

The tool was intended for use by regional Superfund officials, enforcement officials, and the regulated industry. Based on user feedback, it appears that the tool is indeed being used in the Regions as the standard to measure the sufficiency of the cleanup. The tools are also used by regulated industry and by their attorneys.

ESID has developed the three volumes such that they are useable without specific special training. While not absolutely necessary, a workshop describing how to apply the methods would be helpful and is currently being developed. In the mean time, office personnel can provide guidance to users if statistical questions arise.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

The methodology in this tool is fully transferable to any geographic Superfund site in any region. The statistics involved are not esoteric, however this tool is an effort to tailor them exactly to Superfund applications. Because of this fine tailoring, this tool is not directly usable by other media or programs.

VI. Other Information

VII. Contact Person

Barry Nussbaum

Office of Policy, Planning and Evaluation, Office of Strategic Planning and Environmental Data, Environmental Statistics and Information Division, (202) 260-1493

MOLECULAR CHARACTERIZATION OF ESTUARINE MICROORGANISMS

I. Tool Description

Molecular characterization of estuarine microorganisms:

Microbial communities are largely responsible for degradation of pollutants in the aquatic environment. Different molecular tools are being used to identify the types and functions (activities) of different microorganisms in this dynamic process. Isotopic ratios of different chemicals can identify the origin and fate of nutrients and pollutants and their interaction with specific microorganisms. Ribosomal RNA probes for specific microorganisms are used to provide precise phylogenetic determinations, to detect changes in microbiota and to characterize effects of environmental stress on microbial communities.

II. Tool Users

Intended and actual users are government, academia and industry. Probes may also be used in phylogenetic/taxonomic studies and the development of reagents for rapid and sensitive detection of target microorganisms.

Isotopic ratio studies are still developing with great promise. RNA probes are increasingly widespread throughout microbial ecology.

Developing models for microbial community dynamics; optimize sensitivity of probes would enhance this tool..

III. Tool Development

Recently-developed tools were originated as part of program (Pesticides and Toxics) needs to identify "ecological" level, microbial community impacts of toxics and biotechnology products.

Developed in part by EPA and in part by cooperative agreements.

IV. Special Requirements for Use

Dependent on intended application; isotopic ratio studies require specialized mass spectrometer, RNA probes require nucleic acid sequence databases.

V. Program/Media/Geographic Transferability

Transferability unknown.

VI. Other Information

This laboratory studies ecosystem processes in order to understand and solve near-coastal environmental problems resulting from toxic chemicals, pesticides, pathogens and introduced organisms.

VII. Program Contact

Dr. Rick Coffin ORD, Office of Environmental Processes and Effects Research; ERL- Gulf Breeze, Fl., (904) 934-9255

NUTRIENT THRESHOLD ASSESSMENTS TECHNIQUES AND THEIR USE IN DEVELOPING SITE SPECIFIC WATER QUALITY CRITERIA IN FRESHWATER ECOSYSTEMS

I. Tool Description

This document summarizes the rationale used by EPA in the development of the criteria for ammonia, nitrates/nitrites, and phosphorus. Also provided is a detailed matrix and a summary of the nature of the criteria used by the states. Examples have been included that demonstrate the procedures used by the State of Colorado for developing waste load allocations and loading limitations for three reservoirs. This tool will be completed in FY 1996.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof. The documents listed support the managerial and technical components of the TMDL process. Since 1983, the primary impetus for developing the guidance is the need to provide the technical and management tools for States to use in meeting statutory requirements and Agency programmatic priorities. Thus the guidance focused first on conventional pollutants, then toxics and now nonpoint sources and other wet weather discharges.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, nonpoint sources and background loadings (from non-controlled sources such as atmospheric deposition and sediment). The TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. The TMDLs maximize real environmental gains and minimize the need for unnecessary regulation..

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-1330

PATHOLOGY OF MARINE AND ESTUARINE ORGANISMS TOOL

I. Tool Description

Histopathology is a well-recognized and well-documented tool for evaluation of effects of environmental toxicants and carcinogens. Occurrence of infectious diseases in natural populations is usually coincident with a deteriorating environment. Pathological studies include gross, histologic and electron microscopical examinations at the organismal through subcellular levels of organization. Pathology includes disciplines of histology, immunology, physiology and biochemistry.

Histology and immunological markers in fish populations have been very effective at identifying toxic EMAP areas. Related tools are in various stages of development and some are currently being field-tested. Immunological measures of fish and invertebrates are particularly promising.

II. Tool Users

Intended and actual users are government, academia and industry. The tools are used to determine where toxicants and carcinogens pose a risk to aquatic organisms and the severity of effects. Some tools are being applied in EMAP and related studies over the last 3 years.

III. Tool Development

Histopathological tools developed over many years by hundreds of researchers in government and academia. Development was prompted by a need to determine effects of toxicants in the environment. New histological tools and related tools in immunology and physiology are being developed in house and through cooperative agreements.

IV. Special Requirements for Use

Histological processing and expertise in histopathology or related disciplines.

V. Program/Media/Geographic Transferability

Transferability unknown.

VI. Other Information

Gulf Breeze laboratory studies ecosystem processes in order to understand and solve near-coastal environmental problems resulting from toxic chemicals, pesticides, pathogens and introduced organisms.

VII. Program Contact

Dr. William S. Fisher

ORD; Office of Environmental Processes and Effects Research; ERL - Gulf Breeze, Fl.; (904) 934-9394

REMOTE SENSING AND IMAGE PROCESSING

I. Tool Description

Remote Sensing and Image Processing consists of airborne and spaceborne instruments designed to detect electromagnetic radiation which is emitted or reflected from the earth's surface. When collected in a geometrically coordinated fashion (sensor array or scan) the data can be assembled into a visual representation of the portion of the earth's surface observed by the sensor system. These visual representations, or remotely sensed images, can be digitally processed to enhance the separability of the features observed through use of specialized image processing computer hardware and software. These same computer systems can then be used to assemble, store, manipulate, analyze, and display this imagery with other spatial data.

Current civilian satellite systems are capable of resolving areas as small as 2 m square, or can cover 1000 km in a single scene (with 1 km resolution). Airborne systems are capable of resolving minute and subtle features on the earth's surface, and serve as test platforms for future space sensors. The Environmental Monitoring Systems Laboratory (EMSL)-LV Remote Sensing Program currently operates an experimental airborne system capable of acquiring very high spatial and spectral resolution imagery. We are also actively involved in the use of spaceborne imagery for ecological land cover characterization and trend analysis.

II. Tool Users

Remote Sensing and Digital Image Processing technology is being used by EPA to manage, visualize, and assess environmental data observable on the earth's surface. The intended and actual users of this tool and products/services derived from the use of this tool are EPA regional and program offices, particularly the policy, water, and EMAP program offices.

Regular feedback has been received from our customers at meetings and conferences, on conference calls, and through customer critiques that are included as part of final product reviews.

III. Tool Development

Digital remote sensing and image processing has evolved within EPA from the air photography program of the early 1970's, when EMSL-LV operated a fleet of environmental surveillance aircraft, through a period of airborne electronic sensor development, including laser fluorosensors, designed for water quality assessment, and the Ultraviolet Differential Absorption Lidar (UV-DIAL).

The UV-DIAL was developed by a combination of in-house personnel and cooperative researchers from the University of Nevada to support important ozone non-attainment issues under the Clean Air Act such as the development of regional and State Implementation Plans (SIP) and the development and definition of ozone transport regions. A significant portion of this activity is to provide data for the development and application of air quality models for devising appropriate attainment strategies.

The system is currently under the control of NOAA's Environmental Technology Laboratory (ETL) in Boulder, CO, but can be accessed through a Memorandum of Understanding between ETL and the ORD laboratories at EMSL-LV and AREAL. EMSL-LV currently contracts for the operation of an airborne MultiSpectral Scanner (MSS) for research applications, and is sponsoring research for the development of high resolution airborne digital video and soft-copy photogrammetry direct from video.

Current Digital Image Processing activities are oriented toward the development of methodologies for characterizing land cover and deriving land cover change and trend information from satellite imagery over large geographic areas. In concert with these activities is the development of statistical methods for the assessment of categorical accuracy of derived land cover and change information.

IV. Special Requirement for Use

The Image Processing software currently used at EMSL-LV represents a combination of public domain and commercially developed systems. Using this software, EPA's multi-disciplined natural resource scientists and contractor support staff develop image analysis methods and techniques to support a variety of ecosystem management activities.

V. Program/Media/Geographic Transferability

Transferability unknown.

VI. Other Information

Remote Sensing and Digital Image Processing software and hardware is continually being improved by the commercial developers. Upgrades in functionality occur frequently. EPA needs to keep abreast of newer versions of software and hardware, in order to keep abreast of increases in processing speed, processing power, memory and other functionality.

VII. Program Contact

Dr. L. Dorsey Worthy

ORD; Environmental Monitoring Systems Laboratory - Las Vegas, NV;
(702) 798-2200

RIPARIAN CHARACTERIZATION TOOL

I. Tool Description

OPPE has been playing a major role in interagency efforts for developing new techniques for applying satellite and aerial-based remote sensing data to a variety of ecological studies.

The Riparian Characterization project grew out of collaborative work between the EPA Office of Water and the Office of Research and Development's efforts in characterizing riparian corridors in the Pacific Northwest. OPPE crafted a remote sensing study to support this research, particularly to apply remote sensing techniques to study the temperature warming phenomenon in cold water habitats used for salmonid spawning. In the study current military, civil and commercial aircraft and satellite sensors are used to determine optimal techniques for direct sensing of, as well as indirect GIS modeling of riparian parameters. The work supports activities under the CWA, NEPA and in particular, the Pacific Northwest Forest Plan.

II. Tool Users

The actual techniques identified or developed under this effort are intended for use by ecosystem or resource managers who need to map or monitor watersheds. The results of the investigations are intended for use by policy analysts, ecosystem project managers and decision makers of making water quality and watershed assessments in the Pacific Northwest. The results are also useful for any ecosystem manager contemplating the use of wide-area assessment tools such as satellite imagery or aerial photography.

EPA OW and Region 10 have adopted this tool. They have assumed the operational implementation for the riparian characterization project. They have initiated an implementation plan and have enhanced the original research goals.

III. Tool Development

The riparian project is +\$1M; EPA has invested 0.2 OPPE FTE and no funding. Participants in the Riparian Characterization Study include: EPA OPPE, EPA OW, US Forest Service PNW, US Army Corps of Engineers, Environmental Research Institute of Michigan and EPA Region 10.

IV. Special Requirements for Use

The most difficult requirement for the use of remote sensing data is the need for skilled personnel to process and interpret the data. While the cost of image processing software now is very reasonable (under \$10K for "turn key" systems) and the cost of obtaining data is getting more affordable with increased competition and miniaturization of sensor systems. However, the technical skills required in this area typically take years to acquire. Ecosystem managers should learn the basics so that they can be an informed buyer of contracted support. Also, it is useful to work with other agencies to share the critical personnel resources and defray the costs of the study.

V. Program/Media/Geographic Transferability

The remote sensing techniques identified or developed in these projects can be used for making terrestrial and aquatic earth observations anywhere. Specific observables include vegetation and surface geomorphological (including hydrological) characterization, soil moisture and microtopography (very high precision terrain relief mapping). Atmospheric and oceanographic sensing techniques are NOT within the scope of these investigations.

VI. Other Information

VII. Program Contacts

Elizabeth D. Porter

Office of Policy, Planning and Evaluation, Office of Strategic Planning and
Environmental Data, Environmental Results Branch, (202) 260-6129

Doug Norton

Office of Water, Office of Wetlands, Oceans and Watersheds, Assessment
and Watershed Protection Division, (202) 260-7017

SEDIMENT CLASSIFICATION METHODS COMPENDIUM

I. Tool Description

This document provides an overview of recommended methods for evaluating the effects of sediment contaminants on aquatic ecosystems. It covers sediment toxicity evaluations, benthic community evaluations, and other methods used to classify sediment with respect to the presence of contaminants.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel.

III. Tool Development

More than ten Federal statutes provide authority to many EPA program offices to address the problem of contaminated sediment. This resulted in fragmented, and in some cases contradictory or duplicative efforts to evaluate and manage contaminated sediments. EPA developed the Contaminated Sediment Management Strategy to streamline decision-making within and among EPA's program offices by promoting and ensuring the use of consistent sediment assessment practice, consistent consideration of risks posed by contaminated sediment, the use of consistent approaches to management of contaminated sediment risks, and the wise use of scarce resources for research and technology development.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

Applicable to other media and a wide range of ecosystems. Contaminated sediment poses ecological and human health risks in many watersheds throughout the United States. Surveys conducted in 1985 and 1987 began to document the extent and severity of sediment contamination, finding that heavy metals and metalloids (e.g., arsenic), polychlorinated biphenyls, pesticides and polycyclic aromatic hydrocarbons are the most frequently reported contaminants in sediments. Sediments serve as a contaminant reservoir from which fish and bottom dwelling organisms can accumulate toxic compounds and pass them up the food chain until they accumulate to levels that may be toxic to humans. Significant ecological impacts are also reported at contaminated sediment sites, including impairment of reproductive capacity, and impacts to the structure and health of benthic and other aquatic communities.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C.

VII. Program Contacts

Tom Armitage Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-5388.

SEDIMENT TOXICITY TESTING METHODOLOGY GUIDANCE

I. Tool Description

These standard methods manuals contain guidance on testing the toxicity of freshwater, estuarine, and marine sediments to determine ecological effects of sediment contaminants, and include guidance on laboratory methods, interfering effects, statistical analysis, quality assurance and quality control, species selection and handling, and sediment manipulation and handling:

- o Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates;
- o Methods for measuring the toxicity of sediment-associated contaminants with estuarine and marine amphipods.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel.

III. Tool Development

More than ten Federal statutes provide authority to many EPA program offices to address the problem of contaminated sediment. This resulted in fragmented, and in some cases contradictory or duplicative efforts to evaluate and manage contaminated sediments. EPA developed the Contaminated Sediment Management Strategy to streamline decision-making within and among EPA's program offices by promoting and ensuring the use of consistent sediment assessment practice, consistent consideration of risks posed by contaminated sediment, the use of consistent approaches to management of contaminated sediment risks, and the wise use of scarce resources for research and technology development.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

Applicable to other media and a wide range of ecosystems. Sediments serve as a contaminant reservoir from which fish and bottom dwelling organisms can accumulate toxic compounds and pass them up the food chain until they accumulate to levels that may be toxic to humans. Significant ecological impacts are also reported at contaminated sediment sites, including impairment of reproductive capacity, and impacts to the structure and health of benthic and other aquatic communities.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C.

VII. Program Contacts

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SELECTING REMEDIATION TECHNIQUES FOR CONTAMINATED SEDIMENT

I. Tool Description

This document provides guidance on available technologies for remediating contaminated sediment. The document describes how to select an appropriate technology for remediating specific types of contaminants. Site specific environmental conditions are addressed as well as the cost of remedial options.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel.

III. Tool Development

More than ten Federal statutes provide authority to many EPA program offices to address the problem of contaminated sediment. This resulted in fragmented, and in some cases contradictory or duplicative efforts to evaluate and manage contaminated sediments. EPA developed the Contaminated Sediment Management Strategy to streamline decision-making within and among EPA's program offices by promoting and ensuring the use of consistent sediment assessment practice, consistent consideration of risks posed by contaminated sediment, the use of consistent approaches to management of contaminated sediment risks, and the wise use of scarce resources for research and technology development.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

Applicable to other media and a wide range of ecosystems.

Contaminated sediment poses ecological and human health risks in many watersheds throughout the United States. Sediments serve as a contaminant reservoir from which fish and bottom dwelling organisms can accumulate toxic compounds and pass them up the food chain until they accumulate to levels that may be toxic to humans. Significant ecological impacts are also reported at contaminated sediment sites, including impairment of reproductive capacity, and impacts to the structure and health of benthic and other aquatic communities.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Tom Armitage Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-5388

TEST SYSTEMS FOR BIOTECHNOLOGY PRODUCTS

I. Tool Description

Test systems for biotechnology products: Test systems to determine the assimilation capacity of aquatic microbial environments to degrade toxic organics. These are used for both efficacy evaluations and biotechnology risk assessment. Tools include simple tests (shaker flask), microorganisms and field applications.

Containment of microorganisms is an integral part of this system that is essentially for examining genetically-engineered microorganisms. The system can be used for studies of microbe survival, colonization, gene exchange, microbial community structure and function and some aspects of microbial transport.

II. Tool Users

Intended and actual users are government and industry. The tools are used to determine efficacy of biotechnology agents and associated risks of their application. Efficacy tests currently undergoing verification trials.

III. Tool Development

Developed in response to a need by program offices (Toxics and Pesticides) to evaluate permit requests for genetically-engineered biotechnology and bioremediation agents. Developed in part by EPA and in part by cooperative agreements.

IV. Special Requirements for Use

Dependent on intended application.

V. Program/Media/Geographic Transferability

Transferability unknown.

VI. Other Information

This laboratory studies ecosystem processes in order to understand and solve near-coastal environmental problems resulting from toxic chemicals, pesticides, pathogens and introduced organisms.

VII. Program Contact

Rick Cripe ORD, Office of Environmental Processes and Effects Research; ERL - Gulf Breeze, FL.
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WATERSHED SCREENING AND TARGETING TOOL (WSTT)

I. Tool Description

The Watershed Screening and Targeting Tool (WSTT) is a PC-based screening tool intended to help watershed managers at the local, state or regional level evaluate and target watersheds based on indicators from water quality data.

This user-friendly interactive screening tool involves a two step process. The first step allows for preliminary screening of point and nonpoint pollution problems based on multiple criteria and data from the EPA mainframe. The user can compare reference values with land use and water quality observations from different watersheds. The second step involves comparative analysis and more detailed examination of the watershed. Here, the user can include criteria weighing and additional data as warranted. Additionally there is a link to WSM, the Watershed Screening Model, which allows for estimation of total loads of specific pollutants from the watershed when enough data are present.

II. Tool Users

State and Federal water programs, modelers, consultants.

III. Tool Development

A beta-test version was issued in June 1994. Compilation of WSTT data for the lower 48 states is in progress. Several state WSTT databases are complete. Funding was provided by the Office of Watersheds, Oceans, and Wetlands (OWOW), Assessment and Watershed Protection Division (AWPD), Watershed Branch. WSTT is also being incorporated into an ARCVIEW-based geographic analysis tool via cooperation between the Office of Science and Technology (OST) and OWOW.

IV. Special Requirements for Use

The WSTT operates on a 286 or better personal computer and is distributed as a 3.5" floppy.

V. Program/Media/Geographic Transferability

Opportunity to apply screening techniques and water quality data to any activity involving evaluating or priority setting of aquatic ecosystems or watersheds.

VI. Program Contacts

Mimi Dannel Office of Water, Office of Wetlands, Oceans and Watersheds, Assessment and Watershed Protection Division, 202-260-7017

VOLUNTEER MONITORING

I. Description of Tool

Volunteer monitoring is one component of the Office of Wetlands, Oceans, and Watersheds' water monitoring program. OWOW encourages citizen volunteers to become active monitors of stream, lake, estuarine, and wetland water quality. The benefits of this program is that volunteers become educated about water quality issues, become active stewards of their environment, and often generate credible data of value to State and local decision makers. Increasingly, volunteers are moving toward monitoring watersheds rather than individual waters, and are also assessing land conditions, biological communities, acid rain and other ecosystem components.

Major volunteer tools are:

Volunteer Lake Monitoring: A Methods Manual was designed to provide volunteers with acceptable protocols for monitoring lakes. It includes sections on producing quality data, presenting data, and implementing a program. It has been in use since 1991, and was developed by AWPDP/OWOW through a grant.

Volunteer Estuary Monitoring: A Methods Manual was designed to provide volunteers with acceptable protocols for monitoring estuarine waters. It includes sections on producing quality data, presenting data, and implementing a program, and has been in use 1994. The tool was developed by OCPD/OWOW through grant with Alliance for the Chesapeake Bay.

Volunteer Water Monitoring: A Guide for State Managers was developed by AWPDP/OWOW through a grant and is designed to provide guidelines on how to effectively plan and implement a volunteer monitoring program. It has been in use since 1990.

National Directory of Volunteer Environmental Monitoring Programs provides information on 519 volunteer monitoring programs nationwide, with contact names and descriptions. It was developed by AWPDP/OWOW through grant with University of Rhode Island, and has been in use since 1994.

Volunteer Monitoring on the Nonpoint Source Bulletin Board System: A special interest group forum is available on this electronic bulletin board to allow volunteers and coordinators to exchange information, download files, etc. Developed 1993-94 by a contract. However, this tool is not reaching a wide audience of volunteers, perhaps because of the cost of the phone connection and of initial difficulties in using the system. We are addressing this by simplifying user screens on the BBS and generating a fat sheet on how to lower your costs on the BBS.

II. Tool Users

All tools were developed primarily for volunteer program coordinators to be used in developing and planning their programs. These coordinators may be State water quality staff, environmental organization staff, academics, or nonprofit organization staff. Actual volunteers may also use these documents. They have been used since their publication dates.

III. Tool Development

None of these tools were developed in response to statutory mandates. All tools were developed primarily for volunteer program coordinators to be used in developing and planning their programs. They have been used since their publication dates. Monitoring equipment is generally inexpensive, but can be a significant cost for a shoe-string nonprofit organization.

IV. Special Requirements for Use

Volunteers must be trained in the protocols and quality assurance procedures outlined in the methods manuals listed above if they are to generate credible data. The monitoring programs themselves are responsible for this training.

V. Program/Media/Geographic Transferability

These tools are general enough to be used in a variety of geographic areas. The Guide for State Managers and the BBS forum could also be generally applicable to other media (e.g., air). Applicability to other EPA programs would have to be determined on a case-by-case basis.

VI. Other Information

Volunteer monitors should be brought into the ecosystem management process whenever possible. These individuals are educated and concerned about the protection of their natural resources, and can provide significant contributions in terms of labor and insight into local conditions.

EPA should become more involved in developing additional tools for volunteers such as wetlands monitoring techniques and volunteer training methods.

VII. Program Contacts

Alice Mayo Volunteer Monitoring Coordinator, Assessment and Watershed Protection Division, (202) 260-7018

WETLANDS MAPPING TOOL

I. Tool Description

OPPE has been playing a major role in interagency efforts for developing new techniques for applying satellite and aerial-based remote sensing data to a variety of ecological studies.

The wetlands mapping work was initiated in 1993 as a result of a Federal Geographic Data Committee study in which all federal agencies with wetlands mapping mandates conducted a GIS-based study to analyze the level of agreement/disagreement between each program's wetland data.

The first study site of ten planned was Wicomico County, MD on the eastern shore of the Chesapeake Bay. The area is mostly a forested and farmed region. The highest levels of disagreement between the federal agencies were in identifying boundaries and extent of palustrine evergreen and mixed evergreen-deciduous forested wetlands areas and disagreed significantly (90%) in area and boundary location. This result has significant policy implications as forested wetland is the cover type which has experienced the highest rates of wetland loss in recent years. It is critical that these cover types can be accurately mapped so that these resources can be effectively protected under the current statutory mandates (EPA-relevant legislation: Clean Water Act, Sect 404; and NEPA.)

II. Tool Users

The primary client for this project is the USFWS National Wetlands Inventory. The NWI project leader is also an active participant in the study. Secretary of Interior Bruce Babbitt, after being briefed on the project, signed an endorsement letter giving it high level DOI support. Many of the Nation's leading wetlands experts are actively involved in this project. The initial results of the FGDC Wicomico study verified that NWI is underestimating the acreage of forested wetlands. They have already modified their photointerpretation techniques to improve their mapping accuracies based on the study.

The actual techniques identified or developed under this effort are intended for use by ecosystem or resource managers who need to map or monitor wetlands. The results of the investigations are intended for use by policy analysts, ecosystem project managers and decision makers regarding the difficulty (and options for dealing with these) of making wetland assessments under forest canopy. The results are also useful for any ecosystem manager contemplating the use of wide-area assessment tools such as satellite imagery or aerial photography.

III. Tool Development

The wetlands project is a +\$2M effort; EPA has invested 0.5 OPPE FTE and no funding. Various public and private actors participated in the projects in FY94-5. The Wetlands Study involved EPA OPPE, EPA OW, USGS National Mapping Division, US Fish and Wildlife Service National Wetlands Inventory (NWI), Maryland Department of Natural Resources, US Army Corps of Engineers, Environmental Research Institute of Michigan, and Earth Satellite Corporation. Experts in wetlands sciences and remote sensing constitute a Science Advisory Team which provides high level peer review for this experiment. The panel has membership from the USGS, EPA, NBS, SCS, with representatives from the private sector and academia.

IV. Special Requirements for Use

The most difficult requirement for the use of remote sensing data is the need for skilled personnel to process and interpret the data. While the cost of image processing software now is very reasonable (under \$10K for "turn key" systems) and the cost of obtaining data is getting more affordable with increased

competition and miniaturization of sensor systems. However, the technical skills required in this area typically take years to acquire. Ecosystem managers should learn the basics so that they can be an informed buyer of contracted support. Also, it is useful to work with other agencies to share the critical personnel resources and defray the costs of the study.

V. Program/Media/Geographic Transferability

The remote sensing techniques identified or developed in these projects can be used for making terrestrial and aquatic earth observations anywhere. Specific observables include vegetation and surface geomorphological (including hydrological) characterization, soil moisture and microtopography (very high precision terrain relief mapping). Atmospheric and oceanographic sensing techniques are NOT within the scope of these investigations.

VI. Other Information

VII. Program Contacts

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Office of Policy, Planning and Evaluation, Office of Strategic Planning and
Environmental Data, Environmental Results Branch, (202) 260-6129

WETLANDS RESEARCH PROGRAM

I. Tool Description

The Wetlands Research Program at ERL-Corvallis has developed an approach to improving decision-making in wetlands restoration and creation projects. The Approach uses data from a monitoring program, including both naturally occurring wetlands and those restored and created, to develop performance criteria, track the development of projects, and suggest improvements in the design of future projects.

II. Tool Users

A number of state agencies are considering using the tool (e.g., California and New York).

III. Tool Development

The Approach and the research that supports it have been widely reviewed and accepted. The EPA Science Advisory Board reviewed and endorsed the research plan that produced the Approach.

The Approach was developed based upon pilot studies in Connecticut, Florida, and Oregon. A full scale trial was conducted in Oregon. This tool was released two years ago.

IV. Special Requirements for Use

A team of scientists that includes a wetland ecologist and statistician are needed to define the wetland population to be sampled, identify the variables to be sampled, design a data management protocol, train field crews, and analyze and report findings. Field crews can be composed of people of varying skill levels, depending on the variables to be samples.

V. Program/Media/Geographic Transferability

VI. Other Information

Cost of using this tool will vary according to the number of sites and the kinds of variables sampled. Pilot projects conducted by Corvallis staff have averaged \$10K per site sampled with a field protocol that took a day to sample.

VII. Program Contacts

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HEADQUARTERS ECOSYSTEM TOOL INVENTORY

FINANCIAL ASSISTANCE TOOLS

CWA SECTION 104(B)(3) GRANT FUNDING GUIDANCE

I. Tool Description

The FY95 104(b)(3) *Grant Funding Guidance* to the Regions emphasizes that grant funds should be awarded for innovative demonstration projects that promote the development or implementation of State-wide watershed protection approach in the NPDES program. Projects appropriate for FY95 watershed funding should involve any of the six components of the NPDES Watershed Strategy: 1) State-wide Coordination; 2) NPDES Permits; 3) Monitoring and Assessment; 4) Program Measures and Environmental Indicators; 5) Public Participation; and 6) Enforcement.

II. Tool Users

States that apply for 104(b)(3) grants and the Regions that approve 104(b)(3) projects.

III. Tool Development

104(b)(3) grant funding guidance is provided to the Regions annually every September. All funds are reprogrammed to the Regional offices and must be committed by July 1, 1995. Since Headquarters review prior to processing grant applications is not required, the Regions are responsible for ensuring that all projects are consistent with the National program Guidance.

IV. Special Requirements for Use

104(b)(3) grants are limited to research, investigations, experiments, training, demonstrations, surveys, and studies that benefit the State (not the Federal program).

V. Program/Media/Geographic Transferability

104(b)(3) funding guidance demonstrates how funding criteria may be used effectively to encourage States to implement a desired non-mandatory program.

VI. Other Information

In FY94, the Watershed Task Force approved \$100,000 in section 104(b)(3) grant funds for each Region to be used for training, demonstration, or experimental projects that lead to the development or implementation of State-wide Watershed Protection Approaches.

VII. Program Contacts

Nancy Cunningham

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CLEAN WATER ACT TMDL MINI-GRANTS

I. Tool Description

Total Maximum Daily Loads, or TMDLs, are a Clean Water Act tool for estimating the loading reductions necessary to meet water quality standards on an impaired waterbody and identifying the control measures that will bring about this improvement. A whole-watershed approach, in which all loading sources are considered in the model and the recommended controls, is recommended.

The mini-grants are very specifically targeted funds intended to increase the number of TMDLs developed and implemented; they may or may not be the only funding source in a TMDL development project. The mini-grants provide narrowly-defined grants of \$5,000 to \$15,000 to regions/states/tribes for undertaking TMDL development on high priority watersheds using a holistic watershed approach. Mini-grants also are often oriented toward innovative or progressive uses of the TMDL concept that may become routine in future TMDLs.

II. Tool Users

State, Regional and Tribal water programs.

III. Tool Development

The grants have been awarded annually for three years now, using funding from the Office of Wetlands, Oceans and Watersheds and the Office of Science and Technology.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

The grants may eventually go beyond the current clientele to involve interagency cooperation. In principle, several grant programs could prescribe ecosystem management-related practices with only minor changes in the way they operate.

VI. Other Information

VII. Program Contacts

Mimi Dannel Office of Water, Office of Wetlands, Oceans and Watersheds, Assessment and Watershed Protection Division, 202-260-7017

GRANTS FOR WATERSHED RESTORATION PROJECTS

I. Tool Description

To give greater emphasis to funding specific watershed resource restoration activities at the local level, the Office of Water (OW) developed the Watershed Resource Restoration Grant Program. For the FY1994 grant cycle, OW developed the guidance document entitled, Final Guidance on the Award of Nonpoint Source Grants Under Section 319(h) of the Clean Water Act of FY 1994 and Future Years. The OW created ten percent watershed resource restoration element within each State's planning target to encourage watershed restoration activities such as the restoration of wetlands, shorelines, lakes, rivers, streams, coastal zones and estuaries, riparian areas, seagrass beds, coral reefs, and other aquatic habitats.

II. Tool Users

Tool users are the State programs.

III. Tool Development

The Guidance was distributed in June 1993 to the State programs, and the first round of grants were awarded in FY 1994. The OW created this set-aside to encourage watershed restoration activities at the local level. The Guidance was developed in-house. In FY1995, 10% of the \$100 million section 319 appropriation, \$10 million was allocated by OW to State watershed restoration projects.

IV. Special Requirements for Use

A State must have an authorized program and there is a match requirement.

