Table of Contents
SAB Science Integration for Decision Making Fact Finding Interviews
EPA Region 3
January 19, 2010

Schedule for January 19, 2010 Visit by Members of the SAB Committee on Science Integration for Decision Making to EPA Mid Atlantic Region

Place: Brandywine Room
Call in number: 866-299-3188
Conference Code: 2158142627

9:00 a.m. **Interview with EPA Region 3 Senior Managers**

EPA participants will include senior managers from Region 3's Water Protection Division, Air Protection Division, Environmental Assessment & Innovation Division, Land & Chemical Division, Hazardous Site Cleanup Division, and the Office of Enforcement, Compliance and Environmental Justice. These managers have responsibilities for those regional programs which are most involved in science-based decision making, including the region's air quality, drinking and surface water, coastal, energy/climate change, enforcement, quality assurance, laboratory, monitoring, and site cleanups programs.

10:30 **Interview withRegional Scientists**

EPA participants will primarily include members of the Regional Science Council (RSC). The Council is composed of scientists, engineers and technical specialists representing a variety of scientific disciplines, who work to strengthen the application of science. The Council serves as a resource to regional scientists and engineers by developing training, encouraging collaboration, and sharing information on the latest scientific developments.

2:30 **Interview with Regional Administrator and Deputy Regional Administrator**

EPA participants will include Shawn Garvin, the Regional Administrator, and Bill Early, the Deputy Regional Administrator.

Logistics

The interviews will take place in US EPA Region III's Building, at 17th & Arch Street.(1650 Arch St. - tall greenish glass with a white metal structure). SAB members will arrive at 8:30 and go through security.

SAB Science Integration for Decision Making Fact-Finding Interview
Meeting with Region 3 Senior Managers
1650 Arch Street
Philadelphia, PA 19103-2029
Brandywine Room
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Draft Agenda

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1. Introductions facilitated by the SAB Staff Office
2. Discussion facilitated by SAB Members
   - Practices for integrating science to support decision making
   - Consideration of public, stakeholder, external scientific, and other input in science assessment
   - Drivers and impediments to implementing past recommendations for science integration
   - Ways program receives feedback on how science is used in decision-making
   - Workforce to support science integration for decision making
3. Identification of any follow-up actions

Planned participants

EPA Region 3

Ms. Kathy Hodgkiss, Acting Director, Hazardous Site Cleanup Division
Mr. David Arnold, Director, Air Protection Division,
Mr. John "Randy" Pomponio, Director Environmental Assessment & Innovation Division
Mr. Abe Ferdas ,Director, Land and Chemicals Division
Mr. Jon Capacasa, Director, Water Protection Division
Ms. Samantha Phillips Beer, Director, Office of Enforcement, Compliance and Environmental Justice.
Ms. Cythia Metzger, Associate Director, Ft Meade Lab (participating in the Senior Management meeting

SAB Committee on Science Integration Committee Members

Dr. Thomas Burke, Johns Hopkins School of Public Health
Dr. Taylor Eighmy, Texas Tech University
Dr. Deborah Cory-Slechta, University of Rochester (by telephone)
Dr. Thomas Theis, University of Illinois at Chicago (by telephone)

SAB Staff Office

Dr. Anthony Maciorowski, Deputy Director
Dr. Angela Nugent, Designated Federal Officer

Biosketches for Region 3 Senior Managers

Biosketches

Shawn Garvin, Regional Administrator

Shawn M. Garvin has worked for EPA Region 3 for more than 10 years and currently serves as EPA Region 3's Senior State and Congressional Liaison. In that position he serves as the primary contact to Congressional delegations and state and local officials throughout the region. He joined EPA in 1997, serving as Special Assistant to the Regional Administrator. Prior to that, Garvin worked for then-Senator Joe Biden and County Executive Dennis Greenhouse. Garvin earned a bachelor's degree from the University of Delaware.

William C. Early, Deputy Regional Administrator

Bill Early was designated as Deputy Regional Administrator in September 2009. Prior to being selected as Regional Counsel in October 1999, Bill was hired as a staff attorney in November 1978 and has held various positions since that time, including Section Chief, Branch Chief, and Deputy Regional Counsel. Bill has received several Bronze Medals for his efforts in support of the Regional RCRA enforcement program. A member of the Pennsylvania Bar, he was the Chair of the Title VI Task Force which was responsible for developing a framework for investigating and deciding whether recipients of federal assistance had discriminated on the basis of race, color or national origin. Bill also served as Acting Deputy Regional Administrator for seven months during 2001 and again for four months in 2006.

David Arnold, Acting Director

Jon M. Capacasa, Director

Jon Capacasa, a registered professional engineer, became Director of the Water Protection Division in June 2003 after serving as Acting Director and Deputy Director since 1999. In this capacity he serves as the director of Clean Water Act and Safe Drinking Water programs for the five Mid-Atlantic States and the District of Columbia and administers 80% of the regions funding through grants from several programs. He works to integrate over 15 water programs with a focus on measurable environmental results, innovative partnerships and sustainable solutions and presently serves as the Lead Regional Director for input to the national water programs.Jon previously served for nine years as the Deputy Director and Acting Director of the Chesapeake Bay Program Office and assisted in the formation of the new Bay Office. He initiated the process for the drafting and adoption of the landmark Chesapeake 2000 Agreement in June 2000. He also led notable efforts to enhance the Chesapeake Bay Program through the issuance of a 7-state Nutrient Permitting Approach, creation of the Environmental Indicators Network, local government action agendas, launched the small watershed grants program, served as the agency lead for the restoration of the Anacostia and Schuylkill Rivers, promoted Low Impact Development approaches to urban and suburban development, and is leading efforts to develop a watershed wide nutrient TMDL.

Kathy Hodgkiss, Acting Director

Kathy was designated Acting Director for the Division upon the retirement of Division Director in June 2009. She has been the Deputy Director of the Hazardous Site Cleanup Division since the summer of 1997. She joined Region 3 in 1977 as an Environmental Scientist in the Water Enforcement program. Since then she has held numerous positions including Remedial Project Manager, Enforcement Section Chief, Superfund Program Lead Region Coordinator and Branch Chief in the Superfund Program; Deputy Branch Chief in the RCRA Program; Executive Assistant to the Regional Administrator; Acting Deputy Assistant Regional Administrator and Acting Director of the Environmental Services Division. In 1987, she was detailed to EPA Headquarters, serving as an assistant to the Associate Administrator for Regional Operations. Ms. Hodgkiss has been a guest lecturer at universities and EPA sponsored training courses, including several international projects in Central Europe and Taiwan. Prior to beginning her career with EPA, Ms. Hodgkiss worked for an environmental consulting firm and as a volunteer doing environmental work for a local county health department.

Abraham Ferdas, Director

Abe Ferdas is the Director of the Land and Chemicals Division. Previously he served as Director of the Hazardous Site Cleanup Division and Director of the Superfund Office for 14 years. He began his formal environmental career at EPA in 1971 in the Air Management Division as an air planning engineer. From 1973 to 1982, he participated in the enforcement of air regulations as a project engineer in steel industry cases, senior power plant engineer, and Chief of the Air Enforcement Section. In 1982, Abe began an assignment with the Hazardous Waste Management Division, first in the Enforcement Branch, as Deputy Chief, and later as the Chief of the Superfund Remedial Branch. Abe has been a guest lecturer at universities and EPA training courses and has been a participant in numerous public meetings, press briefings and court cases. He is a member of the American Institute of Chemical Engineers.

John “Randy” Pomponio, Director

John “Randy” Pomponio is the Director of the Environmental Assessment and Innovation Division (EAID(. During his 35 years with EPA, Randy has managed the Environmental Services Division, the Waste and Chemicals Management Division, served as the national expert on wetland matters, and has been instrumental in the development of collaborative, geographically-based programs. Randy spent four years as Program Director with the Canaan Valley Institute, a regional NGOdedicated to watershed management and sustainability. Randy’s main interests are connecting science to managing for environmental results, ecosystem protection and restoration, and innovative, collaborative approaches to human health and environmental protection challenges.

