



**Ohio River Valley Water
Sanitation Commission
Annual Report 2022**

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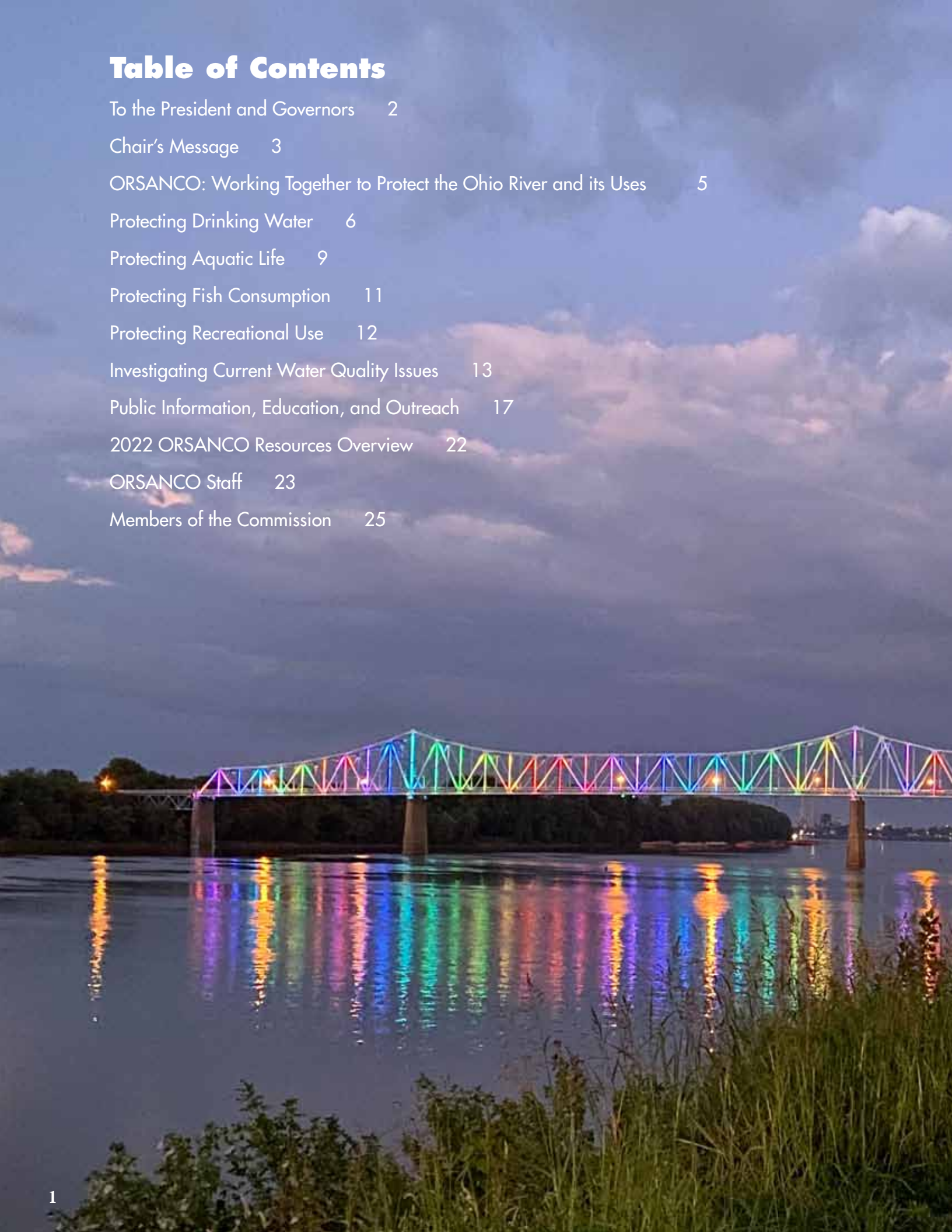
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To the President and Governors*

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 2022 to:

The Honorable J. B. Pritzker
Governor of Illinois

The Honorable Eric Holcomb
Governor of Indiana

The Honorable Andy Beshear
Governor of Kentucky

The Honorable Kathy Hochul
Governor of New York

The Honorable Mike DeWine
Governor of Ohio

The Honorable Tom Wolf
Governor of Pennsylvania

The Honorable Glenn Youngkin
Governor of Virginia

The Honorable Jim Justice
Governor of West Virginia

and

The Honorable Joe Biden
President of the United States

*As of June 30, 2022



Chair's Message

My impression of ORSANCO today is the same as it was when I joined it as a new commissioner eleven years ago: ORSANCO is vibrant, vested, and vigilant. It is uplifting to participate in such an organization, where challenges are addressed while supported by a dynamic staff, involved commissioners, and about three hundred stakeholders who participate in committees and work groups. Challenges this year included continuing concerns for and responses to the coronavirus pandemic, such as providing joint virtual and in-person meetings, which may become a long-term approach for involvement and communication. Another challenge is economic inflation, which we have responded to with our continued use of rolling five-year, financial trends analyses. ORSANCO also completed a five-year Strategic Plan that enhances its mission to use efficient and collaborative approaches to aid member states in their Compact pledges to control and abate pollution in the river. ORSANCO remains steadfast in preserving beneficial uses of the river such as water

supply and public health, contact recreation, tourism, education, aquatic life, navigation, agriculture, and industry.