V. Program/Media/Geographic Transferability

Tool is not transferable.

VI. Program Contacts

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REGIONAL GEOGRAPHIC INITIATIVES PROGRAM (OROSLR)

I. Tool Description

The Regional Geographic Initiatives Program was established to provide multi-media funds for the Regions. These funds support high priority activities which meet specific criteria. Regions use these funds to address environmental problems that are place-based or are unique to the states in their Regions. The Program provides funding for projects that are identified as high priority by a Region, state, or locality, pose a human health, or ecosystem risk, and have significant potential for risk reduction.

II. Tool Users

The Regional Geographic Initiatives funds come from the Regional Multi-media P.E. The P.E. was established in FY 1994, and also contains the Regional Administrator's Discretionary Funds. The two types of funds are completely distinct, and are monitored separately.

III. Tool Development

The Regional Geographic Initiative Program began in FY 1994. The Program has been developed by the Regional Geographic Initiatives Work Group, a National work group with both Regional and HQ participants. The Mission statement and Program Outline were developed, and contain a statement of purpose for the program, selection criteria for projects, and the reporting requirements (see attached).

IV. Special Requirements for Use

Regions send in proposals at the beginning of the Fiscal Year, which must meet the criteria in the Program outline. Some criteria include:

- o The initiative should address places, in contrast to pollutants, sectors or programs. Places can be urban or rural, watersheds or airsheds, coasts or highlands, river corridors or transportation corridors. Scale can be local (from neighborhoods to watersheds), cover an ecosystem or even be an entire EPA Region or sets of Regions. They must, however, be less than national in scope. Places should be tied together socially, environmentally or politically.
- o Initiatives should be based on a Regional, state or other strategic plan, preferably risk-based (e.g., a comparative risk analysis). Problems addressed can be health or ecosystem, preferably both as in the long term they are inseparable, and should reflect the local condition (e.g., economic and social sustainability).¹
- o Problems addressed and solutions showcased by the initiative should be primarily multi-media in nature. Air, water, or waste problems of significance may anchor the effort, however. Multi-media is defined as a combination of medias coordinated under one project or set of projects.

¹Targeting by the Agency, generally, is a major weakness. In the near term, we need targeting models generally based on potential health and ecological risks, i.e., applying comparative risk methodologies to places. Using geographic analyses outlined in the models, we can develop baseline estimates of potential risk from which to compare places. These analyses also provide information on problems and stressors and establish the foundation for setting goals and measuring progress.

- o Initiatives should highlight Agency priorities and strategies. For 1994 through 1996 these are: ecosystem management, environmental justice, partnerships, sound science, pollution prevention, reinventing EPA management, and environmental accountability.

V. Program/Media/Geographic Transferability

This is a Regional Program which has been coordinated through OROSLR. The Regions have responsibility and leadership for proposals, actions, and changes to the program.

VI. Program Contacts

Christine Gonzalez Office of the Administrator, Associate Administrator's Office for Regional Operations and State/Local Relations, Regional Operations Division, (202) 260-4719

STATE REVOLVING FUND PROGRAM

(Financing for Water Pollution Abatement)

I. Tool Description and Development

The State Revolving Fund (SRF) is a financing program that assist States in constructing wastewater treatment facilities and managing water quality programs. The SRF program was authorized by the U.S. Congress through Title VI of the Clean Water Act (CWA) as amended in 1987. The Act authorized Federal funds to capitalize SRFs through FY 1994. The following type of projects are eligible under the SRF program: (1) The construction of section 212 wastewater treatment works; (2) The implementation of nonpoint source (NPS) activities included in approved State NPS management programs pursuant to section 319 of the CWA; and (3) Development and implementation of estuary management plans pursuant to section 320 of the CWA.

States must provide a 20% match for the Federal capitalization grants. Approximately \$15 billion is available in the SRFs through a combination of Federal capitalization grants (\$10 billion), States matching funds (\$2 billion), and other sources (\$3 billion).

Resources for States management of the SRF is estimated at 500-1,000 FTE. States may use up to 4% of their capitalization grant awards for management of their programs.

II. Tool Users

SRFs are established and managed by the States. Under Title VI, States may provide loans, loan guarantees and other credit enhancements, leverage the fund, or refinance debt previously issued by municipalities. Most of the activity to date has been the issuance of loans.

To date, approximately 90% of SRF assistance has been provided to section 212 activities, and about 10% has gone to section 319 and 320 activities. Over the past year, EPA has been pushing States to use SRF funds for watershed planning and management. There are, however, a number of barriers at the State level for using SRF money for non-point source and estuary protection programs. EPA plans a series of workshops with States to identify and resolve these barriers.

EPA managers maintain that more resources are needed at the national and regional level to implement the SRF program. The program is applying for additional funding through the 104(b) grants program to further encourage integration of the SRF and watershed programs.

IV. Special Requirements for Use

No special requirements required for use.

V. Program/Media/Geographic Transferability

The transferability of the SRF program to other program or media is unknown. The SRF can be used for public health, water quality, and natural resource reasons. EPA policymakers are concerned, however, that the program could be misused (e.g., building landfills or cleaning up underground storage tanks). EPA is currently in the process of writing policy that would limit the SRF program to funding projects that correct existing water quality problems.

VI. Program Contacts

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State Revolving Fund Branch (202) 260-7366

WATERSHED INTEGRATION GRANTS TEAM (WIG)

I. Tool Description

The purpose *Watershed Integration Grants Team (WIG)* is to determine if current Agency grant management practices hamper State adoption of Watershed Protection Approach (WPA). Additionally, the team will identify grant management practices which are barriers to implementing WPA, recommend and implement solutions.

The WIG is composed of EPA Headquarters representatives from Grants Administration, General Counsel, Inspector General and the Offices' of Wetlands, Oceans and Watersheds (OWOW) and Wastewater Management (OWM). Regional representatives from Regions I, IV, V, and VI participate as do State members from Texas, New York, Maryland and Delaware. The WIG is co-chaired by OWOW and OWM and is one of a number of activities in OW designed to encourage adoption of the WPA at the State and Federal levels.

II. Tool Users

The users are States that apply for and implement grants.

III. Tool Development

Building upon earlier quality assurance efforts for sections 106 and 319 grants and adding 604(b) grants the WIG is examining ways to make grants management increasingly compatible with watershed based management. States and Regions are adopting WPA, however financial and reporting requirements have not been revised to reflect changes in Regional and State operation.

The WIG's accomplishments as of December 15, 1994 are as follows:

- Recommending early issuance of funding targets for sections 106, 319 and 604(b).
- Consolidating multi-year funding guidance for sections 1096 and 604(b) with previously issued 319 guidance.
- Streamlining grants certification process so that States provide single certification for anti-lobbying activities, suspension and debarment, procurement certification (superfund only) and SF 424 assurances.
- Reviewing and analyzing current grant and administrative requirements to determine burdens on States and recommend improvements.
- Piloting multi-year cooperative agreement with two States to determine if administrative savings result.
- Initiating a work program integration and resource tracking demonstration between Region VI and Texas. This project analyzes all CWA grant resources in relation to geographic location, sources of funds, amounts and characterization of water quality activities within each basin.

IV. Special Requirements for Use

There are no special requirements.

V. Program/Media/Geographic Transferability

This project serves as a model for other media grant operations, and is transferable in geographic areas.

VI. Other Information

On going activities include:

- Investigation of electronic transfer of all grant application, review and approval procedures with the intent of making the whole process "paperless."
- Report on reaction on grant program reporting proposal, including grant reporting requirements and analysis of ways to streamline reporting, emphasize environmental results, reflect diversity of State programs and maintain Federal requirements.
- continue review of funding options, most notably the feasibility of greater use of State Revolving Fund (SRF) funds to support and reflect WPA.

VII. Program Contacts

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Don Brady Office of Water, Office of Wetlands, Oceans and Watersheds, Assessment and Watershed Protection Division, (202) 260-7074

HEADQUARTERS ECOSYSTEM TOOL INVENTORY
ENVIRONMENTAL GOAL SETTING TOOLS

AQUATIC LIFE RISK ASSESSMENT METHODOLOGY

I. Description of Tool

This methodology is intended to provide an overall measure of the integrity of an aquatic assemblage exposed to varying toxicant concentrations, without focusing solely on worst case scenarios. An approach is under development for assessing the impact that time varying toxicant concentrations would have on an assemblage of species having (a) differing sensitivities to the toxicant, and (b) differing life strategies, yielding different rates of recovery.

This approach is part of the revisions to the methodology for deriving water quality criteria for protection of aquatic life. It consists of general guidance on collection and evaluation of appropriate toxicity data for a range of taxa (similar to the program's previous guidance for deriving criteria), coupled with a computer model for assessing the effects of time variable concentrations.

III. Tool Users

The predecessor guidance has a number of users in EPA and State water programs. The new materials under development, including the computer model, are intended for such general use, but are currently used only by the developers.

IV. Tool Development

The tool is still under development. Procedures will be refined by applying them to an assessment of a particular toxicant, by end of summer 1995. The computer model is operational and largely complete, and a first rough draft of the documentation is expected by end of January 1995, at which time the model will be ready for beta testing. Resources have been provided by OW, and ORD Duluth and Narragansett labs.

V. Programmatic/Media/Geographic Transferability

There is nothing that restricts programmatic or geographic transferability. The predecessor guidance could be adapted to other media. The newly developed modeling approach is designed to surmount difficulties associated with a medium with rapidly varying concentrations; its features would not be needed for evaluating more stable media (such as soil or sediment).

VI. Other Information

VII. Program Contact

Charles Delos Office of Water, Office of Standards and Technology, Health and Ecological
Criteria, (202) 260-7039

BIOLOGICAL CRITERIA: NATIONAL PROGRAM GUIDANCE FOR SURFACE WATERS

I. Tool Description

This guidance was issued by EPA in 1990 to provide information on the need for and methods for establishing narrative biological criteria in State/Tribal water quality standards.

II. Tool Users

Federal, State, municipal industrial, environmental and Tribal entities.

III. Tool Development

Section 303(c) of the Clean Water Act require States and Tribes to adopt water quality standards to protect public health and welfare, to enhance water quality, and to serve the purposes of the Act by providing for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water, whenever these goals are attainable. The Act requires States to establish standards taking into consideration the use and value of the water for public water supplies, propagation of fish and wildlife, recreation, agricultural and industrial water supply, navigation and other purposes. As a State/Tribe rule or law, water quality standards provide the basis for treatment controls beyond the technology-based requirements of the Act -- for both point and nonpoint sources of pollution.

Finally, water quality standards provide the bench mark against which to measure the effectiveness of regulatory and non-regulatory programs and in controlling water borne risks.

IV. Special Requirements for Use

None

V. Program/Media/Geographic Transferability

The standards are designed for the water media, but are applicable to a wide range of ecosystems.

VI. Other Information

Water quality standards are the foundation central core of the ecosystem/watershed approach as they define the human health and ecological goals for the aquatic ecosystem and provide the mechanism for meeting the objective of the Clean Water Act -- to restore the chemical physical and biological integrity of the Nation's waters.

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

David K. Sabock Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260 1318

ECOLOGICAL RISK ASSESSMENT FOR APPLICATION OF SEWAGE SLUDGE TO FORESTS AND RANGE LAND

I. Tool Description

The purpose of this tool is to develop an ecological risk assessment methodology for application of sewage sludge of forests and range land and to use that methodology to develop limits for pollutants in sewage sludge applied to those types of land.

II. Tool Users

The Health and Ecological Criteria Division in the Office of Science and Technology will be the primary user. Results of the assessment will be used to assess the protectiveness of the current Standards for the Use of Disposal of Sewage Sludge (58 FR 9248, February 19, 1993), which were based on the information available at the time the standards were developed.

III. Tool Development

A detailed work plan is now being developed for this project. The work plan is expected to be completed and approved in the third quarter of FY 95.

Work will be done through an interagency agreement with the Department of Energy in Oak Ridge, TN. Contract funds (\$500K) are being managed by ORD, Cincinnati, using 0.5 FTEs. Additional funding and FTEs will be needed in FY 96 and FY 97 to complete project.

IV. Special Requirements for Use

V. Program/Media/Geographic Transferability

EPA program offices and other who conduct ecological risk assessments. Methodology may be used for ecological risk assessments for other media.

VI. Other Information

VII. Program Contacts

Robert M. Southworth

Office of Water, Office of Standards and Technology, Health and Ecological
and Criteria Division, 202-260-7157

ECOTOX THRESHOLDS

I. Tool Description

One of the initial decisions in the Superfund site assessment process is to determine which chemicals reported on site are present at concentrations that could cause a significant adverse ecological effect. This chemical screening step is typically accomplished by comparing the reported concentrations from the site to a previously established ecotoxicological benchmark. If the concentration exceeds the benchmark in a particular media, further analysis is required to determine the risk posed by the chemical. To the extent possible, existing EPA protocols will be used for setting acceptable concentrations (e.g., Ambient Water Quality Criteria). When formal criteria have not been developed for a particular chemical, other established and scientifically credible methods will be used to determine appropriate threshold concentrations. The methods will rely on the evaluation and interpretation of existing ecotoxicological data, and will not require additional research.

II. Tool Users

EPA Regional offices.

III. Tool Development

ETs are currently under development. This project was initiated in response to Regional requests for assistance and with their cooperation. ETs are being developed in-house with contractor support. These screening values will accomplish two objectives: ○ Provide Remedial Project Managers with a quick and efficient tool for deciding which contaminants are potential chemicals of concern; ○ Improve programmatic consistency in the way decisions are made regarding risks to ecological receptors at Superfund sites. The methods to generate the values are currently being reviewed by a workgroup of interested parties.

IV. Special Requirements for Use

The list of ETs will be distributed as a self-extracting software application that will operate with minimal hardware requirements.

V. Program/Media/Geographic Transferability

The values should be applicable (for screening purposes) to any program focusing on a relatively small scale sites.

VI. Other Information

The National Contingency Plan (NCP), describing how CERCLA is implemented, requires the Agency to conduct a baseline risk assessment to "characterize the current and potential threats to human health and the environment" (§300.430). As part of this baseline assessment every Superfund site is required to include an ecological risk assessment to "1) identify and characterize the current or potential threats to the environment from a hazardous substance release, 2) evaluate the ecological impacts of alternative remediation strategies, and 3) establish clean-up levels in the selected remedy that will protect those natural resources at risk" (OSWER Directive No. 9285.7-17).

VII. Program Contacts

John Miller

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EMAP'S ECOLOGICAL INDICATORS

I. Tool Description

Because the EMAP can not measure every possible environmental parameter in a cost effective or timely manner, it utilizes certain measurements, or indicators, of ecological condition. From its inception, the foundation of EMAP was the selection, evaluation, and implementation for ecological indicators. EMAP conducts indicator activities in seven ecological resource groups including; forests, surface waters, agricultural lands, rangelands, estuaries, Great Lakes, and landscapes using a wide variety of "tools". These tools include conceptual and process models, indexes such as Karr's Index of Biological Integrity which encompass a number of biological indicator measurements, satellite imagery and remote sensing techniques, design and sampling protocols, or physical and chemical measurements as indicators of habitat condition.

II. Tool Users

EMAP indicators have been designed for use by scientists, environmental policy and management staff, other Federal, state, and regional partners including state water monitoring personnel and other Federal agencies such as National Oceanographic and Atmospheric Administration and the Soil Conservation Survey. These indicator tools provide, in a timely and cost effective manner, scientific information and data with a known confidence to science and policy decision makers for use in comparative ecological risk assessments, environmental management, and resource conservation and protection activities.

III. Tool Development

The EMAP was developed in response to recommendations by EPA's Science Advisory Board (1988 and 1990) to initiate a program to monitor and assess the status and trends of the nation's ecological resources, to develop ecological indicators of the condition of the nation's resources, and to provide data and analytical methods in support of comparative ecological risk assessments. The wide variety of indicators as tools for ecological management were developed by many different participants (e.g., contractors, other Federal agencies, and regional partners). EMAP's 1994 budget approximated \$39 million dollars, and a significant portion of these funds was used to select, evaluate, and implement indicators of ecological condition across the resource groups.

IV. Special Requirements for Use

No special requirements required for use.

V. Program/Media/Geographic Transferability

EMAP Indicators receives numerous requests from Agency, Federal, state, and regional science and policy staff for assistance in identifying research efforts and information contacts on EMAP's various ecological indicator efforts. For example, EMAP indicator activities provide useful information to the Office of Water on contaminated sediments, toxicity to aquatic organisms in surface waters and estuarine resources. State monitoring programs (Delaware, Florida, and New Jersey) have adopted the EMAP approach for assessing status and trends in environmental resources.

VI. Other Information

VII. Program Contacts

H. Kay Austin, Ph.D.

Office of Research and Development, Environmental Monitoring and Assessment Program, (202) 260-5789

ENVIRONMENTAL INDICATORS

I. Tool Description

As part of OW and OPPE's efforts to establish agency-wide goals, environmental indicators are being defined and developed for achieving the goal to "conserve and enhance ecosystems." Indicators are being defined and developed for attaining biologically healthy water resources include: water meeting aquatic life designated use; species at risk; biological integrity of the water and, on a longer time frame for development, habitat quality.

II. Tool Users

Indicators are used by Local, State, Regional and Federal Monitoring agencies.

III. Tool Development

In progress.

IV. Special Requirements for Use

Details for the indicators need to be defined; training and/or guidance will probably be developed in time.

V. Program/Media/Geographic Transferability

Yes, indicators will be developed, and their transferability will be evaluated. Indicators will probably be "General" with specific guidance for their application to specific ecoregion-type areas.

VI. Other Information

Background information on the development of environmental indicators is available.

VII. Program Contacts

Mary Belefski Office of Water, Office of Wetlands, Oceans and Watersheds, Assessment and Watershed Protection Division, (202) 260-7061

FINAL TECHNICAL GUIDANCE ON SUPPLEMENTARY STREAM DESIGN CONDITIONS FOR STEADY STATE MODELING, December 1988.

I. Tool Description

Water quality standards for many pollutants are written as a function of ambient environmental conditions, such as temperature, pH or hardness. This document provides guidance on selecting values for these parameters when performing steady-state WLAs.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

The Office of Science and Technology, Standards and Applied Science Division publishes guidance manuals and case studies to support the development and use of total maximum daily loads (TMDL). Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof. The documents listed support the managerial and technical components of the TMDL process.

Since 1983, the primary impetus for developing the guidance is the need to provide the technical and management tools for States to use in meeting statutory requirements and Agency programmatic priorities. Thus the guidance focused first on conventional pollutants, then toxics and now nonpoint sources and other wet weather discharges.

The guidance documents provide the transport and fate models needed to develop and apply TMDLs when excessive biochemical oxygen demand, low dissolved oxygen, excessive nutrient, eutrophication, toxic pollutant concentrations preclude attainment of water quality standards in rivers, streams, lakes and estuaries, under both wet weather and steady state conditions. Also included in the guidance documents are decision matrices that assist in problem formulation, model development, implementation and assessment, as well as approaches for allocating loads among point and nonpoint sources, including atmospheric deposition. Techniques and case examples are provided whether using "desk top" calculations, steady state or dynamic models. New tools are examined, such as rapid bioassessments, and new information provided to up-date existing tools such as water quality reaction rate coefficients for QUAL2E and WASP.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, nonpoint sources and background loadings (from non-controlled sources such as atmospheric deposition and sediment). The TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different

strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. The TMDLs maximize real environmental gains and minimize the need for unnecessary regulation..

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-1330

GUIDELINES FOR DERIVING SITE SPECIFIC SEDIMENT QUALITY CRITERIA

I. Tool Description

This tool was designed to provide a consistent means for modifying a national criteria to meet the needs or goals of a specific site when a criteria is adopted into a State standard.

The method is applicable to the modification of national sediment quality criteria to meet site specific needs when those criteria are adopted into State Water Quality standards. Reasons for applying the method range from needing to protect an Endangered Species or an economically important species to unique site sediment characteristics.

II. Tool Users

Designed for use by Region and State surface water regulators in the NPDES program.

III. Tool Development

Status: The method was made available for public comment in January of 1994, public comment ended in June 1994, comments have been compiled and responses are being prepared. Anticipate final document in approximately 1 year.

Resources: Development of the method required the involvement of two EPA environmental Research laboratories and is adapted from the method for deriving site specific criteria for the protection of aquatic life.

IV. Special Requirements for Use

V. Program/Media/Geographic Transferability

The method is applicable to any geographic or programmatic need for sediment quality criteria site specificity.

VI. Other Information

VII. Program Contacts

Mary C. Reiley Office of Water, Office of Science and Technology, Health and Ecological Criteria
Division, (202) 260-9456

OVERENRICHMENT GUIDANCE

I. Tool Description

This document provides guidance on appropriate levels of nutrients and related parameters, such as chlorophyll A, to assist assessment and goal setting for watersheds stressed due to overenrichment. This guidance will be used by State or Tribal agencies, or others concerned with watershed management who suspect that overenrichment may be a major problem. The guidance will assist in confirming or denying this assumption, and in setting appropriate targets for the water, which can then be achieved by implementing source controls. At present, detailed guidance for this implementation step is a future project. The guidance may provide a matrix of acceptable parameter levels for different settings, or may simply provide a methodology for determining such levels on a site-specific basis.

II. Tool Users

Widespread use is anticipated for this important guidance by State or Tribal agencies, or others concerned with watershed management who suspect that overenrichment may be a major problem.

III. Tool Development

The project has been approved and incorporated in FY95 budgets for Office of Standards and Technology and the Office of Wetlands, Oceans and Watersheds in the Office of Water. A memo has been sent out to solicit Agency participation on a workgroup. A national meeting of outside experts is planned for FY 95.

Present resources consist mainly of staff from OST and OWOW; additional resources are anticipated from ORD and others. FY95 contract funds are budgeted in the low six figures.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

The guidance will be specific to water, but will relate to air deposition, and will be useful to a variety of programs in a variety of settings.

VI. Other Information

VII. Program Contacts

Bob April Office of Water, Office of Standards and Technology, Health and Ecological Criteria Division, (202) 260-0658

Tim Kasten Office of Water, Office of Standards and Technology, (202) 260-5994

**SEDIMENT QUALITY CRITERIA FOR THE PROTECTION OF BENTHIC
ORGANISMS: ACENAPHTHENE, FLURANTHENE, PHENANTHRENE, DEILDIN,
ENDRIN (five documents, one for each chemical)**

I. Tool Description

This tool consists of five documents, one for each chemical (acenaphthene, fluranthene, phenanthrene, deildrin, endrin). These documents are designed to establish the levels below which EPA expects no toxicity to benthic organisms will be demonstrated. The criteria values are expected to be adopted by States into State Water Quality Standards and eventually become part of the NPDES permitting program.

II. Tool Users

This tool is designed for use by Region and State surface water regulators in the NPDES program. Is also being used by industry, public, and environmental groups to evaluate sites.

III. Tool Development

The criteria was made available for public comment in January of 1994, public comment ended in June 1994, comments have been compiled and responses are being prepared. Anticipate final documents in approximately 1 year.

Development of the criteria required the involvement of five EPA Environmental Research Laboratories, two contractors and several subs, and four universities over approximately 7 years. EPA (Headquarters and Labs) FTE's 2 year Extramural: \$300,000/year.

IV. Special Requirements for Use

V. Program/Media/Geographic Transferability

The criteria have been picked up by Superfund and RCRA to assist with site evaluation and determination of remediation alternatives. Intended to be used in the dredging program as well.

VI. Other Information

VII. Program Contacts

Mary C. Reiley Office of Water, Office of Science and Technology, Health and Ecological Criteria
Division, (202) 260-9456

TECHNICAL ASSISTANCE DOCUMENT TO DELINEATE AREAS OF GROUND WATER/SURFACE WATER INTERACTION

I. Tool Description

A first draft of the Technical Assistance Document (TAD) to delineate areas of ground water/surface water interaction will be completed by the OW's Ground Water Protection Division (GWPD) by December 1994.

II. Tool Users

The TAD is primarily meant to be used by State, Tribes, and local water managers.

III. Tool Development

The development of Technical Assistance Document resulted from the June 1994, Ground Water Ecology Strategic Plan's first key objective to provide technical assistance to water resource managers, especially at the State and local level. The GWPRD entered into an Interagency Agreement with the National Park Service (NPS) to develop the TAD. They hired scientists to draft the TAD.

IV. Special Requirements for Use

No special requirements for use.

V. Program/Media/Geographic Transferability

The TAD will be of interest to State, Tribe, and local water managers, especially in the Western United States, interested in delineating and setting priorities in areas of ground water/surface water interaction that need protection.

VI. Other Information

VII. Program Contacts

John Simons Office of Water, Office of Ground Water and Drinking Water, Ground Water Protection Division, (202) 260-7091

TECHNICAL GUIDANCE DOCUMENT: HOW TO DEVELOP AND USE METAL TRANSLATORS

I. Tool Description

This document investigates the use of total suspended solids (TSS) to characterize metal sorption sites, and gives guidance on field study techniques to gather data necessary to develop the translators. The document illustrates the steps involved in translating from dissolved metals concentrations in the receiving water to total recoverable metals in the effluent stream. This tool will be completed in FY 1996.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof.

Since 1983, the primary impetus for developing the guidance is the need to provide the technical and management tools for States to use in meeting statutory requirements and Agency programmatic priorities. Thus the guidance focused first on conventional pollutants, then toxics and now nonpoint sources and other wet weather discharges.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, nonpoint sources and background loadings (from non-controlled sources such as atmospheric deposition and sediment). The TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. The TMDLs maximize real environmental gains and minimize the need for unnecessary regulation..

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-1330

TECHNICAL GUIDANCE FOR ESTIMATING TOTAL MAXIMUM DAILY LOADS (TMDLS): INTEGRATING STEADY-STATE AND EPISODIC POINT AND NONPOINT SOURCES

I. Tool Description

This guidance provides technical detail on modeling approaches for TMDL estimation, with emphasis on situations that involve wet-weather point and nonpoint source loading in combination with steady point sources. The user is led step-by-step through technical aspects of TMDL estimation, from initial problem scoping through model development and on to TMDL development, implementation, and follow-up assessment. This tool will be completed in FY 1996.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof. Since 1983, the primary impetus for developing the guidance is the need to provide the technical and management tools for States to use in meeting statutory requirements and Agency programmatic priorities. Thus the guidance focused first on conventional pollutants, then toxics and now nonpoint sources and other wet weather discharges.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, nonpoint sources and background loadings (from non-controlled sources such as atmospheric deposition and sediment). The TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. The TMDLs maximize real environmental gains and minimize the need for unnecessary regulation.

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied Science
Division, (202) 260-1330

TECHNICAL GUIDANCE MANUALS FOR PERFORMING WASTE LOAD ALLOCATIONS

I. Tool Description

This tool consist of a series of guidance manuals on performing waste load allocations for streams and rivers, lakes, reservoirs and impoundments, and estuaries. Also included are methods for analyzing biochemical oxygen demand, low dissolved oxygen, nutrient, and eutrophication.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof. Since 1983, the primary impetus for developing the guidance is the need to provide the technical and management tools for States to use in meeting statutory requirements and Agency programmatic priorities. Thus the guidance focused first on conventional pollutants, then toxics and now nonpoint sources and other wet weather discharges.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, nonpoint sources and background loadings (from non-controlled sources such as atmospheric deposition and sediment). The TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. The TMDLs maximize real environmental gains and minimize the need for unnecessary regulation..

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-1330

**TECHNICAL GUIDANCE MANUAL FOR DEVELOPING TOTAL MAXIMUM DAILY
LOADS, BOOK II: STREAMS AND RIVERS, PART I: BIOCHEMICAL
OXYGEN DEMAND/DISSOLVED OXYGEN AND NUTRIENTS/EUTROPHICATION**

I. Tool Description

This manual presents the most recent information and techniques for use in preparing total maximum daily loads (TMDLs) when excessive biochemical oxygen demand (BOD), low dissolved oxygen (DO), and excessive nutrients and eutrophication impair the water quality of streams and rivers. This version includes: an update of water quality reaction rate coefficients, an update of model identification and selection, and an inclusion of a TMDL example using QUAL2E and WASP. This manual will be completed by the end of FY 1995.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof. Since 1983, the primary impetus for developing the guidance is the need to provide the technical and management tools for States to use in meeting statutory requirements and Agency programmatic priorities. Thus the guidance focused first on conventional pollutants, then toxics and now nonpoint sources and other wet weather discharges.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, nonpoint sources and background loadings (from non-controlled sources such as atmospheric deposition and sediment). The TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. The TMDLs maximize real environmental gains and minimize the need for unnecessary regulation.

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied Science
Division, (202) 260-1330

**TECHNICAL GUIDANCE MANUAL FOR PERFORMING WASTE LOAD ALLOCATIONS -
SIMPLIFIED ANALYTICAL METHOD FOR DETERMINING NPDES EFFLUENT
LIMITATIONS FOR POTWS DISCHARGING INTO LOW-FLOW STREAMS.**

I. Tool Description

This document is primarily intended for "desk top" WLA investigations or screening studies that use available data for stream flow, effluent flow, and water quality. It is intended for circumstances where resources for analysis and data acquisition are relatively limited.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof. Since 1983, the primary impetus for developing the guidance is the need to provide the technical and management tools for States to use in meeting statutory requirements and Agency programmatic priorities. Thus the guidance focused first on conventional pollutants, then toxics and now nonpoint sources and other wet weather discharges.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, nonpoint sources and background loadings (from non-controlled sources such as atmospheric deposition and sediment). The TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. The TMDLs maximize real environmental gains and minimize the need for unnecessary regulation..

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-1330

USER'S GUIDE TO THE SEDIMENT QUALITY CRITERIA

I. Tool Description

This tool provides users of the sediment quality criteria information on how the criteria should be applied across the Agency in a variety of programs. Specifically, this guide provides users an insight into how EPA program offices (water, Superfund, RCRA, Pesticides, Toxic Substances, etc.) intend on the criteria to be used in their program as well as the policy and risk management implications.

II. Tool Users

The document is designed for States, Regions, Superfund site managers, industry, environmental groups, others that will be applying sediment quality criteria to site evaluations.

III. Tool Development

Status: A cross-Agency work group has been formed that includes Regions. The work group is drafting program specific outlines of what topics and issues will be discussed in each chapter. Draft document available no earlier than Fall 1995.

Resources: It is expected that the effort will require the participation of representatives from six or seven program offices, all ten Regions, and eventually States and other user groups. The document should take approximately two years to develop.

IV. Special Requirements for Use

V. Program/Media/Geographic Transferability

The document will contain the intended application of sediment quality criteria and risk management options for all affected Agency programs.

VI. Other Information

VII. Program Contacts

Mary C. Reiley Office of Water, Office of Science and Technology, Health and Ecological Criteria Division, (202) 260-9456

WATER QUALITY CRITERIA AND STANDARDS PROGRAMS VIDEOTAPES

I. Tool Description

Nine videos describe various aspects of the water quality standards and criteria programs, including: Introduction to Water Quality Standards, Antidegradation Policy: A Means to Maintain and Protect Existing Uses and Water Quality, Development of Water Quality Criteria and Its Relationship to Water Quality Standards, Enumeration Methods for E. Coli and Enterococci, Water Quality-Based Approach to Pollution Control, Water Quality Standards and 401 Certification, Economic Considerations in Water Quality Standards, Water Quality Standards on Indian Lands, and Development of Biological Criteria for Use in Water Quality Standards.

