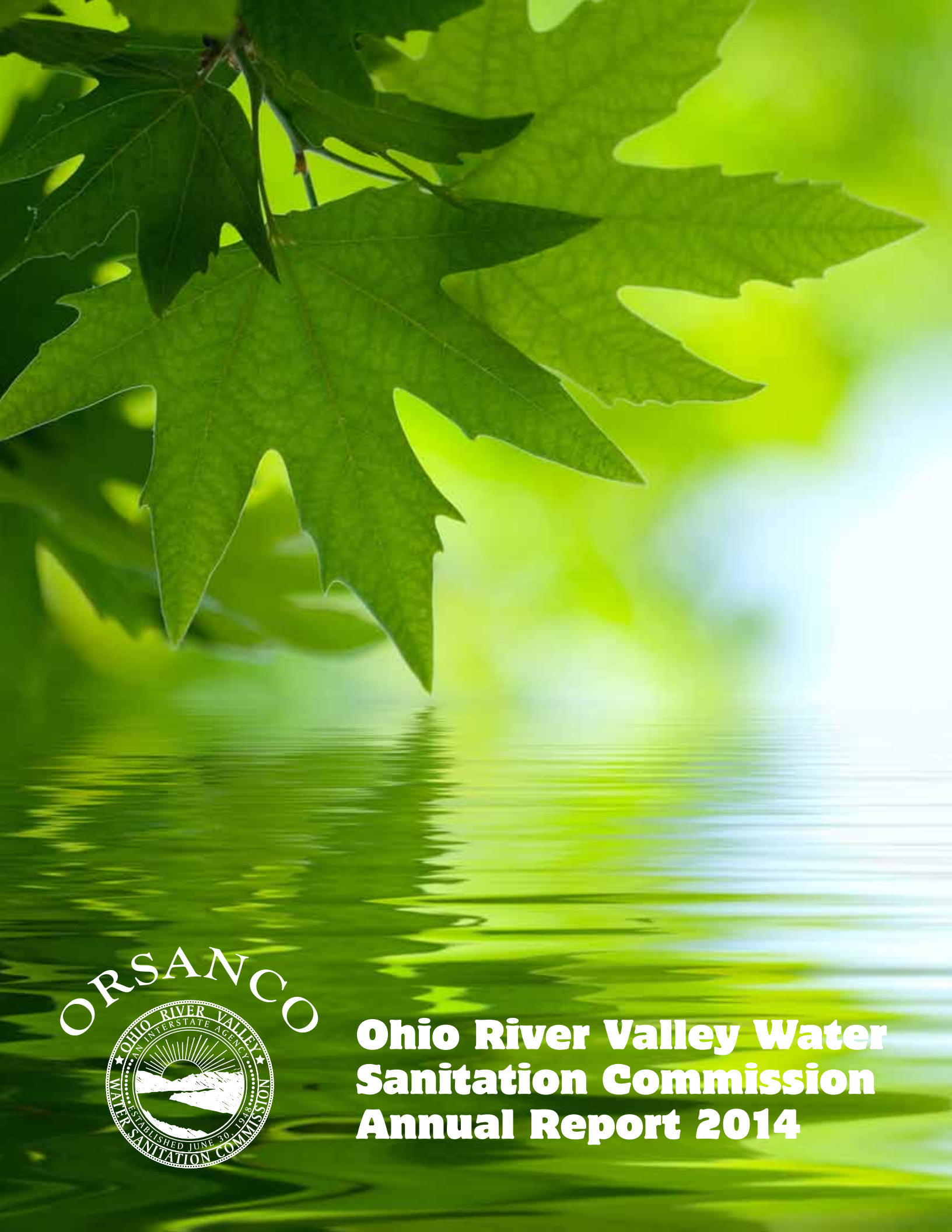

Ohio River Valley Water Sanitation Commission Annual Report 2014

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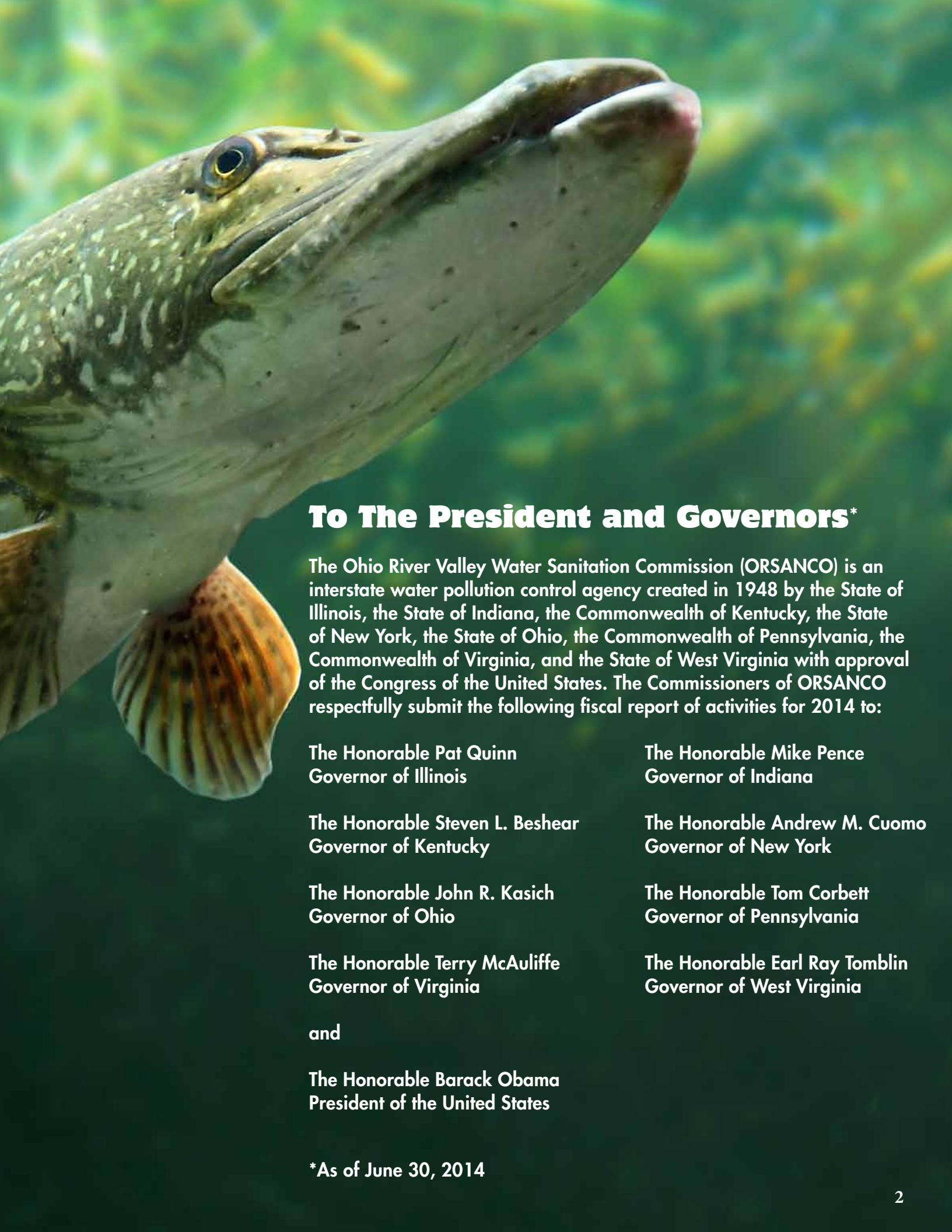


To The President and Governors*

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 fiscal report of activities for 2014 to:

