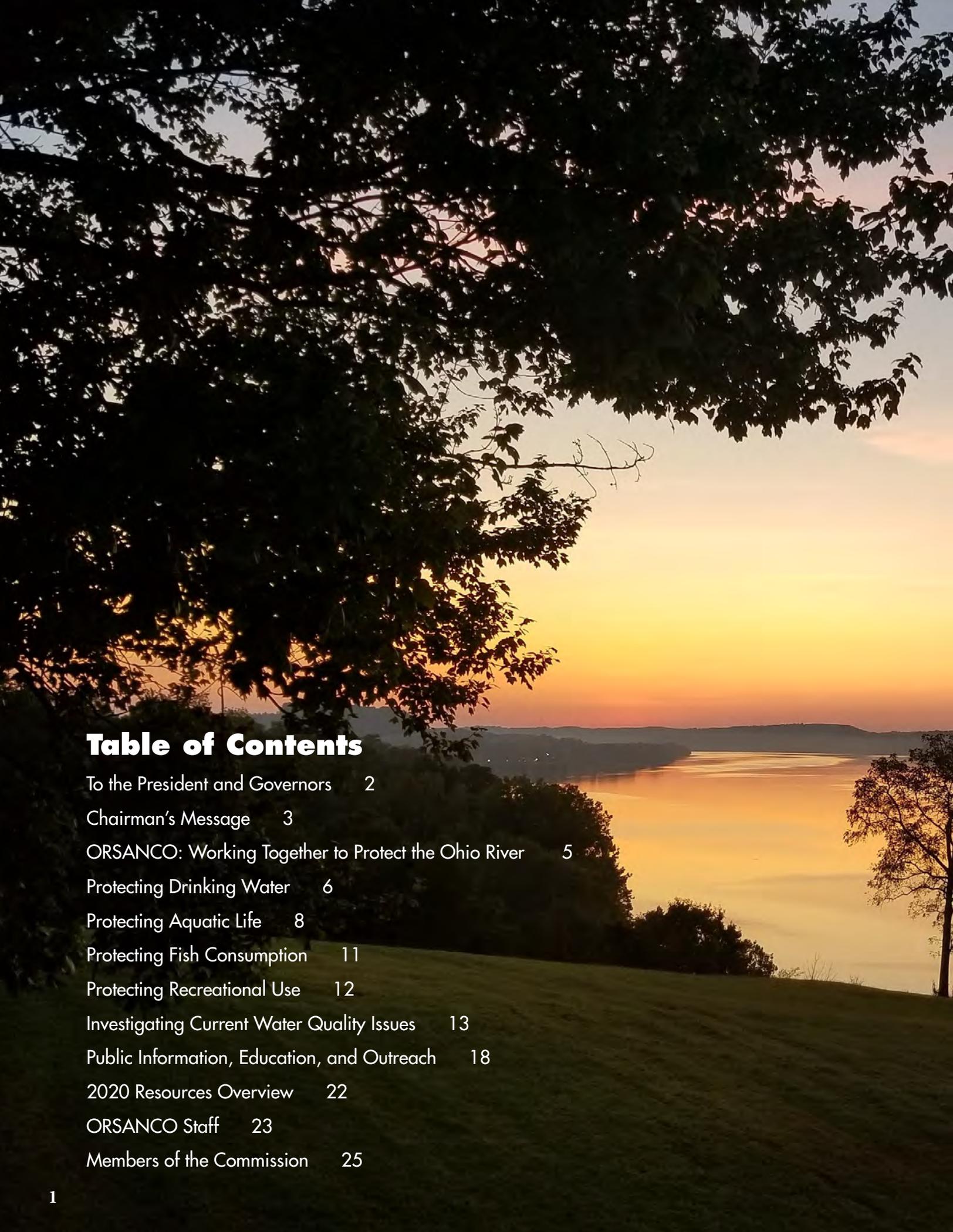




**Ohio River Valley Water  
Sanitation Commission  
Annual Report 2020**





## Table of Contents

To the President and Governors	2
Chairman's Message	3
ORSANCO: Working Together to Protect the Ohio River	5
Protecting Drinking Water	6
Protecting Aquatic Life	8
Protecting Fish Consumption	11
Protecting Recreational Use	12
Investigating Current Water Quality Issues	13
Public Information, Education, and Outreach	18
2020 Resources Overview	22
ORSANCO Staff	23
Members of the Commission	25

# 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 2020 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 Andrew M. Cuomo  
Governor of New York

The Honorable Mike DeWine  
Governor of Ohio

The Honorable Tom Wolf  
Governor of Pennsylvania

The Honorable Ralph S. Northam  
Governor of Virginia

The Honorable Jim Justice  
Governor of West Virginia

and

The Honorable Donald Trump  
President of the United States

\*As of June 30, 2020



“It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of light, it was the season of darkness, it was the spring of hope, it was the winter of despair.” So wrote Charles Dickens in *A Tale of Two Cities* about upheaval during the French Revolution, which occurred over 200 years ago. In 2020, during the unprecedented coronavirus pandemic health crisis, it has not been the best of times, yet we have used our wisdom and talent to move forward with ORSANCO’s mission for a healthy Ohio River watershed.

When I began my chairmanship almost a year ago, it was a time of looking ahead. The rough edges of the revised pollution control standards were being put in order, we were on track to begin the important ambient water quality PFAS sampling program along the main stem, and we had also initiated a concise, one-year effort directed

toward revisiting ORSANCO’s strategic plan, last updated in 2008. All these initiatives, among many others, would be integrated within the framework of ORSANCO’s ongoing, core water quality sampling and analysis plus source water protection programs that are at the heart of the ORSANCO mission in fulfillment of our 1948 Compact.

We have come far in resolving many past water quality concerns of the Ohio River while protecting and preserving the four designated uses of the River. ORSANCO focuses on these uses, through various programs, to support and maintain healthy aquatic life, drinking water, fish consumption, and recreation on the Ohio River. At the same time, we are being confronted with new issues such as harmful algal blooms, PFAS, and other emerging contaminants.

