OHIO CHAPTER OF THE AMERICAN FISHERIES SOCIETY

2024 Annual Meeting
Abstracts

CONTRIBUTED PODIUM PAPERS

Authors: Tory Gabriel[1], Angela Greene[1], Chris Winslow[1], Jill Bartolotta[1], Scott Hale[2], Travis Hartman[2], Matt Leibengood[2], Eric Weimer[2], Abigail Rhodebeck[2], Johanna Dart[2], and Melinda Huntley[3]

Affiliations: 1–Ohio Sea Grant, 2–Ohio Department of Natural Resources, 3–Ohio Travel Association

Title: Erie PrOH: Supporting sustainable angling with Lake Erie charter guides

Launched in August 2023, Erie PrOH is an online voluntary certification course for fishing guides and crew members who work on Lake Erie. This course aims to empower participants to promote their industry and sustainable angling in Lake Erie while using conservation-oriented best practices. Online modules developed by Ohio Sea Grant and the Ohio Department of Natural Resources, Division of Wildlife provide training and materials to guides that clarify Lake Erie fishery topics, help educate the public about the fishery, and attract environmentally aware clients. Certification recognizes fishing guides for using fishing and boating techniques that contribute to a healthy environment and sustainable fisheries. Certification may help distinguish a fishing guide's business, increase booking rates, and enhance market visibility, while helping to create a business reputation known for responsible Lake Erie stewardship. Ohio Sea Grant and the Ohio Division of Wildlife view fishing guides as potential ambassadors for environmental stewardship. Clients will learn about sustainable angling and boating practices, carrying this with them on future outdoor experiences and potentially sharing these practices with friends, family, and the next generation of anglers. As of January 2024, 62 individuals have completed the course. Survey data shows that 98% of finishers improved their Lake Erie literacy, and 89% intend to modify a business practice based on what they learned.

Authors: Bryan Kinter, Kevin Page, and Curt Wagner

Affiliation: Ohio Department of Natural Resources, Division of Wildlife

Title: Comparing fishery-dependent and -independent methods for assessing Ohio Muskellunge populations

Ohio's Muskellunge program currently consists of stocking ~20,000 advanced fingerlings (254–305 mm total length) annually at nine reservoirs. To maintain this program, Muskellunge eggs are collected by trap-netting wild Muskellunge broodstock in Ohio reservoirs. Assessment of these Muskellunge fisheries using traditional assessments (e.g., trap nets and creel surveys) is difficult due to low densities of fish and anglers in Muskellunge fisheries. Since 1961, the Ohio Department of Natural Resources, Division of Wildlife has assessed Muskellunge populations using voluntary catch reporting systems. Until 2007, anglers submitted reports of muskellunge catches via postage-paid catch cards. In 2008, the Ohio Division of Wildlife transitioned to the Muskie Angler

Log, an online reporting system where anglers can report information about their fishing trips in addition to their catch. While these voluntary angler programs have been vital to the management of Ohio's Muskellunge fisheries, little is known about how angler reported data reflects actual changes in density and size structure of reservoir Muskellunge populations. This presentation will compare reports from these voluntary catch programs to Ohio Division of Wildlife trap net and tag return data collected at Clearfork Reservoir during the period 1981–2007 and Leesville Lake during 2008–2023.

Authors: Joe Toth, Nakiah Dague, Jeff Miner, Kevin Neves, and John Farver

Affiliation: Bowling Green State University

Title: Does otolith composition affect survivorship of stocked steelhead trout? A plan to test in Ohio

Sagittal otoliths of salmonids grow as aragonitic (high density) calcium carbonate, but stresses can cause new growth to shift to low density vaterite; hearing loss occurs when this happens. Wild salmonids typically have as low as 5% of the population having vateric otoliths, while >50% of hatchery raised fish are vateritic. Equivocal field studies make it difficult to determine if this shift to vaterite causes increased mortality of hatchery salmonids when released as smolts. At Castalia State Fish Hatchery, for 2024 stocking, about 50% of the Little Manistee steelhead trout *Oncorhynchus mykiss* have vateritic otoliths, while for the Shasta strain (from U.S. Fish & Wildlife Service) about 67% of the fish otoliths have shifted. We are conducting laboratory and field predation studies to determine if there is differential mortality. The lab study involves exposure to expected predators at the time of release in spring (e.g., Smallmouth Bass), while the field study will occur at the Ohio Lake Erie tributaries at the time of stocking.