II. Tool Users

Federal, State, municipal industrial, environmental and Tribal entities.

III. Tool Development

Section 303(c) of the Clean Water Act require States and Tribes to adopt water quality standards to protect public health and welfare, to enhance water quality, and to serve the purposes of the Act by providing for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water, whenever these goals are attainable.

Finally, water quality standards provide the bench mark against which to measure the effectiveness of regulatory and non-regulatory programs and in controlling water borne risks.

IV. Special Requirements for Use

None

V. Program/Media/Geographic Transferability

The standards are designed for the water media, but are applicable to a wide range of ecosystems.

VI. Other Information

Water quality standards are the foundation central core of the ecosystem/watershed approach as they define the human health and ecological goals for the aquatic ecosystem and provide the mechanism for meeting the objective of the Clean Water Act -- to restore the chemical physical and biological integrity of the Nation's waters.

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

David K. Sabock Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260 1318

WATER QUALITY GUIDANCE FOR THE GREAT LAKES SYSTEM

I. Tool Description

The Water Quality Guidance for the Great Lakes System (40 CFR Part 132) will be used by States and Tribes to establish consistent water quality standards and implementation procedures that control discharges from industries and municipalities into the Great Lakes Basin. The Guidance, developed as a rule, places special emphases on persistent, bioaccumulative toxic pollutants, since these are of major concern in the Great Lakes ecosystem.

Using an ecosystem approach, establish minimum water quality criteria (including for the first time, criteria to specifically protect wildlife), anti-degradation policies, and implementation procedures applicable to point source discharges for waters of the Great Lakes Basin within the States of Illinois, Indiana, Michigan, Minnesota, New York, Pennsylvania, Ohio, and Wisconsin and for waters within the jurisdiction of Indian tribes.

II. Tool Users

Regions II, III and IV; the Great Lakes States and Tribes.

III. Tool Development

Status: EPA is under a court order to sign the final Part 132 rule by March 13, 1995 (National Wildlife Federation v. Browner, Civil No. 92-2338-CRR).

Resources:

Development:

- o FY 1989 - FY 1991: 5 FYE/yr (Headquarters and Regions)
- o FY 1992 - FY 1995: 10 FTE/yr and \$150,000/yr Contract Funds (Headquarters/ Regions)

Application

- o Headquarters/Regions - 12 FTEs/\$10M Contract Funds
- o Eight Great Lakes States and Tribes - 16 FTEs/\$40M Contract Funds

IV. Special Requirements for Use

V. Program/Media/Geographic Transferability

With modifications, the Great Lakes Initiative (i.e., public participation aspects) and the final Part 132 rule could be used as a model by other EPA programs and for other media/geographic areas.

VII. Program Contacts

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WATER QUALITY STANDARDS FOR WETLANDS

I. Tool Description

The Clean Water Act requires states to establish water quality standards, which have three components: designated uses; criteria to protect those uses; and an antidegradation policy. The statute requires state standards to meet or exceed EPA minimum standards; EPA Regional Offices review the standards promulgated by states to ensure that they do so.

In general, water quality criteria can be narrative statements or numeric values. To date, States have focused on developing narrative criteria to protect the unique physical and biological characteristics of wetlands. An example of a narrative hydrologic criterion for wetlands would be: "maintain natural hydrologic conditions, including hydroperiod, hydrodynamics, and natural water temperature variations necessary to support vegetation which would be present naturally".

Narrative criteria in conjunction with antidegradation policies can provide the basis for addressing hydrologic and physical impacts to wetlands (not easily discerned through numeric criteria) caused by nonpoint source pollution, storm water discharges, groundwater pumping, filling and other sources of wetlands degradation. When combined with a strong implementation policy, wetlands water quality standards can work in tandem with other wetland protection tools, such as best management practices, monitoring programs, and mitigation plans, as well as serve as the primary basis for Section 401 certification decisions.

II. Tool Users

Standards are used by state water quality protection programs.

III. Tool Development

The development of water quality standards is mandated by section 303 of the Clean Water Act.

IV. Special Requirements for Use

Standards are intended for use in conjunction with an implementation vehicle. For example, an NPDES permitting program may look at the standards to determine whether the permit conditions would lead to a violation of standards.

V. Program/Media/Geographic Transferability

Good standards with appropriate criteria can provide a good indication of ecological goals when assessing the health of a wetland. Such information could be useful to ecosystem efforts which include wetlands.

VI. Other Information

States take varying approaches to the promulgation of standards for wetlands. Some do not differentiate between wetlands and other surface waters in the promulgation of standards; some develop standards generic wetlands standards; others develop specific standards for different types of wetlands (eg: bogs, coastal wetlands).

VII. Program Contacts

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WATERSHED ECOLOGICAL RISK ASSESSMENT GUIDANCE

I. Tool Description

This tool is to provide guidance for using ecological risk assessment methodology for watershed ecosystem management, helping watershed partners identify, evaluate and prioritize complex problems using the scientific method.

The guidance will provide users with a detailed process for defining management goals and selecting ecological values to assess goal achievement. User's will learn how to generate conceptual models, hypotheses and analysis plans for evaluating available data and generating new data to answer key questions. Follow-on sections on data analysis and interpretation will be included. To supplement the guidance, full case study examples of watershed level ecological risk assessments will be included.

II. Tool Users

Guidance will be designed for local, state and federal resource managers,, regulators and risk assessors. Industry, public organizations, interested groups and also be able to use the guidance.

III. Tool Development

Five case studies of watershed ecological risk assessments are currently under development, jointly sponsored by the Office of Water and ORD's Risk Assessment Forum. The case studies are scheduled for draft completion in December 1995. The guidance is being written concurrently and a draft will begin the review process also in December 1995.

Participants on case study work groups include EPA Regional Offices, ORD Laboratories, all EPA program offices, state resource managers and regulators, local resource managers, private organizations and academics. Participation is voluntary. EPA (Headquarters) FTE: 1/yr; Extramural HQ funding: \$150 K/yr.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

The guidance is designed to be broad based and applicable to any geographic area and ecosystem, large or small and can be used to evaluate the effects of chemical, physical and biological stressors or ecological resources.

VI. Other Information

VII. Program Contacts

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WETLANDS BIOCRITERIA DEVELOPMENT

I. Tool Description

Biocriteria are essential components in the development of water quality standards which protect the biological health of the nations waters.

Biocriteria are primarily narrative statements about the health of aquatic communities and populations; work on developing numeric criteria is being conducted in some States. Together with the Office of Science and Technology and the Office of Research and Development (ORD), the Office of Wetlands, Oceans and Watersheds is beginning to develop wetlands biocriteria guidance. In fiscal year 1994, workshops sponsored by ORD were held in Minnesota and Massachusetts to discuss advances in wetland assessment and monitoring protocols. Related research continues in the Prairie Pothole region in North Dakota and is beginning in the Southeast in bottomland hardwoods. States were surveyed to determine the status of wetlands monitoring and biocriteria development efforts. In addition, a contract was initiated to scope out technical issues related to wetlands biocriteria development as well as plan for a technical workshop in the Spring of 1995 bringing together States, Regions, scientists and academia.

II. Tool Users

State water quality protection programs.

III. Tool Development

Section 301 of the Clean Water Act calls for the development of criteria to protect the health (chemical, physical and biological) of the nations waters.

IV. Special Requirements for Use

Standards are intended for use in conjunction with an implementation vehicle. For example, an NPDES permitting program may look at the standards to determine whether the permit conditions would lead to a violation of standards.

V. Program/Media/Geographic Transferability

Good biocriteria can provide an indication of the parameters necessary for assessing the biological health of a wetland. Such information could be useful to ecosystem efforts which include wetlands.

VI. Other Information

Wetlands biocriteria will be an important tool to assess progress towards the goal of no net loss of the quality of our Nation's wetlands, to assess impacts to wetlands and to set restoration goals.

VII. Program Contacts

Doreen Robb Office of Water, Office of Wetlands, Oceans and Watersheds, Wetlands Division, (202) 260-1906

**WHOLE EFFLUENT TOXICITY (WET) TESTS:
METHODS TO MEASURE THE TOXICITY OF EFFLUENT AND
RECEIVING WATERS TO FRESHWATER AND MARINE ORGANISMS**

I. Tool Description

WET tests can be used as a screening device to identify toxicity in effluent or receiving waters. They can also be used to set a permit condition for the allowable toxicity in a discharge. This tool provides EPA-approved methods that enable effluent from dischargers and receiving waters to be analyzed for toxicity (both acute and chronic) in both freshwater and marine environments.

II. Tool Users

EPA Regional Offices, State and Tribal Governments.

III. Tool Development

Final methods for all of the available WET tests are expected to be published in the Federal Register in February, 1995. Test costs range from several hundred dollars for acute tests to several thousand dollars for chronic tests.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

These tests to assess toxicity can be used by other EPA programs that are concerned with aquatic toxicity on a site-specific basis (e.g., Superfund).

VI. Other Information

VII. Program Contacts

Frank Gostomski Office of Water, Office of Standards and Technology, Health and Criteria Division,
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WATER EFFECT RATIO (BIOAVAILABILITY) GUIDANCE

I. Description of Tool

The purpose of the tool is to assess the effect that local water quality would have on the aquatic toxicity of each unit of a particular toxicant. The toxicity of materials (such as metal salts) that form many chemical species in water, all in equilibrium with each other, depends on the particular characteristics of the water used in the toxicity test. Standard aquatic toxicity testing, upon which, the national aquatic life criteria are based, usually try to maximize unit toxicity, by minimizing the presence of sorbing or binding materials. Local waters to which the criteria are applied may have chemical characteristics substantially different than the waters used for the toxicity tests underlying the national criteria. The purpose of the water-effect is to account for this difference.

The approach consists of side-by-side toxicity tests with an indicator species in sample of site water and in typical laboratory water. The water-effect ratio is the ratio of LC50s in site water and in lab water. This ratio is used to adjust the national criterion to fit the site. The guidance recommends appropriate ways to carry out such a study.

II. Tool Users

EPA HQ and Regional Offices, States, dischargers, consultants. OW/OST/HECD and ORD offer technical assistance in the form of consultation on and review of site-specific studies.

III. Tool Development

The tool has been completed and is in use.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

Minimal media transferability. Geographic transferability is the essence and purpose of the approach.

VI. Other Information

VI. Program Contact

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Criteria, (202) 260-7039

HEADQUARTERS ECOSYSTEM TOOL INVENTORY

MODELING TOOLS

ACUTE AVIAN RISK ASSESSMENT MODEL

I. Tool Description

The purpose of the acute avian risk assessment model is to evaluate the comparative risk of acute lethal exposure from pesticides used on corn. The model is currently in external agency peer review. It is expected to be available in early 1995.

II. Tool Users

The intended users of this tool are regulatory agencies (including Office of Pesticide Programs at EPA HQ), pesticide registrants and non-government agencies.

Initial peer reviews of the model have been positive. Remaining peer reviews of the model are pending but are believed to be supportive of the overall direction and intent of effort. Better data on specific parameters, however, would improve the accuracy of the model's assessment capabilities.

III. Tool Development

The acute avian risk assessment model was developed in FY 1993-94 by Abt Associates under contract to the Pesticide Policy Branch, Waste and Chemical Policy Division, Office of Policy Analysis, Office of Policy, Planning and Evaluation. Since development of the model was part of a larger effort, specific cost information is not immediately available.

IV. Special Requirement for Use

None

V. Program/Media/Geographic Transferability

This tool is designed specifically to evaluate pesticides used in the production of corn but the model can be used to evaluate other pesticides on other crops and other toxic substances as well.

VI. Other Information

VII. Program Contact

Ronn Dexter Office of Policy, Planning and Evaluation, Office of Policy Analysis, Waste and Chemical Policy Division, Pesticide Policy Branch, (202) 260-7562

AQUATIC RISK ASSESSMENT MODEL

I. Tool Description

The purpose of the aquatic risk assessment model is to evaluate the comparative risk to aquatic ecosystems from the exposure of pesticides used on corn. This tool is currently in the process of being reviewed by an external agency peer group. It is expected to be available in early 1995.

II. Tool Use

The intended users for this model are regulatory agencies (including the Office of Pesticide Policy), registrants and non-government agencies.

Feedback from initial peer reviews have been positive. Remaining peer reviews are pending but are believed to be supportive of the overall direction and intent of the effort. Some reviewers have commented that better data on specific parameters would improve the accuracy of the model.

III. Tool Development

The model was developed in FY 1993-94 by Abt Associates under contract to the Pesticide Policy Branch in the Office of Policy Analysis, Office of Policy, Planning and Evaluation. Since development of the model was part of a larger effort, specific cost are not immediately available.

IV. Special Requirements for Use

None

V. Program/Media/Geographic Transferability

Tool is designed specifically to evaluate pesticides used in the production of corn but the model can be used to evaluate other pesticides on other crops and other toxic substances as well.

VI. Other Information

VII. Program Contact

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AQUATOX

I. Tool Description

AQUATOX is a computerized model designed to predict the fate and effects of spilled, surface water-borne toxic substances. The system can presently model streams, ponds and reservoirs. The Office of Standards and Technology in the Office of Water is developing additional modules for large estuarine/river systems.

The model is designed to be very user-friendly. It also has a lot of flexibility regarding the presentation of results; information can easily be graphed. This is often a useful feature in preparing information for policy/decision-makers as a way of helping them to understand the significance of the information.

II. Tool Users

The tool can be used by any risk assessor; it is very flexible and designed to be user-friendly. The model was developed in 1993, and is currently being used by Environmental Effects Branch (EEB) in the Health and Environmental Review Division, OPPTS, to evaluate persistent bio-accumulators, and by the Office of Water in its TMDL program. Feedback from the Office of Water has been good.

There aren't too many other users at present, although the model is available to anyone who is interested. There is interest in increasing the number of users, especially since most ecological analysis occurs at the regions, but there has not yet been a lot of advertising.

The model could also be a helpful Pre-manufacture Notice (PMN) Review tool, as PMN turn-around must occur within 90 days.

III. Tool Development

The model was the outgrowth of a 1987 workshop as a result of recognition that the worst toxic releases are water-borne. There was a recommendation to develop a model to provide 1) specifications for how toxics transport/fate (move through the ecosystem), 2) potential toxic ecological effects. The model had to be able to do this with the very little bit of data that comes in on the Pre-Manufacturing Notice (PMNs) that manufacturers are required to submit to the Agency. The **AQUATOX** model was finished in 1993. ABT, a contractor, developed the model, although the Environmental Effects Branch (EEB) worked closely with the contractor throughout development.

Funding has been a stumbling block; a prototype was completed in 1990, but a final version wasn't completed until 1993 due to funding issues. Altogether, HERD spent about \$125,000-\$150,000 on development; OW is putting in several hundred thousand more for their modules and training.

IV. Special Requirements for Use

The model is designed as a tool for risk assessors, so some knowledge of ecology/toxicology is necessary.

The model is PC-based, and designed to be very user-friendly. The present user-interface is a bit awkward, but a Windows interface is being developed through the Office of Water. OW is also developing some additional "guidance" (user-support/technical documentation).

V. Program/Media/Geographic Transferability

The model cannot handle groundwater (there are other models which do), but can be used by any program for which surface water transport is of interest (eg: Superfund, etc.). The model can be used in combination with other models, such as groundwater.

VI. Other Information

The model would benefit from a probabilistic approach to risk, enabling it to better deal with uncertainty. There is an interest in moving away from analyses concerned with "1 death per 100,000" to ones which try to predict the chances of some particular negative impact. Monte Carlo methods have been developed to address this issue, but these have not been incorporated in to the model. It is hoped that the funding to do this additional development will become available.

VII. Program Contacts

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ASSESSMENTS OF IRRIGATION DRAINWATER CONTAMINANT RISKS TO ECOLOGICAL RESOURCES (USFWS/NBS risk-based GIS model)

I. Tool Description

This GIS/hydrological/toxicological model utilizes existing data on environmental concentrations, modeled concentrations based on flows and hydrology as well as chemical behavior, and combines this information with toxicological info. and locations of important/vulnerable ecological resources to generate maps and tabular data to be used in targeting risks from these waters; uncertainty components extremely useful to risk management decision-maker. Potential use in regulatory/non-regulatory actions to reduce risks from these waters.

II. Tool Users

This tool was developed for EPA Water Office, U.S. Fish and Wildlife Service, Bureau of Reclamation, states, etc. and other users dealing with impacts from irrigation waters. It has potential use in non-regulatory schemes associated with water districts.

This tool has not been used yet; validation is not complete.

III. Tool Development

Irrigation drainwaters, particularly those in the western U.S., contain elemental and pesticide/fertilizer compounds which have significant ecological impacts; these waters are not regulated under the Clean Water Act. This model development is designed to assist in targeting those areas of highest risk in the 7 western states. Model and model validation essentially complete; expected delivery in January 1995.

Model developed through Interagency Agreement with USFWS, beginning in 1993; follows ecological risk assessment by USFWS on irrigation return flows; part of the CWA reauthorization debate.

IV. Special Requirements for Use

Users must be knowledgeable and experienced in risk assessment, risk management, ecological toxicology, western water practices, land and water management.

V. Program/Media/Geographic Transferability

This tool has potential utility to ecological risk assessments in general, with certain adaptations where appropriate.

VI. Contact Person

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Don Hunter National Biological Survey, Ft. Collins, Co.

COMPARATIVE TOXICOLOGY MODELS

I. Tool Description

Comparative Toxicology Models: Two models are available which allow: 1) predicting chronic toxicity from acute lethality data (ACE), and 2) inter-taxa correlations for toxicity to aquatic organisms. The ACE model allows one to predict chronic toxicity from any specified time to infinity using only acute toxicity data or extending brief chronic test results (e.g., 7-day fathead minnow effluent tests, 28-day embryo/larval tests) to longer term exposures. The model has just undergone completion and validation, but is in use. Inter-taxa correlations for toxicity to aquatic organisms

allows one to predict acute toxicity for an untested species from acute toxicity data for a surrogate species. This tool is presently being expanded to include several endangered fish species, so is still developmental.

II. Tool Users

Intended and actual users are government, academia, and industry. The tools are user-friendly computer programs and used when certain types of toxicity data are unavailable or cannot be obtained. The ACE program has been in experimental use for 3 years and inter-taxa correlations for 6 years.

Feedback for the ACE program has been very good and proven to be highly accurate and precise. Little feedback has been received on inter-taxa correlations other than people are using it. The ACE program could be enhanced by modifying the models to accommodate endpoints other than lethality. The inter-taxa correlations are being improved by adding endangered fishes.

III. Tool Development

The final aspects of ACE were completed in 1994, and the basic portion of inter-taxa correlations was completed in 1987. Development was prompted by the ecological risk assessment needs and the absence of data for endangered species.

Both tools were developed mainly in-house with assistance from the University of Missouri (ACE) and contractor (inter-taxa correlations). The freshwater endangered fishes data for inter-taxa correlations are being developed in cooperation with the National Biological Survey.

IV. Special Requirements for Use

The only requirement is the ability to operate a computer.

V. Program/Media/Geographic Transferability

Both programs can be used when predictions for aquatic toxicity data are required. In addition, the ACE program can be used for terrestrial organisms as well as aquatic.

VI. Other Information

This laboratory studies ecosystem processes in order to understand and solve near-coastal environmental problems resulting from toxic chemicals, pesticides, pathogens, and introduced organisms.

VII. Program Contact

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COMPREHENSIVE ENVIRONMENTAL ECONOMIC POLICY EVALUATION SYSTEM (CEEPES)

i. Tool Description

CEEPES is an integrated modeling system developed to estimate the economic and environmental consequences of alternative policies affecting the use of pesticides and nutrients. It integrates diverse simulation models comprising four major components: policy, agricultural and economic decisions, fate and transport, and health and ecological risk. It simulates the risk-benefit trade-offs associated with nonpoint source pollution from agricultural productions. It links biophysical with economic modelling systems that have been integrated over the dimensions of time and space. The CEEPES study region includes the Midwestern Corn Belt, the Great Plains, and the Southeastern Corn Belt. The modelling system was used to compare the risks and benefits of alternative policies, including national bans on the use of the corn and sorghum herbicide atrazine, as well as the entire group of triazine herbicides.

II. Tool Use

The system is currently in use for analyses. Intended users of the outcomes of model simulations are policy analysts and policy makers involved with issues associated with pesticide and nutrient use. Peer reviewers of the model have stated that the utility is good to excellent.

Unmet needs of CEEPES include expanding to more crops beyond corn, sorghum, and soybeans, and the crops involved in their rotations; expand the level of detail; and improve the environmental models used. Also, the model needs to be developed for use by an individual, currently it can only be used by a team. This aspect should be completed in early 1995.

III. Tool Development

CEEPES was developed by Iowa State's Center for Agriculture and Rural Development (CARD) over the period of 1989 to 1993. Its development was prompted by the lack of tools available to assess the economic and ecological impact of alternative policies and practices on pesticide use.

The approximate cost of developing the tool was 1 FTE and \$1 million in grant money.

IV. Special Requirements for Use

A team of people is needed for the running of this model due to its complex components. Also, individuals using the model need to know how to ask the right policy questions. In addition, there are special computer requirements.

V. Program/Media/Geographic Transferability

Other offices that are interested in place based decision making and linking water quality with agricultural activities such as OW, PPD, and OPP can use this tool. At this time, however, only corn, sorghum, and soybean crop pesticide and nutrient policies can be evaluated with the full model. Partial analyses, not including modelling of ecological and aquatic impacts can be conducted on wheat and cotton. Full use of the model is geographically restricted to the Midwestern Cornbelt and the Southeast.

VI. Contact Person

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CORNELL MIXING ZONE EXPERT SYSTEM (CORMIX)

I. Tool Description

The Cornell Mixing Zone Expert System (CORMIX) may be used for the analysis, prediction, and design of aqueous toxic or conventional pollutant discharges into diverse waterbodies. Its major emphasis is on the prediction of plume geometry and dilution characteristics within a receiving water's initial mixing zone so that compliance with regulatory constraints may be judged. The system also predicts discharge plume behavior at larger distances. Because of CORMIX's public domain status, extensive feedback has been received from users on needed corrections and enhancements, and the model is continuously updated through interaction with Center for Exposure Assessment Modeling (CEAM).

II. Tool Users

CORMIX is used by engineers and water quality modelers for modeling the mixing zone resulting from diverse types of aquatic pollutant discharge (single point, multiple point, etc.) to receiving water bodies such as streams, rivers, lakes, reservoirs, estuaries, and coastal waters. CORMIX has been in wide use for 5 years. Because of CORMIX's public domain status, extensive feedback has been received from users on needed corrections and enhancements, and the model is continuously updated through interaction with CEAM. This tool could be enhanced by developing a graphics post-processor and a tidal reversing flow component.

III. Tool Development

CORMIX was developed in the late 1980's to provide a tool for analyzing surface water mixing zones. CORMIX was originally developed through a cooperative agreement with Cornell University. Later releases have been funded by the Office of Water.

IV. Special Requirements for Use

With its expert system design, CORMIX is easier to use than many water quality models: all data are entered interactively in response to CORMIX prompts; the user is prompted for complete specification of site/case descriptions, ambient conditions, discharge characteristics, level of output detail, and regulatory definitions, and advice menu options are available to help prepare and enter data values. CORMIX is microcomputer based (DOS-compatible), although the Fortran code may be compiled on any machine. The user is well advised to use the most powerful microcomputer available.

V. Program/Media/Geographic Transferability

CORMIX has general applicability for surface water mixing zone analysis.

VI. Other Information

CEAM was established in 1987 to meet the scientific and technical exposure assessment needs of the United States Environmental Protection Agency (EPA) as well as state environmental and resource management agencies. To support environmental risk-based decisions, CEAM distributes environmental simulation models and databases for urban and rural non-point sources, conventional and toxic pollution of streams, lakes and estuaries, tidal hydrodynamics, geochemical equilibrium, and aquatic food chain bioaccumulation. A wide range of analysis techniques is provided, ranging from simple desk-top techniques suitable for screening analysis, to sophisticated, state-of-the-art continuous simulation models.

VII. Program Contacts

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DYNAMIC TOXICS WASTE LOAD ALLOCATION MODEL (DYNTOX), USER'S MANUAL, September 13, 1985

I. Tool Description

This tool assesses the impact of toxic discharges on receiving water quality over the entire range of historical and future conditions. DYNTOX is both a steady state and dynamic wasteload allocation (WLA) model. Historical and future conditions are analyzed to define the frequency and duration of exposure above specified limits. Simplified pre- and post-processing capabilities are being developed for DYNTOX. Additional new features of the model include partial mix factors and variable water quality criteria for metals and ammonia.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof. Since 1983, the primary impetus for developing the guidance is the need to provide the technical and management tools for States to use in meeting statutory requirements and Agency programmatic priorities. Thus the guidance focused first on conventional pollutants, then toxics and now nonpoint sources and other wet weather discharges.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, nonpoint sources and background loadings (from non-controlled sources such as atmospheric deposition and sediment). The TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. The TMDLs maximize real environmental gains and minimize the need for unnecessary regulation.

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

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ECONOMIC VALUATION MODEL

I. Tool Description

This PC-mounted, spreadsheet-based model will be used by the Office of Toxic Substances to help assess the costs and benefits associated with the ecological impacts anticipated with proposed regulatory and non-regulatory proposed actions. The model is similar in concept to Department of the Interior models which combine physical impacts and cost/benefit analysis for natural resource damage assessment.

The model will offer two site modules for different types of aquatic environments (eg: river systems). This data about the physical environment can be combined with socioeconomic data (eg: is there commercial/sport fishing; size of activity) to model socioeconomic activity's interrelationships with the physical environment. The model accounts for biological and valuation variability, and uses Monte Carlo (probabilistic) techniques to help incorporate and address uncertainty.

As more information is developed on the physical impacts for terrestrial ecosystems, additional modules can be developed to help calculate the costs and benefits relevant to terrestrial systems. The model will also lend itself well to environmental justice purposes, since it easily accepts and addresses socio-demographic data.

II. Tool Users

The intent is for the model to be used internally for chemical evaluations and decision-making to help the agency choose between options based on risk. It could be used in the regulatory environment, although this can be problematic since the model is generic and therefore open to criticism that its results don't match reality. This is a general problem inherent in modeling, however; while the model will be peer-reviewed, one can never get 100% accuracy.

III. Tool Development

Interest in this model was prompted by the risk assessment conducted for the eco-toxin, chloroparaffin. Some physical impact modeling was done and information was provided about population impacts for various species of aquatic exposure to chloroparaffin. However, the modeling was not able to address the costs and benefits associated with clean up.

Work is being done both in-house and by a contractor. A working prototype will be ready in January, 1995. There is interest in developing additional site modules; another system which looks at reservoirs and ponds could easily be added. Wetlands could also be incorporated if one had a measure of impacts. The developer also envisions putting triggers like endangered species into the model, as there are other databases that can link this up with endangered species data. It would take a huge data effort to incorporate terrestrial systems; one would need either to find a huge source of biological data or an existing model, or pay handsomely to have someone develop this information.

IV. Special Requirements for Use

Users must have a PC with Lotus and At-Risk, a Lotus add-on. The model was not designed for external users; if outside interest develops, user documentation will have to be prepared.

V. Program/Media/Geographic Transferability

The model lends itself to many geographic (aquatic) applications as it is river-based. The model offers great applicability to anyone trying to assess ecological insults; however, data must be available on the connection between the insult and the species. A decrease in population or biomass is presently used.

Another factor, such as the impact of a change in water quality on the livability of fish, could still be used based on plausible values for population change.

VI. Other Information

OPPTS is cognizant of the fact that TOSCA defines exposure in a multi-media fashion, but data is not equally available for all three media. Information has focused more on water systems; terrestrial information is tougher to come by. There are roadblocks at all levels regarding the incorporation of economic information into physical impact models.

VII. Program Contacts

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Lynn Blake-Hedges Office of Prevention, Pesticides and Toxic Substances, Office of Pollution Prevention and Toxics, Economics, Exposure and Technology Division, (202) 260-7241

ECOSYSTEM/ECONOMIC MODELING PROJECT (OPPE)

I. Tool Description

The OPPE Ecosystem/Economic modelling project consist of several component models. The ecosystem model is a dynamic process-based simulation model that can cover either an entire watershed or a sub-watershed. The model makes predictions about the future condition of the ecosystems of the watershed. These predictions include the type of ecosystem or habitat that will occur in actual geographic locations within the watershed, as well as ecosystem process type information such as productivity. The model is based on a spatial grid cell format and also uses geographic information systems (GIS). Validation studies on the ecosystem model have been carried out. The ecosystem model is in the process of being coupled to economic models in one of the watershed applications. The economic models have not quite been completed. These will include a model of human land use change (eg. agricultural to residential, low density to high density residential, etc) and models of agricultural management practices. Feedback loops between the ecosystem and economic models are being developed. A general description of this effort is described in Bockstael et al. (in press, 1995)

II. Tool development

The initial version of the model was developed in the 1980's at the Louisiana State University for the US Fish & Wildlife Service and the US Army Corps of Engineers (Costanza et al. 1990). The model was used to project the effects of large scale flood control projects in coastal Louisiana wetlands. The model has since been significantly modified and is known as the General Ecosystem Model (GEM) (Fitz et al. 1995).

III. Tool Users

The Louisiana version of the model has been expanded to help management in the new Terrebonne-Barataria National Estuary Program. The GEM is being applied to the Florida Everglades for the South Florida Water Management District. It is also being applied to the Patuxent River watershed of the Chesapeake Bay. OPPE will be using the Patuxent version of the model to look at policy scenarios for nutrient management that are being proposed as part of the Farm Bill reauthorization. Other uses will include wetlands management issues and county zoning plans.

IV. Special Requirements for Use

Although the model is transferable across geographic regions, it has significant data requirements. Implementation is a several year project and currently needs the involvement of Robert Costanza's modeling group at the University of Maryland.

V. Program/Media/Geographic Transferability

The ecosystem model has already been transferred from Louisiana to coastal regions of Maryland and Florida. OPPE is in the planning stages with Region 10 to implement the model in the Pacific Northwest.

VI. Other Information

VII. Program Contacts

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Mary Jo Kealy Office of Policy, Planning and Evaluation, Office of Policy Analysis, Economic Analysis and Innovations Division, (202) 260-5728

EXAMS v. 2.95

I. Tool Description

EXAMS v. 2.95 combines properties of synthetic organic chemicals and aquatic ecosystems to characterize the ecotoxicology, persistence, and mobility of pesticides and industrial materials in surface water.

II. Tool Users

Intended for regulatory scientists, used by industrial firms, consultants, and educational institutions as well. Used for chemical safety evaluations for the past 12 years. Feedback received is positive, generally asking for expanded capabilities. Unmet needs are in the realm of extensive databases for site-specific applications and tools for analysis of lengthy output time series.

