Ohio River Valley Water Sanitation Commission

Annual Report

2006

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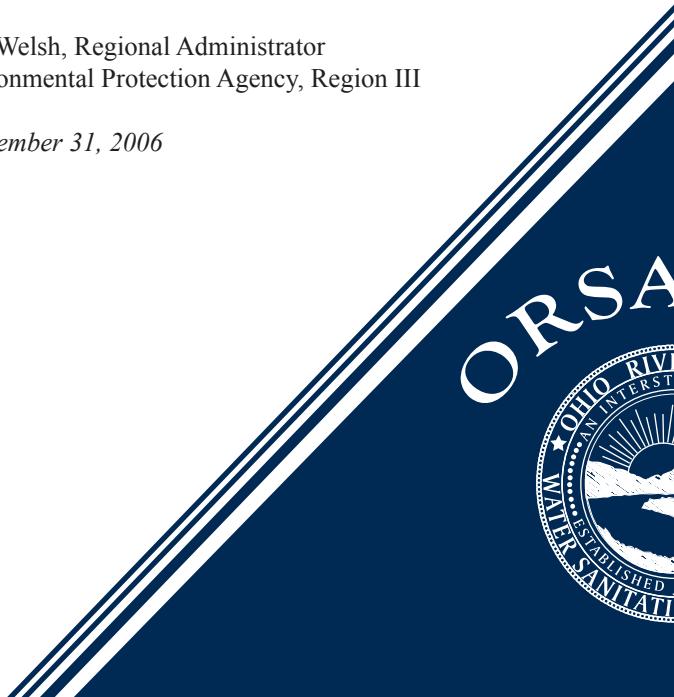
U.S. Environmental Protection Agency, Region III

**as of December 31, 2006*



The Ohio River Valley Water Sanitation Commission (ORSANCO) is an interstate water pollution control agency created in 1948 by the State of Illinois, the State of Indiana, the Commonwealth of Kentucky, the State of New York, the State of Ohio, the Commonwealth of Pennsylvania, the Commonwealth of Virginia, and the State of West Virginia with approval of the Congress of the United States. The Commissioners of ORSANCO respectfully submit the following report of activities for 2006 to:

The Honorable Rod R. Blagojevich
Governor of Illinois

The Honorable Mitch Daniels
Governor of Indiana

The Honorable Ernest L. Fletcher
Governor of Kentucky

The Honorable Eliot Spitzer
Governor of New York

The Honorable Ted Strickland
Governor of Ohio

The Honorable Edward G. Rendell
Governor of Pennsylvania

The Honorable Tim Kaine
Governor of Virginia

The Honorable Joe Manchin III
Governor of West Virginia

And
The Honorable George Walker Bush
President of the United States

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Chairman's Message

Greetings:

It is a privilege to serve as a representative of New York State and Chairman of this distinguished organization, ORSANCO, as it continues to facilitate the stewardship of the Ohio River and its Watershed.

As a retired science teacher, I have an appreciation for the Commission's commitment to the consideration of sound science in its programs. For years, the fine ORSANCO staff has conducted appropriate river research to provide the information necessary for good decision-making. In addition to helping the Commission make decisions, the scientists present much of their information to peer groups and/or publish it in scientific journals so others may also benefit. Several of those presentations and articles occurred in 2006.

ORSANCO has been long respected for its leadership in bringing parties to the table for a collaborative approach to environmental issues, and the Commission continues to set the stage for progress. During 2006, ORSANCO hosted five public hearings to receive public input for the triennial review and revision of its Pollution Control Standards. The Commission also received regular reports and suggestions from advisory committees representing Publicly Owned Wastewater Treatment Works, Water Users (drinking water utilities), the Power Industry, and the Public Interest. The public also gave input on various issues during Commission meetings. Over the years, collaboration and cooperation have generated positive results.

Good science and ideas, communicated effectively, lead to good decisions for appropriate action to produce positive results.

It sounds so simple. However, we face limitations – technological and economic – in attempting to reach our highest goals for a cleaner more enjoyable environment. This increases the need to collaborate and communicate with those who seek similar goals.

Through good science, communication, and collaboration, ORSANCO seeks to turn problems into opportunities.

Sincerely,

Thomas L. Servatius

T. Lee Servatius
Chairman

Ohio River Water Quality Conditions

Bimonthly Sampling

Article I of the Ohio River Valley Water Sanitation Compact pledges "faithful cooperation in the control of future pollution in and abatement of existing pollution from the rivers, streams and water in the Ohio River Basin." For over 30 years, ORSANCO has monitored the Ohio River and its tributaries to assess long-term water quality trends for the Ohio River Watershed. Bimonthly sampling is conducted every other month at 17 stations on the Ohio River mainstem and 14 tributaries. Mainstem sites are usually at dams with access to main channel flows from a fixed facility. Tributary sites are selected so as to assess conditions near the Ohio River confluence. Surface water grab samples are collected and sent to a certified laboratory for analysis. Samples are analyzed for, among other constituents, chlorides, nutrients, phenols, cyanide, suspended solids, hardness, and total organic carbon.

Data are used to evaluate water quality as related to aquatic life and public water supply uses, as well as to support the development of nutrient criteria. Water quality criteria violations observed in 2006 included elevated phenol levels at several dam locations, including RC Byrd, Meldahl, Newburgh, J. T. Myers, Smithland, and Lock and Dam 52, as well as Anderson Ferry.

Clean Metals

Clean metals monitoring was initiated for the Ohio River to permit metal analyses at very low levels. Sampling is conducted every other month at the 17 bimonthy sampling stations on the mainstem and analyzed for 18 different metals. The state-of-the-art "clean" technique employed minimizes the possibility of introducing contamination. In 2006, there were 13 water quality criteria violations for total mercury, particularly at the West Point sampling station. The water quality criteria for total mercury was established to protect human consumption of this contaminant which may accumulate in fish tissue. However, the Commission has established separate fish tissue criteria for mercury for the protection of human health, of which there have been no violations to date.

Clean metals data are being used to develop water quality criteria in areas where discharges occur and to evaluate aquatic life use support for fish and macroinvertebrates.

Bacteria (Contact Recreation)

Bacteria sampling is conducted to evaluate support of contact recreation use in six major urban areas with Combined Sewer Overflows (CSOs) to the Ohio River. Sampling is conducted five times per month from May through October. Surface grab samples are collected downtown, upstream, and downstream of each community and are analyzed for fecal coliform and *Escherichia coli* (*E. coli*). Such bacteria have the potential to cause intestinal illnesses in humans.

All six CSO communities experienced significant violations of the water quality criteria, such that the contact recreation use is considered impaired. Impacts from CSOs during and after precipitation events have the greatest effect on water quality. During periods of impaired water quality, the public is advised to limit physical contact with the River. Figure 1 illustrates the number of bacteria criteria violations in selected Ohio River CSO communities during the recreation season for 2006.

Pollution Control Standards

ORSANCO sets Pollution Control Standards for industrial and municipal waste water discharges to the Ohio River. These Standards designate specific uses for the River (public water supply, recreation, and aquatic life) and establish in-stream criteria and treatment requirements to ensure that it can support these uses. To keep pace with current issues, the Commission reviews the Standards every three years. As part of the review and revision process for 2006, the Commission held hearings in several cities including: Pittsburgh, PA, Charleston/Wheeling, WV, Erlanger, KY, Louisville, KY, and Evansville, IN to allow public comments on proposed revisions. Many agencies, industry representatives, environmental groups, and watershed groups were represented at the hearings.