ORSANCO is vested in collaborative approaches through its continued tracking of organic pollution, especially its Organics Detection System of very high-tech instrumentation operated at shared facilities with water supply utilities along the nearly thousand-mile length of the Ohio River. The Commission continues to work with the Ohio River Basin Alliance to achieve our common goals of watershed-wide retention and enhancement of water quality and beneficial uses, and we recognize that Ohio River water quality is heavily influenced by its tributaries. ORSANCO is also vested in its contributions of water quality measurements for states' reporting requirements. As our water quality data grows in historic importance, we strive to increase our data trends analyses and add new collaborative ventures, such as our joint PFAS measurement project



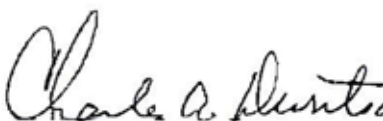
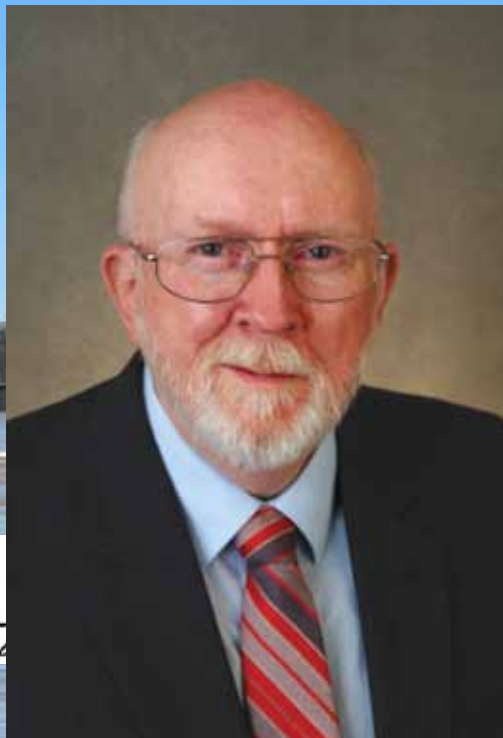
with the US Environmental Protection Agency and the US Geological Survey.

Commissioners, staff, committees, and stakeholders know that the price of water is eternal vigilance. We collaborate with our elected representatives and their agencies, with non-profit citizen alliances, and with commercial entities. These collaborative activities have and are leading us into ever greater concerns for water-based quality of life. This past year, we initiated committee work to review the Commission's role in water equity across communities and environmental justice for water's beneficial uses. We further defined and confirmed our relation to and importance of our Foundation for Ohio River Education and have great hope for its enhanced role in community understanding of the river's beneficial uses. We are planning for more uses of geographic information systems and trends analyses to manage the river and equitably share its resources.

The vibrancy, investments, and vigilance of the Commission continued through this past year, are financed through the coming year (our 75th!), and strategically planned into the future.



Michael P. Wilson



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 to improve water quality throughout the entire watershed. 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 other state, federal, and local agencies and organizations to provide safe drinking water, protect aquatic life, advise fish consumption, and guide

citizens with decisions about recreational activities in and around the river.

Evaluating the Ohio River for its Beneficial Uses: ORSANCO's 305(b) Report

Every two years, ORSANCO completes an assessment of Ohio River Water Quality Conditions (305(b) report). This report summarizes ORSANCO's monitoring results and associated assessments of the Ohio River's beneficial uses. The assessments are guided by a 305(b) Coordinators Work Group composed of the member state representatives. The report is used by the states in developing their state-wide lists of impaired waters.

Four beneficial uses are assessed for the Ohio River including *aquatic life*, *public water supply*, *contact recreation*, and *fish consumption*. Each of these beneficial uses have various monitoring data and criteria that are used to determine if that particular use is met, or alternatively, impaired. The most recent report was released in 2022, covering the five year period between 2016 through 2020. The entire river was found to be in full support of *aquatic life*, *public water supply* uses, and *fish consumption* based on methylmercury concentrations in fish tissue.



The entire river is designated as impaired for *fish consumption* based on levels of PCBs and dioxin in historical water quality samples. Roughly two-thirds of the river is impaired for *contact recreation* use based on bacteria monitoring results, the vast majority of which were collected during intensive longitudinal surveys conducted in the early 2000s. ORSANCO staff and 305(b) workgroup members will be developing study plans to determine the feasibility of updating these older data sets as soon as practicable.

Protecting Drinking Water

Emergency Response

The Ohio River is a vital, natural resource that supplies drinking water to over 5 million people daily, supports a diverse aquatic ecosystem, and provides recreational opportunities for swimmers, boaters, and anglers. The Ohio River, however, is also a working river, providing the necessary water resources to support industries for manufacturing, energy, natural gases, and fuel production. Moreover, the Ohio River is a major corridor for the transportation of a variety of different materials, including fuels and natural resources, chemicals, aggregates, and commodities such as corn, grains, and soybeans. This mode of transportation is a cost-efficient mechanism for commercial navigation of goods to other parts of the country. However, with the substantial industrial and commercial uses of the river, the threat for releases and discharges of pollutants that contaminate the river is considerable, which could make the river unsuitable for its intended uses, including drinking water production, habitable environment for native aquatic and vegetative species, and recreational activities. ORSANCO has served a critical role in emergency spill notification and response since 1958 by providing notification of spills and other incidents that could adversely affect water quality to local, state, and federal emergency response agencies, drinking water utilities, and industries that may be impacted by a chemical release. The "HazAlert" system was created in 1958 by ORSANCO's Water User's Advisory Committee, where it was required that oil releases and other potential toxic chemicals were called into ORSANCO Headquarters via a specific telephone line. ORSANCO staff kept a detailed listing of these incident reports and also performed visual surveillance operations by boat, plane, and vehicle multiple times a year. This was the precursor to ORSANCO's modern Spills Notification and Tracking System.