The Honorable Pat Quinn
Governor of Illinois

The Honorable Steven L. Beshear
Governor of Kentucky

The Honorable John R. Kasich
Governor of Ohio

The Honorable Terry McAuliffe
Governor of Virginia

and

The Honorable Barack Obama
President of the United States

The Honorable Mike Pence
Governor of Indiana

The Honorable Andrew M. Cuomo
Governor of New York

The Honorable Tom Corbett
Governor of Pennsylvania

The Honorable Earl Ray Tomblin
Governor of West Virginia

*As of June 30, 2014

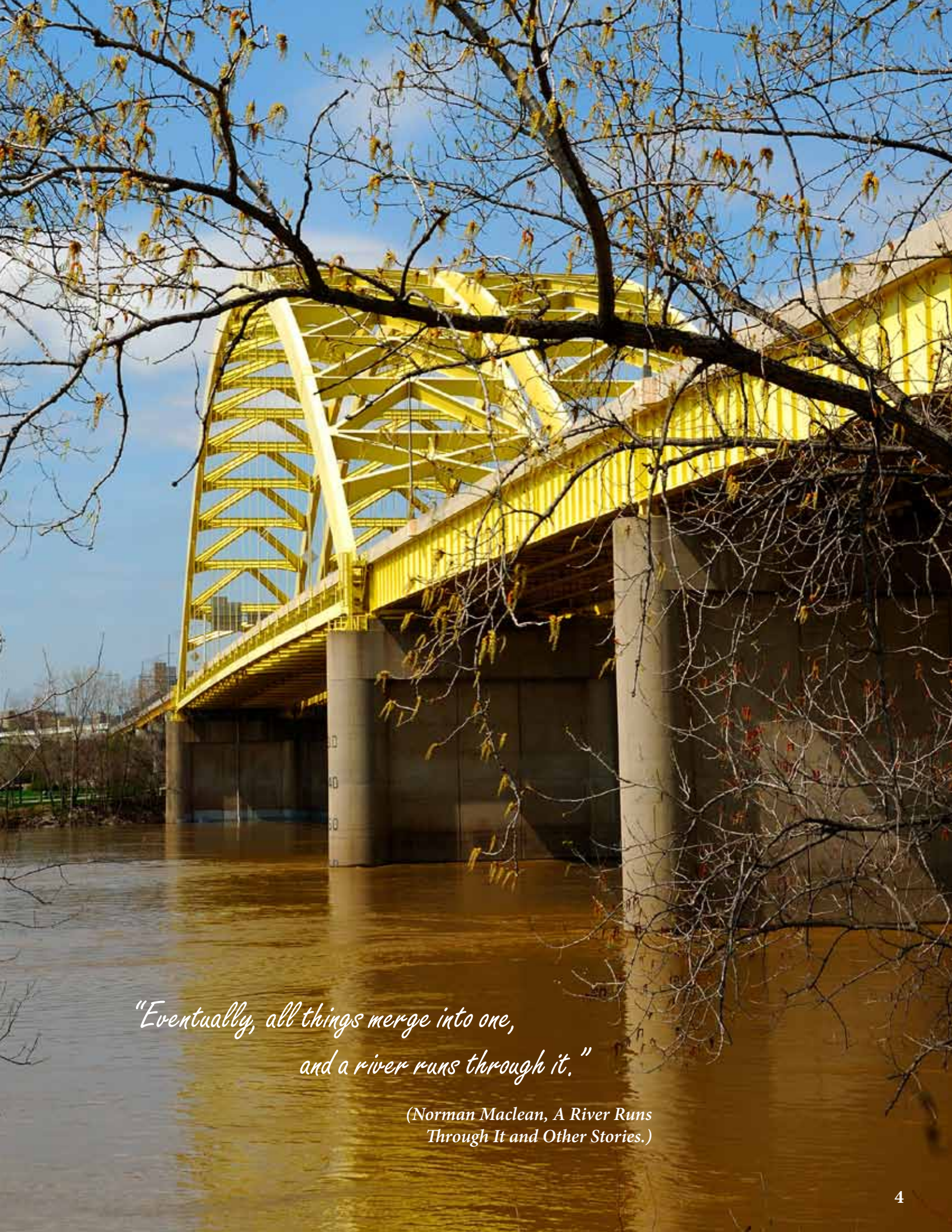
Chairman's Message

The roots of ORSANCO to protect the Ohio River were not cultivated from a single state, person, or place within the watershed, but as a revolutionary agency set up to represent multiple states, people, and waters of these states.

Recognition that the member states must work together along with multiple agencies with a similar mission creates better science and better decisions. ORSANCO works with this scientific knowledge and commitment to improve water quality. Sound science is at the core of the Commission, and our member states and water quality agencies and organizations strengthen this science by working together. The Ohio River runs through all who live within the watershed, and it is this river that brings us together as a collaborative whole to generate data to help preserve and maintain water quality for future decisions and for people both now and for generations to come.

In times of economic instability, water quality organizations who strive to continue to improve water quality face an important challenge of maintaining and continuing their quality of work with less financial assistance. ORSANCO has also faced economic challenges and has continued to produce critically important studies and information without sacrificing the programs that are necessary to maintain and continue water quality improvement for its member states. This close working relationship with the states is the foundation of the Commission, and ORSANCO has continued to build innovative partnerships with many agencies and organizations to help them in their mission for clean water. ORSANCO, our member states, and our many partners build and thrive on the foundation that our best work is a result of working together in many places and with many people, bringing us all together… where the river runs through it.

Toby Frevert, Chairman



"Eventually, all things merge into one,
and a river runs through it."

(Norman Maclean, A River Runs Through It and Other Stories.)

A Collaborative Approach to Clean Water

The Ohio River Valley Water Sanitation Commission (ORSANCO) was established in 1948 to protect the water quality of the Ohio River when the Governors and appointed Commissioners of eight states in the Ohio River Basin – Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia, and West Virginia – signed into law the Ohio River Valley Water Sanitation Compact. ORSANCO was created, not from a single state, person, or place within the basin, but as an innovative agency established to protect the water quality for multiple states and their people. This multi-state agency works with local, regional and national groups, agencies, and organizations to demonstrate that a cooperative approach to water quality management greatly improves the scientific basis for management decisions.

ORSANCO works through an extensive network of committees to advise the Commission on its programs, matters of public interest, and water quality management needs. These committees are a collaboration of water quality professionals and experts who advise and assist ORSANCO in developing scientific approaches for technical issues. The committees work cooperatively with the Commission to identify Ohio River water quality management needs and other issues. Committee members are appointed by the Chairman of the Commission. In January 2014, one of these committees, the Water Users Advisory Committee, proved invaluable in tracking an industrial chemical spill discharged to the Elk River in Charleston, WV, and subsequently to the Ohio River. Their efforts were successful in protecting downstream drinking water intakes to ensure drinking water quality for 1.5 million people in the Ohio River Valley.

A Team Effort: ORSANCO's Water Users Advisory Committee

The Water Users Advisory Committee (WUAC) is comprised primarily of drinking water utility managers. The committee directly advises the Commission on ways to ensure the Ohio River continues to serve as an excellent source of drinking water to more than 5 million people. Members of the WUAC provide in-kind services for ORSANCO's Organics Detection System (ODS) by providing day-to-day operation and maintenance of the monitoring instrumentation. The ODS and the committee members' analytical teams demonstrated their value in January 2014 during the Elk River Spill event.

Ten thousand gallons of an industrial chemical, 4-methylcyclohexane methanol (MCHM), spilled into the Elk River in Charleston, WV, making its way to the Kanawha River and on to the Ohio River. Through the efforts of the WUAC members, ORSANCO staff, and the newly renovated ODS, the MCHM contaminant plume was successfully monitored as it moved downstream. Time of travel estimates were provided to downstream utilities, providing them adequate time to prepare and implement appropriate treatment measures. Due to the combined efforts of the drinking water utilities and the ODS, no Ohio River drinking water utilities were compromised during this event.

The committee also provides input on ORSANCO's Pollution Control Standards from the viewpoint of protecting the Ohio River as a source of drinking water. Most recently, the committee provided valuable assistance and input on the development and adoption of the Commission's stream criterion for total dissolved solids.

< ORSANCO staff members Travis Luncan and Stacey Cochran present at the National Water Quality Monitoring Conference.

> L to R: Jerry Schulte, ORSANCO's Manager of External Relations; U.S. Congressman Thomas Massie; Kentucky Commissioner Ron Lovan; and ORSANCO's Executive Director, Peter Tennant.

Peter Tennant, ORSANCO's Executive Director, is recognized for his role in bringing the NQWMC to Cincinnati.

Jake Speed and the Freddies perform at the River Sweep 25 event.

ORSANCO's Active Advisory Committees

- Water Users Advisory Committee
- Publicly Owned Treatment Works Advisory Committee
- Power Industry Advisory Committee
- Public Interest Advisory Committee

Special Events

Several events in 2014 provided special recognition of the efforts of the Commission and its many partners:

Ohio River Basin Congressional Caucus Meetings

The Ohio River Basin Congressional Caucus was formed in 2009 to address critical water-oriented issues within the Basin. The major goal of the Caucus is to ensure support from Congress and the Administration for programs and projects essential to and within the watershed. ORSANCO works with Congressional staff to provide briefings to the Caucus on emerging issues. In January 2014, a briefing was held on efforts to improve the understanding of how much water is used in the Ohio River Basin and in the entire United States. The briefing took place several days after the Elk River chemical release; a brief presentation of the effects of the release and how special funding by Congress of ORSANCO's Organics Detection System enabled protection of downstream water supplies was added to the program. U. S. Congressman Thomas Massie (R-KY), a new member of the Caucus, visited ORSANCO headquarters, meeting with Commissioners and staff, learning about the Commission and its programs, the Ohio River, and many contemporary water-related issues. Congressman Massie represents Kentucky's 4th Congressional District, which extends along the Ohio River from Ashland, KY to Louisville, KY, a distance of approximately 276 river miles.