III. Tool Development

Initial development 1978-1980, prompted by regulatory needs under TSCA & FIFRA. EXAMS 2.95 was developed in-house and is completed and in use.

IV. Special Requirements for Use

Requires 80386 or better pc for use; some knowledge of environmental chemistry and biology.

V. Program/Media/Geographic Transferability

Program is written in system-independent process-based form that makes it applicable to any geographic area. Requires terrestrial and atmospheric interactions be described rather than directly simulated.

VI. Other Information

The Exposure Analysis Modeling System (EXAMS) is an interactive modeling system that allows a user to specify and store the properties of chemicals and aquatic ecosystems, modify either through simple commands, and conduct rapid evaluations and sensitivity analyses of the probable aquatic fate of synthetic organic chemicals. It include file-transfer interfaces to the PRZM terrestrial model and the FGETS bioaccumulation model.

VII. Contact Person

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FEMWATER/LEWASTE

I. Tool Description

The FEMWATER model is designed to provide a numerical procedure for establishing wellhead protection zones (in agricultural areas) using the assimilative capacity criterion. FEMWATER is a three-dimensional variably saturated zone model that models contaminant movement in heterogeneous and anisotropic media consisting of many geologic formations as desired, considers both distributed and point sources/sinks that are spatially and temporally dependent, and accept four types of boundary conditions. The model is intended to be used to delineate wellhead protection zones based on concentrations at various wellhead points. The first release of the code is available from the Center for Exposure Assessment Modeling, Athens Ecosystem Research Division.

II. Tool Users

The users of this tool are consultants, hydrogeologists, and engineers. The tool has been in use for two years and has been applied in the EPA MASTER program for the Walnut Creek watershed in Iowa, the EPA Eco-Risk program for the DOE facility in Aiken, SC and will be applied in Durango, CO for wellhead protection delineation in housing development.

The model has been modified and a graphical user interface has been developed for its application and use. The interface is now in a beta test stage.

III. Tool Development

The tool was developed under the Safe Drinking Water Act and its mandate for States to produce and submit to EPA, a wellhead protection program. The tool was developed under a joint effort by Federal, university and contract support. A total of 5.0 FTE's were used in the development activities, two universities, and \$500,000 extramural contract support. The initial code was developed during fiscal year 1992 and fiscal year 1993 -- it is still being modified and expanded.

IV. Special Requirements for Use

A workstation or 486/Pentium-based personal computer is required. Effective use of the tool requires significant training, however; since Athens' regulatory and program support was cancelled no training programs have been conducted.

V. Program/Media/Geographic Transferability

The tool could be used by other programs where either organic and/or radionuclides are of concern.

VI. Other Information

VII. Program Contacts

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FOOD AND GILL EXCHANGE OF TOXIC SUBSTANCES (FGETS)

I. Tool Description

FGETS is a FORTRAN simulation program that predicts temporal dynamics of a fish's whole body concentration (μg chemical / (grams live weight fish)) of non-ionic, non-metabolized, organic chemicals that are bioaccumulated from water and food. The model is based on a set of diffusion and forced convection partial differential equations, coupled to a process-based fish growth formulation. Chemical exchange rates are estimated using fundamental principles of passive diffusion and thermodynamics rather than phenomenological toxicokinetic data.

FGETS can be used to analyze the bioaccumulation of organic chemicals under laboratory or field conditions, and its predictions have been shown to agree well with both types of data. For laboratory applications, FGETS can be used to model either constant flow or static exposures. For field assessments, FGETS can be used to simulate the chemical bioaccumulation in multiple fish species that are exposed to either constant or time-varying water concentrations and that feed on either single or multiple food resources. For such assessments, FGETS can be configured to predict the dietary accumulation of chemicals in fish that feed on 1) multiple fish species 2) plankton/drift organisms and 3) benthos. The relative contribution of these food items can be specified as a function of either the fish's age or size (i.e., body weight or length).

The model considers both biological attributes of the fish and physico-chemical properties of the chemical that determine diffusive exchange across gill membranes and intestinal mucosa. Important biological characteristics used by the model include the fish's gill morphometry, body weight, and fractional aqueous, lipid, and structural organic composition. Relevant physico-chemical properties are the chemical's aqueous diffusivity, molar volume, and n-octanol/water partition coefficient (K_{ow}). The model is parameterized for a particular fish species by means of a morphological, physiological, and trophic database that delineates the fish's gill morphometry, feeding and metabolic demands, and body composition. FGETS also calculates the time to reach a lethal activity in the fish assuming that the chemical has a narcotic mode of action.

II. Tool Users

FGETS provides regulators and practitioners with an objective, process-based means to assess not only residue-based, toxicological responses of natural or managed fish assemblages but also dietary exposures to man and piscivorous wildlife.

III. Tool Development

FGETS has been revised and updated annually. Its most recent update was completed in September 1994 (FGETS version 3.0.18). Preliminary algorithms for describing the bioaccumulation of ionizable organics have been developed but have not been incorporated into the existing model. Although FGETS is distributed with a limited database of physiological and morphological parameters, this database has not been updated for over two years. During FY95 and FY96 an updated FGETS database will be compiled as part of an expanded aquatic/riparian community modeling project that is being undertaken for the South Florida Restoration Project. In addition to providing an updated FGETS database, this project will also develop algorithms to describe the bioaccumulation of mercury in fish that will be incorporated into a future version of FGETS.

IV. Special Requirements for Use

FGETS is available for either PC or mainframe applications and is distributed with well documented source code. Users having familiarity with basic ecotoxicological principles and conventional bioenergetic modeling should have little or no difficulty using FGETS.

V. Program/Media/Geographic Transferability

FGETS can be used to analyze bioaccumulation of organic chemical in both freshwater (lake, river, or stream) and marine/ estuarine fish and can be applied to any geographic region of the country.

VI. Other Information

A full description of the theoretical bases and development of FGETS is presented in: Barber, M.C., L.A. Suárez, and R.R. Lassiter. 1991. Modeling Bioaccumulation Organic Pollutants in Fish with an application to PCBs in the Great Lakes salmonids. Can. J. Fish. Aquat. Sci., 48: 318-337.

VII. Contact Persons

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GRAPHICAL EXPOSURE MODELING SYSTEM (GEMS)/PCGEMS

I. Tool Description

GEMS supports exposure and risk assessments by providing access to single media and multimedia fate and exposure models, physical/chemical property estimation techniques, statistical analysis, graphics and mapping programs with related data on environments, sources, receptors, and populations.

This tool is also available as PCGEMS, a stand-alone version of GEMS. PCGEMS is modular in design, allowing the user to use the various PCGEMS programs and datasets without storing the entire program in one sub-directory on a computer's hard drive. The modules and datasets may be stored and accessed from floppy disks.

PCGEMS is available in a variety of different media, which have been broken down into various modules which can be ordered separately. The core system must be ordered before any of the other modules are ordered. The core system module includes the user's guide, postage and handling. Some of the modules are property estimation, air models, surface water models, multimedia models, or graphics.

II. Tool Users

Anyone can obtain a GEMS account from the National Technical Information Service (NTIS). Used by analysts with an interactive, easily learned interface to various models, programs, and data needed for exposure and risk assessments on the EPA, VAX cluster of computers. Users apply GEMS to their specific use. It uses methods for estimating water solubility, lake/stream volatilization rate, or vapor pressure.

PCGEMS can be useful to many users; just about anyone can use this system, ie., OPPTS, EPA program offices, States, environmental groups, and industries.

III. Tool Development

GEMS was first developed in 1981 by the General Sciences Corporation. The tool is still in development.

IV. Special Requirements for Use

GEMS requires the use of a computer terminal or PC and a modem. To operate the PCGEMS, one needs an IBM AT or compatible, Math Co-processor and Disk space or cartridge.

V. Program/Media/Geographic Transferability

Models used by GEMS are atmospheric, surface water, and multimedia models.

VI. Program Contacts

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GEOGRAPHIC INFORMATION SYSTEM FOR SITING RCRA FACILITIES (OSW)

I. Tool Description

GIS is an advanced computer technology that combines map, model, and monitoring data into a single analytic framework. A GIS is composed of tools that create data bases, manage data bases, manipulate and display graphic representations of data, and produce maps.

A statutorily mandated new rulemaking (the draft rule is due out the end of 1995) will develop technical standards for permitting sites in sensitive environments (e.g., wetlands, complex hydrogeology, endangered species and plants, etc.). This GIS framework will enable a RCRA permit writer to import and export databases and focus on a single site location to evaluate its appropriateness for siting. OSW originally developed this GIS to perform locational analyses in support of RCRA location standards for hazardous waste treatment, storage, and disposal facilities. It has been expanded to include other siting concerns such as population analysis.

II. Tool Users

This GIS was developed for permit writers, however, anyone can import data into this framework.

III. Tool Development

OSW's GIS has been finished since May 1994. OSW consulted with Region V during the initial system development to determine the best approach for use in RCRA permit decisions. OSW also worked with Mark Olsen at EPA's Environmental Monitoring Systems Laboratory (EMSL) in Las Vegas. Based on these and other discussions, the system was designed to analyze specified locations.

IV. Special Requirements for Use

This system can be used by novice users, has point and click options, can answer a wide variety of questions, and has a wide array of potential applications. The system runs on an UNIX workstation and requires ARC/INFO software. Purchasing costs for ARC/INFO software are approximately \$10,000 - \$12,000.

V. Program/Media/Geographic Transferability

Unknown

VI. Other Information

This framework does not include environmental data, but it can import any dataset.

VII. Program Contact

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HIGH PERFORMANCE GROUND WATER HYDROLOGY MODELING

I. Tool Description

A unified ground water modeling technology is being developed to represent the subsurface hydrological system at all relevant scales, from the capture zones pumping wells, to the shallow ground-water-shed, to the full regional aquifer. The purpose of the tool is the represent the ground water potential field controlling flow rates and directions everywhere in the modeled aquifer, and to account for the fluxes at the ground-water/surface water interfaces.

The modeling system is not a full GIS, but it does provide a computer-aided-design environment for extracting geographical information from paper or electronic maps and databases, and supports interactive on-screen construction of ground-water simulation models. The modeling system is not an expert system, but in the hands of the geohydrologist, it eliminates many of the technical barriers for productive scientific modeling and visualization. The system runs on Personal Computers and Unix Workstations, and is being developed for Supercomputers. The current high performance ground water modeling system consists of: GAEP (Geographical Analytic Element Preprocessor), USEPA public domain; CZAEM (Capture Zone Analytic Element Model), USEPA public domain ; WhAEM (Wellhead Analytic Element Model=GAEP+CZAEM), USEPA public domain; GFLOW1 (Ground Water/Surface Water Model), USEPA/RSKERL site license; SLAEM (Single Layer Analytic Element Model), Strack Consulting, USEPA/RSKERL site license; MVAEM (Multi-Layer Variable Density Analytic Element Model), Strack Consulting, USEPA/RSKERL site license.

II. Tool Use

The USEPA has in-house expertise in the development and application of the high performance groundwater modeling system.

The Wellhead Analytic Element Model (WhAEM), including GAEP and CZAEM, is the first planned release of the high performance system to the public. The User's Guide is expected to be published in early 1995. The preliminary feedback we are getting from participants in the RSKERL Ground Water Modeling Workshops has been very positive. While RSKERL is not in the business of producing commercial software, we hope to be involved in significant technology transfer to the private sector.

III. Tool Development

The analytic element method was invented by Professor Otto Strack of the University of Minnesota, and is documented in the reference book Groundwater Mechanics, Prentice Hall, 1989. In 1991, RSKERL entered into a two-year cooperative agreement with Indiana University and the University of Minnesota, to create the public domain WhAEM package in support of wellhead protection research authorized by the Amendments to the Safe Drinking Water Act of 1986. RSKERL has been exploring the application of the technology to a variety of problems described in Section IV. The USEPA Midwest Subsurface/Surface Transport and Effects Research (MASTER) program has supported exploration of ground water residence times in the agricultural watersheds. Research continues in 1994 through new two-year cooperative agreements with support from the High Performance Computing Initiative (HPC) managed by USEPA/AREAL-RTP.

IV. Special Requirements for Use

The high performance modeling system requires knowledge of the application of the analytic element method to geohydrologic problems. The release of the WhAEM into the public domain makes the technology accessible for the first time to the wellhead protection community. WhAEM requires a 386/486

PC, DOS 3.0+, 2 MB RAM, 5MB hard disk storage, a mouse, and VGA graphics. Data entry into the pre-processor is greatly eased through use of a digitizing tablet. The rest of the high performance ground water modeling system is rather specialized, requiring expert use.

V. Program/Media/Geographic Transferability

The high performance ground water modeling system is particularly applicable to regional scale assessment of steady ground water flow. The ground water component is just one aspect of the hydrologic cycle, and the connection with surface water systems occurs at rivers, wetlands, lakes, estuaries, and oceans. Potential EPA programs with needs may include ORD, OSWER (Superfund, Office of Solid Waste, Office of Underground Storage Tanks), OW (Ground Water and Drinking Water, Office of Wetlands, Oceans, and Watersheds), OPPTS, and the Regions.

VI. Other Information

Ground water systems are important sustainers of ecosystem integrity and function, whether for the individual farmer relying on the well for drinking water, or for the wetland complex providing sanctuary for migratory birds. The subsurface environment is often the hidden and slow moving pathway for contaminants leaching from landfills, or the long term supply of nonpoint source nutrients from agricultural lands causing eutrophication in rivers, lakes, and coastal estuaries.

VII. Program Contact

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HYDROLOGICAL SIMULATION PROGRAM - FORTRAN (HSPF)

I. Tool Description

HSPF is a comprehensive package for simulation of watershed hydrology and water quality for both conventional and toxic organic pollutants. HSPF incorporates the watershed-scale ARM and NPS models into a basin-scale analysis framework that includes fate and transport in one-dimensional stream channels. It is the only comprehensive model of watershed hydrology and water quality that allows the integrated simulation of land and soil contaminant runoff processes with in-stream hydraulic and sediment-chemical interactions.

The result of this simulation is a time history of the runoff flow rate, sediment load, and nutrient and organic chemical concentrations, along with a time history of water quantity and quality at any point in a watershed. HSPF simulates three sediment types (sand, silt, and clay) in addition to three organic chemicals (or one chemical and 2 transformation products of that chemical). The transport and reaction processes included are hydrolysis, oxidation, photolysis, biodegradation, volatilization, and sorption. Sorption is modeled as a first-order kinetic process in which the user must specify a desorption rate and an equilibrium partition coefficient for each of the three solids types.

Resuspension and settling of silts and clays (cohesive solids) are defined in terms of shear stress at the sediment-water interface. The capacity of the system to transport sand at a particular flow is calculated and net resuspension or settling is defined by the difference between the sand in suspension and the transport capacity. Calibration of the model requires data for each of the three solids types. Benthic exchange is modeled as sorption to, desorption from, and deposition/scour of surficial benthic sediments. Underlying sediment and pore water are not modeled.

II. Tool Users

HSPF, and earlier models from which it was developed, have been extensively applied in a wide variety of hydrologic and water quality studies, including pesticide runoff model testing, aquatic fate and transport model testing, and analyses of agricultural best management practices. HSPF application in a pesticide review screening methodology is described by Donigian et al.. In addition, HSPF has been validated with both field data and model experiments, and has been reviewed by independent experts.

The EPA Chesapeake Bay Program has been using the HSPF model since the late 1970's as the framework for modeling total watershed contributions of flow, sediment, and nutrients (and associated constituents such as water temperature, DO, BOD, etc.) to the tidal region of the Chesapeake Bay.

III. Tool Development

The original version of this report was completed as of January 16, 1980. Extensive, revisions, modifications, and corrections to the original report and the HSPF code were performed under contract, as were Releases 7.0 and 8.0 of HSPF and the corresponding documents. The HSPF maintenance and user support activities directed by the U.S. EPA laboratory in Athens, GA. The HSPF User Manual for Release 10.0 was prepared under contract, incorporating code modifications, corrections, and documentation of selected algorithm enhancements sponsored by the U.S. Geological Survey, the U.S. EPA Chesapeake Bay Program, and the U.S. EPA Athens ERL. Except for additions and revisions of the manual reflecting the recent changes and deletion of outdated introductory material in Part C and Part D, much of the document is identical to the earlier Release 9.0 version. The Release 10.0 manual is available on diskette in WordPerfect format.

IV. Special Requirements for Use

Familiarity with hydrology, agricultural runoff, environmental chemistry, water quality modeling concepts, and an IBM-compatible personal computer

V. Program/Media/Geographic Transferability

HSPF is a general tool for simulation of watershed and rivers . It has been applied extensively in the United States and to a limited extent worldwide. It is primarily intended for analysis of conventional pollutant, nutrient and pesticide pollution in surface waters.

VI. Other Information

The Stream Transport and Agricultural Runoff for Exposure Assessment Methodology (STREAM) applies the HSPF program to several well characterized test watersheds representing the five major crops and four agricultural regions of the United States, defines a "representative" watershed based on regional conditions and an extrapolation of the calibration for the test watershed, and performs a sensitivity analysis on key pesticide parameters to generate cumulative frequency distributions of pesticide loads and concentrations in each region. The resulting methodology requires the user to specify only the crops and regions of interest, the pesticide application rate, and three pesticide parameters -- the partition coefficient, the soil/sediment decay rate, and the solution decay rate.

VII. Contact Person

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LAKE MICHIGAN MASS-BALANCE PILOT PROJECT

I. Tool Description

The Lake Michigan Mass Balance Pilot Project is designed to calculate the movement of contaminants from various media into and on Lake Michigan, as well as develop a prototypical mass-balance model using one geographic area. The goal of this project is to extrapolate data and monitoring methodology from the Great Lakes to other Great Waters programs.

Researchers are collecting information on ambient air quality, and water column, tributary, sediments, biota (micro-layer) quality. Monitoring is still underway and will continue through the fall of 1995. Researchers are developing the mass-balance model concurrently with data monitoring.

II. Tool Users

Because this project is not yet complete, there have been no users of this tool.

III. Tool Development

Mass balance was chosen as the most appropriate method to answer the question of atmospheric contribution to total contaminant loadings, as mandated by Section 112 of the Clean Air Act Amendments of 1990, which recognizes that much of the basic science of the transmission of contaminants needs further study.

Approximately \$800,000 per year is devoted to the air monitoring component of this project. It is unclear how much money is being spent on model development. In fiscal year 1993, OAQPS spent \$600,000 on this project. OAQPS estimates that it will devote \$200,000 in AC&C funds and \$400,000 in CAA Section 105 funds for monitoring and another \$185,000 on other project needs in fiscal year 1995.

IV. Special Requirements for Use

It is not yet apparent whether any special requirements (hardware, software, or training) may be needed to use this tool.

V. Program/Media/Geographic Transferability

Transferability unknown.

VI. Other Information

None.

VII. Program Contacts

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MINTEQA2

I. Tool Description

MINTEQA2 is a geochemical equilibrium speciation model for dilute aqueous systems. The model is an update of MINTEQ, which was developed by combining the fundamental mathematical structure of MINEQL with the well-developed thermodynamic database of WATEQ3. Because of MINTEQA2's public domain status, extensive feedback has been received from users on needed corrections and enhancements. This model was last updated and released by EPA's Center for Exposure Assessment Modeling (CEAM) in 1991, and is in need of updating.

II. Tool Users

MINTEQA2 is used by soil scientists and geochemists to calculate the equilibrium composition of dilute solutions in the laboratory or in natural aquatic systems. It can be used to calculate the mass distribution between dissolved, adsorbed, and multiple solid phases under a variety of conditions. Various versions of MINTEQA2 has been in use for 20 years. Because of MINTEQA2's public domain status, extensive feedback has been received from users on needed corrections and enhancements. This model is currently in need of updating. This tool could be enhanced through a review of the thermodynamics database and through linkage to a solute transport code.

III. Tool Development

Initial development of MINTEQ took place in the mid 1970's. It was developed to provide a better tool for estimating metal's mobility from contaminated areas. MINTEQA2 has been developed through associations with universities and contractors and through an EPA Interagency Agreement with DOE.

IV. Special Requirements for Use

The MINTEQA2 user should have a scientific or engineering background with one year of introductory chemistry. Additional experience with thermodynamics is helpful. MINTEQA2 is microcomputer based (DOS-compatible), although the Fortran code may be compiled on any machine.

V. Program/Media/Geographic Transferability

MINTEQA2 has general applicability for geochemical speciation problems.

VI. Other Information

CEAM was established in 1987 to meet the scientific and technical exposure assessment needs of the United States Environmental Protection Agency (EPA) as well as state environmental and resource management agencies. To support environmental risk-based decisions, CEAM distributes environmental simulation models and databases for urban and rural nonpoint sources, conventional and toxic pollution of streams, lakes and estuaries, tidal hydrodynamics, geochemical equilibrium, and aquatic food chain bioaccumulation. A wide range of analysis techniques is provided, ranging from simple desk-top techniques suitable for screening analysis, to sophisticated, state-of-the-art continuous simulation models.

VII. Contact Person

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MODEL OF ACIDIFICATION OF GROUNDWATER (MAGIC)

I. Tool Description

The Model of Acidification of Groundwater In Catchments (MAGIC) is a computerized watershed simulation model designed to project the chemical effects of atmospheric sulfur deposition (acid rain) on the chemistry of lakes and streams. The initial intended use of the model was both to examine influences of sulfur deposition on watershed and stream chemistry and to serve as a tool for projecting potential future effects of sulfur deposition. To date it has been used extensively in the U.S., Great Britain and Europe to project potential consequences of various scenarios of atmospheric sulfur deposition. EPA used it in a large project, the Direct/Delayed Response Project (DDRP) to assess the implications of various sulfur deposition scenarios for the chemistry of approximately 200 watersheds and their associated lakes and streams in the eastern United States. The model has been tested against laboratory-scale soil chemistry experiments, historical record of acidic deposition effects, and watersheds manipulated by the addition of acidifying compounds. The model has proven to be reasonably reliable in these tests. Testing and refinement continues, especially in the area of soil and solution chemistry of aluminum compounds.

II. Tool Users

Intended and actual users of the model have been research watershed scientists as well as those concerned with possible future effects of sulfur deposition on surface water chemistry. The model has been used ever since its development in the mid-1980's.

III. Tool Development

Drs. Jack Cosby and George Hornberger of the Department of Environmental Sciences at the University of Virginia developed the model in the mid-1980's for the purpose of determining the effects of atmospheric deposition of sulfur on chemistry of streams and lakes. EPA's, Office of Research and Development provided substantial financial assistance for its original development.

IV. Special Requirements for Use

The model user should have knowledge of geochemical effects of acidic deposition on soils, watersheds and lakes and streams. Use of the model requires expertise in computer simulation modeling. The model requires appropriate datasets on wet and dry atmospheric deposition, precipitation, runoff, soils and watersheds geologic and geochemical characteristics, and surface water chemical characteristics of the watershed or watersheds to be simulated. Model use also requires reasonable knowledge of historical scenarios of atmospheric deposition for the sites to be modeled. The model is available on floppy diskettes, and can be run on standard DOS desktop or laptop computers; no Macintosh version of the model is yet available. FORTRAN programming is used.

V. Program/Media/Geographic Transferability

Appropriate for use simulating forested watersheds.

VI. Other Information

The model continues to undergo testing and improvement. Pending extensions include the addition of the capability to model nitrogen cycling and transformations within watersheds as well as the ability to simulate the effects of transient acidification events associated with snowmelts or heavy rainstorms.

VII. Program Contacts

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MULTIMEDIA EXPOSURE ASSESSMENT MODEL (MULTIMED)

I. Tool Description

The Multimedia Exposure Assessment Model (MULTIMED) for exposure assessment simulates the movement of contaminants leaching from a waste disposal facility. The model consists of a number of modules which predict concentrations at a receptor due to transport in the subsurface, surface water, or air. The model includes options for directly specifying infiltration rates to the unsaturated and saturated zones, or a MULTIMED module can be used to estimate infiltration rates.

When applying MULTIMED to Subtitle D (hazardous waste) facilities, the landfill, surface water, and air modules in the model are not accessible by the user; only flow and transport through the unsaturated zone and transport in saturated zone can be considered. MULTIMED uses a steady-state, one-dimensional, semi-analytical module to simulate flow in the unsaturated zone. The output from this module, water saturation as a function of depth, is used as input to the unsaturated zone transport module. The latter simulates transient, one-dimensional (vertical) transport in the unsaturated zone and includes the effects of longitudinal dispersion, linear adsorption, and first-order decay. The unsaturated zone transport module calculates steady-state or transient contaminant concentrations. Output from both unsaturated zone modules is used to couple the unsaturated zone transport module with the steady-state or transient, semi-analytical saturated zone transport module. The latter includes one-dimensional uniform flow, three-dimensional dispersion, linear adsorption, first-order decay, and dilution due to direct infiltration into the groundwater plume (67,68).

The fate of contaminants in the various media depends on the chemical properties of the contaminants as well as a number of media- and environment-specific parameters. The uncertainty in these parameters can be quantified in MULTIMED using the Monte Carlo simulation technique. To enhance the user-friendly nature of MULTIMED, a preprocessor, PREMED, and a post-processor, POSTMED, have been developed. The preprocessor guides the user in the creation of a correct Subtitle D input file by restricting certain options and parameters and by setting appropriate defaults.

II. Tool Users

The operation of each module requires specific input, which is organized into data groups. The General Data Group, which is required for all simulations, contains flags and data which describe the scenario being modelled. The input parameters needed for the Saturated Zone Transport Model are arranged in three additional data groups: the Chemical Data Group, the Source Data Group, and the Aquifer Data Group. Use of the Unsaturated Zone Modules requires input found in the above data groups, as well as data from the Unsaturated Zone Flow Data Group and the Unsaturated Zone Transport Data Group. The MULTIMED manual provides help in estimating the model input parameters.

MULTIMED has been in use since the late 1980's. Because of MULTIMED's public domain status, extensive feedback has been received from users on needed corrections and enhancements, and the model is continuously updated through interaction with CEAM.

MULTIMED, while it is characterized as a multimedia tool has actually only seen use as a screening-level groundwater model. The additional modules simulating landfill water balance, atmospheric emissions and transport, and surface water transport have never been completed and made available to users. The model could be enhanced if these capabilities were to be tested and cleared for use.

III. Tool Development

MULTIMED was developed primarily for, and has seen extensive application in, predicting leachate movement from a Subtitle D (hazardous waste) landfill. This type of application, however, only utilizes a subset of MULTIMED's full capabilities. When MULTIMED has been used in conjunction with a separate source model, such as HELP (69), it has been applied to a much larger range of scenarios. Such scenarios may include development and comparison of the effects of different facility designs on ground water quality, prediction of the results of different types of "failure" of a landfill, and to address questions related to appropriate clean-up levels for contaminated soils. MULTIMED was sponsored by ORD/OEPER/Athens and was developed via an extramural contract.

IV. Special Requirements for Use

Although the user's manual explains most computational algorithms, an engineering background is necessary to appreciate most methods being used and to verify that the model results are reasonable. MULTIMED is microcomputer based (DOS-compatible), although the Fortran code may be compiled on any machine. Execution times are on the order of a few seconds to several minutes for most jobs on a 386/486 machine. However, simulation of large areas with many time steps can require several hours on a microcomputer. The user is well advised to use the most powerful microcomputer available.

V. Program/Media/Geographic Transferability

MULTIMED, as stated was developed to aid in decisions related to landfill design and location. In recent years MULTIMED has been applied, by other program offices, in the context of soil clean-up levels. MULTIMED has been applied to estimate groundwater impacts from contaminated soils.

VI. Other Information

VII. Contact Person

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PATRIOT

I. Tool Description

PATRIOT is a software package that integrates, in a personal computer environment, is a tool that enables scientifically sound analysis of pesticide leaching anywhere in the conterminous United States. PATRIOT is comprised of a chemical fate and transport model (PRAM-2), a comprehensive database, an interface that allows the user to explore the database and select the data appropriate for assessments, interaction that guides the user in performing model analyses, and selected methods for summarizing and visualizing model results.

II. Tool Users

PATRIOT is designed to be used by state and local agencies, consultants, private industry and EPA personnel. PATRIOT is specifically designed to support the development of local pesticide management plans. PATRIOT has been distributed from the Center for Exposure Assessment Modeling located at the Athens Ecosystem Research Division for two years.

Since the activities of regulatory support were eliminated at Athens, virtually no feedback has occurred since PATRIOT's release. However, a request to add concentration migration at the water was incorporated as a feature to the tool. PATRIOT was to have site specific component (evaluation of pesticide movement at the mapping unit level) and a nitrogen assessment capability, however; funding was cut for this component and never was completed.

III. Tool Development

PATRIOT was developed during the fiscal year 1992 and fiscal year 1993 budget periods, under the FIFRA statutory mandate for the development of State pesticide management plans. PATRIOT was a combined Federal and contractor research effort. The Federal component consisted of organizing the databases and outlining the system capabilities. The contractor component consisted of building the FORTRAN code structure and logic for the decision support system.

IV. Special Requirements for Use

No specific training requirements, however; a short course for its use would help.

V. Program/Media/Geographic Transferability

PATRIOT can be used by other programs for assessing organic chemical migration.

VI. Other Information

VII. Program Contact

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POLLUTANT ROUTING (P-ROUTE)

I. Tool Description

P-Route is a modeling system that can survey a watershed area and list all the reaches and all the NPDES dischargers on those reaches. Daily loadings can be attached to any of the dischargers on the list. In addition, nonpoint source loading from monitoring data or from appropriate runoff models can be included. The model routes the pollutants as they go through the reach system and presents a final reach-by-reach pollutant concentration, based on mean or 7Q10 flow.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Modeling is a key component in the TMDL process. As new models come on-line, the applicability of the models is evaluated for use in the TMDL program. In addition, wherever possible, the models are simplified so that a broader spectrum of users can benefit.

IV. Special Requirements for Use

Personnel computer.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable to a wide range of ecosystems.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contact

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PESTICIDE ROOT ZONE MODEL (PRZM-2)

I. Tool Description

The Pesticide Root Zone Model (PRZM-2) is a one-dimensional, dynamic, compartmental model that can be used to simulate chemical movement in unsaturated soil systems within and immediately below the plant root zone. It has two major components-- hydrology (and hydraulics) and chemical transport. The model was specifically designed to provide loadings to selected media, including air, water, groundwater and plants.

PRZM 2 is an daily-time-step agricultural field simulation model. Outputs include pesticide leaching depth, runoff volume, eroded sediment mass, pesticide movement with eroded sediment and runoff, and pesticide volatilization. Processes modeled include, water movement through the soil profile, crop uptake, vapor phase transport, and irrigation. Two pesticide degradates can be modeled along with the parent. PRZM 2 has incorporated the VADOFT program which estimates chemical movement through the vadose zone below the surface soil. A Monte Carlo shell is also included.

II. Tool Users

The tool can be used by persons familiar with fate and transport of xeno-organic chemicals to estimate off-site movement of these chemicals from agricultural fields. PRZM 2 is currently being used by the EPA Office of Pesticide Programs to estimate the transport of pesticides to surface water.

