Winter 2022 Issue

OKI NEWS

Ohio – Kentucky – Indiana Water Science Center
U.S. Geological Survey • U.S. Department of Interior

In This Issue

USGS FEH Primer ……..1
Runoff-Volume Reduction …….2
The Ohio Microbiology Lab ……4
Next Generation Monitoring …….6
High-Frequency Sensors ……8
Employee Spotlights ……10
Recent Publications ……..……15
Upcoming Events ……..……17

USGS Fluvial Erosion Hazards (FEH) Primer

This USGS FEH Primer highlights methods used in regional and reach-scale assessments of fluvial erosion hazards (FEH). Fluvial erosion includes bed erosion, meaning lowering of the bed of a stream, as well as bank erosion, which refers to the retreat of stream banks that occurs as a stream widens or migrates laterally.

The purpose of this primer is to serve as a starting point for planning an assessment of risks related to fluvial erosion, specifically risks to infrastructure in and near streams. The primer provides citations and links (when possible) to a variety of more-detailed references. In addition to FEH applications, the methods described here can be applied to issues related to the impacts of fluvial erosion on stream ecology and habitat, water quality, and sedimentation in downstream reservoirs.

The primer begins with a basic introduction to FEH and fluvial geomorphology, describes the significance of FEH corridors, gives examples of methods used for delineating FEH corridors at regional or statewide scale, and reach-scale FEH assessments.

The FEH Primer was developed by a team of USGS scientists with partners from academia and a private engineering firm. For more information contact Jeff Frey (jwfrey@usgs.gov) or Pete Cinotto (pcinotto@usgs.gov) of the OKI WSC.

USGS Studies Runoff Volume Reduction Associated with Soil Amendments Added to Highway Median-Strip Catchments

The U.S. Geological Survey (USGS) cooperated with ms consultants, STONE Environmental, BUDS INC., and the Ohio Department of Transportation (ODOT) to research stormwater-runoff volume reduction associated with adding soil amendments to portions of highway median-strip catchments. The soil amendments consisted of a mixture of compost plus sand or compost plus expanded shale that were rototilled into the existing soil to depths of 4 or 6 inches. The amended soils were then topped with a compost blanket, seeded, and covered with erosion-control matting (see photo below).

Photo of USGS rainfall and runoff measurement equipment in the foreground with soil amended area in the background.

The USGS' role was to measure rainfall and runoff during time periods before and after the amendments were installed to evaluate whether and how much the various amendment type and depth combinations resulted in runoff reduction. To accomplish that objective, the USGS installed instrumentation to measure rainfall on and runoff from State Route highway median strips at 8 locations in north-central and northeast Ohio. Ten soil-amended sites were instrumented as were two control sites whose drainages did not receive soil amendments. Control sites were collocated with soil amended sites at 2 of the 10 highway locations.

Tipping-bucket rain gages and H-flumes were installed to measure rainfall and runoff, respectively (see first photo below). The H-flumes were pre-calibrated so that instantaneous runoff could be determined by simply measuring the water level near the exit of the H-flumes. Water levels were measured in stilling wells connected to the flumes using non-submersible pressure transducers.

-Continued

Data and photographic images (see second photo below) were telemetered to USGS computers via the internet using cellular modems and the data and images were made publicly available in near real time through the National Water Information System: Web Interface.

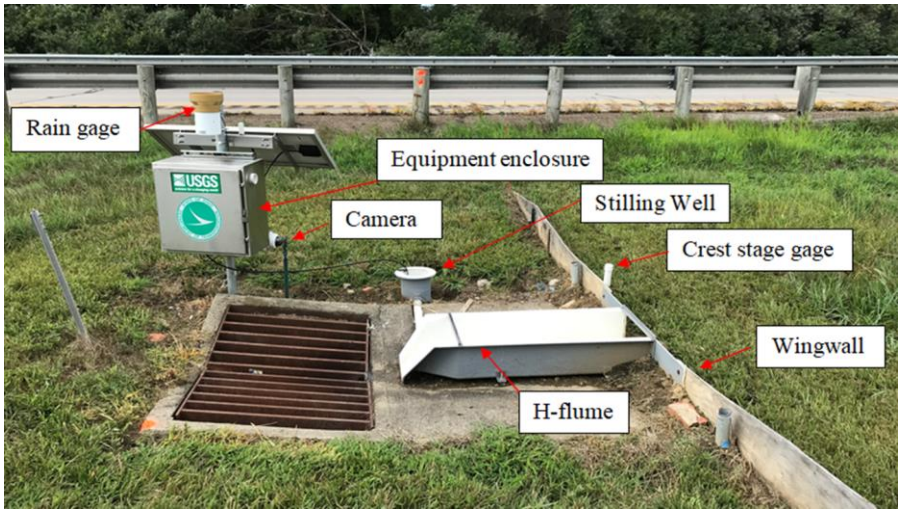


Photo of typical study site with USGS-installed equipment identified.

Photo of flowing H-flume taken at site 404901083053600 by on-site camera on April 20, 2019.

Rainfall and runoff were measured between 2018 and 2020. Data were compiled for more than 4,200 "events" where at least 0.01 inches of rain was recorded, making the study the largest data collection effort of its kind that ODOT has funded. The runoff volume as a percentage of the rainfall volume was computed for each event along with information about rainfall intensities, event durations, and antecedent conditions. A wide variety of statistical and graphical techniques were used to assess runoff reduction. For more information on the study and its findings, see the USGS report. Also, a video presentation about the study, as well as design recommendations resulting from the study, can be found here. For more information, contact Greg Koltun (gfkoltun@usgs.gov) or Matt Whitehead (mtwhiteh@usgs.gov).