9th National Water Quality Monitoring Conference

The 9th biennial National Water Quality Monitoring Conference (NWQMC) was held in Cincinnati the week of April 28, 2014. This conference has become the premier national gathering of water quality monitoring personnel, including agency, academic, private, and citizen monitoring groups and individuals. The 2014 conference attracted about 650 individuals from 49 states and several countries. The Cincinnati location allowed many ORSANCO staff to participate and provided an opportunity to showcase the extent of monitoring activities carried out by the Commission, its member states, and its other collaborators in the Ohio-Kentucky-Indiana area.

River Sweep 25 Event

In May 2014, ORSANCO and the Foundation for Ohio River Education hosted River Sweep 25 to celebrate the sponsors, supporters, and volunteers who have made River Sweep and Ohio River education programs a success for the last 25 years. The event was held at the Behringer-Crawford Museum in Covington, KY, home to a variety of exhibits focused on local history and the Ohio River. River Sweep 25 also featured live music from Jake Speed and the Freddies, a local folk and country blues band famous for their "Ohio River Waltz". Over the years, the band has held several music festivals to raise money for River Sweep. The event honored both Jake for his support of River Sweep, as well as Jeanne Ison, ORSANCO's retired Public Information Manager, who founded and organized River Sweep for 24 years!

The Kanawha River Success Story: A Life Below the Waterline Event

In the 1960s, the Kanawha River in West Virginia was one of the most polluted rivers in the Ohio River Basin. Dissolved oxygen levels fell to zero in June of most years, and stayed there until October. Thanks to the efforts of the West Virginia Department of Environmental Protection (WVDEP) working with industries and municipalities on the river, oxygen levels are now sufficient to support a thriving population of sport fish, and the river is a recreational asset to the region. In October 2013, ORSANCO biologists collected fish from the Kanawha River and displayed them in ORSANCO's Life Below the Waterline mobile aquarium in Charleston, WV. The aquarium displayed fish in a park in downtown Charleston so that the public could view the many fish species that now inhabit the Kanawha River.



ORSANCO: Working Together to Protect the Ohio River and its Uses

Citizens in the Ohio River Basin use the river in various ways, and ORSANCO must protect these uses and help improve water quality for the citizens of the Ohio River Valley. The Ohio River is a source of drinking water for over 5 million people, a major transportation route for coal and other energy products, and a natural resource for many plants and animals. ORSANCO works with many state and local agencies and organizations to provide safe drinking water, protect aquatic life, and guide citizens with decisions about fish consumption and recreational activities in and around the river. ORSANCO's Pollution Control Standards outline these specific uses for the Ohio River and establish certain criteria to ensure that the river is capable of supporting these uses.

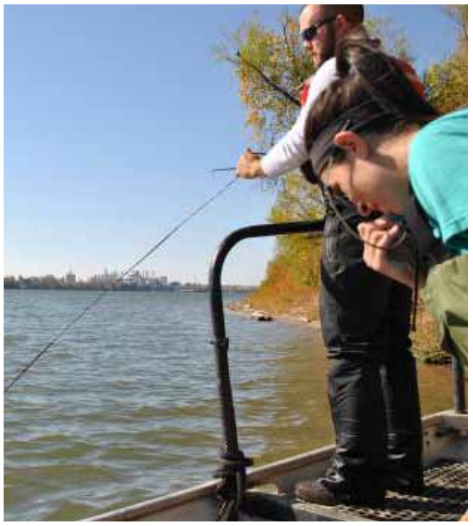
Pollution Control Standards

The Commission revised its Pollution Control Standards for Discharges to the Ohio River in 2013. This revision extended the date of the prohibition on mixing zones for bioaccumulative chemicals of concern to October 2015. A mixing zone is an area where the wastewater discharged from a permitted facility enters and mixes with the surrounding water body. This extension will allow for a re-evaluation of the mixing zone prohibition for the Ohio River. Two webinars and a public hearing were held to gather public comments. More than 50 individual public comments were received on this issue; most were opposed to the extension and several were in favor of the revision.

The Commission is also currently undertaking a new review of its Pollution Control Standards for Discharges to the Ohio River. The Commission initially identified several topics for evaluation including the mixing zone prohibition and criteria for mercury, total dissolved solids (TDS), *E. coli*, temperature, ammonia, and nutrients. Two webinars were held for the public, and comments were received from 35 entities. The Commission will be developing specific proposals on several of these issues in 2014-2015.

In 2014, ORSANCO also received a mixing zone prohibition variance request to its Pollution Control Standards. A variance is a temporary modification of ORSANCO's Pollution Control





Standards granted to a specific discharger whose request has been subject to extensive review by the Commission. ORSANCO will only consider a variance when there are no other reasonable alternatives available to a discharger to meet the requirements of the Commission's Pollution Control Standards. Variances are allowed for a maximum five-year period. During that period, the discharger must develop a pollution reduction plan to eventually meet all the requirements of the Pollution Control Standards.

Broad Scan for Unmonitored Pollutants

In 2014, ORSANCO completed a survey of pollutants not included in routine monitoring programs by analyzing samples for 113 pollutants with water quality criteria. Sampling was conducted in high and low flow conditions at three upper, middle, and lower river segments of the Ohio River. Results of that study show no detections of the previously unmonitored pollutants and do not indicate a need for additional parameters in routine monitoring programs.

The National Water Quality Inventory Report to Congress: 305(b) Report

In 2014, the Commission approved its Assessment of Ohio River Water Quality Conditions. This report contains ORSANCO's water quality assessment for the attainment of the beneficial uses of the Ohio River, including aquatic life, public water supply, contact recreation, and fish consumption. The entire Ohio River was classified as fully attaining the aquatic life and public water supply uses. Two-thirds of the river was designated as impaired for contact recreational use, and the entire river was designated as impaired for fish consumption due to levels of polychlorinated biphenyls (PCBs) and dioxin. A new assessment methodology based on the U.S. EPA's recommendation was employed to evaluate the fish consumption use for mercury. Results indicated that mercury was not a cause of impairment for fish consumption.

The Ohio River and its tributaries provide millions of people in the Ohio River Basin with a source of drinking water for many different activities including washing, cooking, cleaning, and countless other daily uses. The water goes through traditional and enhanced treatment processes prior to use; however, ORSANCO monitors river water quality closely to assure high quality source water for the people in the Ohio River Basin.

SOURCE WATER PROTECTION

ORSANCO's Source Water Protection Program serves to protect Ohio River drinking water utilities and consumers through the implementation of a variety of program-specific activities. Most of the activities are geared toward some form of water quality communication. Through this program, a wide range of information sources are accessed regarding activities on or near the Ohio River and in the Ohio River Basin that have the potential to impact water quality for drinking water utilities. Drinking water utilities use this information in conjunction with their own monitoring efforts to help understand the water quality conditions of the river and develop appropriate treatment strategies when needed. The program also serves as a forum for meetings and discussions with state and federal agency personnel regarding source water protection, water quality management, and emergency response activities. Source Water Protection Program initiatives include communication of water quality conditions; activities that could affect, influence, or otherwise threaten water quality conditions; and interstate communication between state and federal agency personnel. With this program, a comprehensive understanding of activities, procedures, personnel, agencies, and utilities coalesce to provide the maximum coordinated protection for Ohio River drinking water utilities and the 5 million consumers who rely on them daily for their drinking water.

Emergency Response Preparedness and Spill Tracking

ORSANCO's Emergency Response Preparedness and Spill Tracking programs continue to demonstrate

Working Together to Protect Drinking Water

their value during actual spill events. The Emergency Response Preparedness program serves to bring together state and federal emergency response and water quality agency personnel who will work together during spill events or other incidents that may impact the water quality of the Ohio River. Due to the interstate nature of the Ohio River, developing a better understanding of the personnel, authorities, capabilities, and limitations of each agency is critical to coordination of response activities during actual spill events. Through this program, boundaries (as they exist between states and federal agencies the length of the Ohio River) are softened, promoting and supporting better, faster, and more efficient cooperation and coordination to protect the resource and drinking water interests.