Today I’m pleased to report these important activities mostly remain on course. It is recognized that through this COVID-19 pandemic it has not been the best of times for far too many from the standpoint of health, income, and depleted relationships. However, ORSANCO’s stewardship of the River has gone unabated, as key activities continued under different conditions and procedures. Our Ohio River water

## Chairman's Message



and wastewater utility personnel displayed tireless dedication during the pandemic to supply safe drinking water and sanitary service to the millions of folks that depend on the Ohio River for these critical services.

ORSANCO staff continued to function, and we now better understand that, even while working remotely, we can in many cases still be very productive. In June 2020, the Commission held, for the first time in its history, virtual Technical and Commission meetings, connecting Commissioners, Technical Committee members, staff, and public citizens from our eight Basin states. Current technology, that brings people together, will continue to improve, as will our use of it. So, while the circumstances have caused some delays with several of our planned initiatives, we have not stood still and simply awaited the outcome of what still has not been resolved.

I'm most pleased and thankful for ORSANCO staff, our member states, federal partners, ORSANCO advisory committee partners, and all others who have, during this pandemic, continued to exhibit

their commitment and persistence in care of the Ohio River. From what has been accomplished, I am confident that we will emerge from the virus and other current concerns stronger and wiser, as a team that is dedicated to maintaining, and more importantly enhancing, water quality in the Ohio River Basin.

Simply maintaining water quality of the Ohio River is a given...but our programs, direction, and intent go far beyond that. We seek to enhance this precious resource we are blessed to enjoy and serve. Our mission, through our many water quality programs and goals, is directed toward our children, our grandchildren, and future generations to come.

A handwritten signature in black ink, which reads "John E. Kasper". The signature is fluid and cursive, with a large initial "J" and "K".

# ORSANCO: Working Together to Protect the Ohio River

Citizens in the Ohio River Basin use the river in various ways, and ORSANCO must protect these uses and help to improve water quality for the citizens of the Ohio River Valley. The Ohio River is a source of drinking water for over five million people, a major transportation route for coal and other energy products, and a natural resource for many plants and animals. ORSANCO works along 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 utilizes ORSANCO's monitoring results to assess the degree to which the Ohio River's beneficial uses are maintained. The assessments are guided by a 305(b) Coordinators Work Group composed of the states' representatives. The report is utilized by the states in developing their state-wide lists of impaired waters.

Four beneficial uses are assessed for the Ohio River including *public water supply*, *aquatic life*, *fish consumption*, and *contact recreation*. 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 305(b) report was published in June 2020.

Results from the 2020 assessment indicated that: 1.) the entire river fully supports the public water supply use; 2.) the entire river fully supports the aquatic life use; 3.) the entire river is impaired due to dioxin and PCBs for fish consumption; however, the entire river fully supports fish consumption for mercury; and 4.) approximately two-thirds of the Ohio River is impaired for contact recreational use.

## Open World Delegation

In October 2019, Rotary International, the Covington Rotary Club, ORSANCO, Thomas More University, and NKY Chamber co-hosted a delegation of water quality professionals from Russia to learn about Ohio River water quality management. This unique experience was part of the Open World program to share knowledge and resources and establish positive relationships between future leaders of other nations. The group visited the ORSANCO headquarters in Cincinnati and took various other local water quality tours at the Thomas More University Biology Field Station, the US EPA Experimental Stream Facility, and BB Riverboats.



# Protecting Drinking Water

## Emergency Response

The Ohio River is a vital natural resource that supplies drinking water to millions of people every day, 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 and energy production and a cost-efficient commercial navigation system. With the industrial and commercial use of the river comes the potential for accidental releases of pollutants that can contaminate the water and make it unsuitable for other uses on a temporary basis.

ORSANCO serves a critical role in emergency spill response communications by providing notification of spills and other incidents that could adversely affect water quality to state and federal emergency response agencies and to drinking water utilities that may be impacted by a release. 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.



The 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. When spills occur, water quality monitoring and analysis are critical to the drinking water utilities in order to make the best water treatment management decisions and ensure that the public water supply is safe to use for drinking water purposes. Any potential contact recreation and aquatic life impacts are also addressed.

ORSANCO staff also worked with spill response agencies in the Ohio River Basin to simulate emergency response activity for potential source water contamination events. Agencies involved in these collaborations included local 911 responders, medical professionals, health department officials, state environmental and public health agencies, private industry, and the US Coast Guard.

## Organics Detection System

The Organics Detection System (ODS) is a voluntary, cooperative effort involving drinking water utilities, industries, and ORSANCO to monitor volatile organic compounds (VOCs) in the Ohio River on the main stem and four Ohio River tributaries in the Basin. The primary purpose of ORSANCO's ODS Network is to monitor organic volatile water quality conditions for the protection of 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 monitoring from ORSANCO headquarters, 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

*continued on page 7*

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 1978, ORSANCO’s Early Warning Organics Detection System (ODS) 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. This system used purge and trap instrumentation and gas chromatographs (GCs) to detect the presence of select volatile organics which were installed at 7 locations along the Ohio River. New ODS host sites were added, as funding and support became available, to provide more coverage along the Ohio River and tributaries to the Ohio and, up until 2010, ORSANCO had 15 ODS monitoring stations. There are now 17 operating ODS stations; these stations are located along the Ohio, Allegheny, Monongahela, Kanawha, and Elk rivers in the Ohio River Basin.

### **ORSANCO’s Current Organics Detection System**

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

During routine monitoring, raw river water samples are collected, processed, and analyzed up to six times a day at select ODS stations using purge and trap technology and gas chromatographs. The system is calibrated to identify 30 common volatile organic compounds (VOCs), and with mass spectrometer detectors at eight ODS stations, ORSANCO’s ODS network has the capability to detect and identify the presence of thousands of volatile contaminants. The seventeen ODS stations within the Ohio River Basin provide a network of water quality monitoring and information sharing for the protection of public water systems in the event of releases or spills. ORSANCO works closely with local drinking water utilities to detect VOCs by the ODS to help ensure the quality and safety of the Ohio River as a source of drinking

water. The operation of this valuable system is only possible through the collaboration of the drinking water utilities and other partners who operate their respective systems on behalf of the ODS network.