The Ohio Water Microbiology Laboratory

The U.S. Geological Survey (USGS) Ohio Water Microbiology Laboratory (OWML) is in the Columbus, Ohio office of the Ohio-Kentucky-Indiana Water Science Center. The OWML is uniquely positioned to address many of the current science issues facing the Nation and the Region. Consequently, the mission of the OWML is focused on meeting the challenge to improve understanding, advance science, and where applicable, allow for more effective management and mitigation strategies related to emerging and (or) persistent science issues.

The OWML provides microbiological data of public-health significance from surface waters, groundwaters, and sediments using traditional and cutting-edge analytical approaches. Specific research topics include cyanobacterial harmful algal blooms (cyanoHABs), microbial source tracking, environmental DNA (eDNA) monitoring, and taste and odor issues. Each of these topics will be discussed in more detail below.

Although **CyanoHABS** appear to be algae, the blooms are a large growth of cyanobacteria that may produce toxins harmful to humans and animals. Multiple strategies to address cyanoHABs are ongoing and include reducing nutrient sources, monitoring, and predicting concentrations of toxins, minimizing exposures to humans and animals, and treating waters to reduce or eliminate cyanoHAB toxins once they occur. The OWML can analyze for cyanobacterial genes using a quantitative polymerase chain reaction (qPCR) technique on three different scales: identification/concentration of specific cyanobacterial genera that make up the bloom, identification/concentration of the genes that code for toxins, and identification/concentration of cyanobacterial cells that are actively in the process of producing toxin. Additionally, the OWML can perform enzyme-linked immunosorbent assays (ELISAs) to quantify cyanoHAB toxins.

Microbial source tracking (MST) allows for the identification of the source of fecal contamination to a particular waterbody. MST techniques are based on the concept that various warm-blooded animal intestinal systems have different selective pressures caused by differences such as diet and physiology that select for specific gut microbial populations. The OWML has the capability to analyze for several host-associated genetic markers, also known as MST markers, including human, canine, ruminant, cattle, horse, swine, chicken, and waterfowl.

Environmental DNA (eDNA) is genetic material that is shed into the environment from a live organism that can be used to identify the presence of a specific organism. Samples collected for eDNA analysis can help with rare species detection, invasive species tracking, and can also be used to assess the health of streams and wetlands. Currently, the OWML can analyze for the following organisms: Grass Carp, Black Carp, Silver Carp, Bighead Carp, Northern Riffleshell mussels, Kidneyshell mussels, M. pulchellum mayflies, and C. obscura caddisflies.

-Continued

Odorous chemicals such as 2-methylisoborneol (MIB) and geosmin are common taste-and-odor compounds produced by cyanobacteria and bacteria in the class Actinomycetes. These chemicals, although not harmful to humans, are considered “nuisance” compounds. Drinking-water suppliers are often required to increase water treatment to remove these taste-and-odor compounds so that the water is palatable to their customers. The OWML uses both cultural methods (Actinomycetes) and qPCR techniques (geosmin and MIB synthetase genes specific for Actinomycetes and cyanobacteria) to assist in studies focused on taste and odor issues.

While our analytical services can provide meaningful data, the true backbone of the lab is our staff. OWML staff are experts in their field and have been working in the lab and collaborating with other scientists on a variety of studies from across the nation. Interpretation of microbiological data is not always straightforward, and the OWML staff are available to assist from study design to method development (if current analytical services are not sufficient for your needs) to data interpretation and report writing.

For further information, please contact Amie Brady (amgbrady@usgs.gov) or visit the OWML website: https://www.usgs.gov/labs/ohio-water-microbiology-laboratory

Coming soon! The U. S. Geological Survey will be unveiling the "Next Generation" Monitoring Location Pages

The classic U.S. Geological Survey (USGS) website for accessing streamflow stage and discharge information will be changing soon as part of a National Water Information System (NWIS) modernization effort. The original legacy current conditions real-time pages, shown below, have been around since 1995 and haven't really changed much during that time. The legacy pages have served us well; however, they are outdated, and for some users, difficult to navigate.

Current Conditions for Ohio: Streamflow -- 313 site(s) found

PROVISIONAL DATA SUBJECT TO REVISION

--- Predefined displays --- Ohio Streamflow Table | Group table by -- no grouping -- | Select sites by number or name | go | show sites on a map