Jeffrey Lape, Director

Director Jeff Lape became Director of the Chesapeake Bay Program in April 2007. Jeff has over 30 years of environmental program experience including water resources, watershed management and water pollution control, spanning several levels of government and in the

private sector. During 18 years with the U.S. EPA, Jeff led development and implementation of national policies and programs dealing with point and nonpoint sources of pollution. He spearheaded EPA's efforts with municipal and industrial wastewater management, combined sewer overflows, animal feeding operations, and watershed-based permitting. Jeff also served in a variety of senior leadership positions in EPA's Office of Water, Office of the Chief Financial Officer, Office of Solid Waste and Emergency Response and the Office of General Counsel. Jeff has extensive water program experience in state and local government, including with the New York State Department of Environmental Conservation and the Washington Suburban Sanitary Commission. Jeff also spent nearly ten years in the private sector serving a variety of clients on watershed management and water resource issues. Jeff earned an Associates Degree in Public Health Technology from the State University of New York at Morrisville, Bachelor's Degree in Environmental Science from State University of New York at Plattsburgh and a Master's degree in Environmental Science and Engineering from Virginia Polytechnic Institute and State University.

James W. Newsom, Assistant Regional Administrator for Policy and Management

Jim Newsom began his EPA career in 1971 and was appointed Assistant Regional Administrator (ARA) for Policy and Management in November 2000. Prior to this assignment, he served as Deputy ARA for nine years. As ARA, Jim is Region 3's senior executive responsible for administrative and infrastructure management. In this capacity, he serves as the Senior Resources Officer and Senior Information Officer.

Starting his career at EPA in water programs, Jim worked as a project engineer for large wastewater treatment construction projects. He later managed the regional water quality planning program followed by managerial assignments that included responsibilities for environmental monitoring and assessment, risk management, facilities compliance inspections, air enforcement, laboratory operations, and intergovernmental and media relations. Jim received a Bachelor of Science in Chemical Engineer from the University of Kentucky in 1971 where he also worked for the Kentucky Water Resources Institute.

Jim serves on a number of EPA boards and councils, including the Performance Review Board, Working Capital Fund Board, Grants Management Council, Quality Information Council, and the National Partnerships Council with EPA unions.

Catherine Libertz, Director

Cathy Libertz began her career at EPA in 1988. In her current position as Director of the Office of State and Congressional Relations (OSCR), Cathy oversees the staff responsible for ensuring productive relationships with Federal, state and local elected officials, environmental agencies, organized groups and concerned citizens. Prior to this position, Cathy served as the Special Assistant to the Deputy Regional Administrator, and acted as the Deputy Director of the Office of Environmental Assessment and Management within the Environmental Services Division. In addition to other positions within the region, Cathy has worked on various assignments with local governmental agencies. These included assignments with the Broward County Florida Department of Natural Resource Protection, the Philadelphia Mayor's Environmental Cabinet

and the Delaware River Basin Commission. Cathy holds a Bachelor of Arts in Communications, a Masters of Public Administration, and is a graduate of the USDA Graduate School Executive Leadership Program and Duke University's Integrated Marine Conservation Program.

Marcia Mulkey, Regional Counsel

After 11 years and several key national leadership positions for the U. S. Environmental Protection Agency, Marcia E. Mulkey is returning to the position of Regional Counsel for the Region III EPA office. This position, which she held from 1988 to 1998, involves responsibilities for legal counsel and representation for the implementation of all of the EPA statutes and programs throughout the five state (and D. C.) region and management of the 85-lawyer office located in Philadelphia. Marcia, who holds a degree from Harvard Law School and bar membership in the District of Columbia, began her EPA career in the Office of General Counsel, and has, through the years, served in senior positions in that office as well as serving as the Director of the headquarters Office of Pesticides Programs, Office of Site Remediation Enforcement, and National Enforcement Training Institute. During the recent transition of administrations, she was Acting Associate Administrator for Policy, Economics and Innovation and she has also served special assignments with the United Nations Food and Agriculture Organization, the government of the Netherlands, and Temple Law School. She has twice been recognized with Presidential Rank Awards.

Samantha Beers, Director

Samantha Phillips Beers is Director of the Office of Enforcement, Compliance and Environmental Justice (OECEJ). She is the central point of contact for states and EPA headquarters on enforcement, compliance and environmental justice issues. Ms. Beers worked for the EPA since January 1991. Prior to her current position, she was a Senior Attorney in the Office of Regional Counsel. Her practice in Regional Counsel focused on Resource Conservation and Recovery Act and Superfund hazardous waste issues. She was also the Office of Regional Counsel's environmental justice legal advisor and provided legal advice on environmental justice issues to the region. Before coming to EPA, Ms. Beers worked for the California Department of Fair Employment and Housing Department, where she litigated employment and housing.

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Planned participants

EPA Region 3

Dr. Stuart Kerzner, Acting Regional Science Liason
Dr. Debra Forman – Water Protection Division
Mr. Charles App , Environmental Assessment & Innovation Division
Dr. Matt Nicholson, Environmental Assessment & Innovation Division
Mr. Joel Hennessy, Land & Chemical Division
Mr. William Browne, Air Protection Division
Ms. Kathy Davies, Hazardous Site Cleanup Division
Mr. John Butler, Land & Chemical Division
Mr. Bill Hagel, Hazardous Site Cleanup Division
Mr. Frank Borsuk, Environmental Assessment & Innovation Division
Mr. Richard Killian, Air Protection Division
Ms. Regina Poeske, Environmental Assessment & Innovation Division
Dr. Erin C Sullivan, Office of Policy & Management
Dr. David Kargbo, Environmental Assessment & Innovation Division
Mr. Joe Slayton, Environmental Assessment & Innovation Division
Dr. Cynthia Stahl, Environmental Assessment & Innovation Division

SAB Committee on Science Integration Committee Members

Dr. Thomas Burke, Johns Hopkins School of Public Health
Dr. Taylor Eighmy, Texas Tech University
Dr. Deborah Cory-Slechta, University of Rochester (by telephone)
Dr. Thomas Theis, University of Illinois at Chicago (by telephone)

SAB Staff Office

Dr. Anthony Maciorowski, Deputy Director
Dr. Angela Nugent, Designated Federal Officer

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Overview of Region 3

About Region 3

EPA's Mid-Atlantic Regional Office is responsible for programs in Delaware, Maryland, Pennsylvania, Virginia, West Virginia and the District of Columbia.