River water samples (at intake depth) are collected at intervals during a 24 hour period and screened for the presence of VOCs. Fortunately, the vast majority of these samples do not show signs of contamination of volatile organics. If a VOC is detected at or above the program thresholds, ORSANCO will notify downstream water utilities and state and federal water quality and emergency response agencies as necessary. These organizations will then respond to the detection based on their respective emergency response plans. However, 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 this program and ORSANCO’s source water protection efforts.

The success of the ODS is due to the voluntary partnerships between the water utilities 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.

### **ODS Spotlight - Sandra Johnson: West Virginia American Water, Huntington, WV**

Sandy retired at the end of summer 2019 after 32 years as a Water Quality Supervisor with American Water. Among her many daily activities, Sandy was responsible for overseeing, and often operating, ORSANCO’s Early Warning Organics Detection System. Sandy had been with ORSANCO’s Organics Detection System (ODS) since the early beginning and was one of ORSANCO’s longest-serving ODS operators. During her time working with the ODS, the system has transformed in



numerous ways. During the mid-late 80's, Sandy was one of the first to operate a GCMS on behalf of ORSANCO's ODS program. When it was time to upgrade her site with newer instrumentation, she readily embraced the upgraded GCMS and became proficient in its operation. Sandy also frequently ran extra samples from non-GCMS ODS sites to confirm the presence of possible contaminants. Sandy was always willing to troubleshoot and diagnose problems with the ODS instrumentation to assist ORSANCO staff during repair and maintenance situations.

During spill response events, Sandy volunteered to work around the clock to process samples and rapidly turn around results, analyze data, and provide reports to ORSANCO, state and federal agencies, and downstream water utilities.

Sandy was an active participant and valued member of ORSANCO's Water User's Advisory Committee (WUAC) for many years. She had a clear understanding of the water treatment process, source water protection, and emergency preparedness and response. ORSANCO's ODS staff will miss her bright and bubbly spirit conveyed through her warm smile and cheerful, soft-spoken voice, her dedication to the ODS and spill notification program, as well as her contributions to ORSANCO's WUAC over the years. We congratulate Sandy on her retirement and wish her the best in the years to come.



## 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<sub>n</sub> (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.

*continued on page 9*





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 2018 marked the fourth year that both the fish index (mORFI<sub>n</sub>) and the Ohio River Macroinvertebrate Index (ORMI<sub>n</sub>) 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<sub>n</sub> and ORMI<sub>n</sub> scores.

In 2019, ORSANCO biological crews assessed R.C. Byrd and Smithland pools and had plans to sample the Belleville, Markland,

and McAlpine pools in 2020. Over the years, the various pools have generally ranked from “fair” to “very good” for fish. To date, after two complete cycles plus thirteen pools completed in the third cycle, no pools have ranked as “poor” or “very poor.”

### Special Studies

Two Ohio River navigational pools were surveyed during the 2019 field season (traditionally, ORSANCO aquatic biologists sample and assess three pools per year). In 2018 and 2019, resources associated with sampling a third pool were refocused towards completion of ORSANCO’s National Rivers and Streams Assessment (NRSA) 99 site commitment. The NRSA surveys are part of the larger US EPA National Aquatic Resource Survey program, whose goal is to assess all of the nation’s waterways (lakes, wetlands, estuaries, etc.). ORSANCO staff lent their

expertise to sample waterways within the Basin states of Pennsylvania, West Virginia, Kentucky, and Ohio. In 2018, 60 sites were surveyed for numerous parameters including water chemistry, fish and macroinvertebrate assemblages, nutrients, fecal bacteria, algae, and instream and riparian habitat conditions. In 2019, the remainder of ORSANCO’s project responsibility (38 sites) were sampled. These data were collected by ORSANCO on behalf of the Basin states, and the data were given to US EPA for assessment and later released



to the general public. The NRSA data will also provide ORSANCO with additional information to consider when investigating basin-level issues and their potential influence on main stem Ohio River conditions.

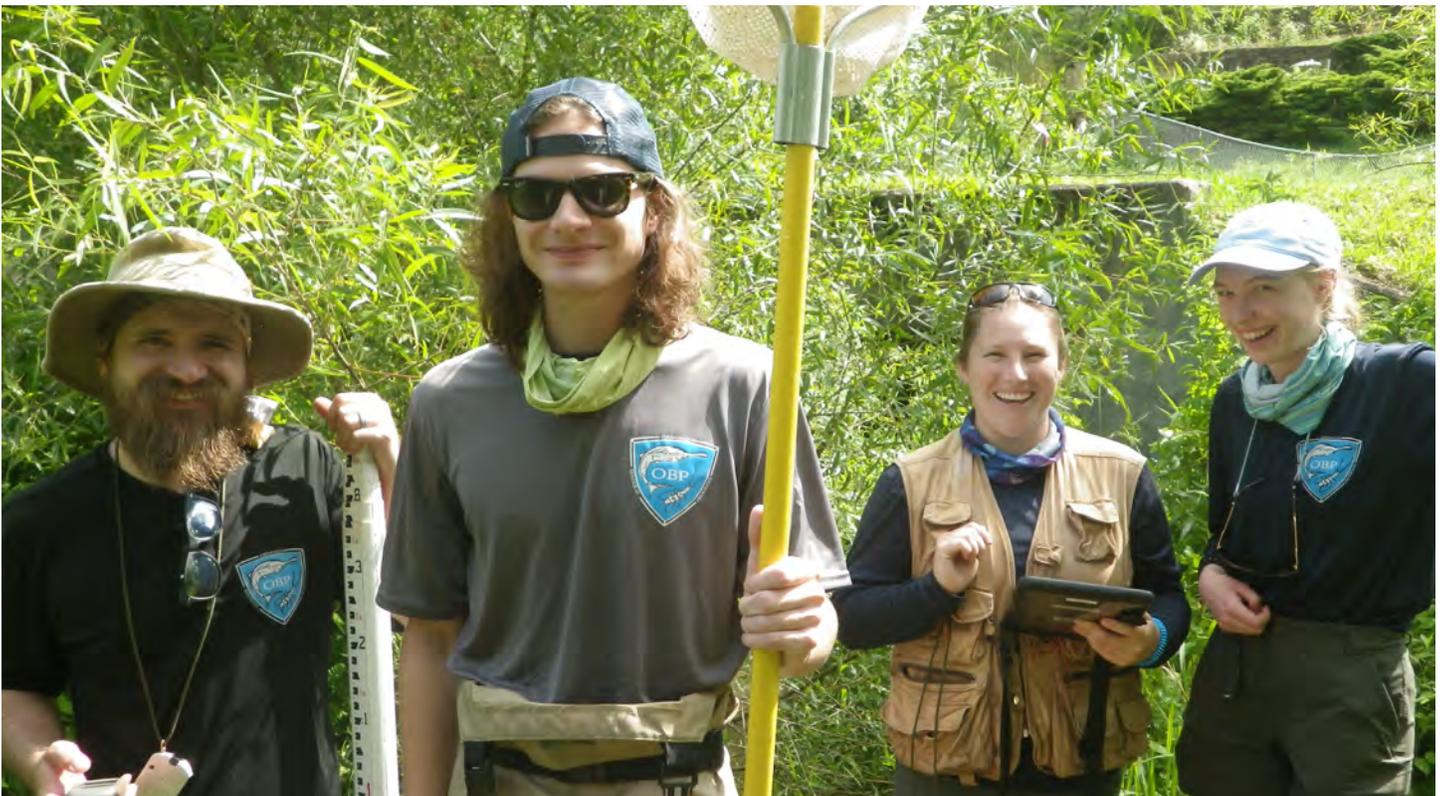
Beyond larger activities like the NRSA, the Biological Water Quality Subcommittee (BWQSC) regularly discusses the allocation of any remaining programmatic resources prior to each field season. These additional studies regularly involve increasing research efforts within the currently scheduled pools to improve the accuracy and efficiency of the annual assessments and support programmatic needs of ORSANCO's state and federal partners. One effort involved collecting additional morphometric information from fish collected in Smithland pool. These data will help inform existing length-weight curves and investigate any potential effects associated with the invasive carp populations established in the pool.