Customize table to display other current-condition parameters

Station Number	Station name	Date/Time	Gage height, feet	Dis-charge, ft3/s	Temper-ature, water, deg C	Long-term median flow 8/31
03086500	Mahoning River at Alliance OH	08/31 09:00 EDT	3.62	--	23.3	---
03090500	Mahoning River bl Berlin Dam nr Berlin Center OH	08/31 09:15 EDT	2.38	210	23.9	183
	[submersible transducer]	08/31 09:15 EDT	2.18	--	--	---
03091500	Mahoning River at Pricetown OH	08/31 09:00 EDT	2.60	227	25.2	197
03092090	West Branch Mahoning River near Ravenna OH	08/31 09:00 EDT	1.40	--	20.8	---
03092460	West Branch Mahoning River at Wayland OH	08/31 09:15 EDT	3.21	91.0	8.1	70.0
03093000	Eagle Creek at Phalanx Station OH	08/31 09:00 EDT	5.13	75.9	--	17.0
03094000	Mahoning River at Leavittsburg OH	08/31 09:15 EDT	3.43	438	22.9	301
03094704	Mosquito Creek near Greene Center OH	08/31 09:45 EDT	5.08	8.67	--	1.20
		08/28 15:45 EDT	--	--	Eqp	---
03095500	Mosquito Creek bl Mosquito Ck Dam nr Cortland OH	08/31 09:45 EDT	2.66	323	25.4	46.0
03098600	Mahoning River below West Ave at Youngstown OH	08/31 09:15 EDT	2.98	1,510	24.0	472
	Instream	08/31 09:15 EDT	--	--	23.8	---
03098700	Crab Creek at Youngstown OH	08/31 09:00 EDT	4.31	--	--	---
03099500	Mahoning River at Lowellville OH	08/31 09:00 EDT	3.97	1,700	24.0	520
03102950	Pymatuning Creek at Kinsman OH	08/31 09:30 EDT	5.05	--	23.6	---
03109500	Little Beaver Creek near East Liverpool OH	08/31 09:00 EDT	3.12	230	--	74.0
03110000	Yellow Creek near Hammondsville OH	08/31 09:00 EDT	1.73	68.0	--	14.0
03110685	OHIO R AT NEW CUMBERLAND LOCK & DAM (UPPER), OH	08/31 08:45 EDT	12.76	--	--	---
03110690	OHIO R AT NEW CUMBERLAND LOCK & DAM (LOWER), OH	08/31 08:45 EDT	15.84	--	--	---
03110955	Cross Creek at Broadacre OH	08/31 09:45 EDT	3.65	--	--	---
03111500	Short Creek near Dillonvale OH	08/31 08:45 EDT	2.19	20.5	--	32.0
03111548	Wheeling Creek below Blaine OH	08/31 09:30 EDT	1.23	47.0	--	32.0
03112000	WHEELING CREEK AT ELM GROVE, WV	08/31 09:15 EDT	2.78	141	--	20.0
03113990	Captina Creek at S.R. 148 at Armstrongs Mills OH	08/31 09:15 EDT	4.17	39.3	--	10.0
03114250	Sunfish Creek at Cameron OH	08/31 09:00 EDT	2.52	--	--	---

Over the past few years, the USGS has been modernizing these pages into what will be called Water Data for the Nation's Next Generation Monitoring Location Pages. These NextGen web pages will provide the same excellent USGS water data, but the pages will be more user-friendly and emphasize a mobile-first platform. These new pages will continue to improve over time and went "live" on October 1, 2021, however, the Legacy Pages will still be available until January 1, 2023.

Starting in March 2022, your web browser bookmarks for the legacy pages will redirect you to the "NextGen" pages.

There will be five major differences between the NextGen pages and the Legacy Pages.

1. Data-first: Hydrograph at top, except for key alerts

2. Interactive: Featuring a clickable, zoomable hydrograph with the ability to compare prior data

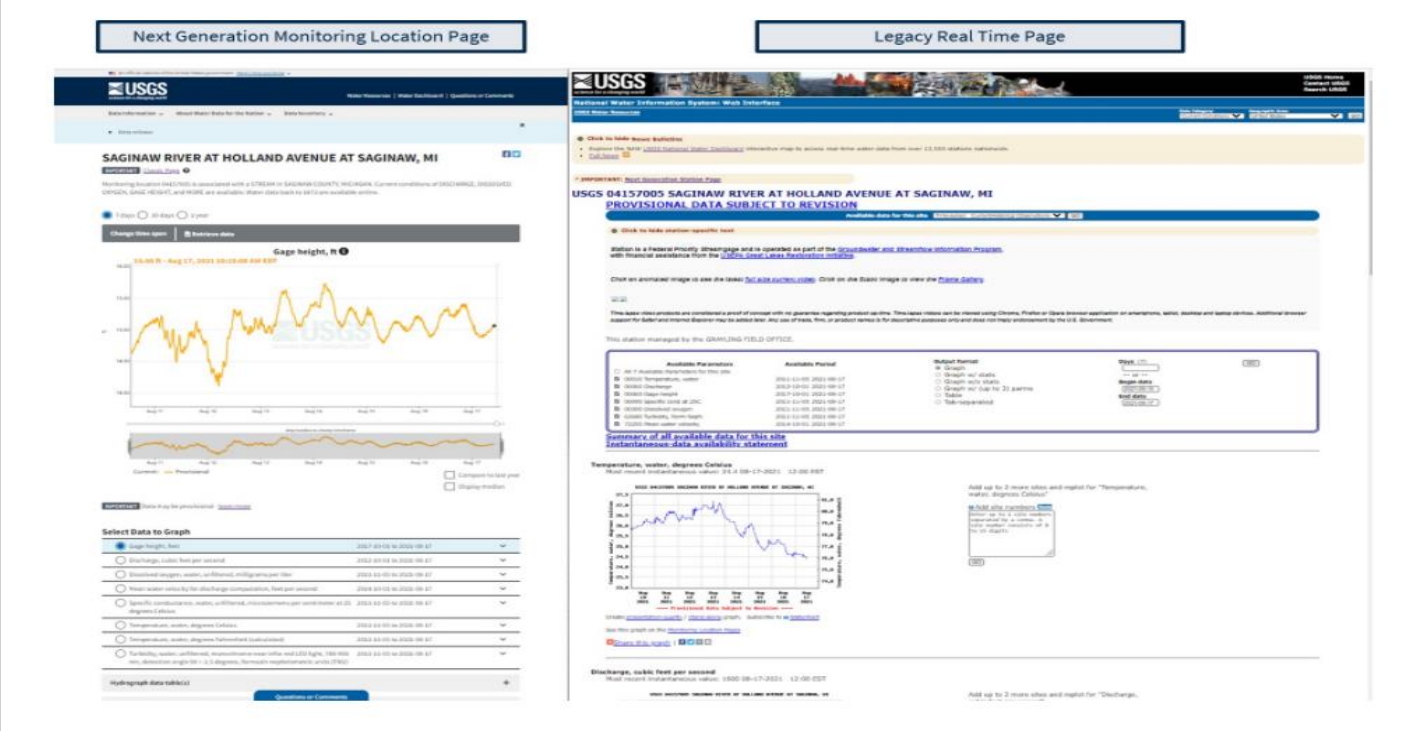
3. Compact & Mobile-First: More things on one page – monitoring location metadata, water-data inventory, groundwater data, interactive map, etc., all summarized on one page