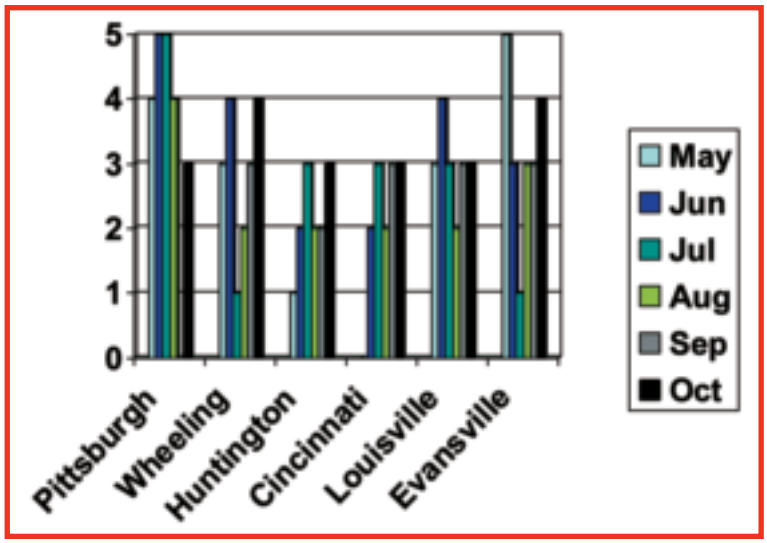


Figure 1. *Number of Sampling Events with a Bacteria Criteria Violation in Selected Ohio River CSO Communities*

The 2006 revised Standards were promulgated on October 5, 2006. Significant revisions included: 1) use of a one-day, ten-year, low flow value in determining discharge requirements to protect against acute aquatic life effects; 2) stipulations regarding the use of "net" discharge limits; and 3) allowance of alternative bacteria water quality criteria for combined sewer overflow communities after the implementation of a Long-Term Control Plan and completion of a use attainability analysis. Several proposed revsions were not promulgated due to significant public concern.

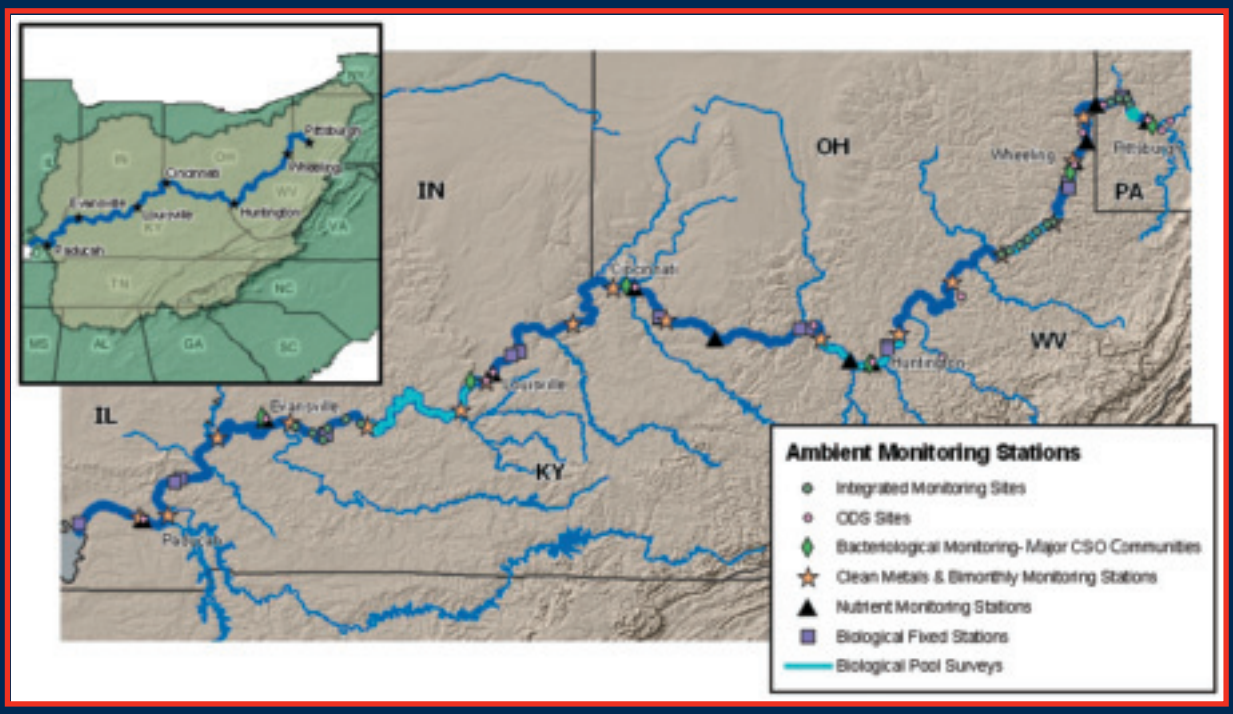


Figure 2. ***ORSANCO's Monitoring Stations along the Ohio River***

Ohio River Watershed Pollutant Reduction Program

ORSANCO initiated the Ohio River Watershed Pollutant Reduction Program in 1995 to characterize the extent and severity of certain pollutants of concern in the Ohio River and develop integrated, interstate strategies for their abatement. To date, the program has received over $6.5 million in grant funding from U.S. EPA to conduct monitoring and research projects on the Ohio River. Since its inception, numerous objectives have been achieved, including: 1) completing Total Maximum Daily Loads (TMDLs) for dioxin and PCBs on portions of the Ohio River; 2) developing an innovative sampling technique for monitoring ultra-low level toxics in-stream; and 3) assessing, for the first time, the entire length of the Ohio River for impairments caused by bacteria.

The initial focus of the program was on dioxin and PCBs; however, the main objective has shifted over the past few years to include more intensive bacteria monitoring and assessment. In 2006, a third river-wide longitudinal survey was completed for bacteria. This extensive data collection effort will facilitate a comprehensive assessment of the Ohio River for pathogen impairments and will also support the development of a bacteria TMDL for the Ohio River.

Currently, 475 miles of the Ohio River are designated as bacteria impaired; however, more recent data generated by ORSANCO may result in a revision of that designation. One significant issue being addressed by ORSANCO is differences among the Ohio River states in their bacteria criteria for contact recreation.

Bacteria monitoring involves collecting samples at five-mile intervals along the mainstem, at the mouths of selected tributaries, and downstream of wastewater treatment plants (Figure 3). Major tributaries were sampled in two previous surveys; however, a new component to the program in 2006 was the addition of sampling locations on over 100 minor tributaries.

Five rounds of sampling were completed along the entire 981 miles of the Ohio River over the course of 15 weeks. Nearly 4,400 samples were collected at 222 locations on the Ohio River and on 124 of its tributaries. This large-scale monitoring effort was made possible through use of the Commission's Mobile Water Quality Laboratory, which allows for the processing and analysis of bacteria samples within six hours of collection in the field.

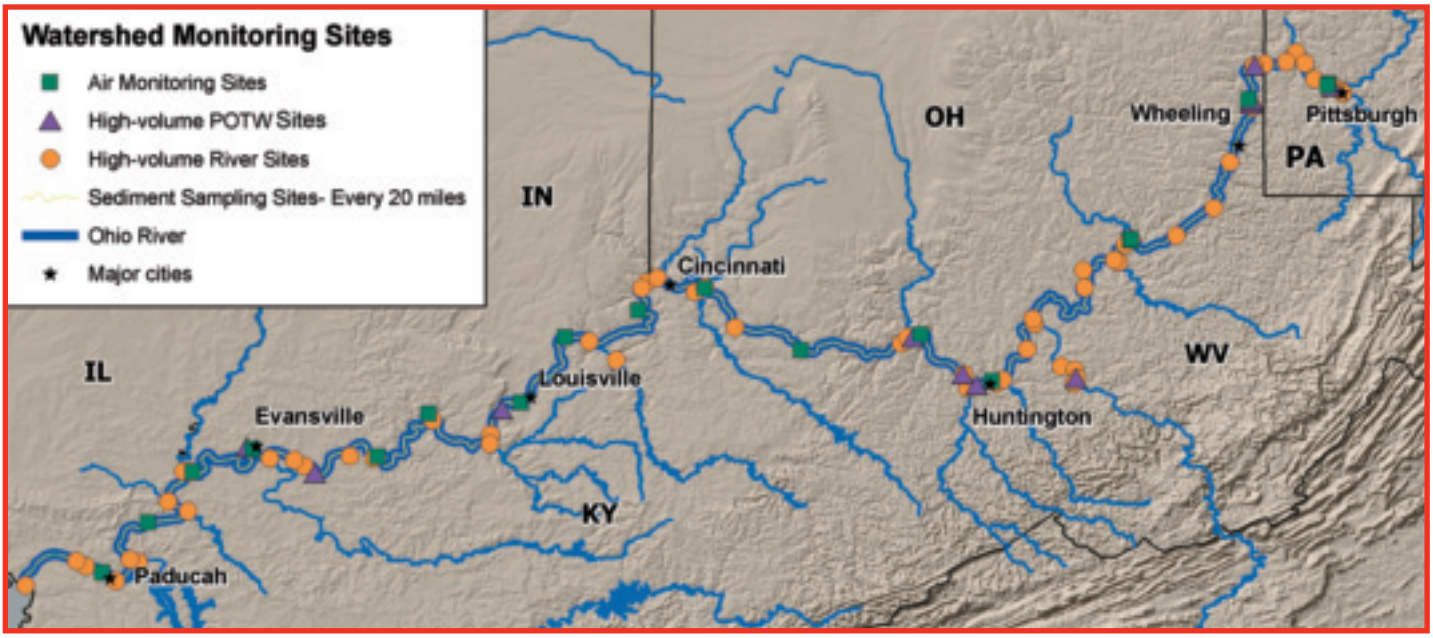


Figure 3. *Watershed Monitoring Sites Along the Ohio River and Selected Tributaries*