For another study, ORSANCO biologists and environmental scientists collected additional instream water samples on behalf of the Kentucky Department of Water. These samples were processed for total metals content and will be used to inform their assessments of local conditions.

## Collaboration

During the winter and spring months, ORSANCO aquatic biologists work with many other entities to lay the groundwork for initiatives to collect much-needed monitoring information from the Ohio River during the following field season.

In 2020, ORSANCO will coordinate efforts with state and federal partners to bolster fish tissue collections from the main stem Ohio River. In 2018 and 2019, fish tissue collections were limited due to scheduling conflicts with ORSANCO's NRSA surveys. This data gap was further exacerbated by our 2020 pool surveys being postponed due to COVID-19 outbreak restrictions prohibiting multi-person crew activities (fish tissue collections require multiple staff to work in close proximity in order to be safe and efficient). The focus of remaining resources for the 2020 field season, aside from probabilistic fish and macroinvertebrate surveys, will be enhanced fish tissue collection efforts along the main stem. Biologists will be partnering with federal and state agencies to minimize duplicative effort and increase ORSANCO's dataset available for future 305(b) assessments and fish consumption advisories.



# 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](http://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](http://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 US EPA 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 conducted between 2003 and 2008 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. This is largely due to the multi-billion dollar investments that wastewater utilities have made to improve wastewater discharge water quality. 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. Although all sections of the river may be unsafe for contact recreation at times, as a testament to the Ohio River's significant water quality improvements, it is now the home to Paddlefest, the nation's largest annual paddling event, as well as the Great Ohio River Swim. Because of the unpredictability of the weather, ORSANCO has also provided monitoring for certain events, such as triathlons, on the Ohio River that bring large numbers of the public in contact with the river. In 2019, the Great Ohio River Swim was cancelled due to a Harmful Algal Bloom (HAB), but ORSANCO staff provided water quality monitoring for *E.coli* bacteria and *Microcystis* (blue-green algae) leading up to the event. ORSANCO staff also provided water quality monitoring for *E.coli* bacteria for the 2019 Paddlefest event. Unfortunately, due to COVID-19, the 2020 Paddlefest event was turned into a virtual event called "Paddle for a Purpose". However, beginning in May, ORSANCO staff was able to conduct routine monitoring for the 2020 recreation season.



# Investigating Current Water Quality Issues



## **Ohio River Basin Mercury Loading Analysis Mercury Ad Hoc Committee**

In June 2015, the Commission established an Ad Hoc Committee on Mercury Studies to address scientific information needs concerning mercury for the Ohio River. The committee was charged to identify the information needs surrounding the impacts of mercury on Ohio River water quality and fish contaminants and to make recommendations to the Commission for further study needs. The committee was composed of ORSANCO Commissioners, selected experts in the field of the environmental impacts of mercury, and representatives of the Commission's Technical Committee, Power Industry Advisory Committee, and Watershed Organizations Advisory Committee.

In October 2016, the Ad Hoc Committee made a recommendation to the Commission regarding a need to study mercury from a basin-wide standpoint, which was endorsed by the Technical Committee and accepted by the Commission. The approved study was to complete a mercury mass loadings analysis of instream, point source, and atmospheric sources

for the Ohio River and its major tributaries. The study was designed to be highly efficient, utilizing existing studies to estimate mercury loads in the Ohio River and major tributaries, while using available discharge monitoring data to estimate loads from point sources.

The Commission approved the report, Ohio River Basin Mercury Loading Analysis, at its June 2020 meeting. The report concluded that during the study period at the most downstream Ohio River mercury monitoring station (OR mile point 912), upstream monitored mercury point sources cumulatively totaled 2% of the annual instream mercury load. Atmospheric mercury deposition to the watershed, both to the landscape and water, cumulatively totaled approximately six times the instream Ohio River mercury load. Major tributaries to the Ohio River cumulatively totaled approximately half the Ohio River mercury load at the downstream mercury station. Finally, monitored mercury point sources





## **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 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. Therefore, the Commission is developing a monitoring plan to characterize ambient conditions for PFAS in the Ohio River, which can be repeated to track changes in the future.