Authors: Steven Gratz, Jacob Bentley, and Stuart Ludsin

Affiliation: The Ohio State University

Title: Exploring spatial and seasonal stable isotope variation of Channel Catfish and Blue Catfish within a reservoir

Stable isotopes are used as a time integrated measure of foraging ecology. They are used to understand differing aspects including trophic positions of organisms within a food web, habitat use, and diet. We sought to understand whether spatial or seasonal variation existed in Channel Catfish *Ictalurus punctatus* or Blue Catfish *I. furcatus* stable isotopes within a central Ohio reservoir to direct field sampling design. Liver tissue was collected in spring samples, muscle tissue was collected in fall samples, and both tissue types were collected in summer samples for analysis. We hypothesized that variation in concentrations of stable isotopes (δ15N, δ13C, and δ34S) would vary between basins due to changes in lake morphometry and subsequent habitat and due to seasonal changes in diet. Muscle isotopic signatures were predicted from the spring liver tissue samples using a linear regression. We found that stable isotope signatures varied between species and that stable isotope differences were negligible between season, proximity to shore, and basins within the reservoir. However, liver tissue stable isotope signatures (not predicted) were able to differentiate between samples collected in different seasons and basins within the reservoir in Blue Catfish, potentially due to their shorter half-life. These differences were not observed in Channel Catfish. While more research is needed, the use of liver tissues for stable isotope analysis

may provide better insight into spatial and seasonal differences among Blue Catfish. The results of these analyses allow for the pooling of analyzed samples within a reservoir and reduces the sampling time and effort required in addition to a reduction in the number of individuals required for an adequate sample size when muscle tissues are collected for stable isotope analysis.

Authors: Jacob Bentley and Stuart Ludsin

Affiliation: The Ohio State University

Title: Food web dynamics and ecological niche of Blue Catfish and other sport fish in Hoover Reservoir using stable isotopes

The introduction of new species into aquatic ecosystems can affect performance of existing taxa through numerous ecological mechanisms (e.g., predation, competition). Generalist feeders are particularly noteworthy, especially if their ecological niche overlaps with other resident species. Toward understanding how a stocked generalist, Blue Catfish, might impact existing species, we used stable isotopes (δ13C and δ15N) of four sport fish (Blue Catfish, Channel Catfish, Largemouth Bass, and saugeye) and four common prey items (Gizzard Shad, Bluegill, chironomids, and *Chaoborus* to quantify ecological niche and understand the potential for species interactions in Hoover Reservoir. Channel Catfish had the widest niche breadth suggesting a more variable diet across individuals. They also had the more depleted δ13C and δ15N signatures suggesting they feed more on macroinvertebrates. Blue Catfish had a narrower niche breadth than Channel Catfish but a broader niche breadth than Largemouth Bass and saugeye, which had the narrowest niche breadth. Blue Catfish, Largemouth Bass, and saugeye had similar δ15N values that were higher than Channel Catfish, suggesting they fed at a higher trophic level than Channel Catfish. However, δ13C varied between Blue Catfish, Largemouth Bass, and saugeye, suggesting varied diets. While more investigation is needed to determine whether interspecific competition is occurring, our findings provide valuable information for fish management agencies to understand the potential consequences of introduced generalists have on other important fish species.

Authors: Stuart Welsh

Affiliation: U.S. Geological Survey, West Virginia Cooperative Fish and Wildlife Research Unit

Title: Hornyheads, madtoms, and darters: Narratives on central Appalachian fishes

North America has a diverse and fascinating array of freshwater fishes, a fauna that is well documented and often celebrated by the scientific community. Some of our fishes, many of which are of conservation concern, are not well known to the general public. Increased public awareness will likely lead to improved conservation efforts. Many conservation agencies have made recent efforts in this area, particularly through internet sites and social media. Zoos and public aquaria have also increased efforts to display regional native fishes. Books may also play a role, particularly if the science is explained in user-friendly terms. In this presentation, a recently published book is featured on the fishes of the central Appalachians, including examples to engage and educate readers, and promote public awareness of our freshwater fauna.