Today, staff maintains a 24/7, 365 day notification system, and incident reports come into ORSANCO from the National Response Center or through direct calls from agencies or citizens. Information is evaluated to determine the potential threat to Ohio River users and communicated to agencies and utilities as appropriate. The vast majority of spills that occur every year are minor and have little to no impact on water quality. Significant spills, however, do occur from time-to-time, coming from a variety of different sources with a variety of different pollutants. When spills occur, water quality monitoring and rapid analysis is critical for drinking water utilities to make the best water treatment management decisions and ensure that the public water supply is safe to use for drinking water purposes. ORSANCO is a key player in this response activity, since many contract and private labs may not be able to provide a quick turnaround time while a spill is traveling downstream. Any potential contact recreation and aquatic life impacts are also addressed.

ORSANCO staff works with spill response entities in the Ohio River Basin to simulate emergency response activity for potential source water contamination events.

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Agencies involved in these collaborations included local 911 responders, medical professionals, health department officials, state environmental and public health agencies, private industry, USEPA, and the US Coast Guard.

Organics Detection System

The Organics Detection System (ODS) is a voluntary, cooperative effort involving water producers, industries, and ORSANCO to monitor volatile organic compounds (VOCs) in the Ohio River main stem and select tributaries. The primary purpose of ORSANCO's ODS Network is to screen river (surface) water samples for VOCs to determine water quality conditions as a protective measure for drinking water supplies. Benefits of the ODS include routine daily analysis of river water samples, remote access to each ODS site for real-time water quality data reviews, spill plume profiling and tracking, and a coordinated communications network to relay water quality disturbances to upstream and downstream sites during spill or unreported release events.

History of ORSANCO's Organics Detection System

ORSANCO's first monitoring system was comprised of "Robot Monitors" at 13 fixed locations along the Ohio River. This essential surveillance system was able to monitor up to ten parameters including dissolved oxygen, temperature, chloride, hydrogen, and pH; however, it was unable to adequately detect other spills,

discharges, and releases of chemical contaminants (such as phenols and petroleum oils) that could potentially impact water quality. These robot monitors were able to transmit and "auto relay" information to ORSANCO headquarters on a continued and routine basis and served as ORSANCO's first river-wide network for several years.

In 1979, ORSANCO's Early Warning Organics Detection System (EWODS) was created in response to a 70-ton spill of carbon tetrachloride into the Kanawha River in West Virginia that went undetected for over a week and contaminated several drinking water facilities. The EWODS was designed utilizing purge and trap instrumentation and gas chromatographs (GCs) to detect the presence of select volatile organics, which were installed at seven locations along the Ohio River. These host sites operated the instrumentation five days a week under the EWODS program. New ODS host sites were added, as funding and support became available, to provide more coverage along the Ohio River and tributaries. From the late 1990's until 2010, ORSANCO had 15 ODS monitoring stations. With the last renovation and upgrade in 2016, ORSANCO was able to add additional ODS sites (Ashland [KY], Maysville [KY], and Charleston [WV]). Combined with the loss of one site, there are currently a total of 16 active ODS stations. These stations can be found along the Ohio, Allegheny, Monongahela, and Elk rivers in the Ohio River Basin. ORSANCO hopes to add additional host sites in the near future by staging instruments in additional locations.

ORSANCO's Current Organics Detection System

ODS stations within the Ohio River Basin provide a network of detailed water quality monitoring and information. ORSANCO works closely with local drinking water utilities and industries, and the operation of this valuable system is only possible through the desired continued collaboration of this integrated river wide sentinel with our ODS host site operators and water quality managers, providing their resources to assist in keeping this program sustainable.

ORSANCO still uses Purge and Trap technology, paired with GCs and GCMS (gas chromatography mass spectroscopy) instrumentation, as it remains the most efficient way to determine the presence of (or confirm the absence of) VOCs in surface water. The

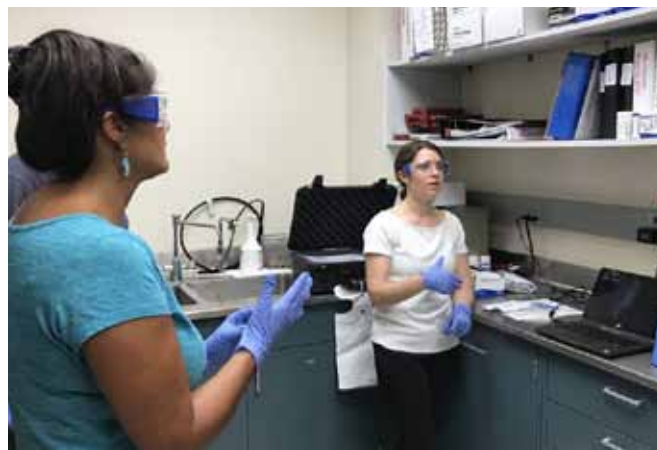


addition of autosamplers has given ODS operators more freedom, as the instrumentation can operate unattended for periods of time (such as overnight and during weekends). When a spill event occurs, many samples can be added and analyzed in large batches. In addition, Mass Spectrometer Detectors have the ability to conclusively identify compounds and contaminants based on the mass of particular atoms at the molecular ion level.

During routine monitoring, river water samples (at intake depth) are collected, processed, and analyzed up to four times a day at select ODS stations. ORSANCO'S ODS system includes instruments that are calibrated to identify and provide concentration amounts for 30 common volatile organic compounds (VOCs). With mass spectrometer detectors at nine ODS stations spanning the length of the Ohio River, ORSANCO's ODS network has the capability to detect and identify the presence of thousands of volatile contaminants qualitatively.