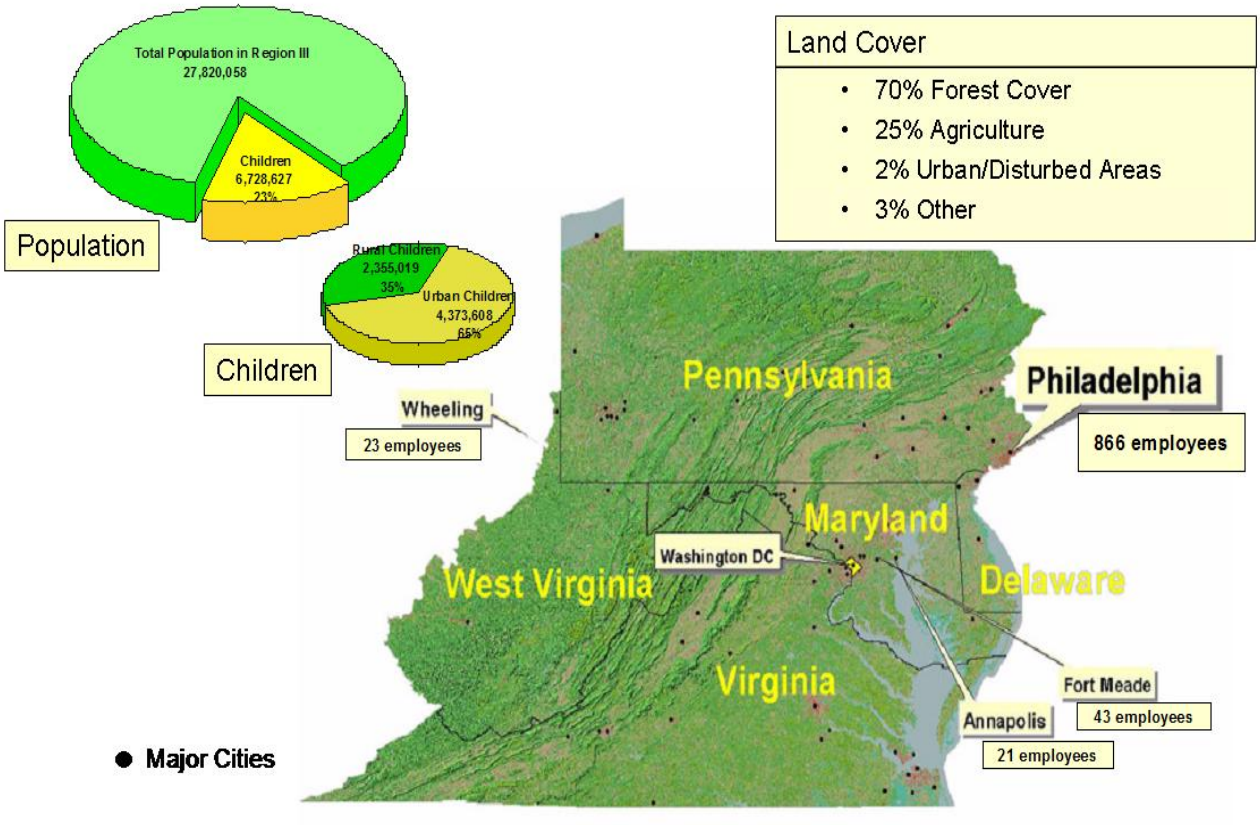
The Region's major program divisions are: Air Protection, Environmental Assessment and Innovation, Hazardous Site Cleanup, Land and Chemicals, Water Protection, and the Chesapeake Bay Program. Five offices provide support services: Enforcement, Compliance and Environmental Justice, Policy and Management, Public Affairs, Regional Counsel, and State and Congressional Relations.

The Region has over 900 employees, which are located at four facilities - the headquarters office in Philadelphia (819), an environmental science center in Fort Meade, Maryland (45), a laboratory field office in Wheeling, West Virginia (23), and the Chesapeake Bay Program Office in Annapolis, MD (21).

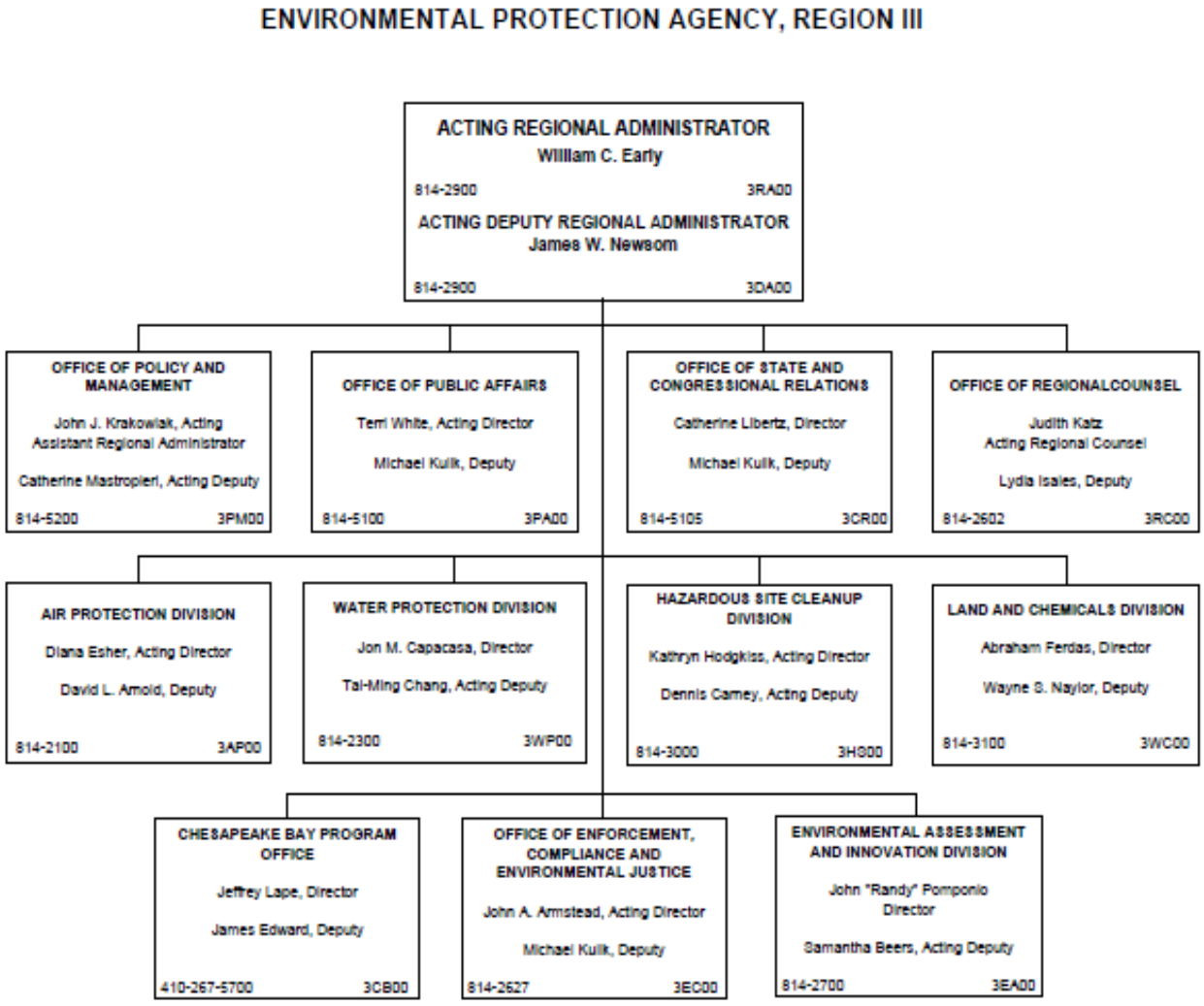
Region 3 characteristics:
- Region 3’s total population is close to 29 million people.

- Region 3’s land area is characterized by 70% forest, 25% agriculture, and 5% urban, developed, and disturbed (such as for mining) areas. The relatively small amount of developed and disturbed lands have caused major and widespread environmental problems, including excess nutrient runoff, acid mine drainage from abandoned mined lands, fragmentation and loss of forests and wetlands, and air, surface and groundwater contamination from industrial sites.

EPA Region 3


Total Population in Region III
27,820,058
Children
6,728,627
23%
Population
Rural Children
2,355,019
35%
Urban Children
4,373,608
65%
Children
Land Cover
• 70% Forest Cover
• 25% Agriculture
• 2% Urban/Disturbed Areas
• 3% Other
Pennsylvania
Philadelphia
866 employees
Wheeling
23 employees
Maryland
Washington DC
West Virginia
Delaware
Virginia
Fort Meade
43 employees
Annapolis
21 employees
Major Cities

Region 3 Organization Chart



Air Quality Designations for Particulate Matter.

EPA is required by law to designate geographical areas that do not meet the National Ambient Air Quality Standards as well as areas that contribute to violations of the standards. States make area boundary recommendations. EPA uses technical factors and analytical tools to evaluate the states' recommendations and make final decisions on nonattainment area boundaries. Examples of these factors are listed below.