4. Geo-located: Featuring a map with flowlines, shaded watershed area, and nearby monitoring locations

5. Affiliated networks: A monitoring location belongs to larger groupings of monitoring locations, and these pages let you explore those groupings to see the bigger picture of water resources

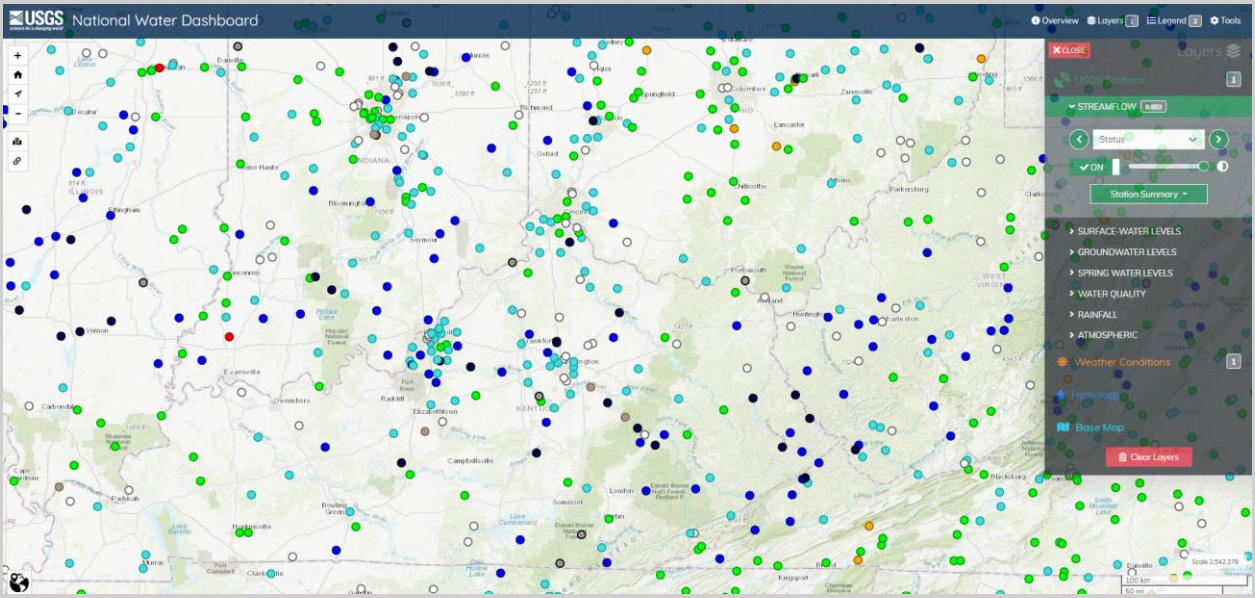
-Continued

Here is a side-by-side comparison of the NextGen pages and the Legacy Pages.



Available right now is the USGS National Water Dashboard, available at https://dashboard.waterdata.usgs.gov which is a step toward modernization and being more mobile-friendly.

Pictured below is the National Water Dashboard.



The menu tree on the right-hand side of the Dashboard can be used to navigate to water information including stage, discharge, lake levels, groundwater levels, water quality, precipitation amounts and even a current radar loop.

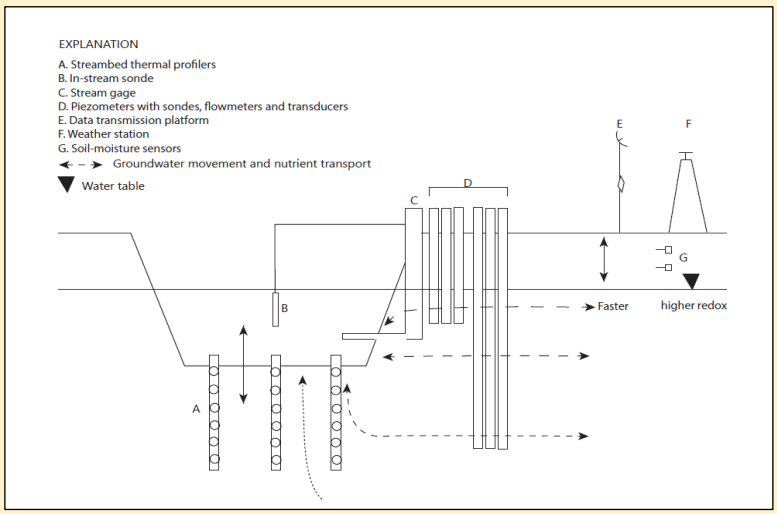
This modernization is an effort to provide you with the timely and accurate water data that you have come to expect from the U.S. Geological Survey.