Authors: Ronald Oldfield and Emily Murphy

Affiliation: Case Western Reserve University

Title: Life in a fishbowl: Space and environmental enrichment affect behavior of *Betta splendens*

The public has expressed growing concern for the wellbeing of fishes, including popular pet species such as the Siamese Fighting Fish *Betta splendens*. In captivity, male bettas behave aggressively, often causing injuries and death if housed together. As a result, they are typically isolated in small fishbowls, which has been widely criticized as cruel. To investigate the impact of keeping bettas in these conditions, we recorded the behavior of individual males in containers of different sizes that were either bare or enriched with gravel, large rocks, and live plants. When male bettas were housed individually in small bowls (0.5 L) they spent less time swimming than they did when they were kept in larger aquaria (10, 38, and 208 L). Fish that were kept in enriched containers exhibited more instances of swimming. To determine if two male bettas housed together might coexist peacefully if given enough space and cover from plants and large rocks, we quantified the behavior of pairs of male bettas in bare or enriched aquaria of different sizes (10, 38, 208, and 378 L). Fish performed fewer approaches and aggressive displays, but not attacks, and more bouts of foraging, when in larger aquaria. This study shows that the small fishbowls typically used in pet stores suppress swimming behavior in male bettas and at least a 10-L aquarium is required to ensure full expression of swimming behavior. Furthermore, even the use of very large aquaria cannot guarantee peaceful cohabitation between two males.

Authors: Bill Zawiski

Affiliation: Ohio Environmental Protection Agency

Title: Fish community response following a train derailment in East Palestine, Ohio

On February 3, 2023, a train derailment occurred in East Palestine, Ohio. The resulting spill and fire garnered international attention. The release from numerous tank cars of materials caused a fish kill in the immediate downstream receiving streams (Sulphur Run and Leslie Run). Recovery of the impacted communities has been rapid as demonstrated using the Index of Biotic Integrity. Previous assessments show how a stream can recover from chronic issues in comparison to an acute event, Leslie Run offers insight into both.

Authors: Jeremy Pritt, Stephen Tyszko, Kevin Page, Joseph Conroy, and Richard Zweifel

Affiliation: Ohio Department of Natural Resources, Division of Wildlife

Title: Effects of a minimum length limit on saugeye population and fishery characteristics in Ohio reservoirs

Fisheries managers use minimum length limits (MLLs) to increase size structure and angler yield in fisheries with high exploitation. We evaluated the effect of a 381-mm MLL on saugeye (Walleye *Sander vitreus* x Sauger *S. canadensis*) population and fishery characteristics implemented in Ohio reservoirs in 2011. Using a before-after-control-impact study design (n = 6 control populations and n = 11 impact), we compared total CPUE, age-2+ CPUE, PSD-harvestable (381-mm), and length at age 2 (to index growth) determined from standardized gill-net surveys and saugeye angler effort, catch rate, harvest rate, length of saugeye at harvest, yield, and satisfaction obtained from

standardized creel surveys. We found evidence that the 381-mm MLL led to an increase in age-2+ CPUE but had no effect on other saugeye population metrics. In regulation reservoirs, harvest rates declined following MLL implementation, despite increases in angler catch rates. Total length of harvested saugeye did not increase significantly in response to the MLL, and combined with decreased harvest rates, angler yield was suppressed in regulation reservoirs compared to control reservoirs. However, over 90% of anglers reported that they were satisfied with the MLL during creel surveys. Despite marginal influence on saugeye populations and failure to increase yield, anglers supported the MLL. Our results suggest that the effects of harvest regulations may be marginal, and managers should consider the nuances of angler satisfaction in regulation decisions.