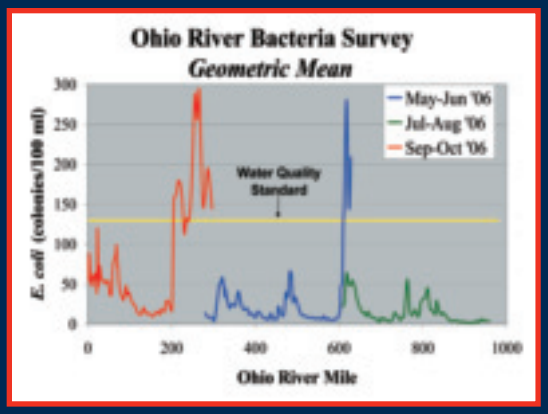


Figure 4. *E.coli Levels for 2006 Sampling Events*

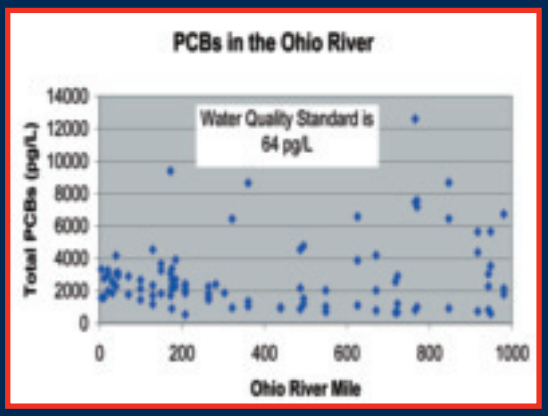


Figure 5. *PCBs in the Ohio River*

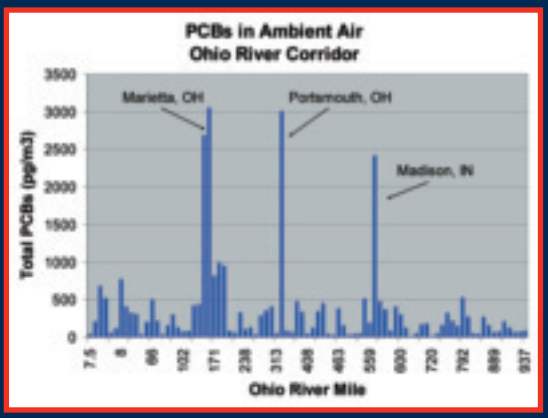


Figure 6. *PCBs in Ambient Air*

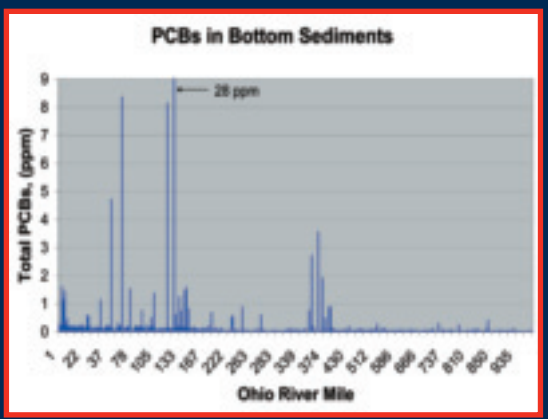


Figure 7. *PCBs in Bottom Sediments*

In 2006, over 10,000 analyses for *E. coli* and total coliforms were performed in the mobile unit. Results for 2006 indicated spikes in *E. coli* levels between Ohio River miles 200-300 and at mile 600 (Figure 4); however, it is believed that these results were influenced by wet weather events prior to sampling. The rest of the River met the criteria for *E. coli* (130 CFU/100mL) during the 2006 sampling events.

PCB Monitoring

The Commission has collected data on polychlorinated biphenols (PCBs) since the late 1990's to support a TMDL for PCBs. Such a TMDL is necessary due to high levels of PCBs in fish tissue. As a result, the entire 981-mile length of the Ohio River remains impaired. Although the use of PCBs was banned in the late 1970's, contamination remains an issue in the Watershed as a form of "legacy" pollution. Legacy pollutants persist in the environment, even though the the substances are no longer actively used. Lack of identifiable sources of PCB contamination complicates the completion of a PCB TMDL. This is because the most significant contributors are non-point, or diffuse, pollutants, which do not originate from a single source. As a result, the Commission formed a Task Force to guide the design, study effort, and remediation strategies for the TMDL. The Task Force is composed of representatives from three states, three U.S. EPA regions, ORSANCO's Publicly Owned Treatment Works Advisory Committee and the Power Industry Advisory Committee, and the Delaware River Basin Commission. The initial phase of work will characterize existing PCB loadings, determine the extent of water quality violations, determine the need for uniform fish consumption advisories among the states, and determine relative source contributions. A report on this phase will be prepared in 2007.

Through the Watershed Pollutant Reduction Program, multimedia monitoring has been conducted to support the PCB TMDL development. In addition to measuring in-stream PCB concentrations in the Ohio River and its tributaries, levels of PCBs have also been sampled in ambient air and in bottom sediments. Results indicate that PCB concentrations exceed the water quality standard for the entire length of the River (Figure 5). Air and sediment data revealed widespread, low-level contamination, with some localized areas of high-level contamination (Figures 6 and 7).

What is a TMDL? A total maximum daily load (TMDL) is the maximum amount of a pollutant that can be present in a body of water without causing impairment or exceeding state water quality standards.

Biological Programs

In 2006, the Commission continued a dual approach to monitoring Ohio River biota by using fixed monitoring locations and pool-specific probability surveys.

Fixed Station Monitoring

Since 2004, ORSANCO has annually sampled at 18 fixed stations along the length of the Ohio River. Sampling the same locations each year allows an assessment of how the biological community changes from year to year. In addition, the sites are evenly distributed along the entire 981 miles of the River to document differences between the biological communities of the upper River (near Pittsburgh) and the communities of the lower River (where the Ohio River flows into the Mississippi River).

In 2004 and 2005, fish were the only organisms sampled at the fixed stations; however, in 2006, macroinvertebrates were also sampled at the same locations. A combination of fish and macroinvertebrate data from the same sites provides more detailed biological information needed to assess changes in water quality conditions. This coordinated sampling also allows a better understanding of how the fish and macroinvertebrate communities affect each other.

Night pool assessment of fish populations in the Ohio River

Pool Assessments

In addition to sampling at fixed locations, four Ohio River pools were monitored as part of a rotating assessment that focuses on different parts of the Ohio River each year. In 2004, ORSANCO developed a long-term monitoring and assessment strategy, which divided the Ohio River into 20 different biological assessment units. In most instances, a single pool serves as an assessment unit. Since four pools are sampled each year, the entire River is essentially surveyed every five years. Sites assessed in 2006 were Montgomery, Willow Island, Greenup, and Cannelton pools (Figure 3).

A bluegill, one of the over 130 species of fish living in the Ohio River

Macroinvertebrate sampling on the River

In each pool, three different biological monitoring methods were employed to aquire information on fish populations, macroinvertebrate populations, and contaminant levels in fish tissue. Fish and macroinvertebrate populations were monitored to assess the ecological health of the River, and fish tissue contaminants were measured for the purpose of assessing consumability.