If you any questions about these web pages, contact Tom Harris (tharris@usgs.gov) or Jeff Woods (jwoods@usgs.gov.

High-Frequency Groundwater Quality and Flow Measurements to Improve Understanding of Nutrient Exchange at the Groundwater/Surface-Water Interface

The Spring 2021 OKI Newsletter introduced the USGS's Next Generation Water Observing System (NGWOS) program in the Illinois River Basin (IRB). The role of nutrients (primarily nitrogen and phosphorus) in the formation of harmful algal blooms (HABs) is one focal area for NGWOS in the IRB. The timing and magnitude of HABs in surface water will be better informed by a detailed understanding of groundwater/surface-water interaction and the exchange of nutrients between the environmental compartments.

The USGS use of high-frequency sensors to monitor water quality field parameters (including turbidity, pH, specific conductance, dissolved oxygen, and temperature) and nutrients at streamgage sites has generated valuable data at many sites in the United States. Similar measurements in groundwater have been limited and rarely coupled with groundwater flow direction and velocity measurements. High-frequency groundwater data are needed to complement high-frequency surface-water data to enhance understanding of nutrient exchange across the groundwater/surface-water interface.



Previous attempts to measure 'continuous' groundwater quality at the streambank entailed pumping water from a well to a gage house at land surface where chemical parameters were measured with a sonde and flow-through cell. The pumping and measurements were done on a timed interval, such as every 6 hours, and required extensive infrastructure to protect equipment and maintain constant ambient conditions. Groundwater vectors were traditionally computed using water levels, measured with continuously recording pressure transducers and hydraulic properties determined from aquifer tests; however, high-frequency velocity and flow direction were rarely computed.

Research sites to address NGWOS goals are being established at two sites in the IRB. High-frequency data collection in groundwater will be done to evaluate the value added by applying new technologies to monitor nutrient exchange at the groundwater/surface-water interface. Sites will be located at Quiver Creek, in west-central Illinois and at the Kankakee River approximately 20 miles south of La Porte, in north-central Indiana. Each site will include multiple sets of nested monitoring wells and be located near a USGS streamgage that also collects high-frequency stage and chemistry data, with periodic discharge measurements.

-Continued

Monitoring wells at the research sites will be instrumented to directly measure high-frequency (1) groundwater velocity and flow direction, (2) groundwater nitrate concentrations, and (3) water-quality field parameters. Measurements will be made at intervals of 15 minutes or less. Additional equipment will be installed at the research sites to enhance future interpretations and test new technologies. Additional equipment will include weather stations and soil moisture sensors to estimate other components of the local water budget, and streambed temperature profilers and seepage meters to help identify periods of streamflow gain or loss.

-Continued

New technologies proposed for testing include fiber-optic systems and infrared cameras to identify high-flow interval of the aquifer and areas of increased connectivity between groundwater and surface-water, acoustic and optical flowmeters to measure groundwater vectors, and other nutrient-measuring techniques. These tests will not only evaluate the utility of the instrumentation being tested but may offer valuable information for further interpretation of high-frequency data and comparison between existing and new technologies. Collectively, the high-frequency NGWOS research sites will reveal details of short-term changes that occur in the near-stream environment during rapid rises and falls in stream stage.

For additional information, contact Randy Bayless (ebayless@usgs.gov)

Employee Spotlights

Jacob Morris – Hydrologic Technician

Jake graduated from Illinois State University with a Bachelors in Geology, during his attendance he worked with Brachiopod specimens, photographing the fossils for scientific journals. Other project work included the use of seismic lines to map aquifers near Champaign, IL, and field work in the mountains of Alberta to collect index fossils for research.

After graduation Jake worked for a short time with an environmental consulting company that mostly dealt with the groundwater and soil cleanup from contamination left by underground storage tanks.

Jake then started graduate school at Northern Illinois University where the focus of his studies where on glacial sedimentology and the use of seismic geophysics to deduce a glacial history of a particular area in Alaska based on the sediment layers left by glaciers.

His first job after graduation was with the USGS in Rolla, MO. Starting as a Hydrologic Technician, he measured stream discharge, worked with water quality, and had occasional project work with the groundwater group. The biggest water event during his time in MO, was the 2011 flood. With all the available staff from Rolla, his team made many discharge measurements and collected water-quality samples at the confluence of the Mississippi and Ohio Rivers. Sand was boiling from the bottoms of flood walls and the water was inches from the tops. A last-minute decision was made by the Corps of Engineers to breech the levees to keep the small town of Cairo, IL from flooding, but instead flooded thousands of acres of farmland including a few farmhouses.

-Continued

Jake moved on to Colorado in 2011 having been hired as a geophysicist for the USGS's Geomagnetism Group. There he worked in operations which manages the equipment and data for a network of Magnetic Observatories across the northern hemisphere. Ranging from Guam to Puerto Rico, Alaska to Arizona, Jake traveled to many locations, worked with, and trained contract observers that measured the magnetic field manually. Jake worked with magneto telluric instruments, which measure ground conductivity and the magnetic field simultaneously. One of his best work experiences was a two-month field deployment of magneto telluric instruments throughout the Florida peninsula contributing to the national conductivity map, which is used to assess electric grid hazards associated with magnetic storms.

After an 11-year tenure with the "Geomag" group, Jake decided to move back to the Midwest to be close to family. He was hired as a Hydrologic Technician, once again, for OKI WSC and is currently working in the Louisville office.