Twenty monitoring sites have been randomly selected, which are located outside the direct influence of any particular point source discharge. These sites will be sampled under two separate flow/seasonal conditions. Each of the twenty sites will be 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.

discharging directly to the Ohio River cumulatively totaled approximately 40% of all monitored mercury point source discharges in the Basin at the most downstream Ohio River monitoring station. ORSANCO completed instream annual mercury loads, based on year-long, monthly monitoring surveys at four Ohio River locations and fifteen major tributaries, which account for approximately 85% of the inflow to the Ohio River. Staff generated point source annual mercury loads for the Basin using discharge monitoring report data as contained in US EPA's national database. A substantial portion of the study involved the development of an estimate over the study period for the atmospheric mercury loading which is transmitted to the Basin. The outcome of these efforts was to estimate how much mercury in the Ohio River is contributed from the major tributary watersheds and to understand the extent of mercury loads in the Ohio River contributed by point sources. These studies will allow for a better understanding of the future management needs regarding water pollution control in the Ohio River Basin.

ORSANCO is working cooperatively with federal partners, US EPA, the United States Geological Survey (USGS), and each of our member states. The current schedule is to complete this important project by early 2021.

## **Nutrient Reduction Activities 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 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.

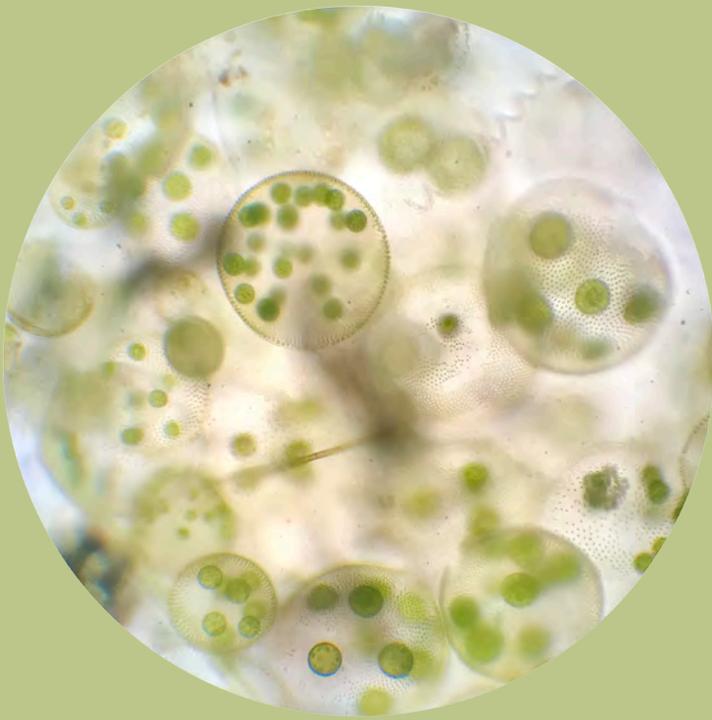
The Trading Project has funded over 35 projects in Ohio, Kentucky, and Indiana. These projects have resulted in the removal of over 100,000 lbs. of nitrogen and phosphorus from the Ohio River Basin. The first credits generated from these projects were sold to Duke Energy, American Electric Power, and Hoosier Energy.

In 2015, the Trading Project was awarded the US Water Prize. The Water Prize honors individuals, institutions, and organizations that have made an outstanding achievement in the advancement of sustainable solutions to our nation's water challenges. A new round of proposals from farmers have been awarded. This round of funding brings the total to over \$1,000,000 in awards for nutrient reduction projects.

### ***Nutrient Criteria Development***

Excessive nutrients have long been an issue in our nation's waterways, and the Ohio River is no exception. To resolve this issue, ORSANCO staff have been working towards defensible nutrient criteria for the Ohio River for over a decade using nutrient, planktonic algae, and chlorophyll-a (an indicator of algae production) data collected from locations in the lower section of the river. However, this approach failed to develop a causal relationship, which is a required step in developing criteria. During the stressor identification portion of the macroinvertebrate index (ORMIn) development, certain metrics exhibited a response to ambient nutrients. Tying a biological response to excessive nutrients is a common approach taken by other agencies to establish nutrient criteria. However, macroinvertebrates do not directly respond to excess nutrients, but rather to the ambient conditions resulting from eutrophication, namely fluctuating and depressed concentrations of dissolved oxygen.

In 2014, ORSANCO purchased 60 continuous dissolved oxygen loggers to obtain this information that was previously unavailable. Since then, these loggers have been placed alongside the macroinvertebrate samplers in the Belleville, Markland, McAlpine, Olmstead/Open Water, Montgomery, Racine, JT Myers, Willow Island, Greenup, Cannelton, Newburgh, Meldahl, RC Byrd, Smithland, and New Cumberland pools in the Ohio River. Additionally, water samples were obtained for nutrient and chlorophyll-a analysis at each of these sites. ORSANCO staff are currently analyzing the data from this paired study, and early indications are promising that defensible nutrient criteria can be developed from this approach.



people and animals who ingest them, either through recreation, such as swimming, or in drinking water.

Ohio River drinking water utilities report algal blooms to ORSANCO, who, in turn, notifies downstream water utilities. Treatment information, if available, is also passed on to assist the downstream utilities in the development of treatment strategies. ORSANCO's Source Water Protection Program serves to protect drinking water interests along the Ohio River and major tributaries. ORSANCO uses and evaluates all available information to develop the best protection strategies and promotes the use of the Ohio River as a quality source for drinking water.

*continued on page 17*

### **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





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 U.S. Army Corps of Engineers (USACE), and ORSANCO staff. ORSANCO has coordinated

with five states and two federal agencies to respond to these reports. Although these blooms were reported, no HABs were identified on the Ohio River.

In September 2019, an algae bloom was observed by KY DOW personnel at Russell, KY (ORM 327.6). The bloom was intermittent both temporally and spatially, but it 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.

# 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.



to define their watershed and trace its connection to the Ohio River. Students also performed storm water surveys and water quality assessments using chemistry and macroinvertebrates. In 2019, Students in the STREAM fifth graders from John P. Parker Elementary School even reached a national audience when they presented their data at the North American Association for Environmental Education (NAEE) Conference in Lexington, Kentucky.