- Emission data
- Air quality data
- Population density and degree of urbanization (including commercial development)
- Traffic and commuting patterns
- Growth rates and patterns
- Meteorology (weather/transport patterns)
- Geography/topography (mountain ranges or other air basin boundaries)
- Jurisdictional boundaries (e.g., counties, air districts, Reservations, metropolitan planning organizations)
- Level of control of emission sources

Data which supports these factors is often generated by both the state's science staff as well as the Region's science staff. Regions evaluate the recommendations and work with EPA HQ and other regions in a national workgroup to share ideas and ensure national consistency. Regional management make decisions on boundaries. The formal proposal, signed by the Administrator, is published in the Federal Register. States are given an opportunity to comment on EPA's proposal and to submit additional information to EPA. This input is considered when making a final decision.

Issue: Total Dissolved Solids Impacts to Region III Aquatic Resources

Discussion:

Total Dissolved Solids (TDS) has emerged as priority issue in Region III. It is suspected as a leading cause of serious environmental impacts stemming from resource extraction issues. High levels of TDS were a likely contributor to the recent widespread fish kill in Dunkard Creek in Pennsylvania and West Virginia.

The complexity of issues surrounding TDS have made effective management and control difficult. Since much of the factors contributing to the determination of threshold targets that will prevent negative impacts are site-specific, EPA has yet to be able to issue national recommended criteria for the variety of ions that are included in TDS.

The present need is to control the effects of excessive levels of TDS range from establishment of Water Quality Standards criteria (leading to enhanced assessment protocols, Total maximum daily Loads evaluations and ultimately to permit limits) to expansion of monitoring programs to further assess and define the extent of the problem. These needs are occurring at a time of severe budget restrictions in many state water quality management programs.

Assistance Needed:

Region III would benefit from a comprehensive review of TDS issues with a goal of the establishment of additional criteria and assessment tools to establish the extent of the problem and to provide a framework to eliminate any negative impacts. A collaborative initiative that would involve Science Advisory Board resources, Region III personnel and state water quality managers is sought. This initiative would seek to:

- Provide further assistance in the establishment of WQS criteria,
- Provide further documentation on the effects of TDS on aquatic resources,
- Provide a spatial analysis that will delineate the extent of excessive TDS levels in Region III, and
- Schedule a Region III work shop to present current information on the TDS problem in Region III and a discussion of options that could be used to control TDS impacts.

Larry Merrill, Associate director
Office of Standards, Assessment and Total maximum Daily Loads
Water Protection Division, Region III
December 17, 2009

Hazardous Site Cleanup Division
Science Integration for Decision Making
December 16, 2009

Case Study: Valmont TCE Superfund Site

Summary

The Valmont Superfund site, located near Hazelton, Pennsylvania, is a good example of how Region 3's Superfund program uses the best available science to evaluate and clean up hazardous waste sites. We are using the Valmont Site to illustrate how the Region uses real time data collection and analysis, the latest scientific understanding of the vapor intrusion pathway, and the most current contaminant toxicity criteria to address vapor intrusion problems at Superfund sites throughout Region 3.

At Valmont, ground water contaminated with trichloroethylene (TCE) was traveling under a residential neighborhood. Although the homes in this neighborhood were supplied with public drinking water, the residents were threatened by vapor intrusion from the TCE contamination in the ground water. EPA conducted a thorough evaluation of the vapor intrusion problem, using ERT's trace atmospheric gas analyzer (TAGA) van, indoor air samples, sub-slab samples, and a ground water evaluation. To evaluate the risks to human health, Region 3 toxicologists evaluated the sampling data, reviewed the controversy surrounding the TCE toxicity factors, and developed cleanup goals that reflected the current understanding of the health effects of TCE.

Background

The Valmont TCE Superfund Site consists of an old manufacturing plant and the contaminated groundwater in the nearby residential neighborhood. The groundwater is contaminated with TCE, from a spill at the plant. Residential wells in the area were also contaminated with TCE, but those homes were hooked up to the public water supply. This site was proposed to the National Priorities List on June 14, 2001.

The vapor intrusion investigation and mitigation program at Valmont proceeded incrementally, and included an evaluation of indoor air, sub-slab vapors, and soil gas. The first step was collecting residential indoor air samples and providing air filtration units to several local residences with elevated concentrations. These temporary indoor air carbon filtration units were later replaced by household vapor reduction systems. The new systems were more effective and provided a better long-term solution to the vapor intrusion problem.

A critical part of EPA's evaluation of the vapor intrusion problem at Valmont was the use of the Environmental Response Team's Trace Atmospheric Gas Analyzer (TAGA) mobile laboratory. At the time, this mobile lab was housed and operated out of the EPA Laboratory in Edison, NJ. The TAGA is a self-contained mobile laboratory capable of real-time sampling and analysis at the low parts per billion level of indoor and

outdoor air. The TAGA unit is equipped with several gas chromatographs to aid in identification and confirmation of analyses.

The TAGA was used very successfully at Valmont, helping to identify precise locations of vapor intrusion in homes and providing local residents real-time information about their indoor air. Some homes had openings in their basement concrete floors for purposes such as for sump pumps. In those affected homes, sampling was conducted directly at these openings with a mobile testing unit in addition to the stationary summa canisters used for previous sampling. Overall, four rounds of air sampling were done at Valmont and a total of 89 indoor air samples were collected.

The interpretation of the air sampling at Valmont also presented challenges to the regional project team. TCE is a volatile organic chemical that has both cancer and non-cancer human health effects. Originally, EPA had recommended toxicity criteria for the cancer effects of TCE that put the acceptable level in air at 30 ppb. After an extensive reevaluation of TCE=s toxicity, the Agency revised its draft cancer criteria and added non-cancer criteria. Rather than providing a single number for the cancer toxicity, however, the new draft criteria were expressed as a range. The protective level in air for carcinogenic effects became 0.6 to 10 ppb and the non-cancer level was 2.4 ppb.

Despite this uncertainty about TCE toxicity at the national level, Region 3 toxicologists needed to develop clean up targets for the work at Valmont. Following a thorough evaluation of the national controversy, the project team was able to develop cleanup goals that were well supported by the scientific information on TCE. These cleanup goals were used to evaluate the significance of the air sampling information and develop long-range cleanup plans for the site.

The Region’s work at the Valmont site is a good example of how the Superfund program uses the best available science to characterize, evaluate and cleanup the threats from hazardous waste sites. The project team used a creative combination of the best available sampling techniques and human health information to resolve many difficult questions about vapor intrusion and TCE toxicity. Despite the lack of national consensus on these emerging issues, the Regional program was able to investigate and protect local residents from the contaminants at this old industrial facility.

Region 3 Case Study – Land & Chemicals Division, RCRA Corrective Action

The following represents a common scenario encountered in RCRA Corrective Action, and was chosen because it highlights some typical issues that arise related to use of science in environmental decision-making. One of the biggest difficulties the program faces is how to incorporate new issues (such as awareness of new contaminants or pathways) at sites where final remedy decisions may already have been made or at sites where site characterizations were thought to be complete.

The Facility

This facility is a post-World War II medium-sized manufacturing plant that machined metal parts followed by degreasing with chlorinated solvents prior to plating, painting, and assembly. Wastes included sludges from degreasing and plating, metal chips, and spent solvents. Past waste disposal included land disposal in unlined surface impoundments. Releases to soil and groundwater also occurred from spills during product delivery, transfer, and use, and from leaking product tanks and transfer piping.

Environmental Setting

The plant is located on about 40 acres, within a small Pennsylvania town about 50 miles north of Philadelphia. The plant is surrounded on all sides by private residential and commercial areas. Source of water in the area is groundwater, both for public water supply and for private drinking water wells. The aquifer is a layered clastic sedimentary formation with fracture enhanced secondary porosity developed primarily along bedding planes. Individual fractures may be highly permeable, with a high degree of connectivity to offsite areas, including public water supply wells. Groundwater flow directions are chiefly toward groundwater pumping centers (the public supply wells) and not necessarily to surface water discharges. In fact, the main stream in the area is a losing stream.