As of FY95 there are a total of 3,000 users*, including an international community, state and local users, academicians, regulatory programs, pesticide firms, and other federal agencies.

III. Tool Development

PRZM 2 was developed and is maintained by EPA's Athens Environmental Research Laboratory in Athens, GA. A total of 4.0 FTEs have been applied to model development. The subsequent model has been developed totally by contractor support. A total of \$500,000 has been spent on the model from extramural R&D dollars.

PRZM 2 is an upgrade from PRZM. It is a component of the PATRIOT shell for estimating the potential for a pesticide to leach to ground water. The major changes from PRZM to PRZM 2 are the addition of volatilization routines, the ability to handle degradates, the addition of a biodegradation module, the incorporation the VADOFT model for estimating chemical movement through the vadose zone, and the addition of a Monte Carlo shell for stochastic simulations.

IV. Special Requirements For Use

A minimum of 486-based computer architecture is optimum for operation. A large hard disk, 100 MB or greater is very helpful if the program is used routinely as the output can be voluminous greater 1 MB per run. The model is a batch model and does require substantial input. PRZM 2 has extensive data requirements, with data on soil, weather, crops, management, and the chemical required for a particular simulation. Training is recommended; however, regulatory and program support has been taken away from Athens. Since then, no training courses have been provided.

V. Program/Media/Geographic Transferability

The model can be used by other programs where organic chemicals are of concern. The model is currently being modified to accommodate nitrogen. The model can simulate daughter product formation and could be used for radionuclide assessments. PRZM 2 has links for data transfer to EXAMS, HSPF, and WASP.

water quality models. PRZM is appropriate for use for modeling most agricultural field crops on mineral soils in the United States.

VI. Other Information

PRZM-2 was developed to simulate the transport and transformation of field-applied pesticides in the crop root zone and the vadose zone taking in to account the effects of agricultural management practices. Because there are variabilities associated with system processes and model input parameters, PRZM-2 has the capability of evaluating uncertainty.

VII. Program Contacts

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Division, Athens, GA, (706) 546-3210

QUAL2E

I. Tool Description

The computer program QUAL2E (Brown and Barnwell, 1987) permits simulation of several water quality constituents in a branching stream system using a finite difference solution to the one-dimensional advective-dispersive mass transport and reaction equation. The conceptual representation of a stream used in the QUAL2E formulation is a stream reach that has been divided into a number of subreaches or computational elements equivalent to finite differences. For each computational element, a hydrologic balance in terms of flow (Q), a heat balance in terms of temperature (T), and a materials balance in terms of concentration (C) is written. Both advective and dispersive transport are considered in the materials balance. Mass can be gained or lost from the element by transport processes, external sources and sinks (e.g., waste discharges or withdrawals) or by internal sources and sinks (e.g., benthic sources or biological transformations). The equation is solved for the steady-flow, steady state condition in a classical implicit backward difference method. The specific equations and solution technique are described in detail in the QUAL2E computer program documentation (Brown and Barnwell, 1985).

II. Tool Users

Recently, the model has been again applied to the Willamette River in Oregon (Tetra Tech, 1993), the Chicago Ship Canal in Illinois (Mercer, personal communication), the Whippany River in New Jersey (van Orden and Urchin, 1993), and the Pigeon River in North Carolina (Summers et al., 1991). The model has seen several European applications in addition to Poland (Gromiec et al., 1994), including the River Blackwater in England (Crabtree et al., 1986), the Pinios River Basin in Greece (Bonazountas et al., 1986), the rivers of Comunidad de Madrid in Spain (Cubillo, 1986; Cubillo et al., 1992), the Nitra River in Slovakia (Somlyódy et al., 1994) and the Karasu River in Turkey (Uluatam, 1993). Other applications of QUAL-II range from South America (Knepp and Wood, 1983) to South Korea (Tischler et al., 1984) and India (Ghosh, personal communication).

III. Tool Development

The QUAL series of computer programs have a long history in systems analysis in water quality management. The foundation upon which the series is built was laid by the Texas Water Development Board (TWDB) in the late 1960s. In the early 1970s, EPA began a program to provide water quality models for major river basins and specified that QUAL-I be used as the basis for developing new, more advanced, basin-specific models. The original model, QUAL-I, (TWDB, 1970) was used as a tool to evaluate flow augmentation for temperature and dissolved oxygen control. Many versions of the QUAL-II model emerged from this effort.

IV. Special Requirements for Use

Familiarity with water quality modeling concepts, and an IBM-compatible personal computer. In its present state, QUAL2E requires some degree of modeling sophistication and expertise on the part of a user. The user must supply more than 100 individual inputs, some of which require considerable judgment to estimate.

V. Program/Media/Geographic Transferability

The QUAL2E model is primarily intended for use by modelers of conventional pollutants in streams and rivers. It has been proven applicable worldwide.

VI. Other Information

A major problem faced by the user when working with a complex model such as QUAL2E is model calibration and determination of the most efficient plan for collection of calibration data. This problem can be addressed by application of principles of uncertainty analysis. These strategies have been applied to QUAL2E and the resulting computer program is called QUAL2E-UNCAS (Brown, 1987).

VII. Program Contact

Thomas O. Barnwell, Jr.

Catherine Green

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Modeling, ERL - Athens, Ga., (706) 546-3180

REGIONAL ACID DEPOSITION MODEL (RADM)

I. Tool Description

The Regional Acid Deposition Model (RADM) is a regional Eulerian dispersion and transport model that was developed in the 1980's. This model determines the extent of acid deposition, sulfate-associated visibility, oxidants, and the long-range transport of such pollutants. Specifically, this model simulates the relationship between acidic compounds emission sources and source receptors, and models the transport, transformation, fate and deposition of acidic and oxidized compounds (e.g., sulfur dioxide) in source receptor areas.

II. Tool Users

The model is used in 1990 by the NAPAP for the integrated assessment, and since then by a number of program offices in the Office of Air and Radiation (generally scientists and statisticians), the Office of Policy, Planning and Evaluation, and in regional offices that are interested in obtaining information on sulfur or nitrogen deposition, visibility degradation, or ozone pollutants.

III. Tool Development

This model was developed during the 1980s through the National Acid Precipitation Assessment Program (NAPAP) and the EPA's ORD Lab continues to operate, develop, improve and manage this model.

IV. Special Requirements for Use

To use this model, interested parties should contact the Atmospheric Research and Exposure Assessment Lab at Research Triangle Park, describing their specific needs. Interested parties should contact the lab, which then operates the model on a supercomputer and returns the output to the user. Users should have expertise in analyzing atmospheric compounds.

V. Program/Media/Geographic Transferability

Unknown; interested parties should contact the lab to discuss possible cross-cutting applications.

VI. Other Information

VII. Program Contacts

Robbin Dennis Office of Research and Development, Atmospheric Research and Exposure Assessment Lab, Research Triangle Park, North Carolina, (919) 541-2870

RAMAS

I. Tool Description

RAMAS is a matrix population model for aquatic or terrestrial plant or animal populations. It enables prediction of population size effects when demographic parameter data is entered (birth rates, death rates, etc.). For ecological assessment, it is valuable in predicting the impact on populations once the effect of a particular stressor has been translated into the demographic parameters. For example, if you figure out how dioxin in pulp sludge impacts the mortality rate of a species then the model allows you to play out the effects over generations.

II. Tool Users

Risk assessors are the audience, although the tool is easy enough for anyone to use it. Clearly, those with some background in population biology will get more out of it. OPPTS is able to distribute copies of the software free through an arrangement with Applied Mathematics.

RAMAS has been used by OPPTS, Health and Environmental Review Division for some time; it is considered to be a "tried and true" tool.

III. Tool Development

RAMAS is a customized version of a commercial product from Applied Biomathematics, which can easily make modifications or enhancements to suit the user.

IV. Special Requirements for Use

None, other than a good PC.

V. Program/Media/Geographic Transferability

The model is extremely flexible; it would be relevant to any effort interested in studying population dynamics.

VI. Other Information

Scale of the system being studied can be an issue, however, this can be addressed by linking RAMAS with GIS. There are also some other factors, such as size/fragmentation of the population, which may need special attention (eg. a large, intact bird population will not have the same dynamics as fragmented populations).

VII. Program Contacts

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REGIONAL ECONOMIC ACCOUNTS: ESTIMATION OF SECTOR CONTRIBUTIONS TO CURRENT ECONOMIC INCOME

I. Tool Description

The project models economic and natural resource accounts for the Upper Mississippi River Basin (UMRB) to help facilitate sustainable watershed management. The goal is to show how changes in natural resource accounts are likely to affect overall economic wealth in addition to the prospects for sustainable watershed management. The approach uses available data to establish how specific agricultural activities contribute to the economic welfare of the current generation and how they are linked with changes in natural resource accounts and bio-physical flow accounts (flows of sediments, nutrients and contaminants). The analyses are being conducted for the base year 1991.

II. Tool Use

Intended users of the tool are individuals that are interested in modeling/estimating the ability of agricultural production to sustain itself over the long term.

Although the tool is still in development, feedback from the developer indicates that the tool needs further refinement and disaggregation of regional economic accounts. Sensitivity tests need to determine which assumptions and variables have the most influence on empirical results. Regional natural resource accounts need to be further specified. Factors that affect the feasibility of tracing bio-physical flow accounts need to be determined. And, still need to determine how regional data can be used to monitor and evaluate changes in natural resource accounts.

III. Tool Development

This tool is still in development, and was prompted by a need to assess potential methods for measuring sustainable agriculture. The tool was developed by the Center for Environmental and Estuarine Studies, University of Maryland.

IV. Special Requirements For Use

No special requirements are necessary.

V. Program/Media/Geographic Transferability

The tool could be used by other EPA programs and geographic areas. Since the tool was developed for a particular area of the country, the user must collect site specific data for other geographic areas.

VI. Other Information

VII. Contact Person

Peter Kuch Office of Policy, Planning and Evaluation, Office of Policy Analysis, Water and
Agricultural Policy Division, Agricultural Policy Branch, 260-6198

SIMULATOR FOR WATER RESOURCES IN RURAL BASINS-WATER QUALITY
(Windows front-end version) EPA 823-C-94-002, February 1994

I. Tool Description

This modeling system predicts the effect of management decisions on the quantity and quality of water and sediment yields with reasonable accuracy. A Microsoft Windows based interface was developed to simplify model setup.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Modeling is a key component in the TMDL process. As new models come on-line, the applicability of the models is evaluated for use in the TMDL program. In addition, wherever possible, the models are simplified so that a broader spectrum of users can benefit.

IV. Special Requirements for Use

Personnel computer.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable to a wide range of ecosystems.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contact

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-1330

SMPTOX3E

I. Tool Description

SMPTOX3E is a one dimensional, steady-state mass balance model that predicts particulate and dissolved-phase non-ionic organic concentrations in the water column and bedded sediment. The current version is being documented. Future plans include implementing equations in SMPTOX to allow for the estimation of metals partitioning to sediments. Anticipated completion for metals FY 1998.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Modeling is a key component in the TMDL process. As new models come on-line, the applicability of the models is evaluated for use in the TMDL program. In addition, wherever possible, the models are simplified so that a broader spectrum of users can benefit.

IV. Special Requirements for Use

Personnel computer.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable to a wide range of ecosystems.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contact

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied Science
Division, (202) 260-1330

SURVEY DESIGNS FOR AQUATIC SYSTEMS

I. Tool Description

The use of probability survey designs are increasingly critical for effective monitoring programs. Probability survey designs allow inference from the sample locations to all resources in the region if done correctly. Thus they are a cost effective approach for monitoring local, watershed, Regional and national issues.

II. Tool Users

The design for lakes has been tested in Region I & II and a national sample selected. Stream design have been applied in Regions III, IV, VII, VIII, IX, and X for streams and are being developed for the Prairie Pothole area in the upper midwest.

III. Tool Development

Total cost to develop the designs to date has been approximately 2 million dollars.

IV. Special Requirements for Use

Minimal training is required to implement the design and assistance is available in data analysis procedures.

V. Program/Media/Geographic Transferability

Intentions are to refine survey designs for each EPA region but make them available for the entire United States. The designs are available for regional scale of resolution. Subregional designs can be developed as requested.

VI. Other Information

VII. Program Contacts

Steve Paulsen, Office of Research and Development, Environmental Research Laboratory -
Corvallis, OR (503) 754-4428

STORM WATER MANAGEMENT MODEL (SWMM)

I. Tool Description

The Storm Water Management Model (SWMM) is a comprehensive model for the analysis of the quantity and quality problems associated with urban runoff. Using SWMM, the modeler can simulate all aspects of the urban hydrologic and quality cycles, including rainfall, snowmelt, surface and subsurface runoff, flow routing through the drainage network, storage and treatment. Statistical analyses may be performed on long-term precipitation data and on output from continuous simulation. Because of SWMM's public domain status, extensive feedback has been received from users on needed corrections and enhancements, and the model is continuously updated through interaction with CEAM.

II. Tool Users

SWMM has been used in scores of U.S. cities as well as extensively in Canada, Europe, Australia and elsewhere. A large body of literature on theory and case studies is available. The model has been used for very complex hydraulic analysis for combined sewer overflow mitigation as well as for many stormwater management planning studies and pollution abatement projects, and there are many instances of successful calibration and verification. SWMM has been extensively used for 25 years. Because of SWMM's public domain status, extensive feedback has been received from users on needed corrections and enhancements, and the model is continuously updated through interaction with CEAM. This tool could be enhanced by developing an improved user interface, and a routine for simulating subsurface water quality (a constant concentration is now assumed).

III. Tool Development

SWMM was originally developed for the EPA between 1969 and 1971 to support urban run-off analyses. EPA Nationwide Urban Runoff Program data are often used as starting values for SWMM water quality computations. SWMM was developed by the EPA Office of Water via contract.

IV. Special Requirements for Use

The model is designed for use by engineers and scientists experienced in urban hydrological and water quality processes. Although the two user's manuals explain most computational algorithms, an engineering background is necessary to appreciate most methods being used and to verify that the model results are reasonable. SWMM Version 4 is microcomputer based (DOS-compatible), although the Fortran code may be compiled on any machine. Execution times are on the order of a few seconds to several minutes for most jobs on a 386/486 machine. However, simulation of large areas with many subcatchments and/or channels for many time steps can require several hours on a microcomputer. The user is well advised to use the most powerful microcomputer available.

V. Program/Media/Geographic Transferability

SWMM has general applicability for the analysis of run-off and flow routing from impermeable areas.

VI. Other Information

VII. Program Contact

Dermont Bouchard Office of Research and Development/OEPER/ Athens-ERL, Manager - Center for Exposure Assessment Modeling (CEAM), (706) 546-3130

SYNOPTIC APPROACH FOR RANKING LANDSCAPE SUBUNITS

I. Tool Description

The synoptic approach is a risk-based framework for comparing and ranking landscape subunits, such as watersheds, ecoregions, or counties. The approach provides a framework based on ecological principles that can be used to define indices of function and value; these indices are then mapped using synoptic indicators. The approach was originally designed by the Wetlands Research Program for use in assessing cumulative impacts to wetlands, but can also be applied to regional risk assessments and development of watershed management plans.

II. Tool Users

The approach has been used by Region 7 in Nebraska, and is being applied by Region 4 in Kentucky, by the Soil Conservation Service in Louisiana, and by the State of Oregon. Puerto Rico's Department of Natural Resources recently expressed interest in the approach.

III. Tool Development

In developing the approach, the Wetlands Research Program (WRP) conducted preliminary synoptic assessments for the Pearl River Basin (Louisiana and Mississippi) and for the states of Washington, Illinois, and Louisiana. WRP is currently conducting an assessment of the prairie pothole region, and will soon begin an assessment of the Willamette Valley in Oregon.

IV. Special Requirements for Use

Defining the indices for a particular assessment requires development of a conceptual model of the environmental processes and resources within the specific area. This requires the involvement of a person having a broad ecological background, with familiarity of community, ecosystem, or landscape ecology. Availability of a GIS is not necessary but aids in measurement and production of map products.

V. Program/Media/Geographic Transferability

The approach can be used to compare and rank landscape units from the national scale to state and regional scales. Maps resulting from a synoptic assessment can be used in planning process to prioritize environmental protection restoration, and enforcement efforts. The approach can also be used to screen regions for areas requiring more intensive study.

VI. Other Information

Because there is a lack of tools that can be used within regulatory constraints for regional assessments, the synoptic approach was designed as a method that could make use of available information and best professional judgement. Thus the approach is a compromise between the need for rigorous results and the need for timely information. The overall quality of a synoptic assessment depends on how well knowledge of the environment is incorporated into the assessment and the availability of environmental data that can be used to represent and map these processes.

VII. Program Contacts

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Corvallis, (503) 754-4508

WATER QUALITY ANALYSIS SIMULATION PROGRAM (WASP5)

I. Tool Description

Water Quality Analysis Simulation Program, WASP5 is a generalized framework for modeling contaminant fate and transport in surface waters. Based on the flexible compartment modeling approach, WASP can be applied in one, two, or three dimensions. WASP is designed to permit easy substitution of user-written routines into the program structure. Problems that have been studied using the WASP framework include biochemical oxygen demand and dissolved oxygen dynamics, nutrients and eutrophication, bacterial contamination, and organic chemical and heavy metal contamination.

Two WASP models are provided with WASP5. The toxics WASP model, TOXI5, combines a kinetic structure adapted from EXAMS2 with the WASP5 transport structure and simple sediment balance algorithms to predict dissolved and sorbed chemical concentrations in the bed and overlying waters. The dissolved oxygen/eutrophication WASP model EUTRO5 combines a kinetic structure adapted from the Potomac Eutrophication Model with the WASP5 transport structure to predict DO and phytoplankton dynamics affected by nutrients and organic material.

WASP has been used to simulate the water quality and pollutant fate for a variety of aquatic systems. It is used primarily to investigate the water quality response to management actions, primarily point and nonpoint source load reduction. It is presently being distributed by CEAM and its status is "in-use." The technical contact is Robert Ambrose.

II. Tool Users

WASP5 is targeted for knowledgeable environmental scientists and engineers. It is used by professionals in a variety of positions, from state and local governments to Federal agencies, universities, foreign governments, industry, and consultants. Because of its public domain status, extensive feedback has been received from users on needed corrections and enhancements, and the model is continuously updated through interaction with CEAM. Technical support has been offered over phone and internet.

III. Tool Development

WASP was originally developed in the 1970s to simulate water quality response to proposed changes in waste loads mandated by the Clean Water Act. WASP was originally developed by a contractor. It has been refined and extended over many years through both contract and in-house projects.

IV. Special Requirements for Use

Although the user's manuals explain the theory and implementation of the computational algorithms, an environmental science or engineering background is necessary to appreciate most methods being used and to verify that the model results are reasonable. WASP5 is microcomputer based (DOS-compatible), although the Fortran code may be compiled on any machine. Execution times for small to moderate problems may vary from a few minutes to an hour or two on a 386/486 machine. However, simulation of large networks over long periods can require several hours on a microcomputer. The user is well advised to use the most powerful microcomputer available.

V. Program/Media/Geographic Transferability

WASP5 is quite general software for the simulation of a range of problems in surface water systems. It has been used for a variety of EPA programs, including water, pesticides, and Superfund. It has been used to simulate water bodies worldwide.

VI. Other Information

The Center for Exposure Assessment Modeling (CEAM) was established in 1987 to meet the scientific and technical exposure assessment needs of the United States Environmental Protection Agency (EPA) as well as state environmental and resource management agencies. To support environmental risk-based decisions, CEAM distributes environmental simulation models and databases for urban and rural nonpoint sources, conventional and toxic pollution of streams, lakes and estuaries, tidal hydrodynamics, geochemical equilibrium, and aquatic food chain bioaccumulation. A wide range of analysis techniques is provided, ranging from simple desk-top techniques suitable for screening analysis, to sophisticated, state-of-the-art continuous simulation models.

VII. Program Contact

Robert B. Ambrose, Jr.

Office of Research and Development; Center for Exposure Assessment Modeling; Athens, GA, (706) 546-3549

HEADQUARTERS ECOSYSTEM TOOL INVENTORY

OUTREACH TOOLS

COMPARATIVE RISK ANALYSIS (CRA) & CONSENSUS BUILDING

I. Tool Description

The purpose of Comparative Risk Analysis is to bring diverse special interests together and reach consensus on which problems pose the most risk to Human Health, Ecosystem Health and Quality of Life (welfare), and to develop consensus on an action plan to reduce those risks in those three categories. These projects take a comprehensive approach to analyzing environmental problems in a particular geographic area (region, state, locality, watershed).

Comparative Risk Analysis has been supported by EPA since 1987; the State Program since 1990. The Regional and State Planning Branch (RSPB) provides technical assistance to place-based comparative risk projects. These projects consist of primarily State projects, some local & tribal projects and one watershed based project. Training on comparative risk analysis and techniques is tailored to the clients' needs. RSPB provides fiscal assistance for State, ecosystem and local projects. Technical assistance is also provided to projects through two technical assistance centers.

II. Tool Users

Current users include States, locals, tribes and other organizations (eg: universities - Case Western Reserve, Jackson State; non-profit organizations - The Elizabeth River Project).

III. Tool Development

The CRA methodology was initially developed in partnership with the EPA Science Advisory Board and EPA Regional offices. Currently methodology has been developed in partnership with various states, locals, and tribes and continues to be improved upon and tailored to meet individual project needs. The methodology requires significant public involvement and the analysis of problem areas in the three categories of risk (human health, ecosystem and quality of life) to qualify for funding. Currently, the methodology is not statutorily mandated.

Funding of \$100,000 is provided per State/Tribal project, with pilot projects receiving over \$100,000; \$50,000 is provided per locality/watershed. \$200,000 is dedicated to training through a cooperative agreement with the two Technical Assistance Centers. Roughly a quarter of each FTE on the RSPB staff is dedicated to training and methodology development. Feedback on the methodology includes extensive assessments of completed projects and continued interest by various parties in conducting comparative risk projects.

IV. Special Requirements

Projects must meet certain criteria to be eligible for funding, including public involvement, analysis in the three risk categories, political buy-in, a plan to address environmental justice issues, and the separation of risk assessment from risk management.

V. Program/Media/Geographic Transferability

This tool can and has been used to examine watershed risks, media specific risks, and can be applied to ecosystem projects. However, RSPB may not fund all projects.

VI. Other Information

The methodology could be enhanced through:

- improved ability to incorporate principles of sustainability into a projects ecological risk rankings;
- improved user access to understandable and usable ecological data on various scales;

- improved ability to better quantify the stressors to ecosystem health to facilitate the selection and implementation of the appropriate risk reduction strategies;
- consolidation of successful risk reduction strategies for ecosystem protection from various levels of governments.

VII. Program Contacts

Debora Martin Office of Policy, Planning and Evaluation, Office of Strategic Planning and Environmental Data, Regional and State Planning Branch (Branch Chief), (202) 260-2699

ENDANGERED SPECIES PESTICIDE USAGE BULLETINS

I. Tool Description

The endangered species bulletins are designed to promote the protection of endangered species from risk due to pesticides. County-specific bulletins (presently voluntary) will require measures for limiting the application of various pesticides in order to prevent harm to listed species.

The bulletins are developed on a county-by-county basis and show areas within a given county where pesticide use must be limited in order to protect listed species. Of the 3,300 counties nationwide, roughly half have some endangered species issues. Bulletins have been prepared and distributed for approximately 230 to 300 counties. It has been estimated that there are another 600 to 900 counties for which bulletins which should be issued. It is not expected that bulletins will be prepared for all counties with endangered species protection issues; in many counties, the protection of endangered species from pesticides is being addressed through other means than the preparation and issuance of bulletins.

II. Tool Users

The tool is intended for pesticide users; bulletins are distributed to pesticide users (primarily agricultural interests) through a variety of entities such as state soil conservation agencies, extension services, national agri-chemical retailers association members, etc.

III. Tool Development

The Endangered Species Act (ESA) mandates the protection of listed species from Federal pesticide actions, including pesticide registration. Provisions in the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) mandate that each pesticide label contain instructions regarding its use and application which must be adhered to at penalty of enforcement action. The pesticides program began working on endangered species requirements in 1977, providing species-specific use prohibitions on the pesticide labels (e.g., "do not use this pesticide for prairie dog control in areas inhabited by the black-footed ferret"...).

This labelling approach was modified in 1985 or 1986, modifying label language to inform users that "this pesticide may harm endangered species - use only in accordance with label instructions and the applicable EPA bulletin".

The program was first proposed in 1987, but hit political controversy, was deferred, and was restructured. At present, suggested pesticide use restrictions presented as voluntary, "interim measures". When the program becomes final, it will be enforceable. OPP expects that Federal Register notices will go out this Spring, and that a call for label changes will go out to pesticide registrants later that year, and that the mandatory labelling program will go into effect over 1996-97.

The bulletins were once prepared by a contractor, based on endangered species maps provided by the Fish and Wildlife Service. However, the program is phasing out the use of the contractor, and is moving towards in-house development of the maps and bulletins using a Pentium-powered PC and GIS software.

Although resource expenditures are difficult to assess accurately and have been highly variable, roughly \$250,000 to \$300,000 and a couple of FTE per year have been devoted to development of the program over the years since 1988.

The program needs better information about the actual location of endangered species, and the location of pesticide use. In response to data requests made of several pesticide registrants, the American Crop

Protection Association (formerly the National Agricultural Chemicals Association) is developing a task force to provide information on the location of species relative to pesticide use sites.

The program could also benefit from conceptual models which can model the various ecological interactions in an ecosystem in a more comprehensive, integrated and fulsome manner.

IV. Special Requirements for Use

None. In multi-lingual areas, multi-lingual versions of the Bulletins are prepared and distributed.

V. Program/Media/Geographic Transferability

The bulletins contain maps showing the location of endangered species within a given county, and these may have relevance to other programs.

VI. Other Information

A) It is important that people remember that the agency is required to protect areas which may impact upon endangered species irrespective of whether or not these areas are the species actual habitats (e.g., must protect upstream water reaches which flow into habitat of endangered fish...).

B) There is a "sub-tool" known as "Landowner Agreements" associated with the pesticide control program. This is a mechanism whereby the need for the preparation and issuance of bulletins in a particular county can be eliminated by having the State obtain voluntary agreements from all relevant agricultural users that they will voluntarily comply with the recommended pesticide uses. Wisconsin and Minnesota currently have very strong landowner agreement efforts, and other States are coming on-board.

VII. Program Contacts

Larry Turner Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs,
Environmental Fate and Effects Division, (703) 305-5007

INTRODUCTION TO WATER QUALITY STANDARDS

I. Tool Description

This basic public information pamphlet was developed by EPA most recently in 1988 to provide general information on the water quality criteria and standards program.

II. Tool Users

Federal, State, municipal industrial, environmental and Tribal entities.

III. Tool Development

Section 303(c) of the Clean Water Act require States and Tribes to adopt water quality standards to protect public health and welfare, to enhance water quality, and to serve the purposes of the Act by providing for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water, whenever these goals are attainable. The Act requires States to establish standards taking into consideration the use and value of the water for public water supplies, propagation of fish and wildlife, recreation, agricultural and industrial water supply, navigation and other purposes. As a State/Tribe rule or law, water quality standards provide the basis for treatment controls beyond the technology-based requirements of the Act -- for both point and nonpoint sources of pollution.

Finally, water quality standards provide the bench mark against which to measure the effectiveness of regulatory and non-regulatory programs and in controlling water borne risks.

IV. Special Requirements for Use

None

V. Program/Media/Geographic Transferability

The standards are designed for the water media, but are applicable to a wide range of ecosystems.

VI. Other Information

Water quality standards are the foundation central core of the ecosystem/watershed approach as they define the human health and ecological goals for the aquatic ecosystem and provide the mechanism for meeting the objective of the Clean Water Act -- to restore the chemical physical and biological integrity of the Nation's waters.

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

David K. Sabock Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260 1318

THE MULTI-STAKEHOLDER CONSENSUS BUILDING PROCESS FOR BUILDING ECOSYSTEM ACTION PLANS

I. Tool Description

This tool is located in the Oceans and Coastal Protection Division, Office of Wetlands, Oceans and Watersheds, which manages the National Estuary Program.

The Clean Water Act, as amended by the Water Quality Act of 1987, establishes the National Estuary Program (NEP) to promote long-term planning and management in nationally significant estuaries threatened by pollution, development, or overuse. Section 320 of the Clean Water Act describes the establishment of a management conference for each estuary to develop a Comprehensive Conservation and Management Plan (CCMP). Section 320 also identifies the seven purposes of the management conference; the management conference has the responsibility of implementing a four-phase program to fulfill these seven purposes:

- . Phase I - The Planning Initiative
- . Phase II - Characterization and Problem Definition
- . Phase III - Development of a CCMP
- . Phase IV - CCMP Implementation

II. Tool Development

There are three main groups of participants in the characterization process: committees that make up the management conference, program coordinators and scientific staff of the estuary program, and local technical experts and contractors. The roles of these groups are described below.

Generally, the management conference structure consists of a policy-making committee or management committee (MC), work groups or subcommittees, and other standing committees, such as a scientific and technical advisory committee (STAC or TAC) and public advisory committee (PAC). Other committees that may be included are a local government committee (LGC), and a financial planning committee (FPC). The general makeup, roles, and organizational structure of these different committees are presented in *Saving Bays and Estuaries: A Primer for establishing and Managing Estuary Projects* (U.S. EPA, 1989). The management committee consists of representatives from the federal, state, regional and local government agencies and other user groups. The scientific and technical advisory committee is composed of technical staff from the above groups as well as regional scientists. The public advisory committee is composed of members from environmental and citizen's groups and other users with interests in the estuary.

III. Tool Use

The management committee of the conference is typically made up of professional environmental managers from participating federal, state, and local agencies, local advocacy groups, and the chairpersons of the Citizens Advisory Committee (CAC) and the Scientific and Technical Advisory Committee (STAC). With the assistance of estuary program staff, work groups, and other committees, the management committee defines and ranks the problems of the estuary, produces status and trends reports and the characterization report, develops management strategies, and designs the CCMP.

The STAC furnishes the scientific guidance to the estuary program in identifying, defining, and quantifying the environmental problems of the estuary. The Citizens Advisory Committee provides opportunity for a greater cross section of the community to take up specific issues and concerns of the public. The CAC is fully involved in the development of all action plans.

The first six of the 21 NEPs have all completed their CCMPs and have begun implementation at various stages. The lesson we learned from these fore-runners are reflected in the way the latest four NEPs were set up in 1992. Primarily, we now believe that in most cases, a CCMP can be furnished sooner than within the five year time frame we first established. However, the key determinants are twofold: How much characterization has there been and how polarized are the stakeholder in the watershed.

IV. Special Requirements

Management Conferences must be convened by the Administrator of EPA.