Last summer, FORE partnered with park departments, conservation districts, and community centers in Cincinnati and Northern Kentucky to offer creek exploration camps and nature programs to over 1,800 children in urban neighborhoods. Through these programs, students explored creeks, studied macroinvertebrates, and constructed their own aquatic ecosystems through hands-on crafts.

While FORE expanded their outreach programs, FORE's River REACH program kicked off the 2019-2020 school year with 15 programs aboard their floating classroom.

## The Foundation for Ohio River Education

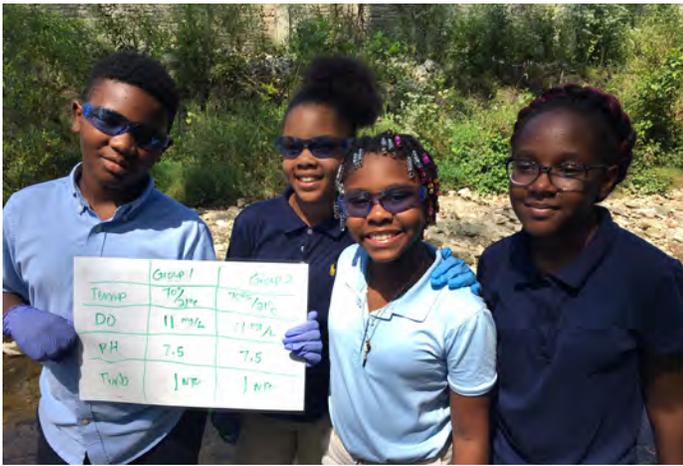
The Foundation for Ohio River Education (FORE) is ORSANCO's non-profit education foundation. Since 2004, FORE has taught people of all ages in the Ohio River Basin to become environmental stewards through hands-on programs that get people on the water and engaged in preserving the cultural, ecological,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

In 2019, FORE made a special commitment to working with students, children, and families in urban areas to help them understand how their neighborhoods are connected to the Ohio River and how they can connect with the Ohio River watershed right in their own backyard.

Through FORE's Students in the STREAM program, staff worked with 70 students in Cincinnati Public Schools to monitor and steward two urban streams located on the eastern side of Cincinnati. Participating students used USGS mapping programs

*continued on page 19*





As FORE prepares for its summer season, they are partnering with numerous organizations to offer a mix of outdoor and virtual summer programs as well as developing exciting plans for reaching students in the upcoming 2020-2021 school year. FORE is working with Cincinnati Parks to provide socially distant activities for Creek Week camps, and they have developed DIY River Exploration kits for Newport City Schools that feature self-directed activities for kids to experience at-home learning about the Ohio River and its watershed. FORE will also continue Nutrient and Harmful Algal Bloom (HAB) Management workshops for farmers and landowners through virtual presentations and socially distant field days.



While the coronavirus pandemic may have changed FORE's program plans in 2020, it has also allowed staff to explore and create new ways of reaching the students and families in the Ohio River watershed.

### RiverWatchers

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.

FORE was scheduled to continue their River REACH programs in spring 2020, but those field trips, along with most of FORE's additional outreach programs, were cancelled due to the coronavirus pandemic.

Although most of FORE's 2020 programs came to an abrupt halt due to COVID-19, they successfully innovated new ways to support teachers and students as they finished out the school year with virtual resources and programs. FORE began by compiling online educational resources and produced DIY Creek Exploration videos designed to introduce students to macroinvertebrate collection and pollution tolerance tests. The videos were also aired on a local PBS station. In addition, FORE worked with staff at Cincinnati Public Schools to offer a virtual, interactive creek field trip for 5th through 8th grade students at the end of the school year.





Since the program began, thousands of volunteers collected water quality data from samples they collect from various sites along the Ohio River or one of its tributaries. Participants collect samples and 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.

Participating schools include:

- Warren Co. Conservation District (PA)
- Woodland Hills School District (PA)
- Cincinnati State and Technical Community College (OH)
- Meigs High School (OH)
- New Richmond High School (OH)
- Leon Elementary School (WV)

### 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 staff continue to welcome applications for future events and look forward to displaying the aquarium in the spring of 2021.

During the 2019 Summer/Fall Season, the Life Below the Waterline mobile aquarium was displayed at the following events in the Ohio River watershed:

#### Event/Location

- ALCOSAN Open House - Pittsburgh, PA
- BBQ on the River - Paducah, KY
- Inland Waterways Festival - Marietta, OH
- Subaru Outdoor Experience - Dayton, OH
- Tour de Donut - Troy, OH

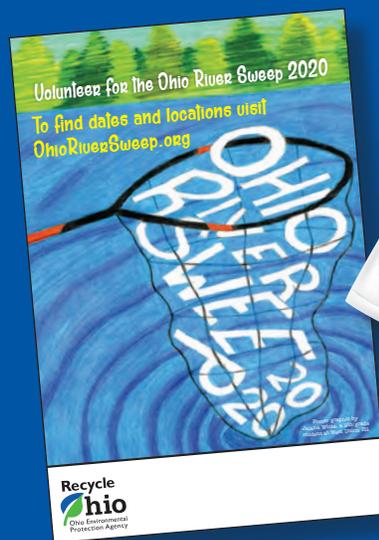


## Ohio River Sweep

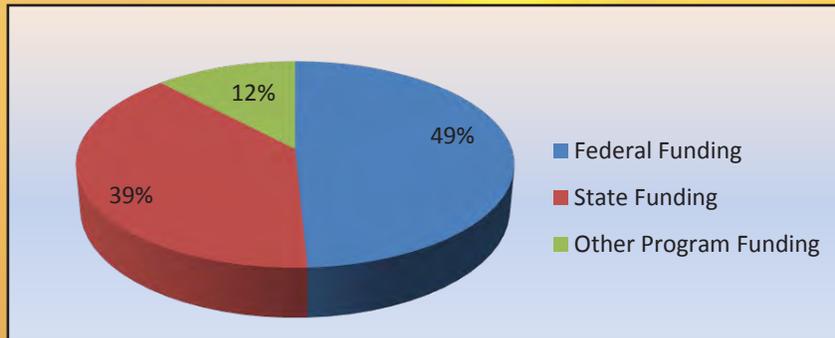
The Ohio River Sweep is the annual, volunteer cleanup of the Ohio River; a collaboration between ORSANCO and the Foundation for Ohio River Education (FORE). The 2020 event was planned to occur on its normal schedule, on the third Saturday in June. However, during the coronavirus pandemic, safety concerns for the coordinators and volunteers prohibited large groups of volunteers that the Ohio River Sweep typically hosts. Despite these challenges, the Ohio River Sweep had a contingent of individuals, families, and small groups who conducted Ohio River "Mini-Sweep" cleanups. Mini-Sweeps were conducted in groups of 10 people or fewer, in compliance with state and local COVID-19 mandates.