When Jake is not at work you might find him on a long bike ride, hiking, or mountaineering, on an adventure (traveling), woodworking, gardening, or learning about subjects related to history, anthropology, or economics. "I'd love to live in a small home on a secluded property, grow some food, read books, travel occasionally, and live a simple existence."

Nicholas Wander – Hydrologic Technician

Nick is a Hydrologic Technician with the Ohio-Kentucky-Indiana Water Science Center (OKI WSC) in Columbus, OH. However, unlike most hydro-techs, Nick's primary focus is on streamgage construction. In his one-year span with the OKI WSC, Nick has installed 20 streamgages across the tri-state area. He showcases his knowledge in project management, carpentry, masonry, metal fabrication, and heavy equipment operation. These specialties allow him to recon, design and build streamgages that accommodate any and every environmental situation that is thrown his way. With the help of his fellow construction crew members (Dakota Mork and Kelsey Simmons) and many other USGS employees, Nick has learned the ins and outs of streamgage construction, stream hydraulics, and overcoming obstacles that one faces during streamgage installations. He is looking forward to the challenges he will face and conquer throughout his career with the USGS.

Nick started his USGS career in 2019 as a hydrologic field assistant (HFA) with the Virginia – West Virginia WSC in Charleston, WV. While an HFA, Nicks primary focus was measuring groundwater levels, performing dye tracer tests, and managing partial record surface water sites in support of the Monroe County, WV, water availability study. Additionally, Nick contributed to the study, "Surface Water Influenced Groundwater Systems in The Ohio River Alluvial Aquifer of West Virginia", by collecting water samples from municipal groundwater wells for a full suite of geochemical analysis, to include PFAS.

Nick's knowledge of construction can be traced back to his 10+ years in the Ohio Air National Guard's 200th REDHORSE squadron. Nick currently serves as a Technical Sergeant in the 3E4X1 career field and has now been selected for a Master Sergeant position in the 3E1X1 career field. Nick not only has a background in construction but also in geology. He attended the University of Akron and had undergraduate and graduate classes focused on acid mine drainage remediation and fluvial geomorphology.

Outside of work Nick enjoys hunting, hiking, kayaking, skiing, caving, or trail riding one of his ATVS. However, most of his free time over the last year has been spent finishing the renovation of his family-owned farmhouse in Perrysville, OH.

Dr. Myles Thomas Moore – Hydrologist

Myles started working as a hydrologist in the Indianapolis office in October of 2020. Myles incorporates field data with geochemical analyses to understand how atmosphere, surface water and groundwater reservoirs interact and mix with one another. He has used this expertise to understand the mechanisms of how oil, natural gas, and brine form in the subsurface and can then later migrate into groundwater aquifers along with understanding hydrologic cycling in agricultural fields. He currently is a manager for a project that gathers air quality data to understand the impact that dredging of harbor canals can have on the local community's atmosphere. He also assists in monitoring the concentrations of hydrocarbon gas within the soil of the dredge facility by maintaining and calibrating soil gas instrumentation to understand how methane could be forming and migrating in the shallow subsurface.

Myles has been instrumental in understanding how brine and natural gas have been migrating through groundwater aquifers in proximity to gas storage fields and regions of historic oil and gas production in Kentucky. By performing a statistical analysis of dissolved gas and chloride concentrations he was able to decipher how gas and brine were migrating via two-phase solubility partitioning and could delineate which monitoring wells the methane was currently migrating into. During his time with the USGS, he has kept in touch with and collaborated with the Ohio State University and the University of Austin at Texas to understand how methane can be stored in unique reservoirs such as in gas hydrate.

Myles developed a technique to collect gas samples from pressurized cores collected 430 to 450 meters below sea floor to determine the hydrocarbon and noble gas abundance and isotopic composition of gas hydrate at in situ subsurface pressure and temperature conditions. By comparing this data to thermogenic and microbial endmembers and by developing mixing, gas partitioning, and thermal maturation models he was able to determine that most of the gas (>76%) contained in gas hydrates from the subsurface of the Gulf of Mexico was formed by microbial processes. This work led to a lead author publication entitled "Integrated geochemical approach to determine the source of methane in gas hydrate from Green Canyon Block 955 in the Gulf of Mexico" in AAPG Bulletin.

-continued

He has worked to understand hydrologic cycling in agricultural fields. He collaborated with researchers at the Ohio State University to study if hydrologic separation was occurring in an agricultural field. Field probes were installed too continuously measure soil water content and soil water potential to decipher how precipitation was infiltrating/adhering to soil in the vadose zone and mixing with groundwater. This study developed a technique to extract water from soil to measure the hydrogen and oxygen isotopic composition in soil water. This work collected precipitation, tile water, and groundwater samples to compare to a local meteoric water line to understand how these difference sources of water interact and mix seasonally. This work has led to a publication entitled "Hydrological separation of event and pre-event soil water in a cultivated landscape" in the Agricultural Science and Technology journal.

In addition to the field sampling and analytical lab skills Myles has developed, he has advance data interpretation and statistical abilities that assist in understanding the vulnerability of water sources. He has incorporated mixing, gas fractionation migration, and sourcing models to understand where water has migrated from, what sources of water are contributing to groundwater reservoirs, and where contaminated groundwater could be migrating to next. He pairs these modeling results with statistical data to demonstrate how correlations between geochemical parameters and groups of data can provide evidence as to the processes controlling surface water and groundwater flow in these complex environments.