Contaminated Media, Receptors, and Environmental Response

Soil, fractured rock vadose zone, and the fractured bedrock aquifer are contaminated with chlorinated solvents and 1,4-Dioxane. The chlorinated solvent and 1,4-Dioxane plumes extend off-site, and have impacted private and public groundwater wells. There are residential areas that overlie the groundwater contaminant plume. New residential development has encroached on the facility property boundary. Off-site impacted wells are treated with air strippers or carbon filtration. There is an onsite groundwater pumping and treatment system, consisting of air stripping and carbon filtration.

Science in Decision-Making

Each of the following represents a scientific decision or issue that arose during EPA's involvement at this site (which is ongoing): site conceptual model development, selection of analytical methods and data quality objectives, appropriate well construction and sampling methods, aquifer testing to determine aquifer parameters and connections, and selection of a protective final remedy. However, when EPA first required site investigation years ago, vapor intrusion from VOC contaminated groundwater was not known to be a potential exposure pathway, nor was it widely known that certain solvents (e.g., 1,1,1-TCA) contained a significant amount of solvent stabilizers (i.e., 1,4-Dioxane). These two issues required additional evaluation, but there was initially very little guidance available to assist our decision-making. Vapor intrusion guidance was often contradictory. 1,4-Dioxane required different analytical

methods (and a different lab), and was found to not be treated by air stripping and carbon filtration because of its different transport and fate characteristics.

Case Study on How Science is Utilized to Make Decisions

Pesticides and Asbestos Programs Branch

Issue: The Pesticides and Asbestos Programs Branch awards grants under various regional and headquarters based pesticide programs each year. Under each solicitation, as outlined in a published Request for Proposals (RFP), applicants are required to submit a description of their scientific protocols in their project proposals. This includes:

1. Specific and clearly stated project objectives.
2. Science based justification for the project.
    A. Potential outcome(s) in terms of environmental, human health, pesticide risk reduction or pollution prevention for each objective.
3. Technical literature review on supporting scientific evaluations.
    A. Relevant information currently available that provides the basis for either the experimental design or the validation of a new approach to pest management. Literature references are cited.
4. Approach and methods
    A. Detailed description on how the project will be conducted and how the system or approach will support the program goals.
    B. Includes a well conceived work plan that contains the experimental design and is appropriate to achieving objectives.
    C. Includes a background on the main issues and challenges, specific objectives, main activities and expected outcomes and deliverables. The specific crop(s), pest(s) and number of acres affected are indicated.
5. Performance measures and expected outputs and outcomes.
    A. Includes how the success of the project will be evaluated in terms of measurable environmental results.
    B. Work plan includes performance measures that demonstrate the progress or environmental benefits of the project.
    C. Outputs and outcomes list specific milestones and how improvements in human health, the ecosystem, or quality of life will be measured.
6. Timetable that includes what will be accomplished under each objective and when completion of each objective is anticipated.
7. Programmatic capability and past performance of applicant.
    A. Proposals include a list of past federally funded assistance agreements that the organization performed with past history of meeting reporting requirements and documentation toward achieving expected results.
    B. Organizational experience, staff knowledge, capabilities and available resources to meet project goals.
8. Projects that include the generation or use of environmental data must provide a Quality Assurance Project Plan (QAPP)
    A. Includes efficacy and performance data, surveys and similar results.
    B. Plan provides comprehensive details about the quality assurance and quality control requirements and technical activities to meet project objectives.

Before the award, applicants are evaluated on their capability in meeting the program objectives. Award selections are made based on a set evaluation criteria that includes clearly stated programmatic indicators, importance of the project to program goals, ability to provide the technology transfer of

project results to other areas as well as their likelihood of achieving environmental results and produce on the ground environmental change.

Organizations receiving assistance agreements are required to submit quarterly and final performance reports. These reports include a description of project activities, accomplishments, successes, lesson learned, challenges, and impediments. Environmental outcomes are provided in relation to the approved schedule and milestones. Progress reports are used to track performance, make adjustments as necessary and ensure targets are being achieved. Related published reports and research publications on the project with analytical data are included with the final project report. Each project also contains an outreach communication component that leads to the effective learning and long term sustainable adoption of new practices.

The Pesticides and Asbestos Programs Branch uses the scientific results reported to evaluate the measure of success of the project. Scientific results will be posted in a program database for EPA-HQ and other regions to reference. A determination will be made on the degree of success and transferability to other areas. This information will also be used to determine the programmatic capability and past performance history of applicants in future solicitations.

Following is an example of a successful project meeting scientific criteria that was funded under the Region 3 Strategic Agricultural Initiative Grant Program.

Project Title: Reducing FQPA Targeted Pesticide Use in Peppers
Organization: Virginia Polytechnic Institute and State University

Project Goal and Objectives:
To evaluate new strategies to reduce broad spectrum insecticide use on bell peppers.

1. Evaluate the efficacy and impact on beneficial arthropods of reduced risk insecticides vs. conventional broad spectrum insecticides.
2. Evaluate the effectiveness and relative cost benefit of a multi-tactic IPM program compared with conventional preventative insecticide spraying.
3. Educate, outreach and help implement the aforementioned IPM approaches with pepper growers in the Mid-Atlantic States.

Procedure:
Each experiment was conducted in a randomized complete block design with 4 replications per treatment. Individual plots were four rows by 20 feet. Treatments were applied at standard label rates. Insect counts of target pests and beneficial insects, percent damaged fruit and marketable yield were compiled and analyzed using analysis of variance procedures. Toxicity bioassays were conducted in the laboratory to assess the efficacy of the insecticides on the biological control agent.

Project Impact:

1. 100% of the pepper growers surveyed benefited from the pepper IPM manual that was distributed under this project.
2. 40% of growers surveyed changed their pest management practices to more integrated pest management (IPM) friendly strategies as a result of this project.
3. 20% of growers surveyed used biological control organisms based on this project.
4. Eight (8) publications were produced on the results from this project. Project results were disseminated at eleven (11) scientific meetings and thirty (30) grower/extension meetings. Total attendance at grower meetings exceeded 1,300.

5. Project Manager reported 750 acres of pepper production were utilizing IPM practices at the start of the project and 1,500 acres were utilizing these practices in the Mid-Atlantic States project area at the conclusion of this EPA Region 3 funded project.

Potential Impediments of Field Projects:

1. Lack of control of target pest pressure due to environmental conditions.
2. Affect of non-target organisms influencing reliability of data.
3. Staff changes at grant recipient organization.
4. Lack of background data to support technical decisions.
5. Recipient under estimates project costs and funding levels required.

Use of Science for Decision-making
Environmental Assessment & Innovation Division
Summary for EPA's Science Advisory Board (SAB)

Mountain Top Mining (MTM)

Action: EPA has responsibility for reviewing numerous Mountain Top Mining (MTM) permits applications to ensure that the waters of the U.S. are appropriately protected. EPA, Region III is requesting that ORD coordinate both internal and external peer reviews of the weight of evidence that exists on the environmental impacts caused by MTM.

Background: Mountaintop coal mining is a surface mining practice involving the removal of mountaintops to expose coal seams, and disposing the associated mining overburden in adjacent valleys, termed "valley fills". Valley fills occur in steep terrain where there are limited disposal alternatives. Mountaintop coal mining operations are concentrated in eastern Kentucky, southern West Virginia, western Virginia, parts of Ohio, and scattered areas in Tennessee. Adverse environmental impacts include: degradation of water quality caused by the increase of minerals in the water that adversely impact fish and macroinvertebrates, covered-up streams, forest fragmentation, destroyed wetlands, and cumulative impacts, including social and economic.