The primary goal of the Ohio River Sweep is to remove litter from the Ohio River. Litter continues to be a problem in the Ohio River Basin and many other watersheds throughout the nation. The Ohio River Sweep provides an opportunity for volunteers to remove tons of litter from the watershed.

In conjunction with the Ohio River Sweep, a student art contest is held annually to promote awareness of the event and the need for volunteers. One grand prize winner is selected, and the winning artwork is displayed on promotional materials and advertisements for the event. A T-shirt design winner and one winner from each grade level are also recognized. The 2020 Ohio River Sweep grand prize winner was Jaiana White from West Union, Ohio and the T-shirt design winner was Haven Brewer, also from West Union, Ohio. Student art is used to create both the poster and T-shirt to encourage young people to understand the importance of their role in managing a great resource such as the Ohio River.

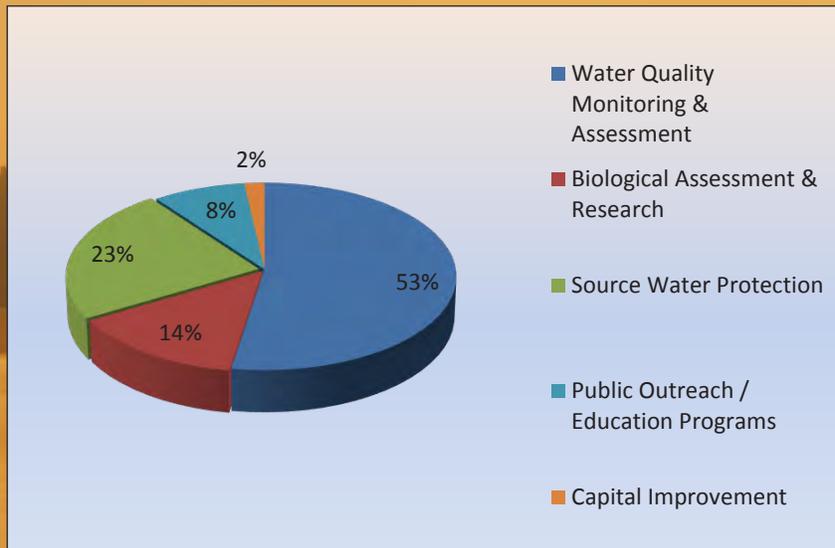


# 2020 Resources Overview



## 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 2020 will be available in February 2021.

# ORSANCO Staff



Richard Harrison,  
P.E., Executive  
Director & Chief  
Engineer



Tracey Edmonds,  
Administrative  
Assistant

## Technical Programs



Jason Heath, P.E.,  
BCEE  
Technical Programs  
Director



Sam Dinkins,  
Technical  
Programs  
Manager



Ryan Argo,  
Technical  
Programs  
Manager



Stacey Cochran,  
Environmental  
Scientist III



Greg Youngstrom,  
Environmental  
Scientist III



Jamie Tsiominas,  
Environmental  
Scientist/Organics  
Detection System



Bridget Taylor,  
Environmental  
Scientist II



Emilee Urichich,  
Contractual  
Environmental  
Scientist



Lila Xepoleas  
Ziolkowski,  
Analytical Chemist,  
Quality Assurance



Rob Tewes,  
Senior Biologist



Bridget  
Borrowdale,  
Aquatic Biologist



Daniel Cleves,  
Aquatic Biologist

## Administrative Programs & Human Resources



☀️  
David Bailey,  
Director of  
Administration &  
Human Resources



☀️  
Adam Scott,  
Data Systems  
Administrator



Donna Beatsch,  
Data Processing/  
Accounting  
Specialist, Part-time



Joe Gilligan,  
Comptroller



☀️  
Lisa Cochran,  
Communications  
Coordinator



Melissa Mann,  
Public  
Information/  
Education  
Specialist



Matt Glazer,  
Building  
Maintenance,  
Part-time

## FORE



Heather Mayfield,  
Executive Director

## ☀️ Staff Milestones

David Bailey – 20 years  
Lisa Cochran – 10 years  
Adam Scott – 5 years





# Members of the Commission



Chairman  
John Kupke  
Indiana



Vice-Chairman  
Charles Duritsa  
Pennsylvania



Secretary/  
Treasurer  
Michael P. Wilson  
New York



Executive Director  
and Chief  
Engineer  
Richard Harrison,  
P.E.



Illinois  
Toby Frevert



Illinois  
John Kim  
Director, Illinois  
EPA



Indiana  
Joseph H.  
Harrison, Jr.  
Massey Law  
Offices, LLC



Indiana  
Bruno Pigott  
Commissioner,  
Indiana Dept. of  
Environmental  
Management



Kentucky  
Jacqueline  
Coleman  
Lieutenant  
Governor



Kentucky  
Rebecca  
Goodman  
Secretary, KY  
Energy and  
Environment  
Cabinet



Kentucky  
C. Ronald Lovan,  
P.E., President/CEO,  
Northern  
Kentucky Water  
District



New York  
Douglas E. Conroe  
Executive Director,  
Chautauqua Lake  
Association Inc.