Ohio River Fish Index (ORFIn)

The Ohio River Fish Index (ORFIn) is a tool developed by ORSANCO to provide numerical scores that relate to the health of fish populations and can be utilized to identify the extent that riverine areas meet aquatic life use designations. In 2006, 18 fixed stations and four target pools were sampled. In the Cannelton Pool, high water levels dictated limited sampling. The results of these assessments are pending further analysis.

A dragonfly larvae, an indicator of good water quality for the Ohio River

Macroinvertebrate Data

High water conditions affected the amount of macroinvertebrate data collected in 2006. Only Montgomery Pool was sampled in its entirety; limited data collection occurred in Willow Island, Greenup, and Cannelton pools and at some fixed stations. The macroinvertebrate data will be used to continue development of an Ohio River macroinvertebrate index, which will assess the River based on macroinvertebrates in a similar way that the ORFIn assesses the health of the River based on fish.

Fish Tissue Data and Consumption Advisories

Since 1975, the Commission has analyzed tissue of certain fish species for the presence of selected contaminants, including pesticides, metals, and other chemicals. Past results indicate certain species are more susceptible to certain types of contaminants and reveal that contaminant levels vary according to the size of each fish and the location of the River where it was captured.

In 2006, fish tissue samples were collected and analyzed from the four target pools and all fixed stations. The resulting data will be provided to the states for their use in the development and modification of consumption advisories.

Fish consumption advisories are in place to advise consumers of the health benefits of eating fish while minimizing the risks associated with consuming fish containing unwanted contaminants. In most instances, the advisories issued by one state are in agreement with advisories issued from its neighboring state across the River. However, at times, inconsistencies can occur. The Commission works with its member states to resolve the differences in these advisories.

Electrofishing studies assess the ecological health of the Ohio River Watershed

Source Water Protection, Organics Detection System and Emergency Response Programs

Source Water Protection

The Ohio River Valley Water Sanitation Compact mandates that the water quality of the Ohio River be, "safe and satisfactory [for] use as public and industrial water supplies..." To this end, several ORSANCO programs have focused on water quality issues of specific concern to industries and utilities using the Ohio River as their drinking water source. The Commission's Organics Detection System (ODS) and Emergency Response programs are designed to inform drinking water utilities of spills and unreported releases of chemicals that, if undetected, could find their way to the taps of consumers, as well as help utilities identify and manage risks in areas upstream of their intakes.

To facilitate efficient development of source water protection in the Cincinnati Region of the Ohio River, the Commission is working with Northern Kentucky and Greater Cincinnati's drinking water utilities, whose intakes are situated along the Kentucky shoreline of the Ohio River, less than a quarter mile apart. Given this proximity, their concern for source water protection and Ohio River water quality conditions are identical. Their Source Water Assessments, which identify the potential risks to these facilities, were developed following guidance from two different states and associated U.S. EPA regional offices. Through ORSANCO's efforts and those of the utilities, meetings were held to compare their Source Water Assessments and discuss the development of properly coordinated and mutually beneficial Source Water Protection Plans. In 2007, ORSANCO will continue to coordinate meetings between utilities and agency personnel to develop similar strategies elsewhere along the Ohio River.

Registry of Distinguished Water and Wastewater Operators

Mr. Joe White of Kentucky American Water Company was nominated and inducted into the Commission's Registry of Distinguished Operators at the Commission's October meeting. Mr. White is the 25th inductee into the Registry since its inception in 1986.

Joe White with ORSANCO Chairman Lee Servatius

Organics Detection System

The Organics Detection System (ODS) has been the backbone of spill detection, spill tracking, and drinking water protection on the Ohio River and its tributaries since 1978. It has repeatedly proven its worth by discovering spills of volatile organic chemicals from unreported releases and tracking volatile components of reported spill events. Since much of the current ODS instrumentation is beyond its design-life of seven years, in 2006 the Commission began working to capitalize a fund that would support a system-wide technology upgrade to improve the operation, capability, and management of the ODS. The ODS, originally developed for the Ohio River Basin, is also considered a model for applications on other river systems.

Spill Response

Over 800 spill reports were reported to ORSANCO in 2006. These reports were received from the National Response Center, ODS operators, and drinking water plant operators.

On January 26th, a barge containing 800,000 gallons of heated, liquid asphalt went over McAlpine Dam in Louisville, KY and impinged on railroad bridge piers located downstream of the dam. At the request of the Kentucky Department of Environmental Protection, ORSANCO field staff collected water samples for analysis of asphalt-related contaminants. The barge could not be removed until the remaining asphalt was off-loaded, and the river level and water velocity decreased. The barge was finally removed on May 29th. Fortunately, there were no impacts to downstream drinking water utilities.

On October 20th, 24 rail cars containing ethanol derailed in New Brighton, PA. Three rail cars came to rest in the Beaver River, releasing more than 60,000 gallons of ethanol that subsequently entered the Ohio River. Utilities and industries participating in the ODS tracked components of this spill over an eight-day period and more than 300 river miles. ODS sampling stations reporting detections included Weirton, Wheeling, DuPont/Parkersburg, Huntington, Portsmouth, and Cincinnati. ORSANCO's river spill model estimated the location of the ethanol plume, which provided vital information facilitating the protection of downstream drinking water utilities.

Ethanol spill on the Beaver River, a tributary of the Ohio River, in Pennsylvania

Special Research Projects

Integrated Assessment Project

ORSANCO is carrying out an integrated study of biological communities and chemical water quality designed to better understand the relationship between water chemistry data and biological monitoring results. It is also designed to determine whether ORSANCO's monitoring stations, which are located at either end of Ohio River pools, adequately describe the water quality conditions of the entire pool.

In 2006, ORSANCO completed surveys of the Montgomery and Willow Island pools and an initial survey of the Newburgh Pool. Initial data show that both pools met biological criteria for their habitat types, and water quality surveys revealed no violations of aquatic life criteria. Flow data for the Integrated Assessment of the Willow Island Pool are presented in Figure 8. Survey data revealed higher and more variable sulfate concentrations at lower flows. This is a characteristic of a constant source of pollutants, such as point source discharges or groundwater contaminated by acid mine drainage (AMD). Data also suggest that routine monitoring stations at dams are less effective at predicting concentrations in the greater pool in low flow conditions.