V. Program/Media/Geographic Transferability

The NEPs are already being use to enhance Coastal Nonpoint Source Programs (Section 319) in several states. Because the process engages a complete spectrum of stakeholder and because the NEP uses a watershed approach in most cases, many of EPA's water programs benefit. Point Source issues, wetlands protection, pollution prevention, and many other programs all benefit from the development of a CCMP which sets a precise agenda and commitment for achieving protection goals. NEPs also take extra steps to share information and techniques with other coastal areas. For example, the NEP will hold a national coastal tech transfer conference in New Orleans in February. All 21 of the NEPs and many of their partners such as the Gulf of Mexico will participate.

The Division is responsible for the development of guidance, policy, and regulations and implementation strategies for programs to protect marine and estuarine waters.

VI. Other Information

VII. Program Contacts

Darrell Brown Office of Water, Office of Wetlands, Oceans and Watersheds, Oceans and Coastal Protection Division, Coastal Management Branch, 202/260-6426

OFFICE OF ENVIRONMENTAL JUSTICE OUTREACH TRAINING

I. Tool Description

EPA's Office of Environmental Justice provides many outreach programs to educate low income minorities on their rights and responsibilities under environmental laws. OEJ has educated minorities in this area to protect the Anacostia River (e.g., cease dumping refuse into the river and its tributaries). In addition, OEJ trains EPA staff on environmental justice issues.

II. Tool Users

Agency-wide program offices, public, and low-income minority communities.

III. Tool Development

Established on inception of program. Training is on-going.

IV. Special Requirements for Use

Ability to listen and the willingness to be educated on environmental justice community issues.

V. Program/Media/Geographic Transferability

VI. Other Information

VII. Program Contacts

Clarice Gaylord Office of Administration and Resource Management, Office of Environmental Justice, (202) 260-0852

WETLANDS INFORMATION HOTLINE

I. Tool Description

The Wetlands Information Hotline was created more than 4 years ago to provide accurate, general information to the public and other interested parties and organizations about wetlands in general, wetlands science, recent issues critical to wetlands habitats, and EPA regulatory and non-regulatory programs designed to preserve, protect, and restore wetlands.

The Hotline provides callers with easy access (through a nationwide toll-free number) to technical information, reports, documents, brochures, timely information about changes in regulations and legislation, educational materials, and referrals to appropriate sources for help. Information specialists answer questions directly, provide literature and documentation, and refer callers to local individuals/organizations who can assist or provide further information.

II. Tool Users

This service benefits the general public as well as particular groups such as private land owners, teachers and students, environmental groups, lawyers, consultants, farmers and agricultural workers, land developers, trade associations, and the media.

During FY 94 the Hotline received 8,665 calls. More than 42,500 documents were distributed in response to over 5,700 document requests (either written or called in). During the one year period which began April 1, 1993, the Hotline distributed 47,585 documents, an increase in volume of 250% over the previous year. Approximately 23% of the calls received originated from States in EPA's Region 3. The Hotline answered questions about a variety of topics including enforcement (1.9%), science (1.9%), permits (3.1%), agriculture (4.1%), delineation (6.4%), and legislation (8.6%). The Hotline also provided over 2,300 referrals to other sources such as Corps of Engineers Districts (23%), EPA Regional Offices (13%), and State resource agencies (10%).

III. Tool Development

The Hotline was established approximately 4 years ago, prompted by the need to get quick, accurate information and documents out to the public and key groups (land owners, farmers, etc.) who would be affected by changes in regulations and programs.

The concept of the Hotline was originated in the Wetlands program; the hotline itself is operated by contractors. The majority of the information/documents distributed are created by the Wetlands program or similar programs in other cooperating Federal Agencies. The resource notebook from which information specialists learn and provide answers to caller's questions was prepared under a grant with Environmental Law Institute in cooperation with EPA Wetlands staff.

Except for the resource book, all of the start-up/development costs come from the contract budget. The contractor uses less than 4 FTEs and has an annual budget of approximately \$250,000. Full funding is anticipated throughout FY 1995.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

The Hotline is limited to the air, earth, and water that surround or are connected to wetlands. The Hotline does answer questions and provide extensive documentation to other EPA programs and offices. Because of the toll free call, the hotline receives calls from all geographic areas.

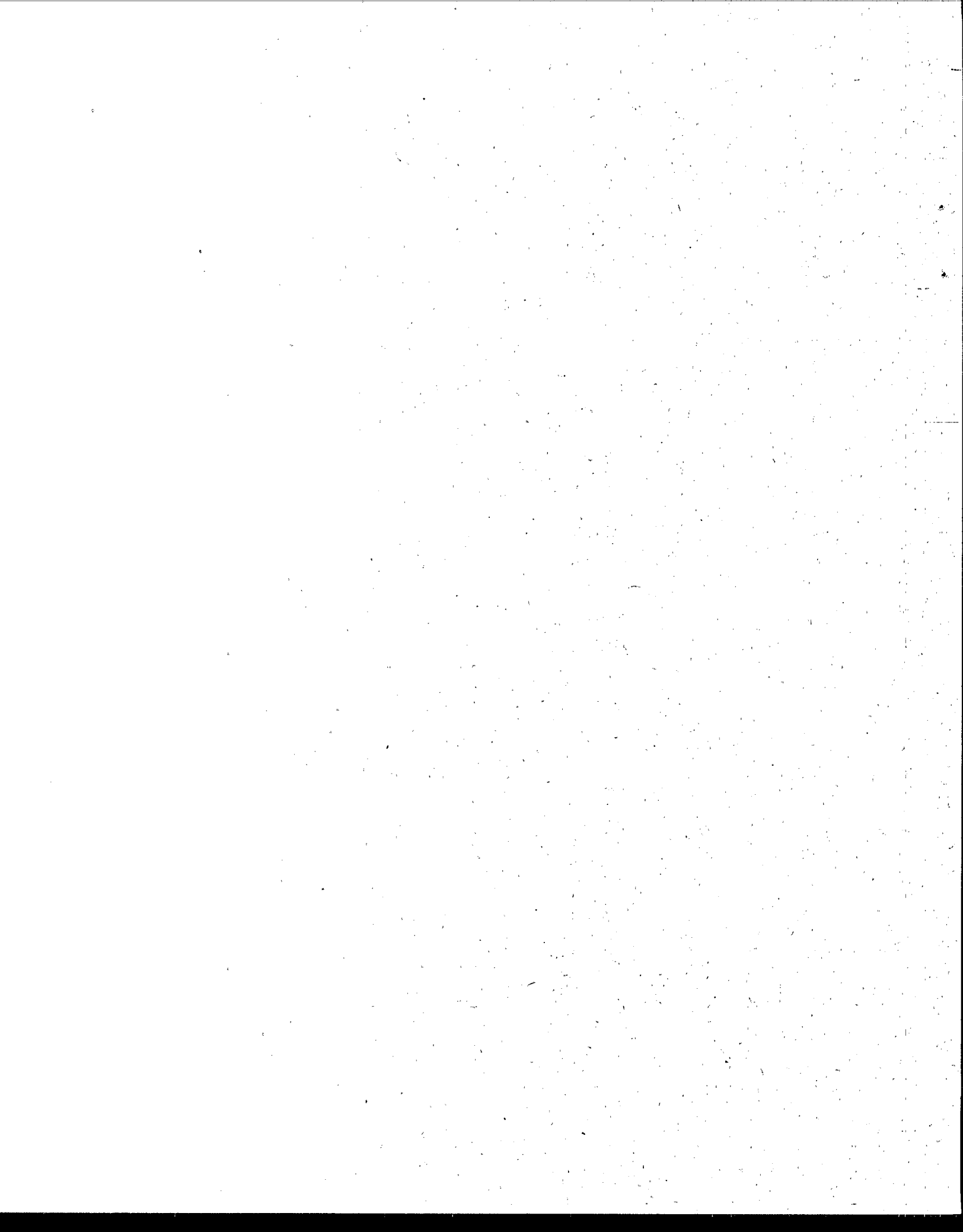
VI. Other Information

The hotline could truly benefit the public (and cut costs to EPA) by providing access to answers and documents electronically over internet accessible e-mail system. Discussions have been held with OIRM about becoming the first hotline in EPA to pilot this idea.

VII. Program Contacts

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HEADQUARTERS ECOSYSTEM TOOL INVENTORY
POLICY AND PLANNING TOOLS



SECTION 404 PERMIT REVIEW/ SECTION 404(B)(1) GUIDELINES

I. Tool Description

Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters that are typically regulated under Section 404 include fills for development, water resource projects (e.g. dams and levees), infrastructure development (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry.

EPA and the Army Corps of Engineers (Corps) jointly administer the Section 404 program. In addition, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and State resource agencies have important advisory roles. The Corps of Engineers evaluates proposed discharges of dredged or fill material using the Section 404(b)(1) guidelines developed by EPA. The guidelines contain substantive environmental criteria that reflect the biological, physical and chemical health of aquatic ecosystems. The basic premise of the Guidelines is that no discharge of dredged or fill material can be permitted if there is a practicable alternative that is less damaging to the aquatic environment or if the discharge would result in significant degradation of our Nation's waters. As such, the Guidelines establish a sequence for mitigating impacts associated with proposed discharges: applicants must first avoid wetland impacts by utilizing the least damaging practicable project alternative; unavoidable impacts must then be minimized to the extent appropriate and practicable, for example, through downsizing or project reconfiguration; finally, remaining unavoidable impacts must be compensated to the extent appropriate and practicable through the restoration or creation of similar wetland habitats to replace the important flood control, water quality and habitat functions of the affected wetlands.

II. Tool Users

Federal and state resource and regulatory agencies. The general public has the opportunity to provide input as part of the public notice and public hearing process.

III. Tool Development

The Section 404 (b) (1) Guidelines were published by the EPA in December, 1980.

IV. Special Requirements for Use

The Section 404 permit review process is triggered when an activity is proposed which involves a discharge of dredged or fill material into a wetland or other aquatic resource. If the discharge is not exempt under Section 404 or otherwise authorized under a nationwide or regional general permit, the prospective discharger must apply for an individual permit.

V. Program/Media/Geographic Transferability

The Section 404 (b)(1) Guidelines contain a requirement that no activity can be permitted if it would violate other applicable laws (eg: state water quality standards, the Endangered Species Act).

VI. Other Information

Section 404 provides a general deterrent to wetlands impacts, and as such, offers an important tool for the management and protection of wetland ecosystems.

VII. Program Contacts

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ECONOMIC GUIDANCE FOR WATER QUALITY STANDARDS: WORKBOOK

I. Tool Description

This technical guidance was developed by EPA in 1994 to assist States/Tribes identify the data and analyses necessary to support revisions to water quality standards based on economic considerations.

II. Tool Users

Federal, State, municipal industrial, environmental and Tribal entities.

III. Tool Development

Section 303(c) of the Clean Water Act require States and Tribes to adopt water quality standards to protect public health and welfare, to enhance water quality, and to serve the purposes of the Act by providing for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water, whenever these goals are attainable. The Act requires States to establish standards taking into consideration the use and value of the water for public water supplies, propagation of fish and wildlife, recreation, agricultural and industrial water supply, navigation and other purposes. As a State/Tribe rule or law, water quality standards provide the basis for treatment controls beyond the technology-based requirements of the Act -- for both point and nonpoint sources of pollution.

Finally, water quality standards provide the bench mark against which to measure the effectiveness of regulatory and non-regulatory programs and in controlling water borne risks.

IV. Special Requirements for Use

None

V. Program/Media/Geographic Transferability

The standards are designed for the water media, but are applicable to a wide range of ecosystems.

VI. Other Information

Water quality standards are the foundation central core of the ecosystem/watershed approach as they define the human health and ecological goals for the aquatic ecosystem and provide the mechanism for meeting the objective of the Clean Water Act -- to restore the chemical physical and biological integrity of the Nation's waters.

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

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EPA'S CONTAMINATED SEDIMENT MANAGEMENT STRATEGY - DRAFT

I. Tool Description

The Strategy describes the cross-program policy framework in which EPA intends to promote consideration and reduction of ecological and human health risks posed by sediment contamination. The goals of the Strategy are: (1) to develop consistent methodologies for assessing contaminated sediments; (2) to prevent ecological or human health risks; (3) to clean-up existing sediment contamination that causes significant effects on human health or the environment; and (4) to ensure that sediment dredging and the disposal of dredged material continue to be managed in an environmentally sound manner.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel.

III. Tool Development

More than ten Federal statutes provide authority to many EPA program offices to address the problem of contaminated sediment. This resulted in fragmented, and in some cases contradictory or duplicative efforts to evaluate and manage contaminated sediments. EPA developed the Contaminated Sediment Management Strategy to streamline decision-making within and among EPA's program offices by promoting and ensuring the use of consistent sediment assessment practice, consistent consideration of risks posed by contaminated sediment, the use of consistent approaches to management of contaminated sediment risks, and the wise use of scarce resources for research and technology development.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

Applicable to other media and a wide range of ecosystems. Contaminated sediment poses ecological and human health risks in many watersheds throughout the United States; sediments serve as a contaminant reservoir from which fish and bottom dwelling organisms can accumulate toxic compounds and pass them up the food chain until they accumulate to levels that may be toxic to humans.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Tom Armitage Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-5388

EPA POLICY ON THE USE OF SUPPLEMENTAL ENVIRONMENTAL PROJECTS IN ENFORCEMENT SETTLEMENTS

I. Tool Description

In the settlement of environmental enforcement cases, EPA will insist upon terms which require defendants to achieve and maintain compliance with Federal environmental laws and regulations. In certain instances, additional relief in the form of projects remediating the adverse public health or environmental consequences of the violations at issue may be included in the settlement to offset the effects of the particular violation which prompted the suit. These projects are called Supplemental Environmental Projects (SEPs) and may be applied in both administrative and judicial settlements.

The SEP policy includes five specific categories of projects which the Agency will consider in a settlement: pollution prevention; pollution reduction; environmental restoration; environmental auditing; and public awareness. Environmental restoration is the category most relevant to ecosystem protection. An environmental restoration project is defined as a project that not only repairs the damage done to the environment because of the violation, but which goes beyond repair to enhance the environment in the vicinity of the violating facility.

II. Tool Users

SEPs are used by EPA Headquarters and Regional Enforcement staff.

III. Tool Development

The current SEP policy was established in a February 12, 1991 memorandum from James M. Strock, Assistant Administrator for the Office of Enforcement. This policy memo amended an existing EPA policy on civil penalties that was established in 1984 (GM-22).

The current SEP policy is in the process of being revised by the Office of Enforcement and Compliance Assurance in order to, among other things, broaden the environmental restoration category to include more opportunities for ecosystem protection.

IV. Special Requirements for Use

The only requirements for use of this tool is a general knowledge of the enforcement process and the SEP policy. OECA will be conducting training in Spring/Summer 1995 on how to more effectively use SEPs.

V. Program/Media/Geographic Transferability

This tool can be applied to any program, media, or geographic area.

VI. Other Information

The Agency's past experience with SEPs, or "mitigation projects," has sometimes been problematic, in part because policy statements did not fully describe the kinds of projects that are appropriate for penalty reduction, the situations under which they should be considered, and the amount by which the penalty demand can be reduced. Further, the U.S. General Accounting Office has questioned EPA's authority to use SEPs. EPA is revising the policy to respond to these concerns.

VIII. Program Contacts

David Hindin Office of Enforcement and Compliance Assurance, (202) 260-564-9001

EPA'S REVIEW AND APPROVAL PROCEDURE FOR STATE SUBMITTED TMDLS/WLAS, March 1986

I. Tool Description

Step-by-step procedures are outlined on the administrative (i.e., non-technical) aspects of developing TMDLs/WLAs and submitting them to EPA for review and approval. It includes questions and answers to focus on key issues, pertinent sections of WQM regulations and the CWA, and examples of correspondence.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof. Since 1983, the primary impetus for developing the guidance is the need to provide the technical and management tools for States to use in meeting statutory requirements and Agency programmatic priorities.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

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EPA STRATEGIC PLAN FOR GROUND WATER ECOLOGY

I. Tool Description

The guidance document entitled, EPA Strategic Plan for Ground Water Ecology, June, 1994, was developed by the Ground Water Protection Division within the Office of Water, to meet the environmental component of the principle of the Ground Water Protection Strategy that calls for the protection of ground water that is closely connected hydrologically to surface water in order to attain surface water quality standards and protect the integrity of associated ecosystems.

The Plan identifies four key objectives for achieving the goals of the strategy: provide technical assistance to water resource managers, especially at the State and local level, to delineate and set priorities for areas of ground water/surface water interaction that need protection; continue to work to incorporate or amend the use of existing statutory/regulatory authorities, policies and guidance to better protect ground water and related ecosystems; cooperate and coordinate with other public, private, and international organizations involved in ground water ecology; and, increase understanding of ground water ecology.

II. Tool Users

This Guidance can provide information to States and EPA Programs, such as the watershed and nonpoint source programs.

III. Tool Development

In response to the Science Advisory Board's Reducing Risk report, in 1990, the EPA developed the Ground Water Protection Strategy, to protect the environmental integrity of the nation's ground water resources. In June 1994, the Ground Water Ecology Strategic Plan was developed by the Office of Water to build upon the Ground Water Protection Strategy and to provide guidance on how to accomplish these efforts.

IV. Special Requirements for Use

No special requirements required for use.

V. Program/Media/Geographic Transferability

Transferability unknown.

VI. Other Information

VII. Program Contacts

John Simons, Office of Water, Office of Ground Water and Drinking Water, Ground Water Protection Division, (202) 260-7091

FRAMEWORK FOR ECOLOGICAL RISK ASSESSMENT ISSUE PAPERS

I. Tool Description

This tool includes nine Forum-sponsored reports on topics related to the ecological risk assessment process as described in the EPA report *Framework for Ecological Risk Assessment* (Framework Report: EPA 630/R-92/001). The report topics are: conceptual model development, characterizations, risk integration methods, uncertainty in ecological risk assessment, ecological significance, ecological recovery, and biological stressors, and ascertaining public values in ecological risk assessment.

II. Tool Users

The primary intended use of the issue papers will be as source materials for development of Agency-wide ecological risk assessment guidelines by the Risk Assessment Forum.

III. Tool Development

The issue papers were developed by expert consultants between 1992 and 1994 and were peer-reviewed in August 1994. The issue papers are not yet available. The estimated publication date is early in 1995.

IV. Special Requirements for Use

These reports are intended for those who have some training and familiarity with ecological risk assessment.

V. Program/Media/Geographic Transferability

The reports contain information that is generally applicable to a wide range of EPA programs, media, and geographic areas.

VI. Other Information

The Risk Assessment Forum (Forum) is composed of senior scientists from around the Agency and was established to promote Agency-wide consensus on scientific issues related to risk assessment both ecological and human health risk issues are considered by Forum technical panels.

VII. Program Contacts

Bill van der Schalie ORD, Risk Assessment Forum, (202) 260-4191

FRAMEWORK FOR ECOLOGICAL RISK ASSESSMENT REPORT

I. Tool Description

This tool is a Forum-developed report entitled Framework for Ecological Risk Assessment (Framework Report; EPA/630/R-92/001) that describes basic elements, or a framework, for ecological risk assessment and offers a flexible structure for conducting and evaluating EPA ecological risk assessments. The report is being used by many assessors both within and outside of the Agency.

II. Tool Users

The Framework Report is primarily intended for EPA risk assessors, EPA risk managers, and other persons who either perform work under EPA contract or sponsorship or are subject to EPA regulations. The terminology and concepts described may be of assistance to other Federal, State, and local agencies as well as to members of the general public who are interested in ecological issues. Several program offices are using the Framework Report to help structure program-specific guidance, and it is being widely used outside of EPA as well.

III. Tool Development

The framework Report was developed by a panel of Agency scientists, peer-reviewed, and published in May, 1992. The need for the Framework Report was based on discussions with the EPA Risk Assessment Council and Science Advisory Board.

IV. Special Requirements for Use

The report is more useful for those who have some training and familiarity with ecological risk assessment.

V. Program/Media/Geographic Transferability

The Framework Report was intended to provide generic -- not program-specific -- guidance. As such, the principles in the report may be applicable to a wide range of stressors, ecological systems, and biological, special, and temporal scales.

VI. Other Information

The Risk Assessment Forum (Forum) is composed of senior scientists from around the Agency and was established to promote Agency-wide consensus on scientific issues related to risk assessment. Both ecological and human health risk issues are considered by Forum technical panels.

VII. Program Contacts

Bill Van Der Schalie ORD, Risk Assessment Forum, (202) 260-4191

GUIDANCE SPECIFYING MANAGEMENT MEASURES FOR SOURCES OF NONPOINT POLLUTION IN COASTAL WATERS

I. Tool Description

This document contains guidance specifying management measures for sources of nonpoint pollution in coastal waters. This "management measures" guidance address five source categories of nonpoint pollution; agriculture, silviculture, urban, marinas, and hydromodification. A suite of management measures is provided for each source category. In addition, there are chapters that provide management measures that list other tools available to address many source categories of nonpoint pollution; these tools include the protection, restoration, and construction of wetlands, riparian areas, and vegetated treatment systems.

II. Tool Users

This Guidance was written to help States to develop and implement State Coastal Nonpoint Pollution Control Programs.

III. Tool Development

In the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA), Congress recognized that nonpoint pollution was a key factor in the continuing degradation of many coastal waters and thus called upon States to develop and implement State Coastal Nonpoint Pollution Control Programs. Congress assigned to EPA the responsibility to develop this technical guidance to guide the States' development of Coastal Nonpoint Control Programs, which must be in conformity with the technical guidance.

This Guidance (#840-B-92-002) was published in January 1993 after two years of work. This Guidance was developed by EPA personnel within the Office of Water's Assessment and Watershed Protection Division and outside contractor support. The total approximate cost of this effort was \$1.5 million.

IV. Special Requirements for Use

This Guidance is too diverse to make a generalization.

V. Program/Media/Geographic Transferability

Portions of this Guidance are applicable to Programs dealing with coastal waters, stormwater permits, wetlands, ground water, pesticides and other Federal and state agencies.

VI. Other Information

VII. Program Contacts

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INTERGOVERNMENTAL TASK FORCE ON MONITORING WATER QUALITY (ITFM)

I. Tool Description

The tool is the Intergovernmental Task Force on Monitoring Water Quality (ITFM), soon to become a permanent National Water Quality Monitoring Council. The ITFM's purpose is to recommend and oversee implementation of a nationwide water monitoring strategy that would:

1. Provide a structure for public and private monitoring partners to collaborate to share information on water resource quality
2. Provide data to measure progress toward environmental goals through use of agreed-upon indicators.
3. Use performance-based methods to collect water data so it can be shared with others
4. Store data in automated systems with agreed upon data descriptors so a secondary data user will know if he can use the data for his own purposes. Link the systems so data can be shared easily. Jointly maintain where necessary common data bases several agencies need, such as a taxonomic system.
5. Provide analysis tools, including joint purchase of data layers (such as remote sensing) and increased joint use of GIS.

The ITFM has 20 members; 10 Federal agencies, 8 States, one Indian Tribe, and one Interstate Basin Commission, plus over 150 Federal and State staff participating in 8 work groups on specific issues. EPA chairs the ITFM (Elizabeth Fellows), with USGS as Vice Chair and Executive Secretariat.

ITFM final recommendations are out in draft form for public review; the final report is due in January, 1995.

II. Tool Users

The intended users of these tools are water quality monitoring/data management experts at all geographic scales. Feedback on the ITFM recommendations and on specific tools has been very positive to date.

III. Tool Development

The ITFM held its first meeting in January, 1992. The ITFM was prompted by EPA and USGS concern to improve water quality monitoring nationwide. The ITFM received further boost by OMB memorandum 92-01 that gave USGS the lead in coordinating water data in the federal government. The ITFM became a key tool in doing so.

The ITFM members, in some cases using contractor help, developed a number of specific tools to use. These include:

- o Framework for recommended water quality monitoring program
- o Selection criteria for indicators
- o Summary matrix of recommended indicators to measure State designated uses
- o Specific recommendations for indicators for State designated uses
- o Policy paper on ecoregions, reference conditions, and index calibration
- o Policy paper on multimetric approach for describing ecological conditions
- o Policy paper on performance-based methods
- o Paper on target audiences, monitoring objectives and format characteristics for reporting water quality information

- o Annotated bibliography of selected outstanding water quality reports
- o Groundwater quality monitoring framework
- o Groundwater quality indicators

Specific dollars per report not available at this time.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

A nationwide water monitoring strategy is important in attempts to assess ecosystem health; the tools developed by the ITFM could be used by other EPA programs and media offices in efforts ecosystem management efforts which require water monitoring. Adoption of the ITFM recommendations and tools by all agencies would facilitate data sharing and aquatic ecosystem analysis at all levels.

VI. Other Information

VII. Program Contacts

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MANAGING CONTAMINATED SEDIMENTS

I. Tool Description

Two documents describe the available regulatory authority and the regulatory processes used by EPA programs to manage contaminated sediment:

- o EPA DECISION-MAKING PROCESSES. Includes flow charts, text and citations describing EPA's regulatory authority and decision making processes used to manage contaminated sediment. All applicable EPA regulatory programs are covered.
- o CONTAMINATED SEDIMENTS: RELEVANT STATUTES AND EPA PROGRAM ACTIVITIES. Contains EPA's regulatory authority available for use in managing contaminated sediment. All applicable EPA regulatory programs are covered.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel.

III. Tool Development

More than ten Federal statutes provide authority to many EPA program offices to address the problem of contaminated sediment. This resulted in fragmented, and in some cases contradictory or duplicative efforts to evaluate and manage contaminated sediments. EPA developed the Contaminated Sediment Management Strategy to streamline decision-making within and among EPA's program offices by promoting and ensuring the use of consistent sediment assessment practice, consistent consideration of risks posed by contaminated sediment, the use of consistent approaches to management of contaminated sediment risks, and the wise use of scarce resources for research and technology development.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

Applicable to other media and a wide range of ecosystems.

Contaminated sediment poses ecological and human health risks in many watersheds throughout the United States. Sediments serve as a contaminant reservoir from which fish and bottom dwelling organisms can accumulate toxic compounds and pass them up the food chain until they accumulate to levels that may be toxic to humans.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Tom Armitage Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-5388

THE NACEPT COMMITTEES ON ECOSYSTEMS

I. Tool Description

The National Advisory Council for Environmental Policy and Technology (NACEPT) is a FACA-chartered committee managed by the Office of Cooperative Environmental Management, which is located in the Administrator's Office. NACEPT committees advise the Administrator and EPA's senior managers on major environmental policy issues and is chartered for two years. Membership on NACEPT is fairly balanced with representatives of State agencies, tribal governments, local governments, academia, non-governmental organizations, and industry.

Three NACEPT committees were established in June 1994 to deliberate and build consensus on ecosystems issues, including: the Ecosystems Implementation Tools Committee; the Ecosystems Sustainable Economies Committee; and the Ecosystems Information & Assessments Committee.

The Ecosystems Information and Assessment Committee, chaired by Tom Davis and Mike Hale, will address the key information and assessment needs of an ecosystems approach. This committee will devise policy recommendations on how the Agency should shift its funds and redirect its staff to improve its collection, use, and dissemination of ecosystem information. Joseph Sierra (260-6839) serves as designated federal official (DFO) to this group.

The Ecosystems Implementation Tools Committee, chaired by Edwin (Toby) Clark and Gerry Digerness, will examine the key tools and authorities that can be major impediments or opportunities to implement an ecosystems approach at EPA. Gwen Whitt (260-9484) and Debbie Miller (260-9937) serve as DFOs to this committee.

The Ecosystems Sustainable Economies Committee, chaired by Joan Bavaria and Diane Ridgely, has identified three general ecosystem topic areas to address during its deliberations, including consensus building, measurement, and incentive structure. First, EPA must build consensus with other federal agencies on ecosystem valuation, private property rights, the integration of regional planning, and education and outreach of an ecosystem approach. Second, the Agency must develop tools to measure an ecosystems approach, such as an integrated ecological/economic model and full-cost accounting of ecosystem protection. Third, EPA must work towards improving and developing new compliance incentives to change behavior to better protect and preserve ecosystems, such as voluntary initiatives, taxes, and subsidies. Mark Joyce (260-6889) serves as EPA's DFO to this committee.

II. Tool Users

NACEPT committees historically have presented their reports and recommendations to EPA's Administrator and other senior Agency officials.

III. Tool Development

The ecosystems committees were established in June 1994 and will continue their work through 1995. The Office of Cooperative Environmental Management, which administers all of EPA's NACEPT committees, is comprised of thirteen employees.

IV. Special Requirements for Use

No special requirements required for use.

V. Program/Media/Geographic Transferability

In the past, NACEPT committee reports were not written to directly address an ecosystems approach. However, it is expected that the reports and recommendations from the three recently-established ecosystems committees will be transferable across programs, media, and geographic areas.

VI. Other Information

VII. Program Contacts

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Gordon Schisler, Deputy Director

Office of the Administrator, Office of Cooperative Environmental Management, (202) 260-8922

NPDES MID-YEAR REVIEW PROCESS

I. Tool Description

In fiscal year 1994, the mid-year process placed more emphasis on program planning and development than the review of past performance. In light of the significant program implementation direction reflected in the NPDES Watershed Strategy, a major goal of the discussions was to gain an understanding each Region's plans for implementing the NPDES Watershed Strategy. In particular, the review focused on Regional State-by State Assessments and Action Plans, State/EPA Work Plan Agreements, and Internal Coordination Strategy.

The mid-year team usually consisted of a Permits Division Branch Chief as the team leader plus a member of the former watershed task force.

II. Tool Users

EPA Headquarters.

III. Tool Development

To help both the Regions and OWM prepare for the discussions, a brief questionnaire was sent to each Region to complete and return prior to the scheduled mid-year. During June and July 1994, a Permits Division review team visited each EPA Region to discuss Regional needs and efforts to implement the NPDES Watershed Strategy. A final report documenting the findings of each visit was provided to the respective Region. A national report representing a synthesis of the individual Regional reports was completed in September 1994.

The purpose the national report was to give the Regions useful information on the status, approaches, and experiences of the various Regions' efforts to implement the NPDES Watershed Strategy and help move the NPDES Program to a watershed based approach. The feedback from the national report and individual Region discussions also helped Headquarters to better understand issues and impediments and to sharpen our focus on the important activities to support the efforts of Regions and States.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

The mid-year review process is applicable to any program.

VI. Other Information

The mid-year review provided a forum to send a clear message that the NPDES Strategy is just one components of an overall comprehensive approach to water resources management, not one of many independent activities.

VII. Program Contacts

Deborah G. Nagle Office of Water, Office of Wastewater Management, Permits Division, (202) 260-2656

NPDES WATERSHED MANAGEMENT TECHNIQUE

I. Tool Description

Permits Division established a Watershed Task Force on October 14, 1993 to develop a national approach, targeting NPDES permitting experience and resources to support the Agency's watershed protection initiative. The Task Force consisted of six members who worked as a team for seven months to develop the NPDES Watershed Strategy.

Once the Strategy was complete, watershed implementation was integrated back into the Permits Division's with the establishment of a watershed matrix manager. The Permits Division's Watershed Matrix Manager has primary responsibility for coordinating implementation of the NPDES Watershed Strategy within the Permits Division, the Office of Water, and the Regional Water Management Divisions.