Authors: Zak Slagle

Affiliation: Ohio Department of Natural Resources, Division of Wildlife

Title: Ohio's western basin trawl: Strengths and challenges of a long-term Lake Erie survey

The Ohio Department of Natural Resources, Division of Wildlife, Sandusky Station has conducted a long-term bottom trawl survey in the Western Basin of Lake Erie for nearly 70 years. Intended to sample young-of-year Walleye and Yellow Perch, this survey is the best predictor of future performance for these two recreationally and commercially important fisheries. Thirty-five years of comparable data is a rarity in fisheries management, but that long time scale also presents challenges for biologists in the modern era. Vessel changes, hypoxia-influenced fish distributions, and poor documentation have heavily influenced the survey over the years. Survey improvement and refinement must be informed by previous changes in the survey which are not always obvious in the dataset. Lessons learned and future directions for this survey may help current and future biologists in assuming control of their own long-term surveys.

Authors: Kristina Flanigan[1], Ryan Brown[1], Christine Mayer[1], Song Qian[1], Bob Mapes[1], Corbin Hilling[2], James Roberts[2], Ryan Young[3], Eric Weimer[4], Lucas Nathan[5], and John Dettmers[6]

Affiliation: 1–University of Toledo, 2–U.S. Geological Survey, 3–U.S. Fish & Wildlife Service, 4–Ohio Department of Natural Resources, 5–Michigan Department of Natural Resources, 6–Great Lakes Fishery Commission

Title: What's the catch? Trends in adult Grass Carp capture and ichthyoplankton monitoring

Invasive Grass Carp *Ctenopharyngodon idella* have been captured in Lake Erie since the mid-1980s. Their reproductive status was unknown until 2012 when two confirmed diploid juveniles that likely originated from the Sandusky River were captured. The discovery of natural reproduction prompted the development of an ichthyoplankton sampling program beginning in 2014 in the Sandusky River and expanding to the Maumee River in 2017. An adaptive response strategy was implemented in 2018 for the Lake Erie watershed, and crews began removing adult grass carp to limit population growth and spread. Removal initially focused on the main-stem areas of Sandusky and Maumee rivers, primarily on the lower 24 and 27 km, respectively. In recent years, however, efforts have expanded to previously unexploited upstream reaches of the Sandusky and Maumee rivers and have yielded high Grass Carp catch rates with a mix of diploid and triploid fish. Continued effort in upstream locations may help increase adult removals. Grass Carp ichthyoplankton sampling has also expanded to multiple tributaries including six in Lake Erie, one in Lake Huron,

and one in Lake Michigan. Grass Carp ichthyoplankton have been captured in the Sandusky and Maumee rivers regularly, however, in 2022, eggs were captured in the Huron River (Ohio) for the first time. Continued monitoring can guide removal crews to areas that may harbor spawning aggregations. Additionally, August spawning was detected for the first time in 2023 during a high flow event on the Sandusky River. Consequently, continued monitoring for adult Grass Carp and ichthyoplankton is important to understand their spread through the Great Lakes and guide control efforts.

Authors: Hannah Kopp

Affiliation: Rural Action

Title: From devastation to destination: Fish success at Monday Creek

With nearly 18,000 acres of underground and surface mines in the Monday Creek watershed, water quality has been severely compromised due to acid mine drainage. With over 30 years of treatment, Monday Creek has seen incredible improvements with chemistry and biology. In 2022, biological surveys were conducted with collaboration from Rural Action, Ohio University, and Ohio Department of Natural Resources, Division of Mineral Resources Management to assess the status of aquatic life communities compared to 2017 data. Join us as we learn about the results of this survey as well as the next steps in improving the health of streams in Southeastern Ohio.

Authors: Peter Smiley

Affiliation: USDA Agricultural Research Service

Title: Effects of planting grass filter strips on fish communities and instream habitat in agricultural headwater streams