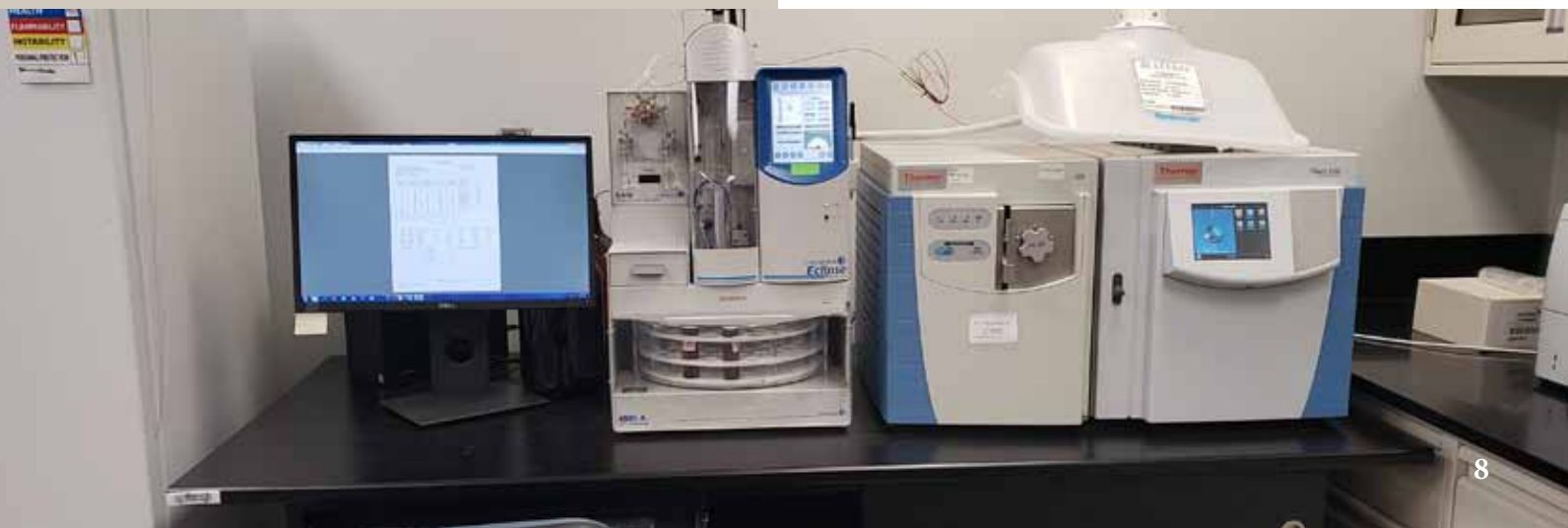
Fortunately, the vast majority of samples do not show signs of contamination from volatile organics (at intake depth). Most importantly, the non-detection or absence of VOCs serves as an indicator that the river water meets its intended designated use (for volatile organics), which is the overall goal for the ODS program and ORSANCO's source water protection efforts.

However, when a VOC is detected at or above the program thresholds, ORSANCO will notify downstream water utilities (not just ODS host sites, but any of the drinking water producers along the Ohio River) and state and federal water quality and emergency response agencies as necessary. These



entities can then respond to the detection based on their respective emergency response plans. The ODS program also implements response protocols for these events, which includes measures such as increasing sampling frequency and collection and analysis of surface water grab samples, treatment process, and finished water samples as rapidly as possible, in order to provide data and information in a consistent and efficient manner. Response protocols stay in effect until the contamination does not pose a threat or significant impact.

The success of the ODS is due to the voluntary partnerships between the water utilities, water users, and ORSANCO. The ODS has been highly effective in detecting and tracking numerous volatile-related spills and discharges since its inception in 1978. The ODS has remained one of ORSANCO's flagship programs and has had recognition from around the world. This invaluable monitoring network serves as part of overall source water protection programs implemented by multiple water utilities and water users.



Protecting Aquatic Life

ORSANCO's aquatic 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 and Macroinvertebrate Indices

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 mORFI_n (modified Ohio River Fish Index). Using the collected data, the index assigns scores to rate the relative condition of fish communities among the Ohio River pools. Similarly, after over a decade of research, ORSANCO recently completed an index that uses information from macroinvertebrate populations encountered at each sampling site to assess water quality conditions. Assessments of the pools sampled in 2021 marked the sixth year that both the fish index (mORFI_n) and the Ohio River Macroinvertebrate Index (ORMI_n) were used in conjunction with each other to assess the biological condition of the Ohio River.



Each year, ORSANCO biological crews collect data from two to three navigational pools using a random, probability-based design that selects 15 sampling locations within each pool. Fish are captured, identified, measured, and inspected for deformities, eroded fins, lesions, or tumors prior to release. Likewise, macroinvertebrates are collected from the same 15 sites and sent to a contractual laboratory for identification. 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 mORFI_n and ORMI_n scores.



Sampling Activities

The postponement of the 2020 field season during the COVID-19 pandemic resulted in an intensive 2021 schedule that included surveys in Dashields, Hannibal, Markland, and McAlpine pools. Fish and macroinvertebrate index scores were all above relative expectations, indicating healthy aquatic communities in each of the four pools. Additionally, biologists successfully obtained fish tissue collections requested by the Indiana Department of Environmental Management (IDEM) from

the 2021 pools bordering their state (Markland and McAlpine). The contaminant results (mercury, polychlorinated biphenyls, and PFAS) from these additional collections will be used by IDEM staff to assess current listings.