II. Tool Users

Permits Division, Office of Wastewater Management.

III. Tool Development

Responsibilities of the matrix manager:

- Works full-time on matrix management responsibilities.
- Develops agreement among the Permits Division Director, Permits Branch Chiefs, and the matrix staff on goals, individual tasks, and a time frame for NPDES Watershed Strategy implementation through a written implementation plan.
- Coordinates existing Permits Division Branch activities that contribute to watershed protection implementation and tracks them as part of the Permits Division Watershed matrix.
- Works closely with Regions to support and encourage implementation of the NPDES Watershed Strategy.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

VI. Other Information

None.

VII. Program Contacts

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NPDES WATERSHED PROTECTION APPROACH

I. Tool Description

In fiscal year 1994, the Office of Wastewater Management developed a strategy to fully integrate the National Pollutant Discharge Elimination System (NPDES) permits program into the national Watershed Protection Approach. The Strategy was signed by Bob Perciasepe on March 21, 1994. The NPDES Watershed Strategy consists of four parts: 1) an introduction, 2) a set of guiding principles for the Watershed Protection Approach, 3) the purpose and objectives of the NPDES Watershed Strategy, and 4) detailed strategy components. The Strategy components address State-wide coordination, NPDES permits, monitoring and assessment, programmatic measures and environmental indicators, public participation, and enforcement. Attached to the strategy is a list of suggested Regional action items for fiscal year 1995 and beyond to support the Watershed Approach.

II. Tool Users

EPA Regions, especially the NPDES program Branches.

III. Tool Development

The NPDES Watershed Strategy was developed over a six month period with detailed input from States and EPA Regions, and reflects the consensus and support of OW's program offices. In developing the Strategy, OWEC staff visited seven States and eight Regions. Drafts of the Strategy were provided to ASIWPCA, DE, NC, OW program offices, to EPA Regional Permits and Water Quality Branch Chiefs, and Environmental Support Divisions. Comments were received from DE, NC, all OW program offices, and all Regions.

The NPDES Watershed Strategy is a critical component of the Watershed Protection Approach. It reflects the Administrator's Agency-wide emphasis on ecosystem protection. It also reflects EPA's fiscal year 1995 budget submission, which specifies that beginning in October 1994, 50% of NPDES resources will be targeted to support and facilitate the Watershed Protection Approach.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

The NPDES Watershed Strategy serves as an example for how to integrate a program into the national Watershed Protection Approach. The Strategy is flexible enough to apply to all geographical areas.

VI. Other Information

None.

VII. Program Contacts

Deborah G. Nagle

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(202) 260-2656

NPDES WATERSHED REGIONAL FISCAL YEAR 1994 PRODUCTS

I. Tool Description

There were three key Regional actions which OWM focused attention during fiscal year 1994 to facilitate implementation of the NPDES Watershed Strategy in fiscal year 1995. These actions are:

- **Regional State-by-State Assessments and Action Plans** - Completing assessments of Watershed Protection activities and needs in each State and, in the context of that assessment, developing Regional action plans for fiscal year 1995 that identify how the Region will support and facilitate each State's movement toward the Watershed Protection Approach;
- **State/EPA Workplan Agreements** - Including specific activities within State/EPA workplans for fiscal year 1995 which will promote the central components of Watershed Protection;
- **Internal Coordination** - Developing integrated Regional strategies which will describe the Regional decision-making processes, oversight role, and internal coordination efforts necessary to ensure support for the Approach.

II. Tool Users EPA Regions.

III. Tool Development

OWM developed a guidance document to assist Regions in developing their State-by-State Assessments and Action Plans. The Regions were requested to provide a copy of their internal strategy, State-by-State assessments, and fiscal year 1995 NPDES Regional action plans for supporting States to OWM by September 1, 1994.

IV. Special Requirements for Use None.

V. Program/Media/Geographic Transferability

Although the guidance issued by EPA Headquarters focus on permit-related activities, many Regions expanded their information gathering to include inquiries about other water programs.

VI. Other Information

OWM has prepared preliminary Regional Factsheets evaluating the completeness of the State Assessments, Regional Action Plans, and Internal Strategies. Draft State factsheets have been completed, giving a snap shot picture of each State's watershed protection approach status. This information will be used to assist Regions and States move toward a watershed protection approach.

VII. Program Contacts

Deborah G. Nagle

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(202) 260-2656

PESTICIDE MITIGATION PLANS

I. Tool Description

For each pesticide that is registered or re-registered, a mitigation plan is developed in negotiation with the registrant. Mitigation plans describe measures which will be taken to reduce the undesirable environmental consequences and impacts of pesticide application. Plans may be narrowly "place-based", eg: focusing on particular fields in which pesticides are being applied.

II. Tool Users

Mitigation plans have been used in-house within the Pesticide Program, although there has also been some use by programs in the Office of Water. There has not been a lot of feedback from users, as the plans are relatively new; plan development has been fully implemented only in the past year. The impact of developing mitigation plans has not yet been felt in the re-registration process, as only 30-40 chemicals have been re-registered in the past year.

III. Tool Development

Development of the mitigation plans began in the early 90's, based on the recommendation on an OPP Taskforce. Previously, such plans were not pursued because of the extensive field testing and data required for their preparation.

The Office of Pesticide Programs is now working to have registrants investigate generic mitigation measures for various classes of chemicals, such as those developed through the Spray Drift Task Force's efforts convening registrants for the development of generic measures for the mitigation of aerially applied pesticides. Generic measure can be extremely useful when integrated with other measures and best management practices for integrated agricultural management.

The preparation of plans can be quite resource and data intensive. Due to resource constraints, it has not been possible to conduct on-going monitoring to assess what impact the mitigation measure are actually having. The program has been trying to develop monitoring protocols for the states, as well as other tools and technical guidance.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

There is some similarity between agricultural measures being developed by the Coastal Water Management Program in the Office of Water, and those being developed for pesticide mitigation plans. The Office of Pesticides has prepared several pages on pesticide mitigation for a Coastal Water Management document. Better integration between media programs could increase effectiveness.

VI. Other Information

The Mitigation Plan information is not available in electronic form, although computer equipment has been purchased. There is an interest in developing a GIS link, as preparation of the plans would benefit from access to GIS tools which help identify the resources at potential risk in the areas under consideration.

VII. Program Contacts

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(703) 305-6120

PRIVATE LANDS INITIATIVE

I. Tool Description

The goal of the Private Land Initiative is to develop a national strategy and implementation plan for voluntary wetlands protection and restoration. Through partnerships at the Federal, state and local level as and with private organizations, the program can help slow the loss and in the long term achieve a net gain, of wetland acres on privately held lands. The program has thus far established an initial pilot project in Maryland, and has expanded and cooperatively marketed private lands programs to additional states and regions with the end goal of developing and implementing National private lands programs across the country.

Since the Maryland pilot project, the Soil Conservation Service, with the National Association of Conservation Districts (NACD), the US EPA, and the Fish and Wildlife Service, and other non-governmental organizations, formed the National Wetlands Conservation Alliance (Alliance). The goal of the Alliance is to encourage private lands alliances on a regional, state and local basis. These non-national alliances are often composed of conservation districts, state foresters, and other agencies and private groups.

II. Tool Users

Federal, state and local partners in wetland conservation.

III. Tool Development

The program started in 1993, with the initiation of two private lands workshops held in Maryland and hosted by the EPA. Over a dozen co-sponsors and in-kind contributions ensured a low overall cost for the workshop. This sponsorship supported the development of a reference guide which has been distributed at each workshop, as well as a slide program created after the workshops.

IV. Special Requirements for Use

V. Program/Media/Geographic Transferability

The experience obtained by working with the various stakeholders involved in the private lands initiatives can advance the ecosystem protection approach; undoubtedly, almost any ecosystem protection initiative will impact private landowner interests.

VI. Other Information

As part of a cooperative agreement established by the wetlands division through the Alliance, draft wetland assistance guides and diskettes based on the earlier Maryland pilot were completed for Oregon, Tennessee and Arkansas. The state alliances, which consist of partnerships among agencies and private groups, are completing the guides for use at training workshops this fall and next year. Under a different cooperative agreement, the Environmental Law Institute produced a report that profiles case studies of two states (North Carolina and Arizona) and two regions (the lower Mississippi Delta and the Northwest). The report identifies wetlands stewardship opportunities on private lands, and gaps in existing resources and programs.

VII. Program Contacts

Stan Austin Office of Water, Office of Wetlands, Oceans and Watersheds, Wetlands Division, (202) 260-0989

RISK ASSESSMENT GUIDANCE FOR SUPERFUND, VOLUME II: ENVIRONMENTAL EVALUATION MANUAL

I. Tool Description

This document (EPA/540/-1/89/001) is part of a two-manual set entitled *Risk Assessment Guidance for Superfund*, which addresses both the human health assessment and the ecological risk assessment. The guidance was developed to be applied during the Removal and Remedial Investigation/Feasibility Study processes.

II. Tool Users

The primary audience for the Environmental Evaluation Manual are Remedial Project Managers and On-Scene Coordinators. The document is not a detailed "how to" type guidance, but identifies the kinds of help site managers are likely to need, and where to find that help. It also describes an overall framework for considering environmental effects.

III. Tool Development

The risk assessment manual was developed with extensive input from EPA workgroups composed of both Regional and Headquarters staff. The document was released in March 1989 as interim final guidance, with the expectation final guidance would be issued following the 1988 revision of the NCP. There are no immediate plans to move forward with this issue.

Guidance for both human health and environmental assessments is needed so that EPA can meet the requirements of §121(b)(1) and (d) of CERCLA, namely that selected remedial actions be protective of human health and the environment. The National Contingency Plan (NCP), describing how CERCLA is implemented, requires the Agency to conduct a baseline risk assessment to "characterize the current and potential threats to human health and the environment" (§300.430). As part of this baseline assessment every Superfund site is required to include an ecological risk assessment.

IV. Special Requirements for Use

No special requirements for use.

V. Program/Media/Geographic Transferability

The analytical framework and specific methods may be equally applicable to evaluations of hazardous wastes and hazardous materials for other purposes.

VI. Other Information

VII. Program Contact

John Miller Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response, (703) 603-8845

STATE WETLANDS CONSERVATION PLANS (SWCP)

I. Tool Description

As part of the state wetlands grant program, the EPA makes funds available for the development of state Wetlands Conservation Plans. A voluntary program, State Wetlands Conservation Plans (SWCP) are strategies for states to achieve no-net-loss and other wetland management goals by integrating both regulatory and cooperative approaches to protecting wetlands.

Typically, many land and water-based activities go unaddressed by public and private wetland programs and activities which are often limited in scope, not well coordinated, or do not address all of the problems affecting wetland ecosystems. A State Wetlands Conservation Plan improves government and private sector effectiveness and efficiency by identifying gaps in wetland protection programs and finding opportunities to make wetlands programs work even better.

Nineteen States are at various stages of developing an SWCP and have received financial assistance from EPA; implementation of plan recommendations is underway California and Ohio. Steps are underway to encourage the development of SWCPs in the remaining 31 states.

II. Tool Users

State environmental protection or natural resource agencies.

III. Tool Development

The emphasis on SWCPs arose from language in the Clean Water Act. Guidance for the planning process is being developed, based on the experience of the nineteen states in which SWCPs are currently being pursued.

IV. Special Requirements for Use

Interested state entities submit applications for wetland grants to the EPA regional offices, which make the final funding determinations. Applications should describe the uses of the funds (eg: SWCP planning process), and the overall goals to be achieved.

V. Program/Media/Geographic Transferability

The planning process has proven to be quite successful in some areas (eg: South Florida), and can offer examples and lessons on how to undertake an ecosystem-oriented planning process.

VI. Other Information

VII. Program Contacts

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(202) 260-6095

TRIBAL PROGRAM GUIDANCE

I. Tool Description

These documents provide guidance directed towards the establishment of water quality programs by tribal authorities:

- o REFERENCE GUIDE FOR WATER QUALITY STANDARDS FOR INDIAN TRIBES. Guidance issued by EPA in 1990 on the requirements for adopting water quality standards. Also describes the materials available to assist Tribes in adopting water quality standards.
- o GUIDANCE ON WATER QUALITY STANDARDS AND 401 CERTIFICATION PROGRAMS ADMINISTERED BY INDIAN TRIBES. Guidance issued by EPA in 1991 to inform Tribal governments about the authorities available to them in setting and enforcing water quality standards.

II. Tool Users

Federal, State, municipal industrial, environmental and Tribal entities.

III. Tool Development

Section 303(c) of the Clean Water Act require States and Tribes to adopt water quality standards to protect public health and welfare, to enhance water quality, and to serve the purposes of the Act by providing for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water, whenever these goals are attainable.

IV. Special Requirements for Use

None

V. Program/Media/Geographic Transferability

The standards are designed for the water media, but are applicable to a wide range of ecosystems.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

David K. Sabock Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-1318

WETLANDS MITIGATION BANKING

I. Tool Description

Wetlands mitigation banking is the restoration, creation, enhancement, or in certain circumstances, preservation of wetlands expressly for the purpose of providing compensation in advance of proposed or future wetlands impacts. A wetlands mitigation bank is created when a government agency, corporation or non-profit organization, under a formal agreement, acquires a long-term interest in a degraded wetlands or an appropriate upland area and restores or creates the site into a functional wetland ecosystem.

The value of a bank is determined by quantifying the wetland values restored or created in terms of "credits", which may later be used to compensate for wetland losses, or "debits", associated with a permitted discharge. Consolidation of mitigation into a single large parcel is often more ecologically advantageous for maintaining the integrity of the aquatic ecosystem. Development of a mitigation bank can also bring together financial resources, as well as planning and scientific expertise not generally practical for individual mitigation proposals, thereby increasing the likelihood of success.

Approximately 100 mitigation banks are in operation or are proposed for construction in 34 States across the country.

II. Tool Users

Mitigation banking is used by federal agencies (EPA, Army Corps of Engineers, Fish and Wildlife Service, Natural Resource Conservation Service, National Marine Fisheries Service) as part of the permit review process. State users include the resource and regulatory agencies, and departments of transportation.

Mitigation banking may be used by local communities as means of enhancing environmental objectives within their boundaries. The regulated community may utilize banks to provide mitigation. Private mitigation banks are being developed by entrepreneurs who can sell mitigation credits to developers.

III. Tool Development

The need to provide compensatory mitigation for wetlands impacts is a requirement of the Clean Water Act, Section 404 program. The 1990 EPA/Army Memorandum of Agreement (MOA) on Mitigation identifies mitigation banking as "an acceptable form of compensatory mitigation under specific criteria designed to ensure an environmentally successful bank." Interim guidance was developed by the EPA and Army Corps of Engineers in August of 1993; final detailed guidance is expected by the summer of 1995.

IV. Special Requirements for Use

Mitigation banking is only one form of compensatory mitigation; certain requirements must be met before applicants can be eligible to use credits from an approved bank to offset proposed wetland losses.

V. Program/Media/Geographic Transferability

While mitigation banks are used primarily within the context of federal and state wetland regulatory programs, banks may also address a number of broader concerns such as non-point source

pollution control, storm water management, habitat destruction, and flood control. Ideally, mitigation banks serve multiple environmental objectives.

Mitigation banking can also be used as a component of comprehensive wetland conservation planning; eg: banking can be used to restore wetlands identified for protection/restoration in such plans.

VI. Other Information

Mitigation banking provides an opportunity to both improve the success and effectiveness of compensatory mitigation and to streamline the permit review process.

VII. Program Contacts

Tom Kelsch Office of Water, Office of Wetlands, Oceans and Watersheds, Wetlands Division, (202) 260-8795

HEADQUARTERS ECOSYSTEM TOOL INVENTORY

REFERENCE REPORTS AND STUDIES

BTAG FORUM

I. Tool Description

All EPA Regions have established groups of scientists to advise and assist site managers with ecological studies produced in conjunction with Remedial Investigations and Removal Actions at Superfund sites. To foster communication between these Regional groups an intermittent bulletin is produced, the **BTAG Forum**, highlighting site-specific developments as well as promoting Regional and national topics. The bulletins provide a mechanism for Regional personnel to keep abreast of activities and developments throughout the country.

II. Tool Users

Anyone concerned with ecological risk assessments at Superfund sites would be among the intended audience. This may include Remedial Project Managers, Biological Technical Assistance Groups, natural resource trustee agencies and risk assessment contractors. These documents are widely accepted throughout the Regions as a useful mechanism for keeping abreast of developments pertinent to Superfund ecological risk assessments.

III. Tool Development

The **BTAG Forum** has been produced intermittently since May, 1991. This project was initiated in response to Regional requests for assistance and with their cooperation. These bulletins are produced by the Toxics Integration Branch in OERR's Hazardous Site Evaluation Division (with contractor support.)

IV. Special Requirements for Use

No special requirements required for use.

V. Program/Media/Geographic Transferability

The material presented in the bulletins would be useful for anyone interested in ecological risk assessment.

VI. Other Information

The National Contingency Plan (NCP), describing how CERCLA is implemented, requires the Agency to conduct a baseline risk assessment to "characterize the current and potential threats to human health and the environment" (§300.430). As part of this baseline assessment every Superfund site is required to include an ecological risk assessment to "1) identify and characterize the current or potential threats to the environment from a hazardous substance release, 2) evaluate the ecological impacts of alternative remediation strategies, and 3) establish clean-up levels in the selected remedy that will protect those natural resources at risk" (OSWER Directive No. 9285.7-17).

VIII. Program Contact

Ron Preston BTAG Forum Editor, (303) 233-2315

ORD'S BULLETIN BOARD SYSTEM (BBS)

I. Tool Description

ORD's Bulletin Board System (BBS) offers an online bibliographic database for searching and identifying ORD's publications including all of ORD's ecological reports since 1977. The BBS also includes an electronic messaging system and conferences on expert systems, biotechnology, regional operations, water regulations and methods standards.

II. Tool Users

The BBS can be used by EPA Headquarters, laboratories, Regions, contractors, States, other Federal agencies, universities, industry, and the public.

III. Tool Development

The ORD BBS, which currently has over 7,000 registered users, started operation in Cincinnati in August 1990. It was set up to improve communication and technology transfer among EPA staff, state and local officials and staff, researchers and the private sector. The ORD BBS is open to all and operates 24 hours a day, 7 days a week. There is no subscription charge.

IV. Special Requirements for Use

Modem: (513) 569-7610 or 7700; Speed: 1200, 2400, or 9600; Mode: full duplex; Data: 8; Parity: none; Stop: 1; Emulation: VT100 (optional); Infilter off (optional).

V. Program/Media/Geographic Transferability

Tool is highly transferable.

VI. Other Information

To order a copy of the user's manual (EPA/600/M-91/050) call (513) 569-7562. To access the ORD Bibliographic Database, type Open 1 from the "mainboard command".

VII. Program Contacts

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(513) 569-7644

CASE STUDIES IN THE USE OF RAPID BIOASSESSMENT PROTOCOLS FOR THE ASSESSMENT OF BIOLOGICAL EFFECTS OF COMBINED SEWER OVERFLOWS.

I. Tool Description

Assesses the applicability of rapid bioassessments (RBAs) in determining the biological condition of a waterbody impacted by CSOs. RBAs use a series of biological "metrics", or statistics which provide information about the biological community; the combination of all the metrics give an overall "score" of the biological condition of the waterbody. The case studies on streams in Ohio and New York indicate that RBAs are well-suited to evaluate their effects of the biota of receiving streams. This tool will be completed in FY 1995.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof. Since 1983, the primary impetus for developing the guidance is the need to provide the technical and management tools for States to use in meeting statutory requirements and Agency programmatic priorities. Thus the guidance focused first on conventional pollutants, then toxics and now nonpoint sources and other wet weather discharges.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, nonpoint sources and background loadings (from non-controlled sources such as atmospheric deposition and sediment). The TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. The TMDLs maximize real environmental gains and minimize the need for unnecessary regulation.

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied Science Division, (202) 260-1330

COMPENDIUM OF ECOLOGICAL RISK ASSESSMENT TOOLS

I. Tool Description

The *Compendium of Ecological Risk Assessment Tools* is a collection of laboratory bioassay techniques, field assessment methods, and models developed by EPA laboratories and program offices to address regulatory and policy needs associated with ecological effects. The Compendium was designed to provide rapid access to ecological risk assessments tools used throughout the EPA, and it contains descriptions of more than 140 tools available for carrying out assessments.

The Compendium contains one-to three-page data sheets with a short description of each method or tool; information regarding its intended and actual uses; information concerning data analysis and validation; a contact person; and references for more information.

II. Tool Users

The Compendium is a resource for regional staff who are responsible for designing ecological assessments to meet regional and program needs.

III. Tool Development

Work on the Compendium started in 1992, because the Environmental Monitoring Methods Committee and its Subcommittee, the Biological Advisory Committee, was concerned that the Agency did not have a central repository for biological methods.

The Compendium originally was developed as a pilot to exist in hardcopy. By FY1996, this Compendium will be incorporated (and available on CD-ROM) into the Environmental Monitoring Methods Index (EMMI), a cross-Agency database of methods that presently contains only chemical methods.

IV. Special Requirements for Use

There are no special requirements for use of the Compendium.

V. Program/Media/Geographic Transferability

This Compendium is applicable across media, program and geographic areas, offering a useful resource for anyone interested in conducting ecological risk assessments.

VI. Other Information

The Compendium includes: a listing of the laboratory bioassays, micro/mesocosms, in-field studies, field assessments, statistical procedures, regional approaches, and support procedures; an example of an ecological risk assessment data sheet; and a primer on how to use the Compendium.

VII. Program Contacts

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CLEAN WATER ACT SECTION 403

I. Tool Description

Section 403 of the Clean Water Act provides that point source discharges to the territorial seas, contiguous zone and oceans are subject to regulatory requirements in addition to the NPDES program's technology- or water quality-based requirements applicable to typical dischargers. The 403 requirements are intended to ensure that no unreasonable degradation of the marine environment will occur as a result of the discharge and to ensure the protection of sensitive marine populations.

Biological and ecological assessments must be conducted to assess the likely impact of the discharge. Requirements may also include ambient monitoring programs, alternative assessments, and pollution prevention techniques. A variety of guidance and protocol documents have been developed for monitoring and conducting ecological assessments, and are available from the program office.

In those cases where there is insufficient information to support a finding of "no unreasonable degradation", applicants must demonstrate that the discharge will not cause "irreparable harm". A permit will then be issued with monitoring and data requirements for the 5 year life of the permit. Data gathered through this monitoring will be used in considering permit reissuance.

More than 300 facilities are subject to section 403 requirements under individual permits; roughly another 3000 facilities ranging from gas and oil wells to seafood processing plants are covered under general permits.

The program has had the impact of introducing ecological concerns in the placement of discharge outfalls, and of increasing the amount of monitoring that is conducted.

The "Clean Water Act Compendium", dated May 1994, lists and briefly describes the various documents that are available from the program office including: guidance; statute, regulations and policy memos; reports to Congress; region-specific guidance and documents; permit-related information; and scientific products and models. Appendices provide additional information about: legal cases; bulletins and fact sheets; and courses, conferences and workshops.

II. Tool Users

Program guidance and support documents are intended for use primarily by those regional offices and delegated state programs which are responsible for operating the NPDES program and applying the 403 section requirements. Guidance and protocols are also useful in aiding permit applicants conduct ecological assessments and implement monitoring programs.

III. Tool Development

Section 403 was part of the 1972 Federal Water Pollution Control Act, commonly known as the Clean Water Act. The Section 403 Program was one of the first of EPA's programs to incorporate ecological risk assessment as part of the evaluation of the impacts of point source dischargers on the marine environment. Numerous guidance documents were prepared in the early 1980's, and are available through the program office in the Oceans and Coastal Protection Division, Office of Wetlands, Oceans and Watershed, Office of Water.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

Anyone interested in marine ecosystems may find benefit in the ecological risk assessment and monitoring guidance documents, and in the data that is collected about marine ecosystems through the program (permit data is made available through agency databases).

VI. Other Information

The program would be greatly strengthened by the development of marine bio-criteria, which are essential to setting program "targets", for defining concepts such as "unreasonable degradation" (eg: how much of a population must die off before the threshold has been surpassed).

VII. Program Contacts

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ECO UPDATES

I. Tool Description

This bulletin series on ecological assessment of Superfund sites supplements Risk Assessment Guidance for Superfund, Volume II: Environmental Evaluation Manual (EPA/540/-1/89/001) addresses technical issues pertinent to Superfund ecological risk assessments. The bulletins discuss approaches, tests, methods and references that would be appropriate and generally accepted for use at Superfund sites.

II. Tool Users

These documents are widely accepted throughout the Regions as appropriate guidance for Superfund risk assessments; anyone concerned with ecological risk assessments at Superfund sites would be among the intended audience. This may include Remedial Project Managers, Biological Technical Assistance Groups, natural resource trustee agencies and risk assessment contractors.

III. Tool Development

Eco Updates have been produced by OERR's Hazardous Site Evaluation Division with contractor support intermittently since September, 1991. This project was initiated in response to Regional requests for assistance and with their cooperation.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

The material presented in the bulletins is consistent with Agency policy and guidance for conducting ecological risk assessments and would be useful for any number of purposes.

VI. Other Information

The National Contingency Plan (NCP), describing how CERCLA is implemented, requires the Agency to conduct a baseline risk assessment to "characterize the current and potential threats to human health and the environment" (§300.430). As part of this baseline assessment every Superfund site is required to include an ecological risk assessment to "1) identify and characterize the current or potential threats to the environment from a hazardous substance release, 2) evaluate the ecological impacts of alternative remediation strategies, and 3) establish clean-up levels in the selected remedy that will protect those natural resources at risk" (OSWER Directive No. 9285.7-17).

VII. Program Contact

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ENVIRONMENTAL ECONOMICS BULLETIN BOARD/INFORMATION SOURCE

I. Tool Description

This project intends to electronically disseminate information prepared for EPA relating to environmental economic issues (e.g., copies of EPA documents used in environmental economic analyses or policy statements) on the Internet system. Both text and data files are to be made available on the system. The logistics of putting this information together and placing it on the Internet is still in the planning stages. We have held preliminary discussions with the LAN and ESID staff for OPPE.

II. Tool Development

This effort currently is in-development and is expected to cost less than \$10,000 and require 0.1 FTE or less.

This project is not mandated in any specific legislation and was conceived of by staff in OPPE's Economic, Analysis, and Research Branch to provide information in a more efficient manner than we can at this point in time.

III. Tool Use

The intended users will be: OPPE staff, other EPA staff, Federal agency personnel, Congressional staff, State and local agency staff, academic researchers, International environmental management staff, and other interested members of the public.

IV. Special Requirements for Use

Users will need to be able to gain access to the Internet system (I think). There may be additional options or requirements. We may make the information more directly available to EPA personnel through the LAN system on a public access drive. We are still thinking about these options.

V. Program/Media/Geographic Transferability

The database and information in the system should be accessible by any user, within the confines of the media.

VI. Other Information

VII. Contact Persons

Brett Snyder Office of Policy, Planning and Evaluation, Office of Policy Analysis, Economic, Analysis and Research Branch, (202) 260-5610

1993 EXPOSURE MODELS LIBRARY/IMES CD-ROM

I. Tool Description

The Exposure Models Library/IMES is an easy-to-use, menu-driven CD-ROM storage system containing more than 90 fate and transport computer models which can be used for exposure assessments in various media (air, groundwater, surface water, soil). The CD-ROM also contains the Integrated Model Evaluation System (IMES) which is an MS-DOS application designed to assist users in the selection and evaluation of exposure models and to provide model validation and model uncertainty information. IMES provides access to the exposure model directories and can be operated on a network or directly on the CD-ROM diskette.

IMES is comprised of three elements: 1) Selection - a query system for selecting exposure models in various environmental media; 2) Validation - a database containing validation literature citations from actual applications and exposure models; 3) Uncertainty - a database demonstrating application of a model uncertainty protocol for simulations involving 6 surface water models. The model files contain source code, sample input files and other data files, sample output files, and in some cases, model documentation in Wordperfect or ASCII format are contained within subdirectories for each environmental medium. The models were developed primarily by various EPA offices and other federal agencies and are in the public domain. With a few exceptions, the models contained on this disk are not designed to run on the CD-ROM.

II. Tool Users

Intended users of the EML/IMES CD-ROM include all EPA staff (headquarters and regional offices), State and local government officials, academic researchers, non-governmental organizations and foreign governments. Typical users might include toxicologists, on-site-coordinators, and risk assessors.

III. Tool Development

ORD's Office of Health and Environmental Assessment developed the EML/IMES CD-ROM to more effectively distribute exposure models, documentation, and a database (IMES) containing information about many computer models used for exposure assessments than was possible in the past. Previously, EPA's Office of Research and Development produced a microfiche containing a more limited set of the type of information available in the EML/IMES CD-ROM. There is no statutory requirement to develop this system or to distribute exposure modeling information. ORD spends approximately \$80,000 to \$100,000 per year, including the costs of producing the CD-ROM diskette, to develop and revise EML/IMES.

IV. Special Requirements for Use

Hardware requirements: IBM/AT or compatible desktop computer with 10 MB available on harddrive, 540K of free RAM, EGA or better monitor, and a CD-ROM drive. Software requirements: MS-DOS 3.1 or higher, Microsoft CD-ROM extensions 2.0 or higher.

V. Program/Media/Geographic Transferability

The EML/IMES CD-ROM diskette is highly transferable to other EPA programs, media, and geographic areas because it contains a variety of single and multi-media computer models as well as a variety of single and multi-program models.

VI. Other Information

The EML/IMES CD-ROM is available free to all EPA staff and to State and local government officials. This system also is available for use by academic researchers and non-profit organizations for \$5.00. ORD plans to issue a new EML/IMES CD-ROM at least once a year. A new version, containing some ecosystem exposure models, is due in late fall 1994. An ecosystem module will be available in IMES in the 1995 version.

VII. Program Contact

Richard Walentowicz Office of research and Development, Office of Health and Environmental Assessment, Exposure Assessment Group, (202) 260-8922.

GREAT WATERS STUDY

I. Tool Description

The Great Waters Study is an analysis of the contribution of air emissions to total contaminant loadings in the following waterways: the Great Lakes, Lake Champlain, EPA's National Estuaries, and certain priority waters identified by the National Oceanic and Atmospheric Administration (NOAA).

As part of the Great Waters analysis, the EPA was directed by Congress to determine if other tools under CAA Section 112 provide sufficient measures to ameliorate the contribution of air deposited contaminants to America's Great Waters. In addition, the Agency was directed to develop environmental policy recommendations under any applicable statutory or regulatory provisions. The study was completed in 1994 and presented as a Report to Congress.

II. Tool Users

Primary users of information of the Great Waters Report include staff from the Agency's geographic program offices, national estuary program offices, Regional offices, State officials, and officials from NOAA.

III. Tool Development

The Great Waters Study was mandated by the 1990 Amendments to the Clean Air Act, Section 112(m)(5) and (6).

IV. Special Requirements for Use

No special requirements for use.

V. Program/Media/Geographic Transferability

Transferability unknown.

VI. Other Information

None.