Danielle Follette – Hydrologist

Danielle began her career with the USGS in the fall of 2019. She holds a bachelor's degree in Environmental Science (BSES) and a Master of Science (MS) in Geology. Both degrees were obtained from Indiana University-Purdue University of Indianapolis (IUPUI) where she was able to participate in a wide range of applied science and educational projects related to sustainable agriculture, harmful algal blooms (HABs) and invasive species management.

Danielle's USGS career started at the Indianapolis Office within the Hydrologic Investigation Section and she became primarily involved in ambient air sample collections and later ground gas monitoring at a confined disposal facility in East Chicago, Indiana. She has recently transitioned to the Ecosystem Science Section and her duties will be branching out to include surface water and water quality sampling and will include various statistical analysis and programmatical tasks. This year, she will become a first-time project chief and continue a program intended to monitor groundwater levels in Carmel, South Bend and Gary, Indiana.

On a personal note, Danielle loves spending time with friends, family, and pets. She is an avid gardener and music lover. She also enjoys reading, hiking, and mushroom hunting.

Ivan Yifan Zhao – IT Specialist

Ivan works as an IT Specialist for the Ohio-Kentucky-Indiana (OKI) Water Science Center and is also employed part time by the national USGS Bureau UNIX technical support team (BUTST) as a Mac OS technical expert. For OKI users, he helps troubleshoot the day-to-day operations of Windows computers, Windows servers, and iPhones, while for BUTST, he provides support to other IT staff across the Bureau, writes technical documentation, and helps test security/configuration policies that ensure USGS computers meet the requirements of Federal law. He also develops web applications that help OKI users automate mundane tasks, and serves as content manager for several USGS websites, including the usgs.gov public facing website (Drupal CMS), the OKI internal website (HTML on OpenAFS), and the USGS TST (technical support) internal website (Wordpress CMS).

Prior to working at the OKI WSC, Ivan worked at Boeing as a Thermodynamics Engineering Intern, as a freelance web developer, as an eBay seller, and also as a sales rep for a DirecTV partner company inside of Costcos across California. He is grateful to be an employee of the USGS. Yifan was hired in 2019 after graduating from UC Berkeley in 2017. He currently lives in the historic preservation district of the Louisville Highlands, and in his free time, enjoys drawing with charcoal, taking long walks, wandering around the gym, and writing.

Recent Publications

Since the Spring 2021 Newsletter – current OKI Staff names are in bold

Bayless, E.R., 2021, Accuracy of flowmeters measuring horizontal flow in fractured-rock simulators: Groundwater Monitoring & Remediation, v. 41, no. 4, p. 50-61, https://doi.org/10.1111/gwmr.12482.

Bunch, A.R., **McCausland, D.R.**, and **Bayless, E.R.**, 2021, Hydrologic and ecological investigations in the School Branch watershed, Hendricks County, Indiana—Water years 2016–2018: U.S. Geological Survey Scientific Investigations Report 2021–5061, 61 p., https://doi.org/10.3133/sir20215061.

Bushon, **R.N.**, **Brady**, **A.M.G.**, **Kephart**, **C.M.**, and Gallardo, V., 2021, Evaluation of a modified rapid viability-polymerase chain reaction method for *Bacillus atrophaeus* spores in water matrices: Journal of Microbiological Methods, v. 188, https://doi.org/10.1016/j.mimet.2021.106293.

Downhour, M.S., **Bunch, A.R.**, and Lathrop, T.R., 2021, Regression models for estimating sediment, nutrient concentrations and loads at School Branch at Brownsburg, Indiana, June 2015 through February 2019: U.S. Geological Survey Scientific Investigations Report 2021–5099, 15 p., https://doi.org/10.3133/sir20215099.

Riddle, A.D., 2021, Update of the groundwater flow model for the Great Miami buried-valley aquifer in the vicinity of Wright-Patterson Air Force Base near Dayton, Ohio: U.S. Geological Survey Scientific Investigations Report 2021–5115, 36 p., https://doi.org/ 10.3133/ sir20215115.

VonIns, Branden, 2021, Operation and maintenance of a statewide crest-stage gage network in Ohio – Summary of methods and results 2001–2021: The Ohio Department of Transportation, Office of Statewide Planning & Research, Final Report, Project ID No. 110630, State Job No. 136055, November 2021, 8 p., https://www.dot.state.oh.us/Divisions/Planning/SPR/Research/reportsandplans/_layouts/15/WopiFrame.aspx?sourcedoc={5F5EAB97-F9AA-4E71-860B-3DDFFAF2381C}&file=Final%20Report%20November%202021%20SJN%20136055.pdf&action=default.

Whitehead, M.T., and **Koltun, G.F.**, 2021, Assessment of runoff volume reduction associated with soil amendments added to portions of highway median-strip catchments in Ohio, 2018–2020: U.S. Geological Survey Scientific Investigations Report 2021–5114, 27 p., https://doi.org/10.3133/sir20215114.

Williamson, T.N., **Dobrowolski, E.G.**, and Kreiling, R.M., 2021, Phosphorus sources, forms, and abundance as a function of streamflow and field conditions in a Maumee River tributary, 2016–2019: Journal of Environmental Quality, first published 20 September 2021, https://doi.org/10.1002/jeq2.20290.