Significant Issues: ORD is being requested to coordinate peer reviews to answer the following: Does the weight of evidence indicate that surface coal mining in the southern coal fields of Appalachia has caused and will likely continue to: cause downstream water quality impairments and degradation; indicate discharges from these mining activities impair aquatic life inhabiting the receiving headwater streams; indicate there a causal relationship between these mining activities and downstream impairments; impairments resulting from mining activities suggest that the prevention/mitigation measures should focus on Total Dissolved Solids (TDS), conductivity, component ions), indicate that mining related biological impairments downstream persist over may years; the scale of the mining, and the potential stressors and pollutants support the need for cumulative impacts analyses on a watershed scale in order to evaluate and protect downstream water quality and aquatic life; and does evidence indicate that the loss of upper reaches of headwater streams, including intermittent and ephemeral reaches, represent a significant adverse impact to the overall aquatic ecosystem within the affected watershed.

What ORD is doing to address these issues: Current status and next steps

ORD has been asked to coordinate the peer review, including the review by the Science Advisory Board (SAB) on the body of science available on the impacts of Mountain Top Mining and Valley Fills. Several options are available for review, which include a range of scopes and time frames, and the Agency should pursue multiple options simultaneously for benefits in both the short and long term. Review options and estimates for the length of time needed to complete them include the following:

1. ORD - Review the use and characterization of science used in existing documents, such as an MTM permit and/or the MTM EIS
   Timeline: 4 – 8 weeks (depending on the scope of the review)

2. National Center for Environmental Assessment (NCEA) – Review the existing scientific literature and put together a synthesis report to address questions such as those presented in the "Scientific Questions Related to MTM Water Quality Impairments" . Timeline: 3 months

3. Science Advisory Board (SAB) Consultation – Consultation based on the NCEA synthesis report cited above. A consultation represents the individual opinions of the SAB reviewers, vs a full review which develops a consensus opinion. Timeline: - 4 months

4. Science Advisory Board (SAB) full review Timeline: 9 months

Use of Science for Decision-making
Chesapeake Bay Program Office (Region 3)
Summary for EPA's Science Advisory Board (SAB)
December 18, 2009

Overview
Following are summary highlights of how Region 3's Chesapeake Bay Program Office (CBPO) uses science for decision-making with specific emphasis on how to strengthen EPA's approaches for integrating human health and ecological science assessment with Socioeconomics, decision sciences and technology development and assessment. Each example demonstrates strengths and successes as well as weaknesses and needs. A contact person is identified for each example given.

CBPO has the unique charge of not only leading EPA's efforts to restore and protect the Chesapeake Watershed and Bay but also to facilitate and coordinate the efforts of nearly a dozen Federal Agencies, six States, and countless other partners. As such, some examples may explicitly reference other partner efforts.

Example 1: Integrating Science to Develop a Comprehensive Ecological Modeling System to Support the Nation's Largest and Most Complex TMDL
The CBP has developed a modeling system to support the Chesapeake TMDL. The system combines atmospheric, watershed, and estuarine transport models, GIS-based cellular automata landuse models, regression-based models of observed data, and extensive data collection and analysis systems into a single decision support framework.

Strengths/Successes
- Developed with extensive input and collaboration from many federal and state agencies, universities, and other organizations
- Integrates many types of analyses of physical systems

Weaknesses/Needs
- Uncertainty as related to decision
- Physical models only, not connected to social sciences

For more information, contact: Gary Shenk

Example 2: Bay Program's Science and Technical Advisory Committee Brings Extensive Credibility to Science Efforts Through Independent Peer Review
STAC reports periodically to the Management Board and annually to the Executive Council as an advisory committee. STAC provides scientific and technical advice to the CBP in various ways, including technical reports and papers, discussion groups, assistance in organizing merit reviews of CBP programs and projects, technical conferences and workshops, and service by STAC members on CBP subcommittees and workgroups. STAC is able to hold meetings, workshops, and reviews in rapid response to CBP requests for scientific and technical input.

Strengths/Successes

- Academic-based, independent body
- Rotating membership keeps viewpoints fresh
- physical and social sciences represented

Weaknesses/Needs

- Communication of the actions taken by the CBP in response to STAC recommendations is not institutionalized
- Continual balance between being involved enough to understand the issues and removed enough to maintain impartiality

For more information, contact: Rich Batiuk

Example 3: Executive Order on Chesapeake Bay Prompts Enhanced Scientific Decision-making

President Obama signed Executive Order 13508, Chesapeake Bay Protection and Restoration, on May 12, 2009 establishing a Federal Leadership Committee for the Chesapeake Bay composed of senior representatives of seven federal agencies. The Executive Order called for a set of reports and a strategy designed to accelerate cleanup efforts for the Bay and its watershed. The draft strategy contains a comprehensive suite of federal initiatives that support three primary actions: restoring clean water, conserving treasured places and iconic species, and adapting to the impacts of climate change. It represents a fundamental shift from voluntary approaches to more regulation with increased accountability for pollution and commits to two-year milestones for all major actions. It establishes 2025 as the year all mechanisms for a restored Bay will be in place.

Strengths/Successes

- Provides a coordinated, science-based strategy for restoring the Bay
- It will focus the Bay partnership on sustainability and will adopt an adaptive, Ecosystem-Based Management approach
- It will establish an interagency decision-support hub to strategically target and assess effectiveness of restoration and conservation practices

Weaknesses/Needs

- Still in draft, many finer details being developed
- Resource needs to carry out initiatives not yet confirmed

For more information, contact: Scott Phillips, USGS

Example 4: ChesapeakeStat Creates Enhanced Accountability, Integration and Transparency of Partners' Actions to Restore the Chesapeake Watershed and Bay

ChesapeakeStat is a web-based accountability and decision-making tool, modeled after the State of Maryland's BayStat program. It will serve as the Bay Program's nucleus of information about partnership goals, strategies, restoration activities, funding levels and progress toward defined goals. A visual presentation of the Program's implementation strategy, it will present geographic information at multiple scales and will provide better access to data for decision-makers while increasing transparency and accountability to the public. This tool will be the mechanism to systematically identify clear measures of

performance and progress toward Program goals, optimize resource targeting, improve the alignment and accountability of federal and state programs, and facilitate decisions on changes in priorities and strategies, as needed.

Strengths/Successes

- Results expected to contribute to adaptive management of the CBP while measuring progress toward reaching goals
- Focus on science as applied to policy and management decisions
- Integrates many types of data, analyses of physical systems and measures that will facilitate evidence-based decision making
- Will be developed with input and collaboration from federal and state agencies

Weaknesses/Needs

- In prototype only, uncertain about all its capabilities
- May be difficult to obtain data in formats needed/states and other organizations may not want to participate

For more information, contact: Doreen Vetter

Example 5: Bay Program uses National Academies of Science as "Independent Evaluator" to Assess Bay program Progress and Reporting

The CBP commissioned the National Academies of Science (NAS) to provide recommendations on how to improve strategic and specific management practice implementation efforts. Specifically, the NAS panel will address the following questions:

- Is the current management practice tracking system reliable and accurate and how do any issues effect reported program results?
- Is the two-year milestone strategy likely to achieve the CBP goals for this milestone period? What improvements can be made?
- Have the CBP agencies developed effective adaptive management approaches?

Strengths/Successes

- Results expected to contribute to adaptive management of the CBP
- Focus on science as applied to policy and management decisions

Weaknesses/Needs

- Does not address ongoing role for independent evaluation
- Does not address policy-oriented analysis

For more information, contact: Julie Winters

Example 6: Monitoring Support of Management Decisions for Regulatory Assessment (Clean Water Act 303d listing) and Assessing Management Effectiveness in the Chesapeake Bay and Basin.

The CBP Long-term Water Quality Monitoring Program, through U.S. EPA and State matching funds support, provides the data that are used as the basis of assessments of management effectiveness. Water quality data underlie the credibility of Chesapeake

Bay ecological model calibrations used to drive TMDL decisions and decision making support for adaptive management. Analyses and syntheses of the data provide sound science that is fundamental to ecosystem health indicator and water quality criteria development used for Clean Water Act 303d listings assessments.