Organics Detection System

Another key component to the Source Water Protection Program is the Commission's Organics Detection System (ODS). A premier system internationally, this program has been the front line water quality sentinel for Ohio River water quality and Ohio River drinking water utilities since 1978. The location of the pollution incident responsible for the creation of the ODS, the Kanawha River in Charleston, WV, has the unfortunate distinction of being featured again in 2014, when ORSANCO responded to the Elk River Spill event.

On January 9, 2014, a release of MCHM from a chemical storage facility in Charleston, WV, contaminated the Elk River and the drinking water supply for the Kanawha Valley Water Treatment plant that serves all or parts of 9 counties surrounding Charleston, WV. Over a quarter of a million people were affected for multiple days due to this event.

The first agency on the scene of the spill was the West Virginia Department of Environmental Protection (WVDEP), who responded to citizen complaints of a powerful sweet smell in their drinking water. WVDEP reported the spill to the National Response Center (NRC), who issued a

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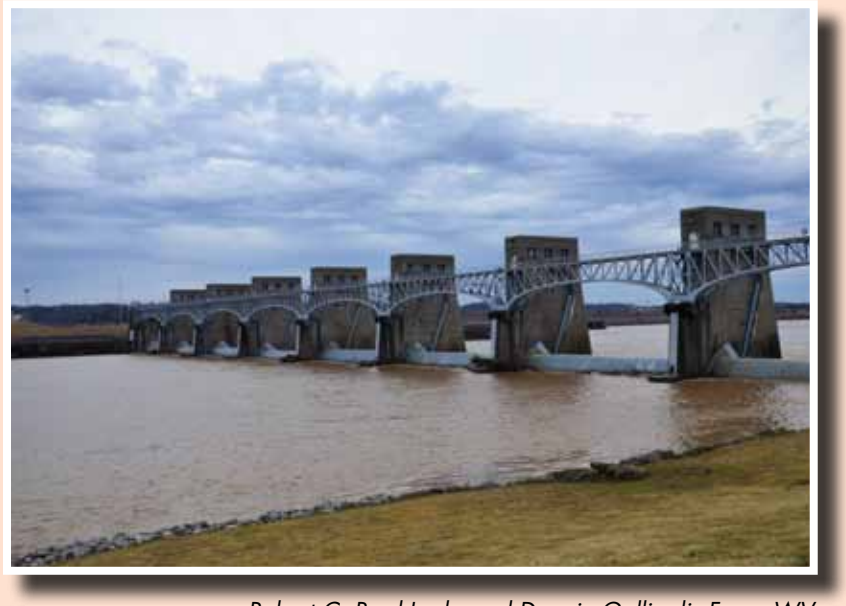
Cincinnati's Drinking Water Intake on the Ohio River



Robert C. Byrd Locks and Dam in Gallipolis Ferry, WV

Transporting potable water from an Ohio River drinking water utility

formal alert to ORSANCO and other agencies. The MCHM traveled downstream 58 miles from the spill site to the Ohio River. Once in the Ohio, it threatened the water resource relied upon by more than 1.5 million people. The ODS was ready for the challenge, and upgrades made to ODS instrumentation proved essential to the detection and identification of the MCHM. The substance is an industrial, coal-cleaning chemical, and little is known about its affects to human health after exposure.

The first Ohio River drinking water utility to be effected by the spill was West Virginia American Water's (WVAW) Huntington Drinking water plant in Huntington, WV, which is part of the ODS. ORSANCO's ODS staff worked with WVAW's Huntington water staff to develop a detection methodology and calibration curve that provided accurate concentration data for the MCHM plume as it approached and passed by their intake. Downstream utilities were notified of the plume's location and estimated concentration. Time of travel projections were developed by ORSANCO and distributed to downstream utilities along with treatment information provided from upstream utilities. The plume was tracked by the ODS for over 400 Ohio River miles.

The coalescence of ORSANCO's various programs, including the Source Water Protection Program, the Emergency Response Preparedness Program, the Spill Tracking and Notification Program, the Water Users Advisory Committee, and the ODS culminated in a well-coordinated, exceptional spill response effort. Due to the efforts of many individuals, no Ohio River utilities were compromised by the MCHM contaminant plume.

ODS MVP: Glenn Anderson (1957-2014)

ORSANCO could not operate its ODS program without its many partners and people who work behind the scenes in its various locations along the river. One such invaluable member of the ODS team was Glenn Anderson from Pennsylvania American Water Company (PAWC). Glenn was employed by PAWC as a chemist at the Hays Mine drinking water treatment facility in Pittsburgh, PA for more than 29 years.

Soon after his employment at PAWC, Glenn became familiar with purge and trap technology and the gas chromatograph (GC) and became one of the most respected analysts within ORSANCO's ODS system. He was able to keep the same GC system running for over 19 years! Years later, PAWC took advantage of more sophisticated technologies and purchased a GC/MS (gas chromatograph/ mass spectrometer) unit to identify volatile organic substances in Ohio River water samples. Once again, Glenn took on the challenge and mastered the art of operating a highly complex piece of analytical instrumentation. His advice and expertise were relied upon in upgrading ORSANCO's ODS program, and he was the "go-to guy" when other ODS operators needed assistance in mastering the GC and GC/MS technologies.

Glenn was a highly gifted analytical chemist with a desire for perfection, but operating the ODS for ORSANCO was only one of the roles he had at PAWC. In everything he did, Glenn followed

the method protocol. He was meticulous and exacting when it came to preparing standards for calibration curves, and the data he generated was always of the highest quality.

Glenn put others first, and his children and grandchildren were very precious to him. He enjoyed hunting, camping, archery, fishing, and dartball. He was also a Pittsburgh fan to the core, from the Steelers and the Penguins to the Pirates. The sadness in his passing in spring 2014 reflects our gratitude in the many years of service and dedication that Glenn gave to the ODS program. He is missed and fondly remembered.

TDS Bromide Study

The Ohio River Users Program is a prime example of how ORSANCO engages stakeholders to improve understanding of the Ohio River through collaboration. The need for strong scientific data is the driving force behind this innovative program. The program's advisory committee brings together representatives from a diverse group of industries that rely on the river to conduct their business, along with water and wastewater utilities, to identify and support relevant projects that will improve the scientific basis for water quality management decisions. A study to characterize dissolved solids in the Ohio River and selected tributaries is the most recent example of the value provided by this collaborative initiative. This project was a response to the lack of existing total dissolved solids (TDS) data that was needed to evaluate Ohio River conditions relative to the TDS ambient water quality standard adopted by the Commission in 2011.