Grass filter strips are a widely used conservation practice in the USA to mitigate agricultural impacts on streams and rivers. Yet, only a limited amount of information is available on the long-term effects of grass filter strips on stream fishes and instream habitat conditions at the watershed scale. My objective was to document the long-term effects of planting grass filter strips adjacent to channelized agricultural headwater streams on fish community structure and instream habitat. Fishes, instream habitat, and riparian habitat were sampled for 10 years from three channelized headwater streams without grass filter strips, three channelized headwater streams with grass filter strips, and two unchannelized streams having forested riparian habitats in central Ohio. Linear mixed effects model analysis was used to quantify the effects of riparian habitat type and year on the response variables. Fish species richness, abundance, percent darters, sunfish species richness, minnow species richness, and percent headwater fishes did not differ ($P > 0.05$) among riparian habitat types. Annual trends in darter species richness differed ($P < 0.05$) among riparian habitat types. Mean wetted width, mean dominant grain size, and percent instream wood did not differ ($P > 0.05$) among riparian habitat types. Annual trends in water depth, water velocity, and instream habitat diversity differed ($P < 0.05$) among riparian habitat types. Mean riparian width, woody vegetation density, and percent canopy cover was greater ($P < 0.05$) in forested streams than unplanted and grass filter strip streams. My results suggest grass filter strips should not be implemented alone, but in conjunction with conservation practices that will improve physical habitat quality and subsequently benefit the fish communities.

Authors: Brian Alford, Shawna Fix, Augustin Engman, and Bernard Kuhajda

Affiliation: The Ohio State University, Ohio Sea Grant, Stone Laboratory

Title: A surrogate species approach to determine the life history of the federally endangered Laurel Dace *Chrosomus saylori*

The Laurel Dace *Chrosomus saylori* is a federally endangered minnow found only on Walden Ridge within the Cumberland Plateau in the upper Tennessee River drainage in east-central Tennessee. The species' recovery plan calls for a life history study to be conducted to better manage the species. Due to the endangered status of the Laurel Dace, the Tennessee Dace *C. tennesseensis* was used as a surrogate species to describe the life history characteristics of the Laurel Dace. The Tennessee Dace population used in this study occurs 8.6-km from Bumbee Creek, the type-locality for Laurel Dace. Twenty Tennessee Dace per month were collected from Laurel Ford Branch for 18 months. Data collected included standard length (SL, mm), weight (g), gonadosomatic index (GSI), clutch size, and age interpreted from annual growth rings in whole otoliths. Diet data were collected from Tennessee Dace sampled in the present study, and from preserved specimens of Laurel Dace from a historic collection. The sex ratio of females to males was 1.3:1, and the mean SL for all specimens was 33.8 mm (SD = 10.6 mm). Length-frequency analysis suggested that there were 3+ size classes, and otolith age data suggested 4+ age classes. A von Bertalanffy individual growth model on mean length-at-age data was estimated to be $L_t = 50.63 \text{ mm} \times (1 - e^{-0.38 (t - 1.84)})$. Pectoral fin lengths were significantly longer in males than females. Female GSI slowly increased from October 2018 until it reached a peak the following April and May. Male GSI slowly increased in January, peaked in May, and returned to zero in June. Mature ova counts ranged 64–143, and average ova diameters ranged 0.83–1.37 mm. Both Tennessee Dace and Laurel Dace consumed a diverse array of aquatic and terrestrial invertebrates as well as algae and plant matter. Based on the data from the surrogate Tennessee Dace, it is projected that Laurel Dace have low mature ova counts, small eggs compared to other *Chrosomus* species, 4+ age classes, reach sexual maturity at age two, are multiple clutch spawners, and are opportunistic feeders. This study will help guide managers to make informed decisions on the recovery of the Laurel Dace.

Authors: Brian Zimmerman

Affiliation: The Ohio State University

Title: Reintroduction via translocation of Tippecanoe Darter *Nothonotus tippecanoe* and Longhead Darter *Percina macrocephala* to the upper Muskingum River Basin

Although the passage of the Clean Water Act led to the recovery of many threatened and endangered species of fish within Ohio's river and stream ecosystems, several populations have been limited in their ability to naturally re-expand because of physical barriers (e.g., dams) and degradation of the physical habitat. Conservation translocation (the deliberate movement of organisms from one site to another) is one effective strategy used to overcome these obstacles. This reintroduction method can have advantages over captive propagation in terms of cost-effectiveness and increased genetic diversity of founding populations. The Tippecanoe Darter and Longhead Darter within the upper Muskingum watershed are of conservation concern because of their Ohio-listed status as threatened and endangered, respectively. Longhead Darter was last