VII. Program Contacts

Melissa McCullough Office of Air and Radiation, Office of Air Quality Planning Standards (Research Triangle Park), (919) 541-5646

GUIDE TO SELECTED NATIONAL ENVIRONMENTAL STATISTICS IN THE FEDERAL GOVERNMENT

I. Tool Description

The Guide to Selected National Environmental Statistics in the U.S. Government is a reference directory of sources of national level, time-series environmental or environmentally-related statistics. It covers data related to the state of the environment (e.g. air and water quality, status of natural resources), pressures on the environment (e.g. energy use, mining, transport), and on societal responses to environmental problems (e.g. pollution abatement expenditures, cleanup of toxic wastes), containing a brief description of the statistical program, data coverage, collection methods and frequency, major publications, and telephone contacts. Its purpose is to provide analysts, researchers, policy makers, students and the public with sources of statistics on the environment.

II. Tool Development

This tool is complete and in use, and has been updated as of first quarter, 1994. The Guide was developed as a prototype in collaboration with the World Resources Institute in early, 1990. OPPE enhanced the document and assumed development in 1991, with an OPPE-issued Guide in 1992 (including an electronic version), one in 1993, and a 1994 update. The development effort stemmed from a need expressed by data users and producers, by an EPA Senior-level Task Force on the establishment of a Center for Environmental Statistics, in its February, 1990 report to the Administrator, and from recommendations of the National Advisory Council on Environmental Policy and Technology Subcommittee on Environmental Statistics in its 1992 report to the Administrator.

III. Tool Use

The Guide can be used by analysts, researchers, policy makers, students and the public with sources of statistics on the environment. Many comments on the usefulness of this tool have been submitted. It has been described in government wide newsletters and publications, in the Commerce Department's Products Listing, and in EPA publications. Copies (both hardcopy and electronic) have been made available to the EPA Public Information Center (PIC), the Organization for Economic Cooperation and Development member countries, and all EPA program offices. Major news organizations (e.g. Newsweek, USA Today) have commented on its utility as a pathfinder to EPA statistics and those of other Federal agencies as well. Some commenters would like to see more regional sources. Others have noted a need for special focus statistical guides (e.g. water, air, resource accounting information).

IV. Special Requirements for Use

There is a special instruction sheet for use of the electronic version. There are computer equipment specifications as well (e.g. IBM-compatibility, 640K of memory, etc).

V. Program/Media/Geographic Transferability

Since the Guide represents information from many EPA programs, and other Federal agencies, as well, its use is very broad.

VI. Other Information

VI. Contact Person

James C. Morant Office of Policy, Planning and Evaluation, Office of Strategic Planning and Environmental Data, Environmental Statistics and Information Division, (202) 260-2680

Eleanor Leonard Office of Policy, Planning and Evaluation, Office of Strategic Planning and Environmental Data, Environmental Statistics and Information Division, (202) 260-9753

LAKE MICHIGAN OZONE STUDY (LMOS)

I. Tool Description

This study is designed to analyze the effects of urban area-generated ozone and ozone-precursors on Lake Michigan and surrounding waterways. Data was collected via monitoring stations throughout the Chicago area. A report was issued in the summer of 1994.

II. Tool Users

Tool users include ??(EPA's Region 5 Office, ??the Great Lakes National Program Office, and States)??

III. Tool Development

This was a cooperative effort of Air's Office of Air Quality Planning Standards, which contributed \$50,000, and the Office of Research and Development, which contributed \$200,000 to the University of Michigan's Jerry Keeler to oversee this project.

IV. Special Requirements for Use

No special requirements for use.

V. Program/Media/Geographic Transferability

Transferability unknown.

VI. Other Information

The Office of Research and Development also issued a cooperative agreement with Jill Baker at the University of Maryland to conduct a similar, although limited, analysis of ozone urban area effects in Chesapeake Bay. Three sampling sites, located in rural areas away from major urban centers, were used to collect data which was combined with emissions data from Baltimore. The report for the Chesapeake Bay analysis was issued in the summer of 1994.

VII. Program Contacts

John Ackerman Office of Air and Radiation, Office of Air Quality Planning Standards (Research Triangle Park), (919) 541-5687

METHODS FOR ASSESSING NONPOINT SOURCE CONTAMINATED GROUND WATER DISCHARGE TO SURFACE WATERS

I. Tool Description

This report (EPA 570-0-91-010, April 1991) presents a summary of methods that have been applied to measure or estimate nonpoint source contaminated ground water discharge to surface water. This report is intended to broaden understanding of how contaminated ground water discharge can be a significant source of nonpoint source loading to surface water ecosystems. It provides an overview of these methods, rather than a "how to" manual.

II. Tool Users

This report is meant to be used primarily by States, Tribes and local water managers.

III. Tool Development

This report was developed to increase awareness of the importance of ground water discharging to surface water and if this discharge is contaminated, how it can impact on surface water quality. It is important in any efforts to protect surface water ecosystems, such as rivers and wetlands, as well as account for the ground water component.

IV. Special Requirements for Use

Some technical background in science is necessary to be able to understand the report. A training manual that was developed in conjunction with the report also requires a person to have some technical background in order to follow the instructions.

V. Program/Media/Geographic Transferability

This report should be of wide interest to water resource managers in understanding and protecting surface water ecosystems.

VI. Program Contacts

Chuck Job & John Simons Office of Water, Office of Ground Water and Drinking Water, Ground
Water Protection Division, (202) 260-7077

NATIONAL STUDY OF CHEMICAL RESIDUES IN FISH. Volume I and II
U.S. EPA 823-R-92-008 a and b, September 1992.

I. Tool Description

The purpose of this study was to determine the prevalence of selected bioaccumulative pollutants in fish and to identify correlations with sources of these pollutants. Volume I includes the results of a screening study of chemical residues in fish taken from polluted waters. Volume II contains results of a screening study of chemical residues in fish taken from polluted waters.

II. Tool Users

A broad spectrum of individuals that are involved with developing, issuing, communicating and evaluating information on fish tissue contamination.

III. Tool Development

In 1989, the American Fisheries Society at the request of EPA conducted a survey of State fish and shellfish consumption advisory practices. The survey documented that monitoring and risk assessment procedure used by States in their fish and shellfish advisory programs varied widely. The survey also report on State requested Federal assistance including providing consistent approaches for State agencies to use in assessing health risks from consumption of chemically contaminated fish and shellfish, guidance on sample collection procedure and uniform, cost-effective analytical methods for quantification of contaminants.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

Applicable to other media and a wide range of ecosystems.

VI. Other Information

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Tom Armitage Office of Water, Office of Science and Technology, Standards and Applied
Science Division, (202) 260-5388

PESTICIDE USAGE DATA

I. Tool Description

The Economic Analysis Branch, Biological and Economic Analysis Division, Office of Pesticide Programs, is responsible for serving as the focal point within EPA for collection and access to quantitative data on actual usage of pesticides. A number of information tools are available through the branch.

1. Published reports/data on pesticide usage and suggestions on possible sources to meet particular needs.
(contact Al Aspelin (703) 308-8136 or Rob Esworthy (703) 308-8111).
2. Proprietary reports on pesticide usage reports/data which are not in public domain, but can be used to determine pesticide usage or policy and other purposes within the Agency or without cite or quotation.
(Contact Al Aspelin or Al Goozner, (703) 308-8147)
3. Section 7 CBI data submitted to registrants to EPA on production/distribution of particular pesticides (Contact Edward Brandt, (703) 308-8150)
4. Automated data bases on agricultural pesticide usage for recent years (proprietary).
(Contact Art Grube, (703) 308-8095)
5. EPA surveys of non-agricultural applications of pesticides, including restricted use pesticides as required by 1990 Farm Bill (Contact Al Goozner or Ed Brandt)

II. Tool Users

Economists in BEAD use data on the actual usage of pesticides by chemical, site, method of application, geographic, etc., in conducting analyses of benefits and costs of pesticides as they relate to individual decision and generic rules/policies/ legislation that involves ecosystem impacts.

All of the tools have the same general use, which is to quantify past, current and future usage and trends for purposes of exposure, risk and benefit analyses.

III. Tool Development

BEAD/OPP has a budget of about \$200k per year for proprietary data sources and bases. The Branch work with an number of cooperators and other agencies, especially USDA. In particular, Section 7 data was developed primarily for enforcement purposes and is managed by Enforcement in cooperation with the Regions.

IV. Special Requirements for Use

Most of the data require specialized knowledge of the data and its limitations to insure proper use of it. BEAD assists as resources are available.

There has been a lot of feedback on limitations on usage data bases, and need for improvement, especially small acreage crops and non-agricultural use sites. These limitations are of increasing importance as more sophisticated analyses are being conducted of pesticide issues and programs are being developed to reduce use/risk. There have been legislative proposals in this area by EPA, outside parties and on the Hill.

Better, more comprehensive data are needed which have better statistical validity for various purposes. More data need to be assembled for release in the public domain, collected by efficient modern market research techniques rather than traditional one-shot surveys.

V. Program/Media/Geographic Transferability

Usage data are adaptable to other media/programs, given the limitations of the sources.

VI. Other Information

Other programs should help support usage data development if they are expected to be regular users, depending on such information for program purposes.

VII. Program Contacts

Arnold L. Aspelin, Economist

Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, Biological and Economic Analysis Division, (703) 308-8136

Rob Esworthy, Branch Chief

Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, Biological and Economic Analysis Division, (703) 308-8111

A PHASE I INVENTORY OF CURRENT EPA EFFORTS TO PROTECT ECOSYSTEMS

I. Tool Description

This Inventory is a 357-page project reference directory. It includes summaries of projects that involve EPA and its partners in the beginnings of place-based management and ecosystem protection -- an approach intended to integrate environmental management with human needs, consider long-term ecosystem health, and highlight the positive correlations between economic prosperity and environmental well-being. The purpose of this document is to let readers throughout EPA and outside the Agency know of the increasing amount and variety of ecologically oriented activities in which EPA is participating and the many places at which these activities are occurring.

The Inventory was prepared under the direction of EPA's Ecosystem Protection Task Force. Part One summarizes EPA's largest ecologically oriented projects; these are large-scale initiatives that cover areas of at least 100,000 square kilometers. Part Two, which constitutes most of the report, is organized by EPA Region and includes summaries of ongoing, place-based projects at the local scale (less than 100,000 square kilometers). Part Three describes multi-site projects and programs, in which generally the same ecosystem-oriented activity is carried out at a number of places distributed throughout the Region or nation. A color national map of all the ecosystem projects has been developed in GIS; a simplified black-and-white version of this map appears in the report.

II. Tool Users

Virtually all EPA staff, other state and federal environmental agency employees, the scientific community, and interested citizens may have different uses for this reference.

III. Tool Development

The Inventory covers ongoing projects and was compiled from submittals by Regions, Headquarters Program Offices, and EPA Laboratories. Except for minor editorial changes, the summaries appear exactly as submitted. About half of these project summaries were submitted originally to the *Watershed Protection Approach 1993/94 Activity Report*, and the others were submitted in response to Task Force requests issued Agency-wide. The submittal process was voluntary and as a result the Inventory is not comprehensive.

Focusing on ecosystems and place-based management is new to EPA. Although many projects with an ecosystem component have been initiated, few of them involve comprehensive ecosystem assessment or management at this early stage. Thus, in developing this Inventory, the Agency's Ecosystem Protection Task Force decided to be more inclusive than exclusive of projects that are just beginning to apply the principles of a place-based, ecosystem protection approach. Their guidelines for project suitability included current place-based activity, some form of ecosystem protection, some EPA role, ecological goals or assessments, and stakeholder involvement. Although meeting or planning to meet the listing guidelines was important, it was considered equally important to encourage and involve parties throughout the Agency who have nominated sites and have shown an interest in supporting the ecosystem approach.

IV. Special Requirements for Use

None. The report uses common language to describe projects in brief summaries. An electronic version can be accessed through EPA's All-In-One Email system, in the Videotex (VTX) utility. To obtain printed report copies, contact: National Center for Environmental Publications and Information (NCEPI)

Phone: (513) 489-8190; Fax: (513) 891-6685

This report should be cited as:

U.S. Environmental Protection Agency. 1995. A Phase I Inventory of Current EPA Efforts to Protect Ecosystems. EPA841-S-95-001. Office of Water (4503F), United States Environmental Protection Agency, Washington, DC.

V. Program/Media/Geographic Transferability

The projects covered are Agency-wide and include examples of all regions, offices and media.

VI. Other Information

An interactive, electronic format for the Inventory may be developed as EPA moves toward widespread, regular use of its information systems.

VII. Program Contact

Doug Norton Office of Water, Office of Wetlands, Oceans and Watersheds, Assessment and Watershed Protection Division, (202) 260-7017

**RATES, CONSTANTS, AND KINETICS FORMULATIONS IN SURFACE WATER
QUALITY MODELING (Second Edition), U.S. EPA 600/3-85/040,
June 1985.**

I. Tool Description

This manual serves as a reference on modeling formulations, constants and rates commonly used in surface water quality simulations. This manual also provides a range of coefficient values that can be used to perform sensitivity analyses.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases assisted in their testing.

III. Tool Development

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof. The documents listed support the managerial and technical components of the TMDL process. The guidance focused first on conventional pollutants, then toxics and now nonpoint sources and other wet weather discharges.

The guidance documents provide the transport and fate models needed to develop and apply TMDLs when excessive biochemical oxygen demand, low dissolved oxygen, excessive nutrient, eutrophication, toxic pollutant concentrations preclude attainment of water quality standards in rivers, streams, lakes and estuaries, under both wet weather and steady state conditions. The guidance also includes documents are decision matrices that assist in problem formulation, model development, implementation and assessment, as well as approaches for allocating loads among point and nonpoint sources, including atmospheric deposition. Techniques and case examples are provided whether using "desk top" calculations, steady state or dynamic models. New tools are examined, such as rapid bioassessments, and new information provided to up-date existing tools such as water quality reaction rate coefficients for QUAL2E and WASP.

IV. Special Requirements for Use

None. Readability depends on the topics covered.

V. Program/Media/Geographic Transferability

Designed for the water media. Applicable for a wide range of ecosystems.

VI. Other Information

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, nonpoint sources and background loadings (from non-controlled sources such as atmospheric deposition and sediment). The TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality

standards. The TMDLs maximize real environmental gains and minimize the need for unnecessary regulation..

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C. at no cost.

VII. Program Contacts

Russell Kinerson Office of Water, Office of Science and Technology, Standards and Applied
Science Division, (202) 260-1330

SEVENTEEN PEER-REVIEWED ECOLOGICAL RISK CASE STUDIES

I. Tool Description

This tool includes two Forum-developed reports: Review of Ecological Assessment Case Studies from a Risk Assessment Perspective (EPA/630/R-92/005) and Review of Ecological Assessment Case Studies from a Risk Assessment Perspective Volume II (EPA/630/R-94/003). These reports includes a total of 17 peer-reviewed case studies that explore the relationship between the ecological risk assessment process as described in the EPA report Framework for Ecological Risk Assessment (Framework Report; EPA 630/R-92/001) and several types of ecological assessments done by EPA and others.

II. Tool Users

The case studies are intended for use by EPA risk assessors. While these cases are representative of the state of the practice in ecological assessments, they should not be regarded as models to be followed. Rather they should be used to attain a better understanding of ecological risk assessments practices and principles. These case studies will be used as source materials for future Agency-wide guidelines for ecological risk assessment.

III. Tool Development

The case study reports were developed and peer-reviewed between 1991 and 1993 to provide illustrations of state-of-the-practice ecological assessments and evaluate their relationship to the process of ecological risk assessment.

IV. Special Requirements for Use

These reports are intended for those who have some training and familiarity with ecological risk assessment.

V. Program/Media/Geographic Transferability

The reports address a wide range of EPA programs, media, and geographic areas.

VI. Other Information

The Risk Assessment Forum (Forum) is composed of senior scientists from around the Agency and was established to prorate Agency-wide consensus on scientific issues related to risk assessment. Both ecological and human health risk issues are considered by Forum technical panels.

VII. Program Contacts

Bill Van Der Schalie Office of Research and Development, Risk Assessment Forum, (202) 260-4191

REVIEW OF NATIONAL LISTS OF PRIORITY NATURAL RESOURCES

I. Tool Description

The Review of National Lists of Priority Natural Resources is a compendium of 25 lists of existing priority ecological resources, presented in a tabular form. This reference can assist readers in identifying important ecological sites for targeting special protection. A suggested subset of sites for EPA use in targeting protection is also included. In addition to identifying existing priority ecological resources, this document briefly describes the reasons for listing each resource and identifies the "list" (database) contact managers.

II. Tool Development

The project was completed in 1991 through 1992 by a contractor. The project's EPA manager developed this reference to prevent EPA HQ and Regions from "re-inventing" lists of priority resources which were already available and agreed upon by ecological experts nationwide. This reference also was developed to meet an agency need to comply with the ESA and to support ecological objectives within OPPE and EPA (e.g., Habitat Cluster).

III. Tool Use

This document is complete and has received much positive feedback from its readers. It was "sold-out" soon after its completion and is still being requested. The project manager has distributed 50 completed copies and 150 summaries to a variety of readers including: EPA HQ and Regional Offices; State officials; and private users. This is a ready reference which has seen successful use in many applications both within EPA and at State and private levels.

IV. Special Requirements for Use

None

V. Program/Media/Geographic Transferability

This document identifies nationally significant ecological sites and is transferable to any geographic area in the United States. To be more useful to Regional Offices and State and local governments, a step-down version of the reference is proposed to identify more locally-significant sites, in addition to national ones.

VI. Other Information

VII. Contact Person

Molly Whitworth Office of Policy, Planning and Evaluation, Office of Policy Analysis, Water Policy Branch, (202) 260-7561

STORET/BIOS/ODES/WQAS TOOLS INVENTORY

I. Tool Description

This document presents an inventory of tools with which the STORET/BIOS/ODES/WQAS user communities manipulate data. All the systems, databases and tools discussed in the report reside on an IBM ES 9000 mainframe computer at EPA's National Computing Center in North Carolina. The scope of the report includes the systems, databases and tools that can be accessed through the EPA mainframe.

Input for the report was obtained from two sources: 1) institutional knowledge of the original user assistance team; 2) limited surveying and interviews with key users and managers. For each tool in the survey, the following characteristics were determined: tool capabilities; tool uses; tool use activity and user types; and tool links to other systems and databases.

The report contains five chapters: 1) Introduction; 2) **STOrage and RETrieval (STORET) System**; 3) **BIOflogical System (BIOS)**; 4) **Ocean Data Evaluation System (ODES)**; 5) **Water Quality Analysis System (WQAS)**. Three appendices present comprehensive use information for the STORET, BIOS, and WQAS systems.

II. Tool Users

Any user of the systems described.

III. Tool Development

The inventory was developed to support a seven-year effort begun in 1990 by the Assessment and Watershed Protection Division of the EPA to update and modernize critical computer systems which support programs of the Office of Water. The inventory was developed by a contractor and submitted to AWPDP.

IV. Special Requirements for Use

The inventory is available in hardcopy form.

V. Program/Media/Geographic Transferability

The systems, databases and tools described in the inventory can be of use to any ecosystem manager who is looking to obtain water quality information.

VI. Other Information

VII. Program Contacts

Louis Hoelman Office of Water, Office of Wetlands, Oceans and Watersheds, Assessment and Watershed Protection Division, (202) 260-7050

WILDLIFE EXPOSURES FACTORS HANDBOOK

I. Tool Description

The Wildlife Exposure Factors Handbook is a compendium of data and references for conducting exposure and risk assessments for wildlife species (e.g., selected groups of mammals, birds, amphibians, and reptiles) exposed to toxic chemicals in their environment. The purpose of the Handbook is to provide a convenient source of information and an analytic framework to facilitate screening-level risk assessments for common wildlife species.

II. Tool Users

This handbook can be used by any risk assessor in the preparation of risk assessments.

III. Tool Development

The Handbook was under development for 5 years at a cost of \$250,000 in contractor funds and .33 FTE per year. The Handbook was published in December 1993 and made available for distribution on March 1994 (EPA/600/SR-93-187).

IV. Special Requirements for Use

Knowledge of ecological risk assessment.

V. Program/Media/Geographic Transferability

These screening-level risk assessments may be used to support site-specific decisions (e.g., for hazardous waste sites), to support the development of water quality or other media-specific criteria for limiting environmental levels of toxic substances to protect wildlife species, or to focus research and monitoring efforts.

VI. Other Information

VII. Program Contacts

Sue Norton Office of Research and Development, Office of Health and Environmental Assessment,
Exposure Assessment Group, (202) 260-6955

HEADQUARTERS ECOSYSTEM TOOL INVENTORY

TRAINING TOOLS

INTERNATIONAL CONFERENCE ON GROUND WATER ECOLOGY

I. Tool Description

The Office of Water's Ground Water Protection Division co-sponsored the First International Conference on Ground Water Ecology in Tampa, Florida on April 26-29, 1992. A Second International Conference, sponsored by EPA and the American Water Resources Association, was convened from March 27-30, 1994, in Atlanta, Georgia.

The primary purpose of the conferences was to have ground water ecologists from around the world provide insight into the current state of knowledge of ground water ecology and how this knowledge can be used to form the scientific basis of our policies to protect ground water ecosystems.

II. Tool Users

Anyone interested in ground water ecology.

III. Tool Development

To begin building a framework to respond to the mandate of the Ground Water Strategy, EPA's Ground Water Protection Division co-sponsored these two conferences. The cost of each conference was approximately \$50,000, and the cost of publishing the proceedings from the 1992 conference was \$20,000. The cost of attending the conferences was around \$200. The 1994 conference in Atlanta was attended by approximately 200 people.

IV. Special Requirements for Use

No special requirements required for use.

V. Program/Media/Geographic Transferability

Conferences should be attended by anyone interested in ground water ecology.

VI. Other Information

Proceedings from the 1992 Conference (containing 38 papers in the following groups: i) synthesis of ground water ecology; ii) plenary papers; iii) microbial ecology in ground waters; iv) ground water food webs; v) organisms and processes; vi) ground and surface water interactions; vii) pollution effects, biomonitoring, and toxicity studies; viii) case studies; ix) unique ground water ecosystems; and, x) conference conclusions and recommendations for research and management) are available from the American Water Resources Association.

VII. Program Contacts

John Simons Office of Water, Office of Ground Water and Drinking Water, Ground Water Protection Division, (202) 260-7091

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1994. The next workshop will
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TRAINING COURSE ON THE STATEWIDE BASIN MANAGEMENT APPROACH

I. Tool Description

The Training course on the Statewide Basin Management Approach is intended for staff and management who are interested in evaluating application of a BMA in their State or Region. The training emphasizes key elements of a framework for integrating a broad range of water resource protection programs into a comprehensive, Statewide, geographically-based approach. Also, participants in the course review typical impacts of a BMA on program functions and staff operations and are asked to identify and explore potential impacts on their programs and responsibilities.

The course format will consist of a combination of presentations, interaction among participants, role playing, and extrapolation of concepts to the participants' home State or Region.

II. Tool Users

EPA Regions and States.

III. Tool Development

The Permits Division of OWM and the Assessment and Watershed Protection Division of OWOW are jointly developing the two day training course on the Statewide Basin Management Approach (BMA). The BMA is a leading form of the Watershed Protection Approach that has emerged among the States. The training course supports the objective of comprehensive water resources planning and management as stated in the Assistant Administrator for Water's October 7, 1994 memorandum on the watershed approach. The course will be offered to EPA Regions and their States in early 1995.

IV. Special Requirements for Use

None.

V. Program/Media/Geographic Transferability

The course is designed to apply to all geographic areas.

VI. Other Information

VII. Program Contacts

Greg Currey Office of Water, Office of Wastewater Management, Permits Division, (202) 260-1718

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TRAINING FOR PERFORMING REGULATORY IMPACT ANALYSES

I. Tool Description

This course will be designed so that EPA program office staff can be trained to prepare environmental regulatory impact analyses (RIAs). It probably will be comprised of a one or two day workshop, with invited speakers making presentations on the various subject matter included in an RIA. There will be a strong effort to ensure that the focus of the course is practical-minded and directly-applicable to producing an RIA. An RIA primarily consists of benefit-cost information, but it can also include impact analyses, flexibility analyses (e.g., small business and government impacts), environmental justice, and other distributional concerns.

II. Tool Development

There is no training module available, although some materials do exist from some similar, previous efforts conducted on behalf of OSWER and OW. Existing RIA training material was developed by in-house staff and contractors as part of an experimental pilot project. EPA may elect to partner this course with other federal agencies having similar needs and their own courses (e.g., U.S. Fish and Wildlife Service, and NOAA). Also, Region X has conducted workshops on economic analysis and may collaborate with OPPE to develop this course.

Although this course is not mandated by any specific legislation or executive order, Executive Order 12866 requires major regulatory actions to undergo a cost-benefit analysis, including consideration of distributional and other concerns. Also, some federal environmental statutes call for cost-benefit information to be included in the decision-making process.

III. Tool Use

The intended users will be: EPA staff, other Federal agency personnel, and Congressional staff. Personnel in OPPE's Economic, Analysis and Research Branch have been contacted by State environmental management officials having a similar interest in producing RIAs for their own regulatory actions, so the course also will be given to State and local agency staff.

IV. Special Requirements for Use

No special equipment is envisioned. It would be better if the persons being trained had some knowledge of economic theory and environmental economic background. Absent that, there may need to be a preparatory course offered prior to getting into more details on the RIA process.

V. Program/Media/Geographic Transferability

The materials should be relevant to all areas of the country and useful to many different persons and organizations. Geography and local conditions may make some problems of more immediate interest of applicability. The course could be designed to account for those particular interests. There will be a stand-alone guidance document on the RIA process. It won't substitute for the course, but may provide some insight into the methods and issues that arise in benefit-cost analysis and the other analytical issues raised in the RIA guidelines.

VI. Other Information

VII. Contact Person

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TRAINING IN TMDL DEVELOPMENT AND APPLICABLE MODELS

I. Tool Description

The TMDL process is the back bone of the watershed/ecosystem approach to environmental management by providing the basis on which to allocate pollutant loads among point sources, non-point sources and background loadings from non-controlled sources such as atmospheric deposition and sediment. TMDLs, particularly when linked with geographic information systems, enable resource managers to examine the cumulative effects of pollutant loadings in a watershed and to evaluate the effect of different strategies (e.g., pollutant reductions, land management, or restoration actions, etc.) on the functioning of the aquatic ecosystem and the attainment of aquatic ecosystem goals -- water quality standards. This, in turn, maximizes real environmental gains and minimizes the need for unnecessary regulation. Workshops provide program support and technical guidance for States and EPA Regions to use in the development of TMDLs. Formal training courses are also provided in the use of SWMM, QUAL2E, CORMIX, AND PLUMES.

II. Tool Users

Managerial and technical Federal, State, local and Tribal personnel use the tools and in some cases, assisted in their testing.

III. Tool Development

Modeling is a key component in the TMDL process. As new models come on-line, training in the use of the models is a critical component in enhancing their applicability to the TMDL process. Specialized training costs approximately \$1,000 per student.

Section 303(d) of the Clean Water Act requires States to identify waters where the technology-based controls are insufficient to meet water quality standards, to establish priorities for these waters based on the severity of the pollution and the uses to be made of the water, and to develop the total maximum daily load of pollutants which, if not exceeded, would allow the water to attain the standard adopted by the State for the particular waterbody or segment thereof.

IV. Special Requirements for Use

None

V. Program/Media/Geographic Transferability

Not applicable.

VI. Other Information

Training is free.

VII. Program Contact

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Science Division, (202) 260-1330

**WATER QUALITY STANDARDS ACADEMY/
REGIONAL WATER QUALITY STANDARDS WORKSHOPS**

I. Tool Description

These training offerings include:

- o a formal, 5-day training course developed by EPA in 1992 describing the fundamental regulatory requirements, policies, and interpretative guidance supporting the national water quality criteria and standards program. It is designed to provide information on the fundamentals of the program to anyone with 6 months program experience or less;
- o a series of multi-regional/State workshops established by EPA in 1985 to provide a forum for discussion of current operational issues in implementing various aspects of the water quality criteria and standards program.

II. Tool Users

Federal, State, municipal industrial, environmental and Tribal entities.

III. Tool Development

Section 303(c) of the Clean Water Act require States and Tribes to adopt water quality standards to protect public health and welfare, to enhance water quality, and to serve the purposes of the Act by providing for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water, whenever these goals are attainable.

IV. Special Requirements for Use

None

V. Program/Media/Geographic Transferability

The standards are designed for the water media, but are applicable to a wide range of ecosystems.

VI. Other Information

Water quality standards are the foundation central core of the ecosystem/watershed approach as they define the human health and ecological goals for the aquatic ecosystem and provide the mechanism for meeting the objective of the Clean Water Act -- to restore the chemical physical and biological integrity of the Nation's waters.

All guidance documents are available from the Water Resource Center (4104), U.S. EPA, 401 M Street SW, Washington, D. C.

VII. Program Contacts

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APPENDIX A:

**EPA HEADQUARTERS ECOSYSTEM TOOL INVENTORY
SURVEY FORM/INTERVIEW GUIDE**

APPENDIX A:

EPA HEADQUARTERS ECOSYSTEM TOOL INVENTORY SURVEY FORM/INTERVIEW GUIDE

For the purposes of this survey/interview, an ecosystem management "tool/activity" can be defined as a solitary or linked action, mechanism, or capability that directly supports/facilitates the protection of living and non-living resources, integrating air, water, land protection. Each "tool" may be expressly designed for use in ecosystem management or -- having been designed for single-media or program use - is being applied towards ecosystem management.

I. Background

1. Please provide your name, office, position, phone number and a brief description of the work conducted by your office & the manner in which is involved in ecosystem management.

II. Tool Description

2. Please provide the tool name, a brief description, and the name of a contact person.
 - What is each tool's intended & actual purpose?
 - What is each tool's status (e.g., complete and in-use; in-development; no longer in-use)?

III. Tool Development

3. When was each tool developed & what prompted its development (e.g., statutory mandate)?
4. Who developed each tool (e.g., developed in-house, by a contractor, by an outside party, in partnership with Federal, state, local entities...)?
5. If available or applicable, how many FTE/dollars were used to develop and use each tool?

IV. Tool Use

6. Who are the intended and actual users of each tool?
 - How is each tool used?
 - How long has it been used?
7. Have you received any feedback (formal or otherwise) from users regarding the utility of each tool? Please describe.
8. Are there any unmet needs which would enhance/improve this tool? Please describe.

V. Special Requirements for Use

9. Are there any special requirements (e.g., training, equipment, costs) for using each tool?

VI. Program/Media/Geographic Transferability

10. Can each tool be used by other EPA programs, media, or geographic areas in addition to the program, media, or area for which it was developed? Please describe.

VII. Other Information

11. Is there any other information about each ecosystem tool you would like to mention?
12. Do you have any suggestions regarding what EPA or OPPE should do to facilitate ecosystem management in your program? overall?

APPENDIX B:

**EPA HEADQUARTERS ECOSYSTEM TOOL INVENTORY
INDEX**

APPENDIX B:

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