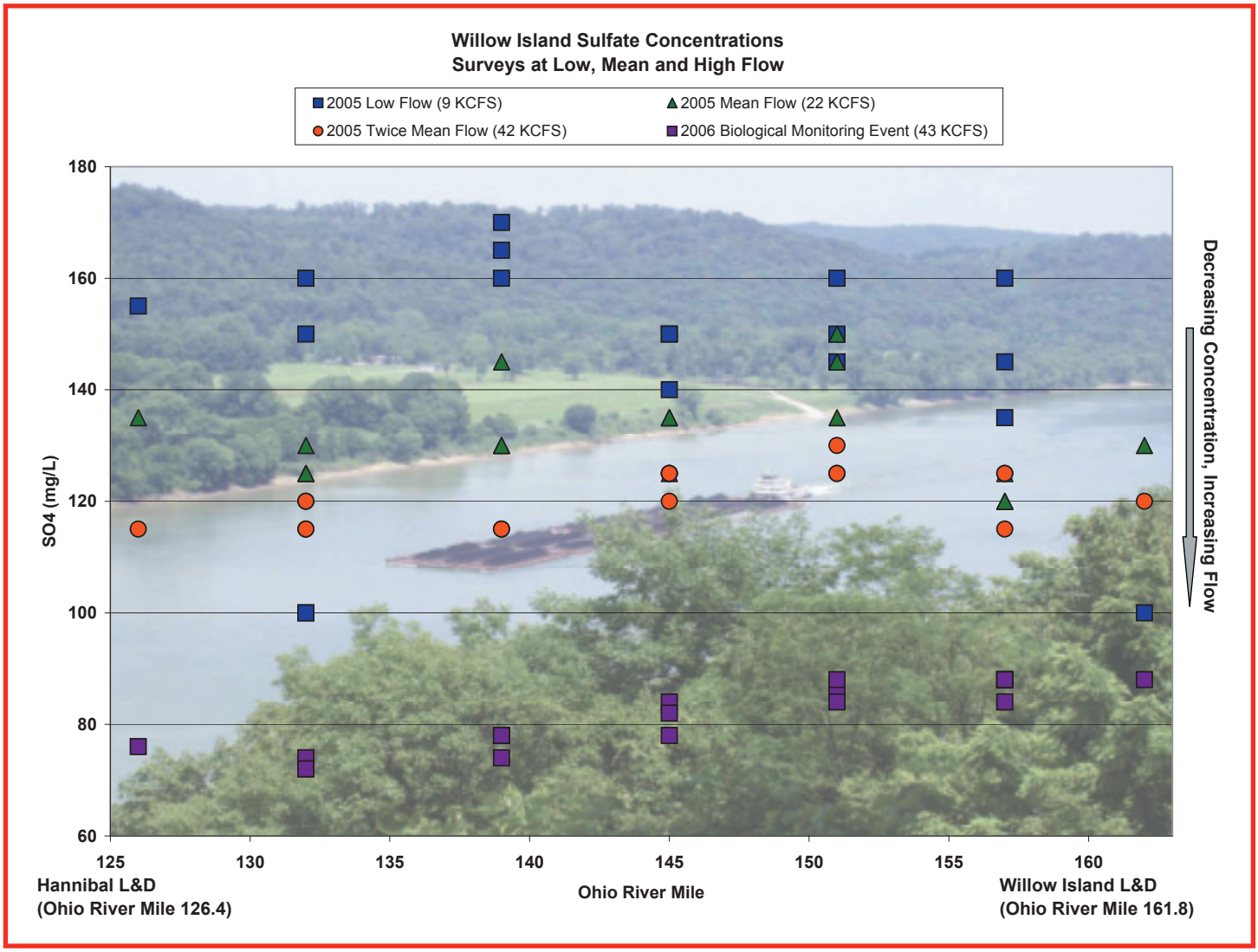


Figure 8. *Integrated Assessment of Willow Island Pool for 2005-2006*

Upper Big Walnut Creek Methodology Project

Nonpoint source water pollution is not traceable to any single source, but instead results from many activities in both urban and rural areas. This type of pollution is the leading cause of water quality impairment in the nation. Each year, billions of dollars are allocated to nonpoint control programs. ORSANCO, supported by Malcolm Pirnie Inc., has been funded by the U.S. EPA Office of Research and Development to create an adaptive methodology to evaluate and optimize water quality benefits from nonpoint source pollution abatement programs.

Phase I of the project, completed in August 2005, selected USDA's National Agricultural Pesticide Risk Analysis (NAPRA) model to characterize the risk of atrazine runoff from the Watershed's 44 soil groups compared to 135 Best Management Practice (BMP) scenarios and 3,096 crop fields (Figure 9). Phase I results suggest that the Upper Big Walnut Creek Methodology Project has sufficiently reduced the risk of atrazine runoff from exceeding drinking water standards.

Phase II of this project, scheduled for completion in August 2007, will develop an optimization procedure to help planners identify the most effective BMP for each crop field in the Watershed. This procedure will be applied to identify optimal BMP selection for the unique soil and landscape characteristics of each crop field. This methodology and subsequent optimization procedure can be applied to other watersheds nationally and adapted to other nonpoint source pollutants such as sediment, toxics, and nutrients.

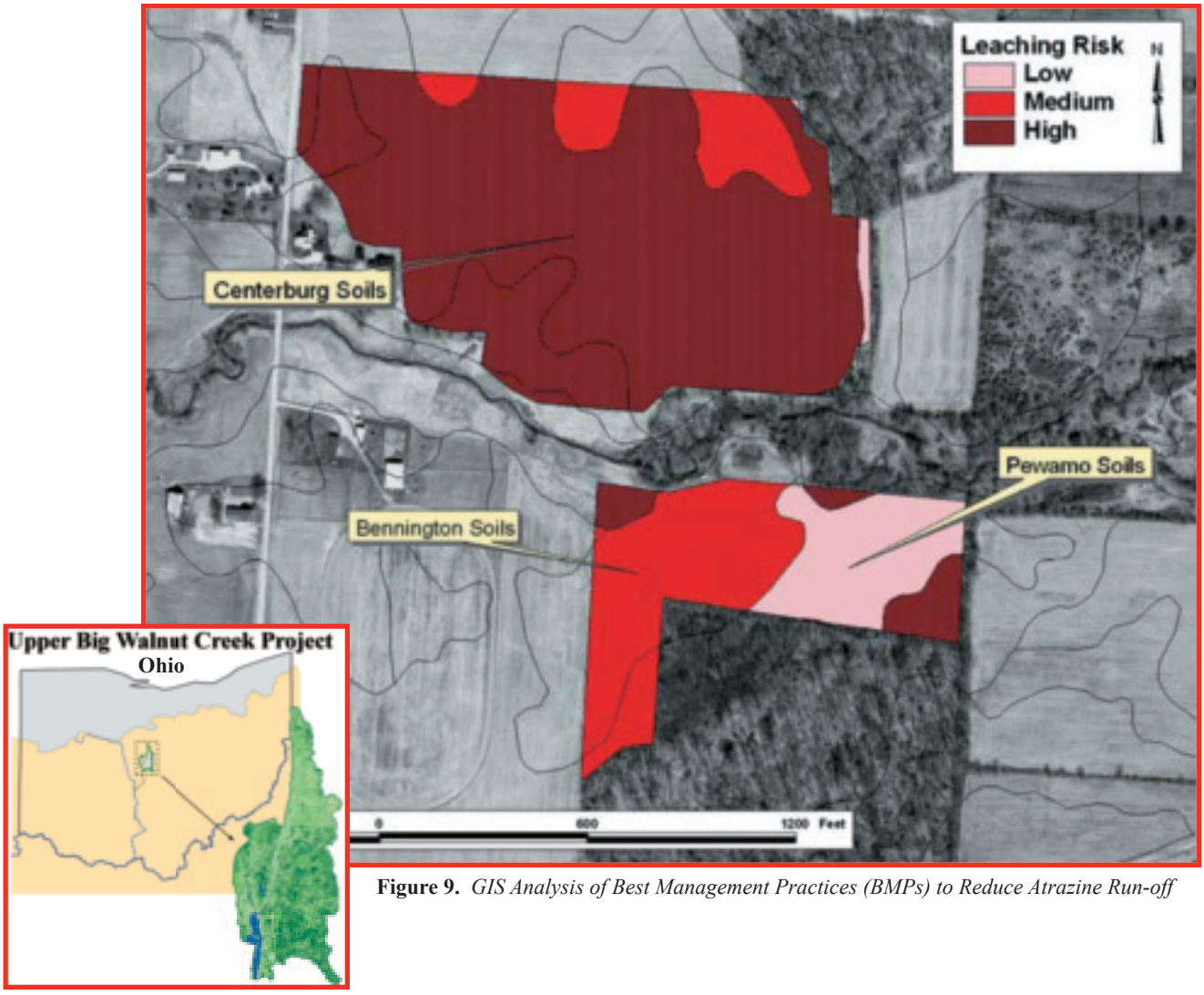


Figure 9. *GIS Analysis of Best Management Practices (BMPs) to Reduce Atrazine Run-off*

Gulf of Mexico Hypoxia Abatement

Each summer, a hypoxic zone or "dead zone" of low oxygen forms in the Gulf of Mexico, threatening the nation's largest commercial fishery (Figure 10). In 1997, U.S. EPA established the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force to develop an action plan to reduce this hypoxic zone. The Task Force identified nutrients (predominantly nitrogen and phosphorous) as the cause of the hypoxic zone, and determined that approximately 40% of these nutrients are contributed by the Ohio River and its tributaries (Figures 11-12). In response, ORSANCO convened the Ohio River Sub Basin Committee (ORSBC) to address further strategies for hypoxic zone abatement. The ORSBC has representatives from agricultural, environmental, and natural resource agencies of the Basin states.