In 2022, biologists will complete the third assessment cycle of the Ohio River with surveys in Belleville, John T. Myers, and Olmsted pools. This will be the first complete cycle where aquatic life was assessed on the Ohio River using both fish and macroinvertebrate indices. Staff will reevaluate the two indices with data collected over the third cycle as they look to further refine these essential assessment tools. Similarly, staff will use data from targeted sampling in the open water section of the Ohio River, between Olmsted Lock & Dam and the Mississippi River, to develop an assessment approach for this unique section of the river. Additionally, biologists will sample the full suite of fixed stations, continue fish tissue collections on behalf

of IDEM (John T. Myers pool), add PFAS analysis to all regular Ohio River fish tissue collections, collect water samples for Kentucky Department of Water (John T. Myers and Olmsted pools), and conduct additional surveys at the request of our member states.



Protecting Fish Consumption

Tissue Contaminants Program

Every year, ORSANCO collects composite fish fillet samples from species that are thought to be commonly consumed from the Ohio River main stem for contaminant analysis. These samples are sent to a contract laboratory and are analyzed for mercury, methylmercury, polychlorinated biphenyls (PCBs), pesticides, and other contaminants. Resulting data are reviewed by ORSANCO staff and are then posted online at www.orsanco.org and shared with members of the Fish Consumption Advisory Workgroup (FCAW), which comprises members of regulatory agencies representing each of the six main stem states.

Fish Consumption Advisories

The most recent 10 years of fish tissue data are separated by river segment, species, and size (where appropriate) and compared to Ohio River Fish Consumption Advisory Protocol (ORFCAP) concentration thresholds, which were derived from a consensus of the FCAW and are unique to the Ohio River, to determine appropriate proposed consumption advisory categories.



These proposed advisories are then discussed with the FCAW and, upon reaching consensus, are updated in state publications and on a website hosted by ORSANCO (www.orsanco.org/fca) that sums up the approved advisories and breaks down the listings by species, state, and river segment. The site includes links to individual state pages and provides information on the health benefits of consuming fish as well as tips on how to properly prepare fillets. The site details information about the FCAW, specific contaminants, and how to follow advisories.

At present, all six main stem states defer to a unified protocol to issue ORFCAP-suggested consumption advisories for the Ohio River, greatly enhancing the consistency of information relayed to the public.

Assessing the Fish Consumption Use of the Ohio River for Mercury

The 305(b) section of the Clean Water Act requires reporting the condition of waterbodies with regard to designated uses of the river, including fish consumption. A contaminant in fish flesh that may be responsible for impairing this designated use in some waterbodies is methylmercury, for which ORSANCO analyzes regularly. To assess fish consumption, ORSANCO biologists calculate trophic (food chain) level average fish tissue concentrations on a pool by pool basis, incorporating estimated national consumption rates using USEPA published guidance. To ensure that an updated data set is available to meet reporting requirements, samples in three or four pools are analyzed annually.



Protecting 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

ORSANCO assesses whether the river is suitable for contact recreation based on bacteria data collected from urban areas with combined sewer systems. It also uses bacteria data from longitudinal surveys at over 200 sites along the Ohio River. Using these data provides a more accurate picture of water quality because bacteria levels fluctuate frequently depending on local or regional weather conditions. During the contact recreation season of April through October, Ohio River bacteriological conditions are often suitable for swimming and other contact recreation activities except during significant rain events and periods of high river flow. Based on these data, ORSANCO is able to classify sections of the Ohio River as being impaired for contact recreation caused by *E.coli* bacteria. Beginning in April, ORSANCO staff was able to conduct routine monitoring for the 2022 recreation season. A weekly Ohio River Water Quality Report is published online and updated every Friday at www.orsanco.org/weekly-ohio-river-water-quality-report.



Although all sections of the river may be unsafe for contact recreation at times, due to the Ohio River's significant water quality improvements, many events take place in or around the Ohio River. Two major river events on the Ohio River near Cincinnati include the Great Ohio River Swim and Paddlefest, the largest paddling event in the nation. ORSANCO has provided bacteria monitoring for these events and others, due to the probability that a large number of people may come into contact with the river. In 2022, Paddlefest is scheduled for Saturday, August 6th and the Great Ohio River Swim is scheduled for Sunday, August 28th. ORSANCO staff will provide bacteria monitoring for those two events in 2022.

Ohio River Way

ORSANCO has also partnered with the Ohio River Way (formerly the Ohio River Recreation Trail) to connect people and communities to opportunities for adventure on and along the Ohio River. The vision of the Ohio River Way is to create a 274-mile land and waterway self-guided adventure trail that connects people to opportunities for outdoor adventure, recreation, and discovery on and along the Ohio River from Portsmouth, Ohio to West Point, Kentucky.

It will serve to promote tourism and economic development, facilitate education about the valley's unique history, culture and beauty, and promote environmental awareness and safety, respecting lands and waters with a "Leave No Trace" ethic. The trail can be enjoyed from either land or water by paddlers, power boaters, cyclists, motorists, hikers, and more.

In 2022, the Ohio River Way explored 250 Ohio River miles during the 2022 Ohio River Challenge, paddling together in voyageur canoes. The team documented the recreational, historical, and ecological sites along the route and met with river town officials and community members to promote river recreation. ORSANCO staff was able to attend some of these events, had the opportunity to canoe with the team during a portion of the event, and was even able to provide drone footage of the crew on their adventure to share with the public.