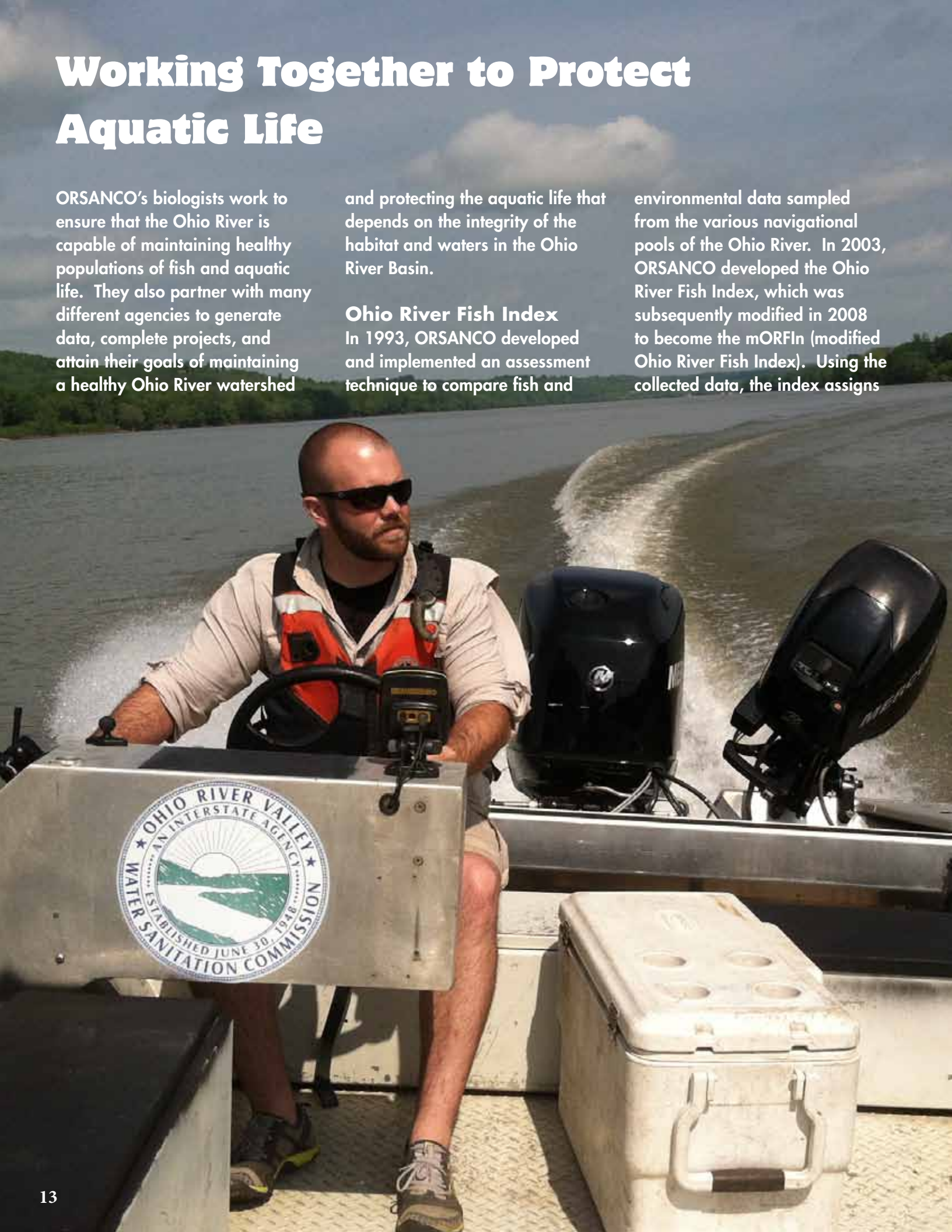
ORSANCO partnered with municipal water utilities and industries with surface water intakes to conduct a year-long monitoring effort involving weekly sample collection at 11 Ohio River and 5 tributary locations. Samples were analyzed for TDS and 14 individual ion constituents. Laboratory results indicate that all samples collected from the Ohio River were well below the 500 mg/L standard. Sulfate and bicarbonate were the most abundant ions detected, followed by calcium, chloride, and sodium. The Commission approved the final report in February 2014 and published the complete results on ORSANCO's website at www.orsanco.org.

Working Together to Protect Aquatic Life

ORSANCO's biologists work to ensure that the Ohio River is capable of maintaining healthy populations of fish and aquatic life. They also partner with many different agencies to generate data, complete projects, and attain their goals of maintaining a healthy Ohio River watershed and protecting the aquatic life that depends on the integrity of the habitat and waters in the Ohio River Basin.

Ohio River Fish Index

In 1993, ORSANCO developed and implemented an assessment technique to compare fish and environmental data sampled from the various navigational pools of the Ohio River. In 2003, ORSANCO developed the Ohio River Fish Index, which was subsequently modified in 2008 to become the mORFIn (modified Ohio River Fish Index). Using the collected data, the index assigns



scores to rate the relative condition of fish communities among the pools. Each year, ORSANCO biological crews collect data from up to four navigational pools using a random, probability-based design that selects 15 sampling locations within each of the pools. Fish are captured, identified, measured, and inspected prior to release. The data obtained are converted into multiple metrics (e.g. diversity, abundance, pollution tolerance, etc.) that are added together for each site and compared to previous results in order to calculate the mORFIn score values.

ORSANCO biological crews assessed Dashields, Hannibal, RC Byrd, and Smithland pools in 2013 and are sampling Belleville, Markland, McAlpine, and Olmsted/Open Water pools in 2014. All four pools sampled in 2013 were found to be in "good" condition. Over the years, the various pools have generally ranked from "fair" to "very good." To date, no pools have ranked as "poor" or "very poor."

Ohio River Macroinvertebrate Index

ORSANCO biologists have collaborated extensively with outside agencies on the development of a macroinvertebrate (macro) index since 2004. In 2007, ORSANCO was awarded a U.S. EPA Environmental Monitoring and Assessment Program (EMAP) cooperative grant to continue work on the development of the index. The grant allowed for additional environmental data (e.g. water quality, sediment quality, nutrient levels) to be collected alongside normal macro samples. With these data, ORSANCO was able to better identify and classify the environmental stressors affecting macro assemblages in the Ohio River; an essential first step in developing a biological index. After the EMAP co-op concluded, the Ohio River Macroinvertebrate Index (ORMIn) was created and tested in ORSANCO's annual pool assessments. In addition, the Louisville District of the U.S. Army Corp of Engineers (USACE) contributed funds allowing ORSANCO to continue collecting the essential environmental data from two pools within their jurisdiction. These data have given ORSANCO the opportunity to test and validate the newly developed ORMIn before its incorporation in annual assessments.

Ohio River Basin Fish Habitat Partnership

The Ohio River Basin Fish Habitat Partnership (ORBFHP) is one of 19 current officially recognized working units of the National Fish Habitat Partnership (NFHP) which aims to protect, restore, and enhance the nation's fish and aquatic communities through partnerships that foster fish habitat conservation. ORSANCO is one of a diverse group of entities that includes state, regional, and federal agencies, non-governmental organizations, and universities that helped form the ORBFHP and help steer its activities today. In addition to serving as Steering Committee chair, ORSANCO staff members have also participated as Science Committee chairs, helping to guide the partnership through a collaborative effort with other FHPs across the Midwest to develop data-driven, basin-wide aquatic habitat assessments that led to the identification of priority action areas. It was this effort, in part, that helped the ORBFHP become the only FHP in the country to be evaluated at the highest level (Level 3) in a new funding allocation strategy employed by the NFHP. This evaluation led to three times the resources being directed to the Ohio River Basin for aquatic habitat and water quality improvements in 2014 than in any previous year. ORSANCO and the ORBFHP are also currently collaborating with other Midwest FHPs and the U.S. Fish and Wildlife Service (USFWS) to develop a web-based habitat improvement application that will consist of three tools to aid managers in directing resources.

continued

When completed, users will be able to: 1) visualize current landscape conditions within the entire basin; 2) rank watersheds based on a large suite of anthropogenic or natural landscape factors; and 3) estimate future consequences to aquatic habitats and in-stream variables due to changes in landscape conditions.

National Rivers and Streams Assessment

The National Rivers and Streams Assessment (NRSA) is one of four National Aquatic Resource Surveys that are probability-based studies designed to provide nationally consistent and scientifically-defensible assessments of our nation's waters that can be used to define current conditions, identify major impacts, and track changes in condition over time. Rivers, streams, coastal waters, wetlands, lakes, and reservoirs across the country are rigorously surveyed every five years through a collaborative process involving the U.S. EPA, state, regional, and tribal water quality agencies, and many other organizations. The NRSA is a two-year survey that developed from the 2004 Wadeable Streams Assessment and the 2005-2006 Environmental Monitoring and Assessment Program - Great River Ecosystems survey. ORSANCO was invited by the U.S. EPA and several member states to participate in the first NRSA survey period in 2008-2009, sampling boatable sites on the main stem of the Ohio River and throughout Pennsylvania, Kentucky, and Indiana. U.S. EPA and three states again invited ORSANCO to participate in the 2013-2014 survey. Between the two years, ORSANCO staff and contractual biologists will sample 42 sites throughout Pennsylvania, Kentucky, and Ohio. During the 2013 field season of May to September, crews successfully completed sampling at 27 of these events and spent much of the off-season completing data submission and quality assurance protocols associated with the program and preparing for the final 15 events.

Ohio River Invasive Species Control

The Ohio River has been subject to invasions from exotic aquatic species since the mid to late 1800's when common carp were first encountered in the basin. Since that time, numerous other aquatic animals and plants have made their way into the river. In addition to common carp, the most notable animals to become established in the Ohio River include zebra mussels, Asiatic clams, rusty crayfish, striped bass and their hybrids, white perch, goldfish, and grass carp. More recently (since the late 1990's), two new carp species, bighead carp and silver carp, and a submerged aquatic plant, hydrilla, have all been currently experiencing population explosions in the river at the expense of native species.