New York  
Basil Seggos  
Commissioner,  
New York  
Department of  
Environmental  
Conservation



Ohio  
Stuart F. Bruny



Ohio  
Laurie Stevenson  
Director,  
Ohio EPA



Ohio  
John M.  
Hoopingarner



Pennsylvania  
Patrick McDonnell  
Secretary,  
Pennsylvania DEP



Pennsylvania  
Davitt Woodwell  
President,  
Pennsylvania  
Environmental  
Council



Virginia  
Lou Ann Jessee-  
Wallace  
Virginia Water  
Control Board &  
Owner of Design  
Printers



Virginia  
David Paylor  
Director, Virginia  
DEQ



West Virginia  
Austin Caperton  
Cabinet Secretary,  
West Virginia DEP



West Virginia  
David Flannery  
Steptoe &  
Johnson, PLLC



West Virginia  
Ronald R. Potesta  
President, Potesta  
and Associates



Federal  
George  
Elmaraghy



Federal  
Tom FitzGerald  
Director, Kentucky  
Resources Council



Federal  
David Miracle

\* As of June 30, 2020. A current list of ORSANCO's Commissioners is available at [www.orsanco.org](http://www.orsanco.org).

In 2020, Jenean Hampton (KY) and Charles Snavely (KY) completed their service on the Commission, and Jacqueline Coleman (KY), Rebecca Goodman (KY), and David Miracle (federal) were appointed to the Commission. ORSANCO would like to welcome Jacqueline, Rebecca, and David to the Commission and would like to thank Jenean and Charles for their dedicated years of service. We wish them all the best of luck in their future endeavors.



### **Special Recognition: Commissioner Stuart Bruny**

In June 2020, Commissioner Stuart Bruny completed over 28 years of dedicated service to the Commission. Commissioner Bruny served ORSANCO for over 10 years as the Ohio member of the Technical Committee from 1992 to 2003 and continued his service to ORSANCO for another 18 years as an ORSANCO Commissioner. He served as a Federal ORSANCO Commissioner, appointed by President George W. Bush, between 2003 and 2012 and served as an Ohio ORSANCO Commissioner, appointed by Gov. John R. Kasich, between 2012 and June 30, 2020. He served in numerous leadership roles from 2003 until 2020. Commissioner Bruny was very active with the Commission, serving as Commission Chairman in 2007-2008 and again in 2017-2018. He chaired a number of Committees including the Technical Committee, Pollution Control Standards Committee and the Ad Hoc Committee on Mercury Studies. The Commission's 2008 Strategic Plan update was also completed through Commissioner Bruny's leadership.

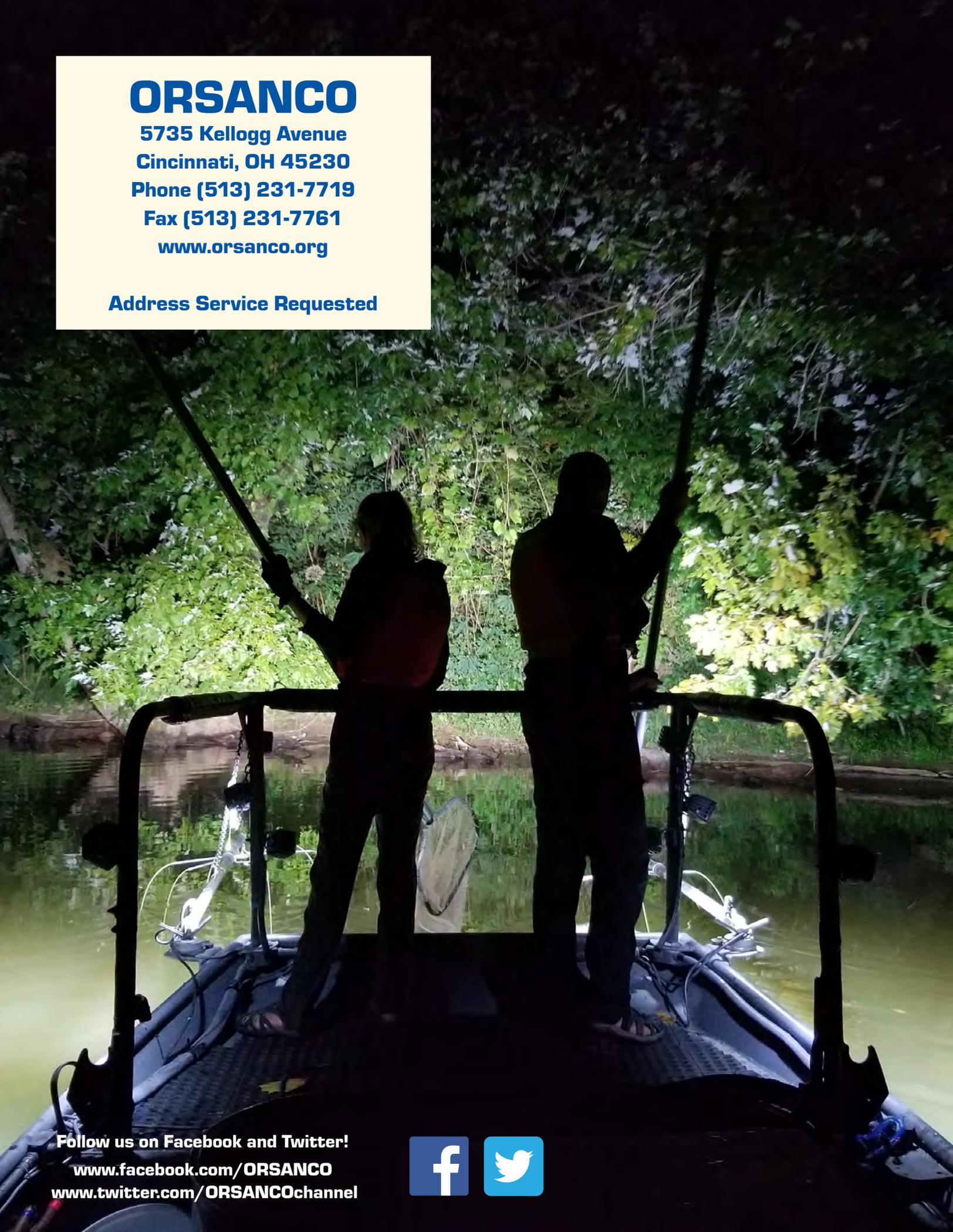
In addition to his service as an ORSANCO Commissioner, Commissioner Bruny dedicated over 30 years to the Ohio EPA serving as the Chief of the Northeast District Office as well as the Chief of the Southeast District Office. He also served as the Chief of the Division of Public Drinking Water.



# ORSANCO

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