In 2006, the ORSBC elected Ohio to be the Chair State and representative to the Task Force. The ORSBC also completed a nutrient reduction strategy for the Watershed, which brings together resources from the states within the Ohio River Basin. A two-year grant was awarded from the U.S. EPA to the ORSBC to implement pilot projects in support of this strategy.

Figure 10. *Hypoxic Zone in the Gulf of Mexico and Contributing Watersheds*

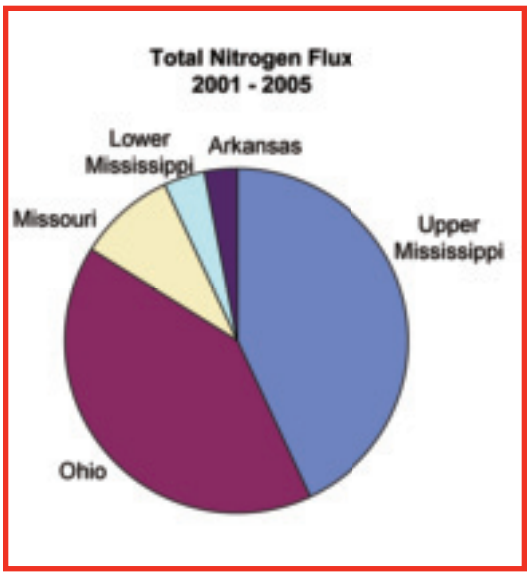


Figure 11. *Percentage of Nitrogen Contributing to the Hypoxic Zone from Each Major Watershed*

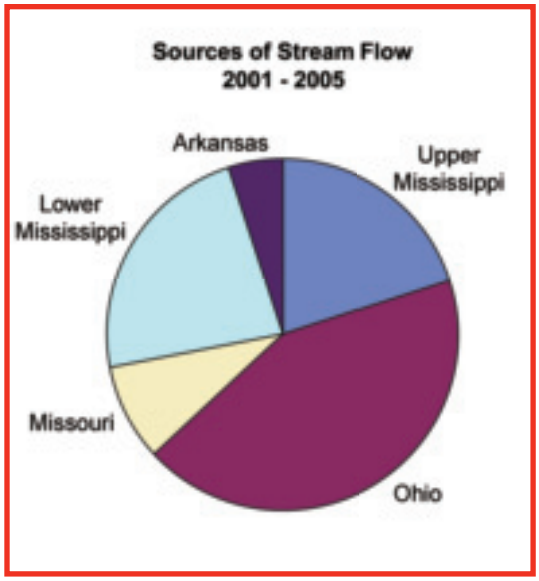


Figure 12. *Percentage of Flow to the Hypoxic Zone from Each Major Watershed*

Great Rivers Ecosystems Study

In 2004, U.S. EPA began one of the most comprehensive surveys ever conducted, focused on the great rivers of the central United States. The U.S. EPA's Environmental Monitoring and Assessment Program (EMAP) - Great Rivers Ecosystems (GRE) study will provide an assessment of the condition of these rivers. Biological attributes such as fish, macroinvertebrates, and algae, as well as components of water quality, including sediment quality, hydrology, and landscape information, will be the key components used in this assessment.

In 2006, ORSANCO continued to serve on U.S. EPA's GRE Science Advisory Committee and Technical Committee, and provided technical guidance, trained field crews, and conducted quality assurance audits. In addition, through the GRE program, ORSANCO began a cooperative agreement with the U.S. EPA, which will provide resources for extensive measures of water quality, sediment quality, and habitat and landuse information. It will build upon the efforts initiated by the Commission in 2005 to combine biological and water quality monitoring and assessment efforts, as well as allow a better understanding of the potential causes of impairment to biological communities.

Figure 13. *Great Rivers Study Watersheds*

Benthic Trawling

In 2006, ORSANCO initiated a study to assess the benefits of benthic trawling as a means of further characterizing the status and distribution of Ohio River fish communities. This new sampling technique will expand the proportion of the aquatic community used to make assessments. In 2006, trawls were conducted at all ORSANCO biological sampling locations, and will be compared to results obtained using electrofishing techniques.

Endocrine Disrupting Compounds

In 2005, ORSANCO initiated a study to investigate the presence and effects of Endocrine Disrupting Compounds (EDCs) within the mainstem of the Ohio River. EDCs have gained regional and national attention as an emerging "family" of chemicals of concern, the presence of which may be linked to a wide variety of developmental and reproductive abnormalities in aquatic life, and may also pose a threat to humans. An initial analysis of 20 fish samples showed evidence of effects that could be related to EDC exposure. In 2006, an additional 214 samples were aquired for analysis.

Large River Tributary Studies

In 2004, the Commission initiated studies comparing various fish sampling techniques. The results of this study, to be completed in 2007, will lead to a better understanding of whether subtle differences in sampling protocols result in significant differences in data.

In 2006, ORSANCO continued a study using key fish community attributes, such as species diversity, fish health, and the spread of invading species such as silver carp, to describe the condition within certain rivers and relate changes in the fish community to broad-scale changes in land use.

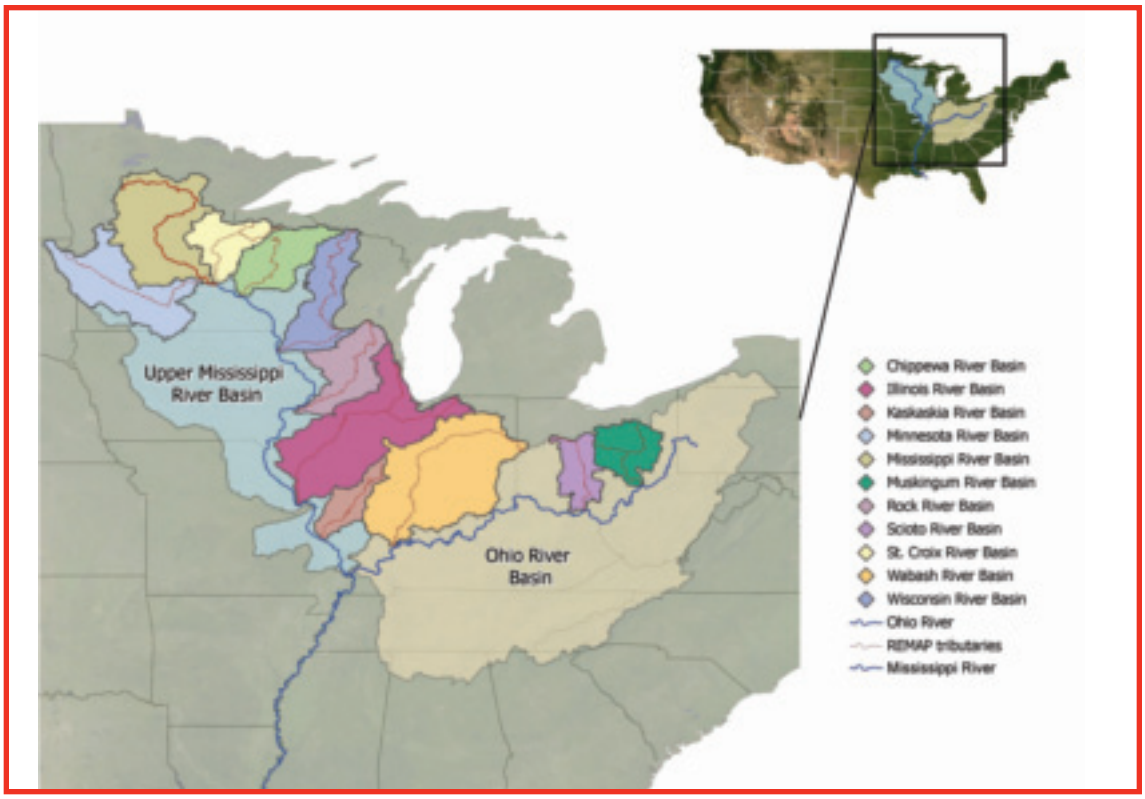


Figure 14. *Watersheds Analyzed in ORSANCO's Large River Tributary Studies*

Public Information and Involvement

The Commission continuously strives to inform and educate the public about its activities and programs. In addition to producing a variety of informational publications, ORSANCO provides the public with diverse opportunities for hands-on involvement and education.