Bighead and Silver Carp

Although found in the river as early as 1983, bighead and silver carp did not start becoming nuisance species until the late 1990's. Introduced into Arkansas from China, both species migrated up the Mississippi River and quickly became established in the lower Ohio River. They are currently spreading upstream with the leading edges of their populations believed to be just upstream of Cincinnati. While much federal attention has been directed towards keeping the species from reaching the Great Lakes, efforts to reduce populations in the Ohio River have been primarily state-driven. U.S. Fish and Wildlife Service (USFWS) has been working with several state agencies to track the leading edge of the invasion, but most of their resources are directed towards ensuring the carp do not enter the Great Lakes via existing connections between the Great Lakes Basin and the Ohio River Basin. In 2013, USFWS assisted West Virginia Department of Natural Resources (WVDNR) and Kentucky Department of Fish and Wildlife Resources (KYDFWR) to place 58 stationary receivers between Willow Island and Meldahl Locks and Dam to track the movements of 24 carp implanted with transmitters. In addition, the effort has included the collection of 200 water samples from Pittsburgh, PA to Wheeling, WV that were tested for carp DNA. Of these samples, two tested positive. In a similar study, several agencies collaborated to test 222 water samples from the Muskingum River in Ohio and detected genetic material from bighead carp in 10 of them.

In addition to monitoring, several state agencies have been sponsoring and encouraging practices to remove bighead and silver carp from state waters, including the Ohio River and its direct tributaries. In the spring of 2013, KYDFWR hosted the first commercial fishing event which successfully removed 42 tons of the two carp species from Barkley and Kentucky lakes. Other states such as Indiana are encouraging more people to eat silver carp as a means of population control. ORSANCO biologists have been involved in carp monitoring and removal efforts, participating in workshops and meetings and reporting occurrences of the two species observed during routine sampling.

Hydrilla

ORSANCO biologists have also played a role in working with other agencies to develop monitoring and eradication plans for the invasive submerged plant hydrilla. This nuisance species was first observed in the upper sections of the Ohio River in the mid-2000's and has spread upstream into the Monongahela River and downstream to below Greenup Locks and Dam, covering both shorelines in extremely dense mats. ORSANCO biologists worked closely with the ORBFHP and researchers from Northwest Missouri State University to develop remote sensing techniques using satellite imagery to detect dense beds of submerged aquatic vegetation (presumably hydrilla) on the shorelines of the river. ORSANCO biologists also attended an information exchange workshop on methods to eradicate the plant hosted by ORBFHP and the Appalachian Ohio Weed Control Partnership. The workshop was part of a larger educational effort funded by the ORBFHP and coordinated by the Central Hardwoods Invasive Plant Network.

Working Together to Protect Recreational Use

ORSANCO monitors water quality for the safety of people who live in the Ohio River watershed during the spring, summer, and fall when people engage in recreational activities such as fishing, boating, skiing, and swimming.

Contact Recreation Bacteria Monitoring
During the recreation season from April through October, ORSANCO monitors bacteria levels in six urban areas with combined sewer systems on the Ohio River. In addition to ORSANCO's environmental specialists, staff from local water plants and wastewater treatment plants sample these sites every week. The samples are then taken to a local laboratory to be analyzed for bacteria, including *E.coli* and fecal coliform. These bacteria indicate the presence of fecal contamination that can cause illness after swimming, jet-skiing, or participating in other activities with the potential for direct contact with the river. Bacteria monitoring data and updates regarding water quality are available to the public on ORSANCO's website at www.orsanco.org. ORSANCO and Sanitation District No. 1 of Northern Kentucky (SD1) also worked with Cincinnati Metropolitan Sewer District (MSD) to develop the Recr8OhioRiver app to help the public make informed decisions about recreating on the Ohio River. MSD developed Recr8OhioRiver, a website and free wireless app, to help predict *E. coli* counts in the Ohio River. Further information is available online at www.recr8ohioriver.org.

Bacteria levels are typically lower during the dry summer months; however, all six urban areas can be unsuitable for contact recreation for some period of the season, especially when there is frequent rainfall. Because of the unpredictability of the weather, ORSANCO has also provided monitoring for events that bring numerous people in contact with the River.

In 2014, ORSANCO monitored for the following events:

- The Great Ohio River Swim (Cincinnati, OH)
- Cincinnati Triathlon (OH)
- Louisville Triathlon (KY)
- Ironman Louisville (KY)

Working Together to Investigate Current Water Quality Issues

NUTRIENT REDUCTION ACTIVITIES

ORSANCO works cooperatively with various federal, state, and local agencies to address nutrient pollution within the Ohio River Basin and in other connecting watersheds. Excess nutrient pollution, including nitrogen and phosphorus, leads to significant water quality problems such as harmful algal blooms, hypoxia (low oxygen), and negative impacts on aquatic life and habitat.

Nutrient Trading Program

The Electric Power Research Institute (EPRI) is leading an effort to develop an interstate water quality trading program for the Ohio River Basin. Partners in the effort include American Farmland Trust, ORSANCO, the University of California at Santa Barbara, and the Ohio Farm Bureau. The project partners are facilitating "pilot trades" of nutrients between point and nonpoint sources, marking the first trades in what could provide a model for dischargers to comply with emerging requirements in many watersheds facing high nutrient levels.

Water quality trading programs in the United States have been confined by political boundaries, while many pollutants, notably nutrients, are problems on a watershed scale. Some regions, such as the Chesapeake Bay, have allowed cross-state trading; however, even the Chesapeake Bay Nutrient Trading Program has limited participation due to conflicting rules between the states surrounding the Bay.

The Ohio River Basin Trading Project is the first trading project designed from its inception to be interstate in nature. During the pilot phase of the project, three states (Ohio, Kentucky and Indiana) agreed to allow an agricultural best management practice (BMP) in one state to offset the permit limit in another state. The Pilot Trading Plan 1.0 for the Ohio River Basin Interstate Water Quality Trading Project was signed on August 9, 2012 by the Commissioners of the agricultural and permitting agencies of each of the states. The first trades under this agreement were completed on March 11, 2014.

The project also funded 20 projects which resulted in the removal of nearly 50,000 lbs of nitrogen and phosphorus from the Ohio River Basin. The first "credits" generated from these projects were sold in March to Duke Energy, American Electric Power, and Hoosier Energy.

In March, Peter Tennant, ORSANCO's Executive Director, made a testimony to a subcommittee of the United States House of Representatives regarding the role of nutrient trading to achieve Clean Water Act goals and the role of collaborative leadership and cooperation of many states, federal agencies, local utilities, and industries to make the program successful.

Gulf of Mexico Hypoxia

A hypoxic (low oxygen) zone develops in the Gulf of Mexico near the Mississippi River every summer. It is caused by excess nutrients coming from the Mississippi River that feed large algal blooms in the Gulf. These algal blooms are eventually decomposed by bacteria which consume oxygen in the process. The resulting area of low dissolved oxygen has been measured in excess of 20,000 km^2 (about the size of the state of Massachusetts). As a member of the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force, ORSANCO helps to set priorities for nutrient reductions throughout the Mississippi River and Ohio River basins.

The Mississippi River/Gulf of Mexico Watershed Nutrient Task Force began as a partnership of 5 federal agencies and 10 states bordering the Mississippi River. In 2001, the Task Force adopted an action plan to guide the group in reducing nutrients to the Gulf of Mexico. Although not a member of the Task Force at the time, ORSANCO convened the Ohio River Sub Basin Steering Committee to help coordinate the implementation of the Action Plan. Over the years, ORSANCO has worked to add the Ohio River Basin states to the Task Force; currently Indiana, Ohio, and Kentucky are members.

In a 2013 update to the Action Plan, ORSANCO was named a member of the Task Force and joined the states and federal agencies as a full partner.

As a partner, ORSANCO has worked with states in developing their nutrient reduction strategies. In the future, the Commission will help the states implement these strategies to meet the goals of the Action Plan and to restore the Gulf of Mexico.

Wabash River Nutrient Monitoring

Under a grant from the Indiana Department of Environmental Management (IDEM), ORSANCO is engaged in a study of the output from the Wabash River. The initial period of this project began in July 2010 and ended in September 2011. The project was reauthorized for an additional 3 years beginning in January 2012. In 2014, ORSANCO completed the third year of sampling. The program is scheduled to be completed in January 2015.

The data from this project is used by ORSANCO to evaluate the contribution of nutrients from the Wabash River to the Gulf of Mexico and to identify the causes of low dissolved oxygen on the Ohio River. The data is also used by IDEM to report to Congress on the health of the river.

MERCURY STUDIES

Bioaccumulation Study

In 2014, ORSANCO completed a bioaccumulation study of aqueous methylmercury at a location near Hannibal Dam on the Ohio River. ORSANCO completed the study using sampling techniques learned from the U.S. Geological Survey (USGS). ORSANCO purchased highly specific equipment from the USGS Hydrologic Instrumentation Facility and adapted a boat for sampling. Cross-sectional composite sampling was conducted monthly for one year. Water samples were collected for mercury and methylmercury in total and dissolved phases and compared with fish tissue methylmercury levels. Results were compared to assess the range of mercury levels in the water that would protect against the bioaccumulation of methylmercury in fish tissue. Data indicate that long-term average methylmercury concentrations in the Ohio River are below the site-specific threshold for bioaccumulation of methylmercury for ORSANCO's human health criterion in fish tissue.