Investigating Current Water Quality Issues

Development of an Ohio River Ambient Monitoring Plan for PFAS

Per- and polyfluoroalkyl substances (PFAS) are a group of chemicals that includes PFOA, PFOS, GenX, and many others. There is strong evidence that exposure to PFAS can lead to adverse human health effects. PFAS has been detected in the Ohio River, and there are known contaminated sites near the river as well. As such, ORSANCO developed a monitoring plan to: 1) characterize ambient conditions for PFAS in the Ohio River, which can be repeatable in the future, to track changes over time, and 2) provide information on how PFAS may be distributed in the Ohio River water column at selected sites.

Twenty Ohio River monitoring sites were randomly selected and evenly distributed along the length of the river and located outside the direct influence of any point source discharge. These sites were sampled under two separate flow/seasonal conditions during summer and fall of 2021. Each of the twenty sites were sampled using a flow-weighted, cross-sectional sampling technique to more accurately reflect the entire water column, which is beneficial for use in great flowing rivers such as the Ohio. In addition, discrete sampling at individual points in the water column were collected to investigate if there were any distribution patterns in the river.

Project results show detections of certain PFAS at every monitoring station during both rounds of sampling. PFOS, PFOA, GenX, and other PFAS were detected frequently. In general, the first round of sampling experienced more detections under higher flows than the second round of sampling. Quality assurance samples met their acceptance criteria, with the exception of one sample that is being re-analyzed.

The project report and data can be accessed at www.orsanco.org. This was a cooperative effort with federal partners, USEPA, and the United States Geological Survey (USGS). USEPA provided full analytical contract laboratory support, while the USGS provided invaluable consultation on the use of its large river sampling method for collecting PFAS samples.

Harmful Algal Blooms

Algae are present in the Ohio River throughout the year. During optimal conditions, some algae may rapidly proliferate causing a “bloom.” During a bloom, the algal concentration may go from a few thousand cells per milliliter (cells/ml) of water to hundreds of thousands or even millions of cells/ml. Algal blooms are most common in the summer, although they may occur at any time of the year. On the Ohio River, the conditions that allow these blooms to occur are typically low and slow flow, clear water, and warm water.

Sampling on the Ohio River has identified over 300 different species of algae. These algae are divided into eight taxonomic divisions, with the most common being diatoms (Bacillariophyta), green algae (Chlorophyta), and blue-green algae (Cyanobacteria).





Cyanobacteria can produce toxins which can be harmful if ingested. For this reason, an algal bloom which consists primarily of cyanobacteria is considered a Harmful Algal Bloom (HAB). These toxins can affect people and animals who ingest them, either through recreation, such as swimming, or in drinking water.

ORSANCO relies on water utilities, the U.S. Army Corps of Engineers (USACE), and citizens to report possible algal blooms. Additionally, ORSANCO operates four monitoring stations to help detect HABs on the Ohio River. All reported blooms are investigated to determine if there is an impact to drinking water or recreation.

On August 19, 2015, ORSANCO received an NRC report of a paint-like green material on the Ohio River at Pike Island Locks and Dam (ORM 84.2), which covered 100 X 200 feet. This was quickly identified

as the blue-green algae *Microcystis aeruginosa*. Over the next month, this bloom expanded to cover the Ohio River from Pike Island L&D to Cannelton L&D (ORM 84.2 to 720.7). Below Cannelton L&D, there were intermittent patches of the bloom but not a continuous coverage. No illnesses were reported as a result of this bloom and no toxins were detected in finished drinking water.

Since 2015, ORSANCO has responded to numerous reports of algal blooms (both on the Ohio River and on tributaries). These incidents have been reported by citizens, the USACE, and ORSANCO staff. ORSANCO has coordinated with five states and two federal agencies to respond to these reports.

In September 2019, an algal bloom was observed by KY DOW personnel at Russell, KY (ORM 327.6).

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The bloom was intermittent both temporally and spatially, but was observed as far downstream as J.T. Myers Lock and Dam (ORM 846.0) and persisted until early November. The densest portion of the HAB was between Maysville, KY and Louisville, KY. The states of Ohio, Kentucky, and Indiana issued recreation advisories for the Greenup, Meldahl, Markland, and McAlpine pools. No illnesses were reported due to this HAB and no toxins entered the finished drinking water of any utility.

Real Time Risk Characterization Tool for HABs on the Ohio River (HAB App)

In partnership with USEPA, ORSANCO has developed an online GIS based tool to predict the occurrence of HABs on the Ohio River (HAB App). The tool uses flow data from USACE gauges to compare the current flow to that experienced in 2015 and 2019 when HABs occurred. The tool displays the probability of a bloom occurring and persisting and shows relevant water quality data from eight locations on the river. A link to the HAB App can be found on our website. The project team wrote an article detailing the modeling effort and tool development, which was published in the journal Water.



Review of Bimonthly and Clean Metals Ambient Monitoring Network

A Work Group of main stem states was established to review and make recommendations on ORSANCO's Bimonthly and Clean Metals monitoring programs. These are ORSANCO's fixed station, ambient monitoring network, collecting samples for conventional parameters, nutrients and metals, once every other month at 16 main stem stations and 14 tributaries. The data are used to make beneficial use assessments for long-term trends as well as and provide information for the states' integrated lists of waters requiring Total Maximum Daily Loads.

ORSANCO's bimonthly monitoring has been in place for over 40 years, while metals monitoring has been in effect since the 1990's.

The work group met multiple times in 2021 and developed a number of recommendations to improve the monitoring network. Recommendations were developed regarding the addition of several water quality parameters to all stations, as well as the addition of four new stations. These recommendations will be implemented in the Commission's fiscal year 2023 program and budget.