Strengths/Successes

- An estuarine network of 150 stations with 25 years of data
- A watershed network of 85 stations with between 5 and 50 years of data
- Solid process for QA/QC of data, analysis of data, and communication of results
- Hundreds of scientific and technical publications generated using these data
- The program offers leveraging power for forming new partnerships

Weaknesses/Needs

- Estuarine network insufficient to asses all standards currently in force
- Watershed network lacking in smaller-scale monitoring for management effectiveness
- Living resources sparsely monitored
- Lacking support for assessments of human-health relevant metrics such as bacteria and chemical contaminants
- Lacking socioeconomic dataset for understanding factors affecting water quality conditions and trends in the context of the quality of life, health, and well-being of our watershed citizens

For more information, contact: Peter Tango

How We Use Data in the MidAtlantic Region

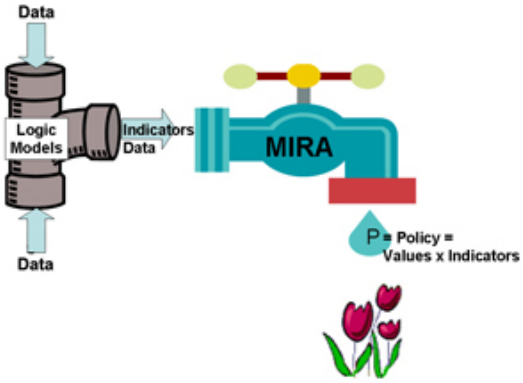
We have found the logic model/multi-criteria integrated resource assessment (MIRA) process to be of great benefit in demonstrating the potential for enhancing the linkages between program activities and major stressors to achieve greater environmental outcomes. Additionally, we found the logic model/MIRA process to be a mechanism for supporting cross-programmatic learning within Region III, which will allow the Region to become more responsive and effective in meeting its goals.

Challenges to Implementation of the Logic Model/MIRA process

Communication of the vision between senior managers and staff is critical throughout the process to build trust and get staff engagement. Timing of the effort must be structured to meet budget deadlines. We have found that facilitated sessions where a small group of people work directly to apply logic models to their program works best.

Gathering data and creating indicators for logic models and MIRA is a major challenge. Through the logic model/MIRA process, we have discovered that much of data that we need does not exist or is in the wrong format. Continual encouragement and support from senior management is needed to keep the process going.

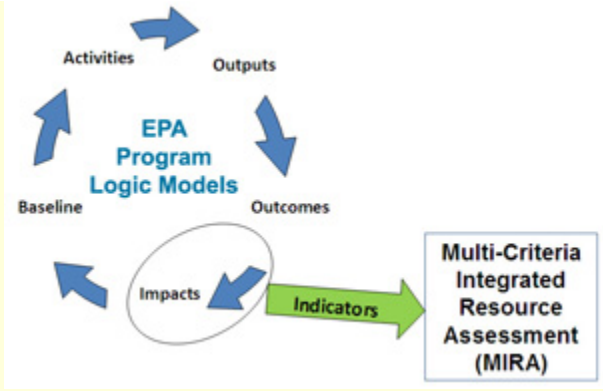
Data is used in decision-making. We take facts and information and apply our judgment to make decisions on how best to help the environment.



We ensure the quality of data collected connect programs to environmental results & then evaluate environmental results to prioritize our work use the data in decision-making, and connect data sets to gain additional insights

Here's how the process works.

1. EPA programs feed information, like monitoring data, into Logic Models.
2. Then we look at Indicators, which give us a sense of the impact on the environment.
3. Then we use the Multi-criteria Integrated Resource Assessment (MIRA) tool to decide what should be done, like requiring pollution controls.



The Link between the Logic Model and the Multi-Criteria Integrated Resource Assessment (MIRA); the process is results-driven based on environmental results; what are the impacts of what we do?

Both MIRA and Logic Models are part of EPA's overall process to connect programs to environmental results and then measure and evaluate those results to prioritize our work.

Connect programs: How do EPA program activities impact environmental results? (Use Logic Models)

Measure environmental results: Match indicators with environmental results (Use Logic Models)

Evaluate environmental conditions/results using indicators (Use MIRA)

Prioritize program outcomes (Use MIRA)

Prioritize activities based on prioritized outcomes (Use MIRA and Logic Models)

Our policies take into account our values -- what's most important to us and what we are trying to achieve. Our values may be different at different times and in different locations. For example, the amount of a pollutant allowed to be discharged into a stream may be based on whether that stream is using for swimming, for fishing, for boating, or for none of those uses. This concept as an equation is: Policy = Values x Indicators.

What is a Logic Model?

The Logic Model is a learning and management tool which gives a picture of how an organization does its work. It helps everyone see what works and why. This tool links the expected outcome of a program or project to its individual activities and processes.

How Does The Mid-Atlantic Office Use Logic Models?

EPA's mid-Atlantic Region has adapted a model developed by the W. K. Kellogg Foundation, a recognized leader in the development and practical application of this tool. EPA has a different "bottom line" than most organizations: not money, but environmental results. And, EPA takes input from many different programs with different goals: some environmental, some educational, and some collaborative.

The Region is using this model as its organizational planning tool to maximize outcomes through efficient targeting of our resources.

We are currently applying the Logic Model and its data to answer questions such as:

Which activities do we do that more effectively reduce pollution?
Where can we find more effective combinations of activities/programs to improve public health and the environment?
What other additional activities should we be doing to better meet our mission?

Logic Models help define activities we need to do so that ... scientists can understand what is causing the fish to die so that ... different options that help the fish populations can be evaluated within the whole environmental, economic and social context, so that ... conditions improve, the fish are healthy, and the EPA mission is met.

Definitions of Logic Model Terms

Baseline = Present or current state related to outcomes and impacts; measures from which to judge success/accomplishment of outcomes and impacts.

Program Impediments = Barriers to completing activities or completing activities effectively or efficiently.

Activities = Assigned or self-generated tasks that are performed by individuals or groups.

Outputs = Products generated as a result of accomplishing activities; evidence of service delivery.

Outcomes = Results of specific outputs; describe an organization's mission (e.g., Environmental Assessment & Innovation Division mission for divisional logic model; Office mission for office logic model).

Impacts = Impacts are organized into two general accountability categories:

For public health, impacts are health effects (single or combined). For ecosystems, impacts are ecosystem function or services. For public education, impacts can be defined by sector, constituency or public health/ecosystem services education. In addition, impacts can represent

statutory accomplishment. Ideally, mission and statutory accomplishment are the same; but currently, this is not necessarily the case.

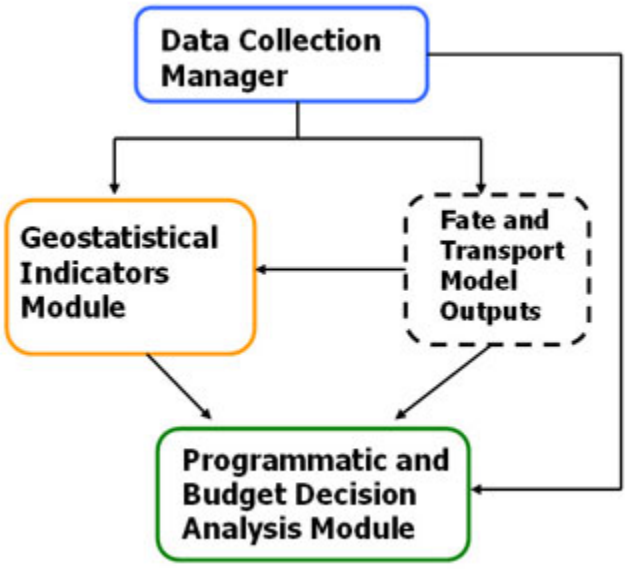
What is the Multi-criteria Integrated Resource Assessment (MIRA)?