Discharge Survey

In 2014, ORSANCO also completed an investigation of mercury discharges from Flue Gas Desulfurization (FGD) systems at coal-fired power plants. FGD systems are used by power plants to remove sulfur dioxide, selenium, mercury, and other volatile metals from their flue gas emissions. This partnership with the Commission's Power Industry Advisory Committee (PIAC) granted ORSANCO direct access to sample waters of three American Electric Power (AEP) plants and one Indiana-Kentucky Electric Corporation (IKEC) plant. Contacts made at each facility guided ORSANCO staff to the restricted access sample points within the plant. Intake waters, FGD wastewaters, and final effluent were sampled by clean techniques during each event. The one-year project of quarterly sampling indicated that, at those facilities, mercury removed by FGD systems does not contribute to additional mercury loads in the final effluent discharged to the Ohio River.

Working Together to Teach and Reach the Public

ORSANCO participates in river-related events and activities throughout the Ohio River Basin to provide the public with educational opportunities to learn more about the Ohio River and the quality of this great natural resource.

LIFE BELOW THE WATERLINE

ORSANCO's mobile aquarium is displayed at selected educational events and festivals within the Ohio River Watershed every year. The 2,200-gallon mobile aquarium was designed to display Ohio River fish and demonstrate the biodiversity of aquatic life in the Ohio River and improvements in water quality that are essential for these species to thrive in the watershed. ORSANCO biologists collect the fish onsite by electrofishing and return them to the river following each event.

In 2013-2014, the mobile aquarium was displayed at the following Ohio River events:

- American Electric Power Earth Day Event (Conesville, OH)
- Barbecue on the River (Paducah, KY)
- Cincinnati Earth Day Celebration (Cincinnati, OH)
- Louisville Water Company's Water Wows Event (Louisville, KY)
- Navy Bean Festival (Rising Sun, IN)
- Ohio Tobacco Festival (Ripley, OH)
- ORSANCO's 207th Commission Meeting (Charleston, WV)
- Paddlefest Kids Outdoor Adventure Expo (Cincinnati, OH)
- River Days Festival (New Richmond, OH)

RIVER SWEEP

2014 marked the 25th annual River Sweep. During the past 25 years, volunteers have collected thousands of bags of trash from the shorelines of the Ohio River every June. In addition to bringing volunteers together and promoting awareness of the Ohio River, a major goal of the event is to create a clean shoreline with greater appeal for recreation on the river. The first Ohio River Sweep, held in 1989, covered 150 miles of shoreline from Portsmouth, OH to Cincinnati, OH and from Constance, KY to Ashland, KY. Approximately 1,000 volunteers collected trash and litter from the Ohio River that first year. Now the Ohio River Sweep covers over 3,000 miles of shoreline, including many tributaries. In 2014, approximately 17,000 people volunteered!

Every year, ORSANCO distributes River Sweep posters and T-shirts throughout the counties bordering the Ohio River to promote the event. ORSANCO invites schools along the Ohio River to participate in an environmental contest to provide artwork for the event. The 2014 River Sweep Poster Contest winner was Katie Long from Ripley, WV. Katie's artwork was printed on 1,200 posters. The T-shirt design winner was Jessica Dunham from Florence, KY. Jessica's artwork was printed on 18,000 T-shirts. The posters and T-shirts were distributed at each River Sweep location throughout the watershed.

In addition to all the volunteers who make the River Sweep events possible, many state and local county coordinators are also an invaluable part of the River Sweep team.

Becky Ploucha, New Richmond, OH
Becky Ploucha has been involved with River Sweep for over 15 years. She grew up in New Richmond and originally organized the River Sweep event in her hometown. She then coordinated the event for the entire county! This year, Becky had over 300 volunteers who collected more than 850 bags of trash and debris from the riverbanks. They also collected tires and metal for recycling. Becky has represented Clermont 20/20, a nonprofit group created to improve the quality of life in Clermont County, OH. She now represents the Valley View Foundation, a nature preserve and education facility located near the confluence of the East Fork and Little Miami tributaries of the Ohio River in Milford, OH.

"I grew up in New Richmond and have always had a connection with the Ohio River. It would take a team of wild horses to keep me from continuing to work in and for this initiative. The time has flown by and I honestly love organizing this event just as much now as when I started."

Becky coordinates one of the several Clermont County sites in the village of Moscow, OH. In March 2012, a tornado destroyed 80% of the village and claimed the life of village councilwoman and Moscow Sweep coordinator, Carol Forsee. Although the Sweep event was cancelled in Moscow the year of the tornado, village residents returned to "pick up the pieces" (and the riverbank) a year following the devastating event. Becky's passion for the project continues to encourage the residents of Moscow to participate in River Sweep.

RIVERWATCHERS

The RiverWatchers volunteer monitoring program began as a pilot program in 1992 with only five monitoring groups and has since grown to include school groups and citizens in six Ohio River Basin states. These groups are not only concerned about water quality issues but are trained to conduct the scientific tests to measure the health of Ohio River water in their local community. Each group conducts sampling throughout the year and submits their results to ORSANCO. The data is available on ORSANCO's website.

2013-2014 Participating RiverWatchers:

- *Clymer Central School (NY)*
- *Warren County Conservation District (PA)*
- *Woodland Hills School District (PA)*
- *Williamstown High School (WV)*
- *Wahama High School (WV)*
- *Leon Elementary School (WV)*
- *Raceland High School (KY)*
- *New Richmond High School (OH)*
- *Cincinnati State Career and Technical College (OH)*
- *Ivy Tech Community College (IN)*
- *Switzerland County High School (IN)*
- *Mater Dei High School (IN)*

School groups and other volunteers take part in the RiverWatchers program from many areas along the Ohio River and its tributaries. In 2006, almost 15 years since the program began, Clymer Central School from the Chautauqua Watershed in New York was added to the RiverWatchers team. Although the area is near the Lake Erie Basin, waters from the Chautauqua region drain into the Allegheny River in Warren, PA and then into the Ohio River in Pittsburgh.

Clymer Central School

Dave VanEarden and his students at Clymer Central School have been sampling water for over 30 years. Dave has been incorporating his data with the RiverWatchers program for the last eight years from two sites in Chautauqua County, NY. Dave and his students monitor water quality from these sites monthly from September through April every year.

Dave began his graduate work in environmental science in the fall of 1985 under the leadership of Dr. Stanley Zegorski in Erie, PA. Dave was inspired by "Dr. Z" with many trips to Presque Isle Bay and was taught to have a deep understanding of aquatic ecology as it relates to water and to oneself…as human stewards of this precious natural resource. The trips to the lake inspired many, including Dave, to take similar trips with their own students and inspired his deep love and connection to the aquatic environment and aquatic life.

"My father, grandfather, and I built our first pond while I was still in high school back in 1978. It was 4-5 acre farm pond, and I take my students to that same pond on our property. We built the pond with farm equipment and our own sweat; I was still a junior in high school at the time. My biology class was taught by a friend of my family. His name was Kenneth Sullivan, and being in his class was like being home on the farm. Not a hard stretch, considering he had rented a little rental house from my father and lived right next door to my actual home on the farm. He has fished and hunted with us on the same piece of land. When I left for college in the fall of 1980, picking a major was easy- biology was the only area of study I knew and loved."

Dave currently teaches in the same class room as his first biology teacher, Mr. Sullivan. Love of nature and aquatics has now filled the walls of the school building in Clymer, NY for well over 60 years.

continued

Dr. Z taught not only Dave, but his high school mentor and teacher, Mr. Sullivan, too. Between the teachers, they have all shared the stream and pond with hundreds of students.

In 1999, Dave became involved with Allegheny College in Meadville, PA, through a stream monitoring program called "Creek Connections". Only a few years old at the time, the program has now been successfully teaching students in the local schools of Pennsylvania and New York for almost 20 years. Creek Connections taught water monitoring in a local stream called French Creek, where Dave's own farm stream and pond empty into. Dave and his students also monitor the creek, and it is one of two sites they monitor for ORSANCO's RiverWatchers program.

Not only has Dave taught his students the value of their local water resource, but they have shared their data with Findley Lake Watershed Foundation (FLWF) for almost 10 years. Their data has been used by FLWF to verify the water quality results measured each year by professional water quality consultants.