Williamson, T.N., **Shaffer, K.H.**, **Runkle, D.L.**, **Hardebeck, M.J.**, **Dobrowolski, E.G.**, **Frey, J.W.**, **Baker, N.T.**, **Collier, K.M.**, **Huitger, C.A.**, **Kula, S.P.**, Haefner, R.J., **Hartley, L.M.**, **Crates, H.F.**, **Finnegan, D.P.**, Reithel, N.J., **Toussant, C.A.**, Weaver, T.L., 2021, Nutrient and suspended-sediment concentrations in the Maumee River and tributaries during 2019 rain-induced fallow conditions: Journal of Great Lakes Research, v. 47, Issue 6, p. 1726-1736, https://doi.org/10.1016/j.jglr.2021.10.004.

Non-OKI WSC Publications with OKI Staff

Fogarty, L.R., Maurer, J.A., Hyslop, I.M., Totten, A.R., **Kephart, C.M.**, and Brennan, A.K., 2021, Understanding sources and distribution of Escherichia coli at Lake St. Clair Metropark Beach, Macomb County, Michigan: U.S. Geological Survey Scientific Investigations Report 2021–5089, 34 p., https://doi.org/10.3133/sir20215089.

Johnson, T.D., Belitz, K., Kauffman, L.K., Watson, E., and **Wilson, J.T.**, 2021, Populations using public-supply groundwater in the conterminous U.S. 2010; Identifying the wells, hydrogeologic regions, and hydrogeologic mapping units: Science of the Total Environment, v. 806, Part 2, https://doi.org/10.1016/j.scitotenv.2021.150618.

Nowell, L.H., Moran, P.W., Bexfield, L.M., Mahler, B.J., Van Metre, P.C., Bradley, P.M., Schmidt, T.S., **Button, D.T.**, and Qi, S.L., 2021, Is there an urban pesticide signature? Urban streams in five U.S. regions share common dissolved-phase pesticides but differ in predicted aquatic toxicity: Science of the Total Environment, v. 793, https://doi.org/10.1016/j.scitotenv.2021.148453.

Tagliaferri, T.N., Fisher, S.C., **Kephart**, **C.M.**, Cheung, N., Reed, A.P., and Welk, R.J., 2021, Using microbial source tracking to identify fecal contamination sources in an embayment in Hempstead Harbor on Long Island, New York: U.S. Geological Survey Scientific Investigations Report 2021–5042, 19 p., https://doi.org/10.3133/sir20215042.

Wilson, J.L., and **Dobrowolski, E.G.**, 2021, Water-quality distributions in the East Branch Black River near the Chemical Recovery Systems site in Elyria, Ohio, 2021: U.S. Geological Survey Open-File Report 2021–1086, 10 p., https://doi.org/10.3133/ofr20211086.

Zuellig, R.E., Graham, J.L., **Stelzer, E.A.**, Loftin, K.A., and Rosen, B.H., 2021, Cyanobacteria, cyanotoxin synthetase gene, and cyanotoxin occurrence among selected large river sites of the conterminous United States, 2017–18: U.S. Geological Survey Scientific Investigations Report 2021–5121, 22 p., https://doi.org/10.3133/sir20215121.

Upcoming Events

OKI WSC Director – Retiring April 30, 2022

Mike Griffin, the Ohio-Kentucky-Indiana (OKI) Water Science Center Director plans to retire April 30, 2022. Mike began his career in 1985 as a hydrologic field assistant (HFA) after graduating from Murray State University. Mike has spent the last 37 years passionately contributing to the USGS mission and has been lucky enough to gain experience in all three major science disciplines starting with groundwater monitoring early in his career at the Maxey Flats low-level radioactive waste disposal site assisting in the drilling of 120 observation wells. In 1987, Mike joined the USGS National Water-Quality Assessment (NAWQA) Kentucky pilot study and the National Stream Quality Accounting Network (NASQAN) program to help collect data to better understand the status and trends of Kentucky's surface-water quality. Mike has spent most of his early career in the surface-water discipline as he started learning the importance of real-time continuous monitoring while being a "streamgager". All of this led to the job he held the longest and wanted the most. In 1998, he was selected as the Kentucky Data Chief and Assistant Director. He held that position till 2010. In 2010, the Indiana and Kentucky Districts were merged into one Center, and Mike became the INKY WSC Deputy Director. In late 2013, Mike took on the role of Acting Director for the INKY WSC and was selected as the Director in July 2014. In 2017, the INKY WSC became the OKI WSC when the Ohio WSC was merged with INKY. Now, you know the rest of the story!!

I feel very fortunate to have had this career. I've only worked in one state, (office has moved a couple times) but have been a part of 5 different USGS Regions. You've got to love government re-organizations. One important thing about me working for this great organization is that I have met and worked with some very talented people from all over the country. It has been an honor and a pleasure to work with all of you over the years. Your science and support of the USGS is making a difference and I am proud to have been a small part of what has been achieved!

The OKI WSC has offices located in Columbus and New Philadelphia, Ohio; Indianapolis, and Ft. Wayne Indiana; and Louisville, Murray, and Williamsburg, Kentucky. We hope that you find the information in our newsletter and on our web page helpful, interesting, and informative.

Contact us!

Mike Griffin, Director
mgriffin@usgs.gov
502-548-5448 (cell)

Columbus, Ohio
614-430-7700

David Straub, Deputy Director
destraub@usgs.gov
614-506-8349 (cell)

Louisville, Kentucky
502-493-1900

Pete Cinotto, Deputy Director
pcinotto@usgs.gov
502-475-4113 (cell)

Indianapolis, Indiana
317-290-3333

Jeff Frey, Deputy Director
jwfrey@usgs.gov
317-340-5028 (cell)

Visit us online

https://www.usgs.gov/centers/oki-water