Life Below the Waterline

Life Below the Waterline is a 2,200-gallon mobile aquarium that the Commission uses to educate the public about aquatic life and water quality in the Ohio River. The aquarium is displayed at festivals and other events throughout the Ohio River Valley. Local Ohio River fish are caught by ORSANCO staff or other local organizations and displayed in the aquarium during the event. This unique experience showcases the local aquatic environment to the public. In 2006, the aquarium was displayed at events held in West Virginia, Ohio, Pennsylvania, and Kentucky. In October 2006, an estimated 300,000 people viewed the aquarium at the Tall Stacks Music, Arts and Heritage Festival held in Cincinnati, OH.

ORSANCO's Life Below the Waterline Aquarium at Tall Stacks Music, Arts and Heritage Festival in Cincinnati, OH

A channel catfish, commonly found in the Ohio River

River Sweep

Since 1989, volunteers have participated in a clean-up event on the third Saturday in June to clear the Ohio River and its tributaries of trash and debris. The event encompasses more than 3,000 miles of shoreline from Pittsburgh, PA to Cairo, IL. The 2006 event resulted in 22,000 participants throughout the Ohio River Valley. ORSANCO also sponsors a poster and t-shirt design contest for students in grades K-12 in conjunction with River Sweep. The 2006 poster contest winner was Matt Dugger, a junior from Independence, KY. The t-shirt design winner was Lizz Royce, a sophomore from Amelia, OH. Both are students at Calvary Christian School in Covington, KY.

River Sweep volunteers along the bank of the the Ohio River

River Sweep

River Sweep Corporate Sponsors for 2006

AEP River Transportation
AK Steel
ALCOA
American Electric Power
Arch Chemical
Arkema Inc.
Ashland Chemical
Ashland Inc.
BASF
Bayer
Cargill
Casino Aztar
Dayton Power and Light
Dominion Foundation
Dow Corning
DuPont Washington Works
Duquesne Light
E. ON U.S.
Gallatin Steel
The Home Depot
Kentucky River Authority
LaFarge
Louisville and Jefferson County MSD
Louisville Water Co.
Massac County Soil and Water
Mittal USA Weirton
Neville Chemical
Nova Chemical
Procter and Gamble
Rivertown Breakdown
Sanitation District No. 1 of Northern Kentucky
Toyota

Volunteers at a River Sweep site along the Ohio Rivcer

RiverWatchers Volunteer Monitoring Program

Established in 1992, the RiverWatchers program was designed to train volunteers to monitor the Ohio River Watershed by measuring various chemical parameters such as turbidity, pH, water temperature change, phosphates, nitrates, dissolved oxygen, biochemical oxygen demand, and *E. coli*. Monitoring groups serve as "watchdogs" in areas where ORSANCO cannot conduct routine monitoring. In 2006, the program provided testing supplies and training for 20 schools and community organizations in the Ohio River Basin. Data are recorded throughout the year and sent to ORSANCO for evaluation. Participants enter their results directly on the ORSANCO website, and the data are immediately displayed online. Group leaders are trained throughout the year to participate in the program. In 2006, training workshops were held in Cincinnati, OH and Jamestown, NY. Throughout the year, programs were presented to schools and organizations to promote volunteer monitoring in the Ohio River Valley.

Two fifth-graders measure dissolved oxygen in river water at Rankin Intermediate School in Rankin, PA

In October, Chesapeake Middle School, Cincinnati State Technical and Community College, Daviess County High School, and Rankin Intermediate School collected data for World Water Monitoring Day, an international water quality monitoring event. Two new schools were added to the program for the 2005-2006 school year, including Leon Elementary in Leon, WV, and Kings Mill Junior High in Cincinnati, OH. In April, participants from the Chautauqua Lake area in New York State were also trained to collect water quality data for the 2006-2007 season. It was first time in RiverWatchers history that the program incorporated data from New York State.

A student from Switzerland County High School analyzes Ohio River water near Vevay, IN

RiverWatchers Groups

INDIANA (3): Mater Dei High School, Rising Sun High School, Switzerland County High School
KENTUCKY (4): Daviess County High School, River Ridge Intermediate School, Worthington Intermediate School, Raceland High School
OHIO (6): Chesapeake Middle School, Cincinnati State Technical & Community College, Franklin Junior High School, Kings Junior High, Marietta High School, New Richmond High School
PENNSYLVANIA (1): Rankin Intermediate School
WEST VIRGINIA (5): St. Francis Xavier School, Leon Elementary, Magnolia High School, Wahama High School, Warwood Middle School
VIRGINIA (1): Committee for the Improvement of Dickenson County

New Groups for 2006:
NEW YORK (7): Cassadaga Valley Middle/High School, Cattaraugus-Little Valley Central, Clymer Central, Maple Grove High School, Randolph High School, Roger Tory Peterson Institute, Southwestern Elementary
PENNSYLVANIA (1): Individual Participant

The ORSANCO Educational Foundation

The ORSANCO Educational Foundation (OEF) is the 501c(3) non-profit arm of ORSANCO. OEF's mission is to design, manage, and raise funds for Ohio River Basin educational programs that will foster an environmentally aware and responsible public.

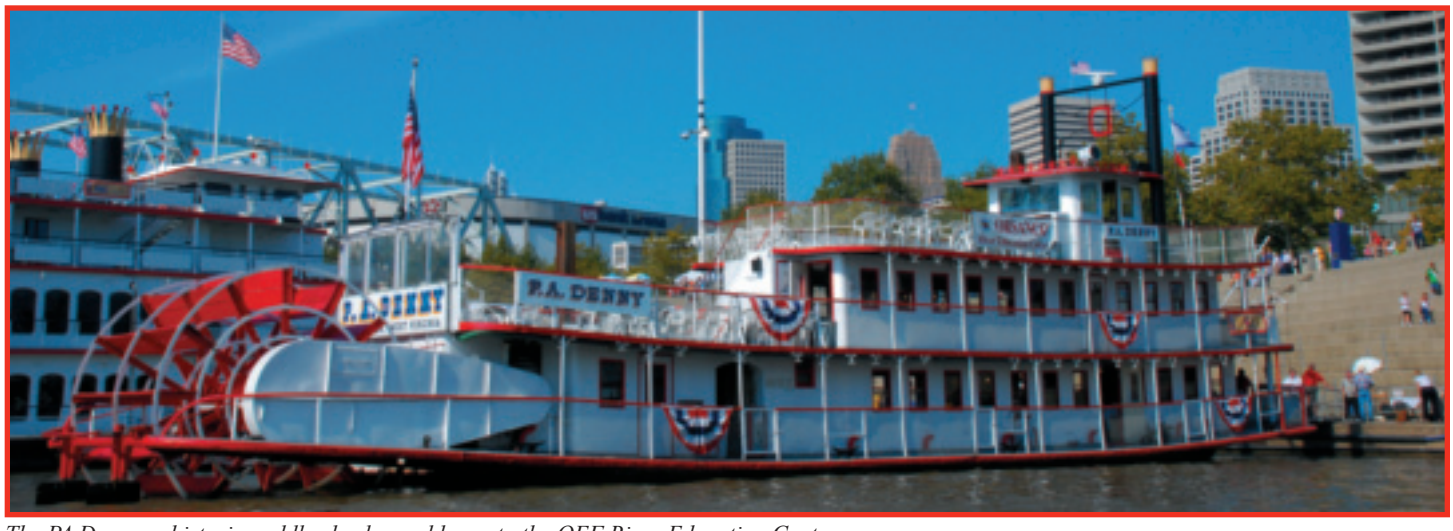
The flagship program of the Foundation is the PA Denny River Education Center, a floating science classroom on board a historic paddlewheeler. In 2006, over 400 high school students from Cincinnati, Northern Kentucky, and Southeastern Indiana boarded the River Education Center for interactive voyages focusing on water chemistry, biological testing, land use, and navigation. The Foundation also supported numerous programs throughout the year for younger children and the general public.

In May, more than 200 fifth-graders from Kanawha County Schools, WV, came aboard the PA Denny River Education Center to perform water quality tests and to study live animals with biologists from Marshall University and WV Department of Environmental Protection. Students also learned the art of navigating the river and line throwing with a local riverboat captain.