MIRA is a new approach to help decision makers make more informed environmental decisions that include stakeholder concerns.

The process is used to:

organize and rank decision criteria or indicators
link the data to our policy decision
use the decision context to determine the relative importance of the decision criteria, and
explore alternative decision options

Tools in the MIRA Toolbox



How the MIRA modules connect with each other and with outside information:

Data Collection Manager

allows users to store, sort, and retrieve data such as source emissions, demographics, and environmental quality values

Geostatistical Indicators Module

allows users to take spatial fields (i.e., maps) and collapse them into a single number in order to compare one map to another in making a decision

Programmatic and Budget Decision Analysis Module

provides a way to organize all decision criteria (i.e., indicators), include expert opinions and include what's important to stakeholders in making a decision

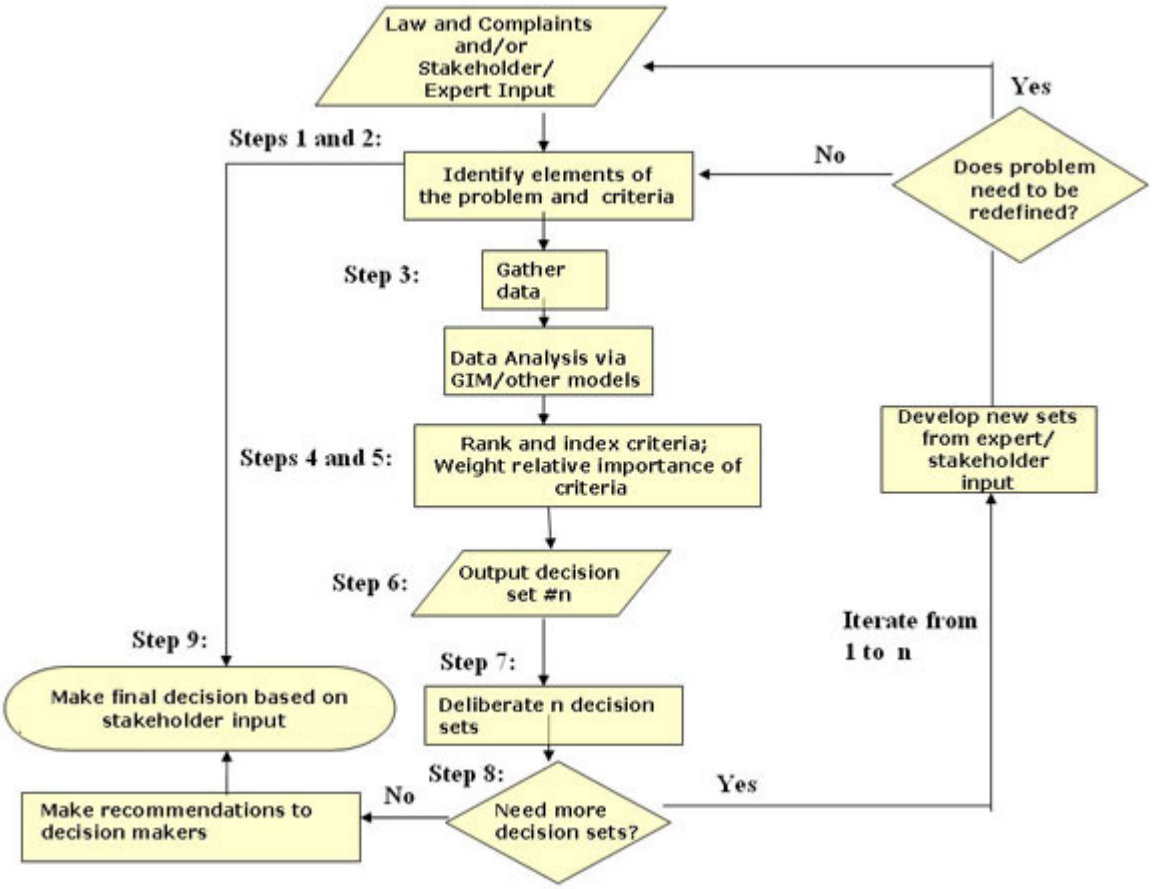
Fate and Transport Model Outputs

outputs from Cause and Effect Models (from EPA and non-EPA sources) become inputs into MIRA; connects science with decision making (via the MIRA Decision Analysis Module)

10 Steps of the MIRA Process

1. define the decision question; decide on decision criteria based on that question
2. select the 'problem set' which is the set of elements (the decision options or pollutant sources) that are to be ranked using MIRA
3. gather the data needed for each criterion
4. index set of elements (expert input)
5. weigh the criteria (decision maker/stakeholder values)
6. create an initial 'decision set' (a problem set whose elements are ranked based on the data and criteria weighting)
7. create different decision sets for the initial problem set and modifying that problem set if appropriate as learning occurs and additional options are discovered;
8. discuss these with stakeholders
9. make the final decision
10. iterate

The data from the Data Collection Manager and from the Geostatistical Indicators Module, as well as other databases or models, are incorporated into the MIRA Process in step 3, as guided by the decision criteria and the problem set identified in steps 1 and 2. Users are key to the MIRA approach as it is these stakeholders that determine what criteria are used, which data adequately represent those criteria, how the criteria are weighted and the kinds of alternatives that will be examined.



MIRA Process Flow

Regional Priorities

Through the use of logics models and the Multi-Criteria Integrated Resource Assessment (MIRA) have helped enable us to begin to make resource decisions based on environmental indicators and data.

During the 2009 budget process, we were able to identify the following five priority areas to "refocus" resources: Healthy Waters, Clean Energy/Resource Conservation Challenge, Healthy Air, Natural Infrastructure, and Partnership for Community Health.

The Healthy Waters Priority has two primary goals: to accelerate the pace of waterbody restoration in the Region and to elevate attention to the protection and maintenance of healthy waters and watersheds. It aims to accomplish these through the promotion of systems level solutions, integrated strategies across programs, innovative approaches, and a targeting of existing programmatic resources for maximum results. The goals of the effort align with EPA's Strategic Plan and the Office of Water's Strategic elements that support Clean and Safe Water. It is expanding the tool box for water protection through such tools as Corporate Stewardship Agreements, State Performance Partnership Agreements, a Water Policy Innovations Forum, and Sector Strategies.

EPA Region 3 is implementing the Energy and Resource Conservation Challenge (RCC) Priority to increase energy efficiency and more effectively manage and conserve energy, water, and other resources/materials. Tremendous savings in energy and resources will increase sustainability in the Mid-Atlantic region and reduce GHG emissions to help mitigate climate change impacts.

This goal is accomplished through collaborative, cross-program projects; these integrate EPA programs that focus on energy and resource conservation from across the Region and involve partnering with external federal, state, local, and industry stakeholders. Major projects/objectives include GreenWork$, Green Highways, Green Cleanups, LOGICS- local government sustainability assistance, the Sustainable Skylines Initiative, and Carbon Sequestration.

The Healthy Air Priority is designed to more effectively reduce the human health risks associated with poor air quality by focusing additional efforts and resources towards areas of Region 3 which are impaired due to a combination of high levels of ozone, particulate matter and toxic air pollutants. Focusing our efforts on these pollutant groups will not only make the Mid-Atlantic region's air healthier to breathe, but will reduce ecosystem damage and help address our global air quality problems.

The Natural Infrastructure Priority will stem the loss of our remaining forests and wetlands, and achieve a net gain in both acreage and overall ecosystem function. We will protect and enhance ecosystem services vital to achieving EPA's goals: protection of human health and the environment. We will develop and implement an over-arching Regional Natural Infrastructure Strategy that strengthens and builds program capacity and partnerships, is science and ecosystem-based, and proactively and strategically guides protection and enhancement activities from the Regional to state to local level.

The Partnerships for Healthy Communities use health and environmental data to identify communities that are at risk due to a barrage of cumulative environmental problems. Take measures to assess and determine results-based strategies to address concerns.