Public Information, Education, and Outreach

ORSANCO participates in various 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

Since 2002, ORSANCO's 2,200-gallon mobile aquarium has put local fish species on display at over 100 events throughout the Ohio River Basin in portions of all eight Compact states, reaching hundreds of thousands of people in the process. The consistent message conveyed from ORSANCO staff during these events is that the Ohio River main stem and other local waterways support much more diverse and healthy fish populations than perceived by the public and are therefore resources worth enjoying and protecting.

The aquarium is often displayed at educational events for children, various festivals, and other celebrations generally located in cities situated on the banks of the Ohio River. In 2020, however, concerns associated with the coronavirus pandemic and the emphasis on data collection in a shortened field season led to the cancellation of all events scheduled for the calendar year. ORSANCO's Life Below the Waterline Mobile Aquarium program remains suspended until further

notice; however, interested parties may still submit application materials for possible future events.

Foundation for Ohio River Education (FORE)

The Foundation for Ohio River Education (FORE) is ORSANCO's non-profit education foundation. Since 2004, FORE has taught people of all ages in the Ohio River Basin to become environmental stewards through hands-on programs that get people on the water and engaged in preserving the cultural, ecological, and economic value of the Ohio River watershed.

The past year has been an exciting one for FORE with three new faces joining the organization: Annette Shumard (Communications and Environmental Education Manager), Nicholas Callahan, (Environmental Education and Outreach Coordinator), and Maggie Voyles, (Program Educator). Even with the transition, our team has been planning new programs and outreach opportunities as the lifting of pandemic restrictions has allowed programming to return.

In 2022, FORE continued its River REACH floating classroom program, teaching students in the Greater Cincinnati area about Ohio River water quality in partnership with BB Riverboats. In the past year, FORE has scheduled a total of 18 boat programs that have reached over 700 students. Additionally, FORE staff have participated in various public events and festivals, reaching over 2,000 individuals in just one year. FORE has educated students in various environments, not only in a traditional classroom setting, but on board a majestic riverboat, in a canoe or kayak, or at a public festival or other event.

FORE has also put a strong focus on developing and maintaining partnerships with other organizations that share common goals of Ohio River education through hands-on programs to get students on the water and engaged in preserving



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F.O.R.ETM
FOUNDATION for OHIO RIVER EDUCATION





the cultural, ecological, and economic value of our rivers. In 2022, FORE partnered with the Mill Creek Alliance, Mill Creek Yacht Club, and Cincinnati State Community and Technical College to teach environmental science students while paddling in canoes on the Ohio River.

In addition to developing basinwide relationships, FORE educators also participated in the first annual CaliFest in California, Ohio. The festival was an opportunity for local businesses, organizations, and groups to interact with the public. Both FORE and ORSANCO staff worked together to educate attendees about water quality monitoring and the overall health of the river. The event was a unique opportunity to work with local partners and strengthen those relationships in the community that has been home to ORSANCO since 1993.

FORE also supports the RiverWatchers volunteer monitoring program for the Ohio River and selected tributaries



throughout the Ohio River Basin. The program was originally founded in 1992 by ORSANCO, but it is now supported by FORE. The program is comprised of students and citizens who are concerned about water quality issues in the Ohio River Basin.

Since the program began, thousands of volunteers have collected water quality data from samples they collect from various sites along the Ohio River or one of its tributaries. Participants use chemical test kits to evaluate the health of local waterways in the Ohio River Basin. Data collected during testing are sent to ORSANCO where they are evaluated and entered into a database. This volunteer monitoring data provides valuable insight to the health of the local waterways, while also providing students and citizens with a real, hands-on science experience.

Ohio River Sweep

Each year, the Ohio River Sweep provides numerous opportunities for coordinators and volunteers from six states, extending the entire length of the Ohio River, to remove litter from various locations along the river and its tributaries. Our award-winning cleanup event has been in operation since 1989, more than 8,000 citizens participate each year, and in total we have collected more than 100,000 tons of trash! The Ohio River Sweep started as a one-day event, but it has since expanded to a seasonal cleanup program that runs from March through October. The program relies on contributions from industries and corporations throughout the watershed to provide volunteer supplies (gloves, trash bags, t-shirts) and promotional materials that make the Ohio River Sweep successful.

In 2021, The Ohio River Sweep program continued to adapt to the ever-changing coronavirus pandemic. Cleanup events were held throughout the spring, summer, and fall, providing a unique opportunity for smaller sized groups to make a big impact on waterways in their communities. Participants were able to choose various dates and locations for their events, while ORSANCO and FORE provided support and supplies. The total number of cleanup events grew from 25 sites in 2020 to over 150 cleanup sites in 2021!