OEF also collaborated with the Newport Aquarium and WAVE Foundation on a summer "Finstitute" camp for elementary school children as well as a World Water Monitoring Day event for the general public. In October, OEF celebrated World Water Monitoring Day with Duke Energy and Griffin Industries, which sponsored hands-on water testing voyages for 100 fifth-graders from schools in Cincinnati, OH and Newport, KY.

As part of the Cincinnati Tall Stacks Festival, OEF presented a land-based educational program that focused on water chemistry and live aquatic animals, including ORSANCO's 2,200-gallon mobile aquarium.

Top: Local children participate with water quality activities at the Tall Stacks Festival in Cincinnati
Bottom: Two fifth-graders from Kanawha County, WV observe wildlife during their voyage along the Ohio River while aboard the PA Denny



The PA Denny, a historic paddlewheeler and home to the OEF River Education Center

Staff

Alan H. Vicory, Jr., P.E., DEE, Executive Director & Chief Engineer
Peter Tennant, P.E., Deputy Executive Director
Tracey Edmonds, Administrative Assistant

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David Bailey, Manager of Administrative Programs & Human Resources Programs
Donna Beatsch, Data Processing Specialist
Joe Gilligan, Comptroller
John Klear, Data Systems Administrator
Jennifer Monroe, Administrative Assistant
Paul Spires, Sr., Head of Maintenance

Source Water Protection & Emergency Response

Jerry Schulte, Manager of Source Water Protection & Emergency Response
Travis Luncan, Environmental Chemist
Lila Xepoleas Ziolkowski, Analytical and Environmental Chemist

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Jeff Thomas, Aquatic Biologist
Contractual Biological Research:
Rob Tewes, Aquatic Biologist
Ryan Argo, Aquatic Biologist

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Steve Braun, Environmental Specialist
Stacey Cochran, Environmental Specialist
Sam Dinkins, Environmental Specialist
Eben Hobbins, Environmental Specialist
Elizabeth McGuire, Environmental Specialist
Greg Youngstrom, Environmental Specialist

Public Information Programs

Jeanne Ison, Manager of Public Information/Education Programs
Melissa Mann, Public Information/Education Specialist
Alexandra Stevenson, Publications Coordinator

ORSANCO Educational Foundation

Jeanne Ison, Executive Director
Heather Mayfield, PA Denny River Education Center Program Coordinator

Years of Service Awards for 2006

Tracey Edmonds – 10 years
Sam Dinkins – 10 years

Presentations, Papers and Publications

ORSANCO employs a diverse staff with expertise in many areas. Throughout the year, staff members give presentations to a variety of organizations through meetings and conferences. Staff members also serve on committees in a number of state and interstate agencies and associations and hold memberships in a broad array of professional organizations. Representatives of ORSANCO also periodically submit professional papers relating to the Commission's role as an interstate agency conducting research and collecting data on a large river system. The following is a select list of conferences attended, presentations given, and papers submitted by staff in 2006.

Presentations and Conferences

"Comparing *E. coli* Results Analyzed by Colilert® and Membrane Filtration," 2006 National Monitoring Conference, May 7-11, 2006, San Jose, CA, (Samuel A. Dinkins).

"A 57-Year Perspective on River Basin Management: Milestones Reached and Challenges Ahead, Ohio River, USA," Linking Watersheds Workshop hosted by the Canadian Rivers Institute, New Brunswick, Canada, (Erich Emery).

"Approach to Wet Weather Water Quality Standards," Ohio Water Environment Association, Southeast Section (Jason Heath).

"Interstate CSO UAA Case Study," USEPA Workshop: *Weighing Ecological Risks, Costs, and Benefits of Use-Attainment Decisions*, (Jason Heath).

"Public Information Programs that Work," North American Association of Environmental Educators, St. Paul, MN, (Jeanne Ison).

"2005 Ohio River Bioassessment Results," Association of Mid-Atlantic Aquatic Biologists Annual Meeting, Berkeley Springs, WV, (Dan Phirman).

"Use of Biological Data to Monitor and Assess the Ohio River," Midwest Fish and Wildlife Symposium, Omaha, NE, (Jeff Thomas).

"Results of Recent Fish Population Surveys of the Ohio River," Kentucky Academy of Science, Morehead, KY, (Jeff Thomas).

"Benthic Trawling: Is there anything down there?" North American Benthological Society, Annual Meeting, Anchorage, AL, (Matt Wooten).

Professional Papers and Publications

Blocksom, K.A., E. Emery, and J. Thomas. 2006. Comparison of random and systematic site selection for assessing attainment of aquatic life uses in segments of the Ohio River. EPA 600/R-06/089. U.S. Environmental Protection Agency, National Exposure Research Laboratory, Cincinnati, Ohio.

Wooten, M.S., B.R. Johnson and E.B. Emery. 2006. Temporal variation in Ohio River macroinvertebrates: a historical comparison of rock basket sampling (1965-1971 and 2002). The Journal of Freshwater Ecology. Vol 21 (4), 561-574.

ORSANCO Publications*

"A Biological Study of the New Cumberland Pool of the Ohio River," (2004).
"A Biological Study of the Racine Pool of the Ohio River," (2004).
"A Biological Study of the Markland Pool of the Ohio River," (2004).
"A Biological Study of the J.T. Myers Pool of the Ohio River," (2004).
"2005 ORSANCO Annual Report: Working Beyond Boundaries."
"2006 Biennial Assessment of Ohio River Water Quality Conditions."
"2006 Revision Pollution Control Standards for Discharges to the Ohio River."
"Ohio River Metals Translators - Development of Ohio River Translators for Estimating Total Recoverable Permit Limits from Dissolved Metal Criteria."

**released in 2006*

Various research techniques determine water quality of the Ohio River

OHIO RIVER VALLEY WATER SANITATION COMMISSION
Statement of Activities

Year Ended June 30, 2006

Program Expenses:	
Salaries, benefits and taxes	$ 1,578,405
Travel	358,814
Supplies	275,307
Contractual services	857,003
Lab fees and delivery	307,754
Office and utilities	51,006
Repairs and maintenance	21,246
Telephone	38,301
Printing and reproduction	18,500
Depreciation	212,552
Interest	54,683
Loss on disposal of capital assets	30,691
Total program expenses	3,804,262
Program revenues:	
Operating grants and contributions restricted to specific programs:	
Federal, state, and local grants	2,406,363
Contributions	148,984
Total program revenues	2,555,347
Net program expenses (revenues)	1,248,915
General revenues:	
Grants and contributions not restricted to specific programs:	
State	1,260,900
Other assistance	77,121
Total general revenues	1,338,021
Increase (decrease) in net assets	89,106
Net assets, beginning of year	1,528,505
Net assets, end of year	$ 1,617,611

Extracted from Clark, Schaefer, Hackett & Co. Independent Auditor's Report dated June 30, 2006. Additional financial information is available in the audit report.

State Agencies, U.S. EPA

Illinois
Environmental Protection Agency
Division of Water Pollution Control
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Indiana
Department of Environmental Management
Office of Water Management
P.O. Box 6015
Indianapolis, IN 46206-6015

Kentucky
Environmental and Public Protection Cabinet
500 Mero Street 5th Floor, CPT
Frankfort, KY 40601

New York
Department of Environmental Conservation
Division of Water
625 Broadway
Albany, NY 12233

Ohio
Environmental Protection Agency
Division of Water Pollution Control
50 West Town Street, Suite 700
Columbus, OH 43215

Pennsylvania
Department of Environmental Protection
Bureau of Water Quality Management
P.O. Box 2063
Harrisburg, PA 17105-2063

Virginia
Department of Environmental Quality
P.O. Box 10009
Richmond, VA 23240

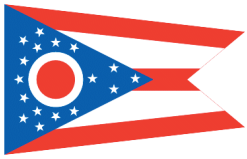
West Virginia
Department of Environmental Protection
601 57th Street
Charleston, WV 25304

U.S. Environmental Protection Agency
U.S. EPA Region 3
1650 Arch Street
Philadelphia, PA 19103

U.S. EPA Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-3104

U.S. EPA Region 5
77 W. Jackson Blvd.
Chicago, IL 60604

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