In addition to RiverWatchers and water quality monitoring, Dave and his students have worked on many different environmental projects in their local watershed, including: 1) a well water nitrate level study when the city of Clymer had to drill a new well; 2) an electrofishing field trip with ORSANCO in Pennsylvania to survey the Allegheny River; 3) an electrofishing survey for brook trout and other invasive species with the New York State Department of Environmental Conservation (NYSDEC); 4) a survey of every tributary in the entire Beaver Meadow Brook drainage to determine the water quality using a Water Quality Index formula from Allegheny College; 5) work to restore riparian buffer zones by planting over 15,000 trees on drainages in Pennsylvania and New York, and many more!

"In all of these things we have done, I will tell you that it has also been the trained professionals that I have worked with that have made our work and success possible."

Dave and his students clearly define how successful research is attained through the cooperation of many individuals and organizations… working together to protect our watershed in its many areas within the Ohio River Basin.

THE FOUNDATION FOR OHIO RIVER EDUCATION

The Foundation for Ohio River Education (FORE) is a non-profit education foundation that was established by ORSANCO in 2004.

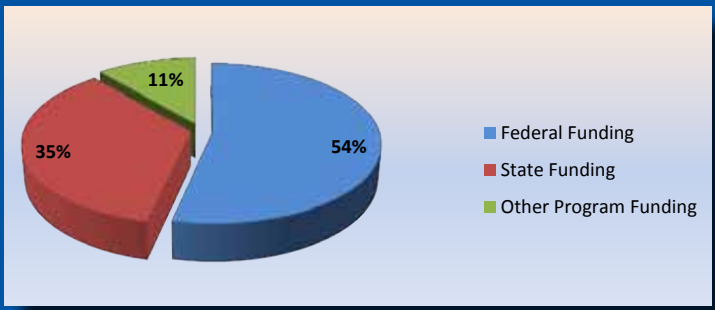
Each year, FORE reaches over 3,000 people in the Ohio River Basin through a variety of programs that engage students and the general public in river monitoring, ecology studies, and stewardship. In the past year, FORE conducted 29 River Research, Education and Adventure Charters on the Ohio River for schools in the Greater Cincinnati area. These charters, known as "River REACH" programs, bring students in grades 4 through 12 aboard a Queen City Riverboat for a day of hands-on water quality monitoring, biological monitoring, and river ecology studies. FORE also worked with 17 agencies, utilities, and organizations to

bring hands-on exhibits, presentations, trainings, summer camps, and professional development workshops to a variety of audiences in the region. This past June, FORE collaborated with Greater Cincinnati Water Works (GCWW) and Northern Kentucky's Ecological Stewardship Institute on a Source Water Protection Workshop for students enrolled in GCWW's summer internship program and for students from NKU's Center for Environmental Education. Students participating in the workshop worked directly with staff in ORSANCO's watershed, ODS, and biological programs to learn how they monitor and protect the Ohio River. The highlights of the workshop for many students were getting out on the river to learn about electrofishing and processing water samples for *E. coli* in ORSANCO's mobile lab. FORE looks forward to another great year of outreach programming with their partners in the local community while continuing to promote the great work of ORSANCO's staff and the entire Commission.

2014 Resources Overview

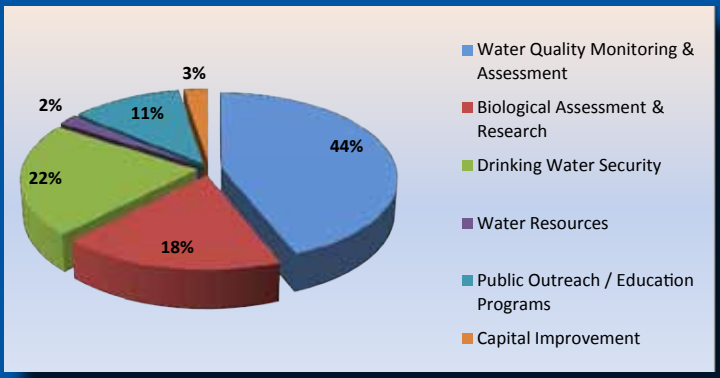
Resources by Major Source

Federal Funding
State Funding
Other Program Funding



Resources by Major Program Area

Water Quality Monitoring & Assessment
Biological Assessment & Research
Drinking Water Security
Water Resources
Public Outreach / Education Programs
Capital Improvement



Audited financial statements for 2014 will be available in February 2015.

ORSANCO Staff

Peter Tennant, P.E., BCEE, Executive Director & Chief Engineer
Tracey Edmonds, Administrative Assistant

Technical Programs

Jason Heath, P.E., Technical Programs Manager
Eben Hobbins, Environmental Specialist
Greg Youngstrom, Environmental Specialist

Biological & Research Programs

Jeff Thomas, Manager of Biological Programs
Ryan Argo, Senior Biologist
Rob Tewes, Senior Biologist

Source Water Protection & Emergency Response

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

Water Resources

Sam Dinkins, Water Resources Assessment Manager
Steve Braun, Environmental Specialist
Stacey Cochran, Environmental Specialist

Public Information Programs

Lisa Cochran, Communications Coordinator
Melissa Mann, Public Information/Education Specialist

Administrative Programs & Human Resources

David Bailey, Director of Administration & Human Resources
Joe Gilligan, Comptroller
Adam Scott, Computer Systems Administrator
Donna Beatsch, Data Processing Specialist, Part-time
Matt Glazer, Maintenance, Part-time

FORE

Heather Mayfield, Director

Staff Milestones

Jason Heath – 25 years
Stacey Cochran – 10 years
Ryan Argo – 5 years

ORSANCO staff members participate in the 2014 River Sweep.

Jason Heath and son

Stacey Cochran and family

Ryan Argo and daughter

Members of the Commission

Chairman: Toby Frevert
Vice-Chairman: Thomas Easterly
Secretary/Treasurer: Douglas E. Conroe
Executive Director and Chief Engineer: Peter Tennant, P.E., BCEE

As of June 30, 2014. An updated list of ORSANCO's Commissioners is available at www.orsanco.org

Illinois
Lisa Bonnett, Director, Illinois EPA
Toby Frevert
Phillip C. Morgan

Indiana
Joseph H. Harrison, Sr., Bowers Harrison, LLP
Thomas Easterly, Commissioner, Indiana Department of Environmental Management
Vasiliki Keramida, Ph.D., President and Chief Executive Officer, Keramida Environmental, Inc.

Kentucky
Leonard Peters, Kentucky Energy and Environment Cabinet
Jerry Abramson, Lieutenant Governor
C. Ronald Lovan, P.E., President/CEO, Northern Kentucky Water District

New York
Douglas E. Conroe, Director of Operations, Chautauqua Institution
Joe Martens, Commissioner, New York Department of Environmental Conservation
Michael P. Wilson

Ohio
Craig Butler, Director, Ohio EPA
Paul Tomes
Stuart F. Bruny

Pennsylvania
Greg Phillips, District Manager/CEO, Westmoreland Conservation District
E. Christopher Abruzzo, Secretary, Pennsylvania Department of Environmental Protection
Charles Duritsa

Virginia
David Paylor, Director, Virginia Department of Environmental Quality
Robert L. Dunn, Virginia State Water Control Board

West Virginia
Randy C. Huffman, Cabinet Secretary, Department of Environmental Protection
David Flannery, Steptoe & Johnson, PLLC
Ronald R. Potesta, President, Potesta and Associates

Federal
George Elmaraghy, Senior Project Manager, Stantec Consulting
Tom FitzGerald, Director, Kentucky Resources Council
Susan Hedman, Administrator, EPA Region 5

Joseph H. Harrison, Sr.
A Commissioner of Distinction

Joe was appointed to the Commission in 1982 by then-Governor Robert Orr. He served as Commission Chairman in 1986-87. He subsequently served on a number of Commission committees, most notably the Congressional Liaison Committee which he chaired from its inception until the present. His 32 years as a commissioner mark the longest service to ORSANCO of any commissioner.

Joe was a founding member and former managing partner of Bowers Harrison and has recently retired after 60 years of practicing law. He represented numerous businesses and individuals in the Evansville area concerning their daily business and personal needs. Joe was admitted to practice in Indiana and the District of Columbia, as well as being admitted to practice before the United States District Court for the Southern District of Indiana, United States Court of Appeals, 7th Circuit and the United States Tax Court. He was a member of the Evansville Bar Association, Indiana State Bar Association, and the American Bar Association. We thank Joe for his lifetime of dedication to Ohio River water quality and his commitment to ORSANCO and wish him the best in his retirement.

Joe Harrison, Jr. accepts service recognition award on his father's behalf.

ORSANCO

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