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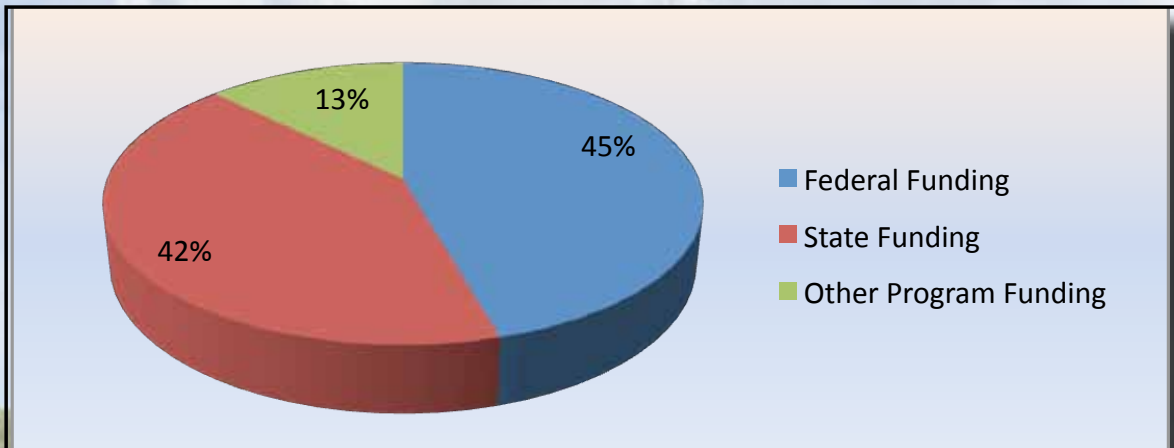
In 2022, the Ohio River Sweep has reached even further into the Ohio River Basin to include more creeks and tributaries, further extending the message that litter throughout the watershed can eventually end up in the Ohio River and beyond. Some Ohio River Sweep events included partnerships with new organizations and sponsors in many areas including:

- Braskem (sponsor), Marathon (sponsor), Kenova Rotary Club, City of Kenova - Kenova, WV
- WAVE Foundation at the Newport Aquarium - Newport, KY
- Midwest Sustainability Summit - Newport, KY
- Berry Global (sponsor) - Evansville, IN
- Great Parks of Hamilton County: Fernbank Park and Woodland Mound - Cincinnati, OH
- Thomas More University: Saints Serve Day and Thomas More University Biology Field Station - Crestview Hills & California, KY

The Ohio River Sweep serves as a collaboration between ORSANCO and FORE. FORE is the 501(c)(3) non-profit supporting organization of ORSANCO that provides environmental education and stewardship programs in the Ohio River Basin. FORE raises and manages funding for the Ohio River Sweep. Residual funds from Ohio River Sweep may be used to support additional environmental stewardship programs.

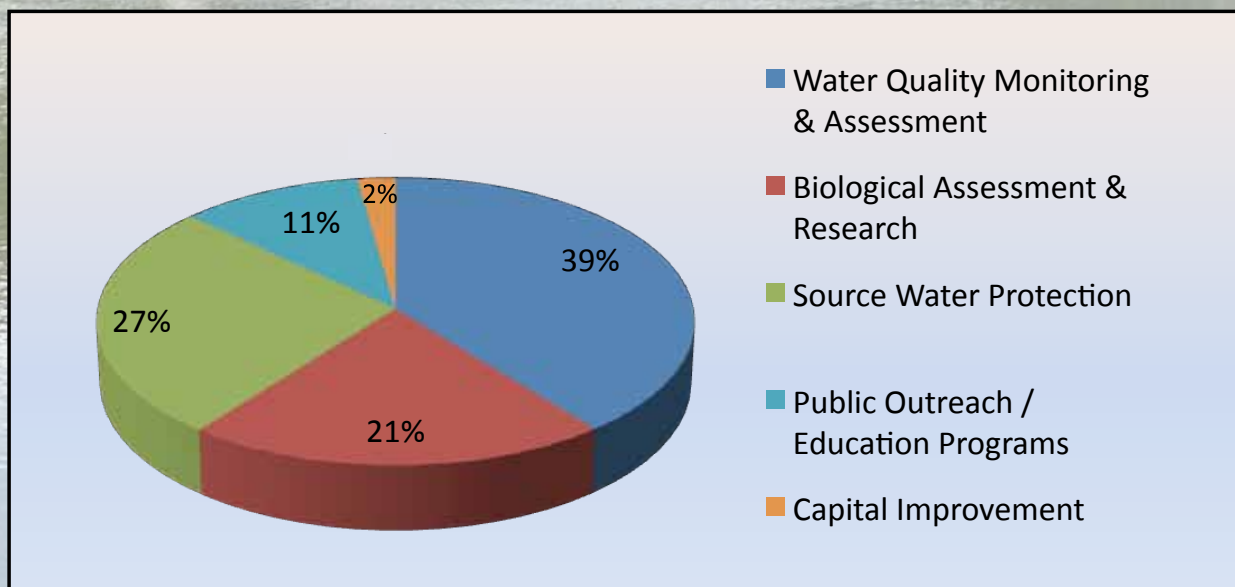


2022 ORSANCO Resources Overview



Budgeted Resources by Major Source

- Federal Funding • State Funding • Other Program Funding



Budgeted Expenditures by Major Program Area

- Water Quality Monitoring & Assessment
- Biological Assessment & Research • Source Water Protection
- Public Outreach / Education Programs • Capital Improvement

*Audited financial statements for 2022 will be available in February 2023.

ORSANCO Staff



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Joe Gilligan,
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Annette Shumard,
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& Environmental
Education Manager



Nick Callahan,
Environmental
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Specialist



Melissa Mann,
Public Information
Specialist



Matt Glazer,
Building
Maintenance,
Part-time



🌟 Staff Milestones

Joe Gilligan – 30 years



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P.E.



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President, Potesta
and Associates



West Virginia
Harold Ward,
Cabinet
Secretary, West
Virginia DEP

* As of June 30, 2022. A current list of ORSANCO's Commissioners is available at www.orsanco.org.

Special Recognition:

In 2021, Bruno Pigott (IN) retired from service on the Commission, and Brian Rockensuess (IN), Holly Christmann (OH), and Michael Forbeck (PA) were appointed to the Commission. ORSANCO would like to welcome Brian, Holly, and Michael to the Commission and would like to thank Bruno for his dedicated years of service. We wish him the best of luck in his future endeavors.



Bruno Pigott



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