collected by Milton Trautman in 1939 and Tippecanoe Darter by Roger Troutman in 1963 in the Walhonding River (Upper Muskingum watershed). However, no recent records exist and both species were presumed extirpated from the upper Muskingum watershed. Although there have been improvements to chemical water quality in this system, the ability of either species to recolonize the system is stifled by ten dams on the Muskingum River. Thus in 2018, we began translocation of the Tippecanoe Darter and Longhead Darter back into their historic range in the upper Muskingum watershed. We set a goal to translocate 1,200 individuals of each, evenly divided across six upper Muskingum basin sites, for five consecutive years. All translocated fish were tagged with Visible Implant Elastomer tags. We conducted annual surveys for recaptures and natural recruitment. After six years of effort, the Tippecanoe Darter appears established once again in the upper Muskingum River basin. Results have been more varied for Longhead Darter.

CONTRIBUTED POSTERS

Authors: William Bell and Jeff Miner

Affiliation: Bowling Green State University

Title: Diel hypoxia in shallow wetlands: assessing distribution patterns of zooplankton and fish

While hypoxia in the hypolimnion of eutrophic lakes, and diel vertical migration tracking light, are well known, hypoxia can occur on a diel cycle in shallow wetlands like in Old Woman Creek. We are proposing a study to quantify the extent to which this daily oxygen cycle (especially in summer) affects/causes patterns of vertical distribution. Our initial observation is that after oxygen saturation during the day (from photosynthesis), there is a progressive oxygen decline dipping to lowest concentrations after dawn (often near 0 mg/L). We hypothesize that this (like in lakes) will force organisms up in the water column progressing toward the air-water interface. In OWC, the dominant fish species are Goldfish *Carassius auratus* and Bluegill *Lepomis macrochirus*; we expect to see that Goldfish will be able to use much more of the water column during this hypoxic condition than Bluegill, which will be forced up in the water column. Similarly, zooplankton will be forced to aggregate in surface waters, and this may affect their vulnerability. Because of the confounding effects of light on vertical migration we will make observations in the field, but also conduct an experiment in the lab.

Authors: Caitlin Black, Peter Grap, and Michael Booth

Affiliation: University of Cincinnati

Title: Impacts of hydrological conditions on fish diversity and populations in a small urban stream

The characteristics of urban streams create stressors for fish that cause dramatic shifts in their population dynamics. These characteristics include a flashy hydrograph, increased nutrient input, loss of biodiversity, and channelization. Hydrology is a major factor that impacts fish compositions because it determines habitat availability in streams. Hydrology is especially important in urban streams, as urban fish communities already face habitat degradation compared to natural streams. Urban streams are populated by fewer species that are more tolerant to changes caused by urbanization, but these species are still affected by changing hydrology. Using a five-year dataset collected in four sites within Cooper Creek, an urban headwater stream in Cincinnati, Ohio, we analyze variations in fish population and community structure in response to habitat availability in wet and dry years in an urban stream. The two focuses of this study are understanding (1) how fish community composition and (2) population characteristics (e.g., size distribution, body condition) change in wet versus dry years. Cooper Creek is inhabited by tolerant pioneer species like Creek Chub, Western Blacknose Dace, Central Stoneroller, and a few more species present in the creek's lower reaches. In this study, we hypothesize that there is a correlation between fish community composition/population characteristics and the amount of rainfall in a year. We predict that in wetter years with more rainfall, there will be greater habitat availability. This will result in better population numbers, larger fish, and more well-rounded size distributions. In dryer years there will be a drop in population numbers and size distributions due to lack of habitat availability. Dryer years will also see a reduction in species diversity, as the less resilient species lose habitat to more dominant species like the Creek Chubs.

Authors: Adam Daniels, Augustus McAnally, and Michael Booth

Affiliation: University of Cincinnati

Title: Comparison of methods for woody debris assessment in the Ohio River

The Ohio River is a vital aquatic resource used for transportation, recreation, and potable water that has been affected by centuries of human impact. To ensure and better the Ohio River's health and water quality, management evaluates the state of riverine habitat using the ORSANCO-derived Ohio River Fish Index (mORFIn), a relative estimate of ecosystem condition. mORFIn scores are obtained through yearly sampling of fish and macroinvertebrate populations, habitat, and water quality at sites throughout the Ohio River watershed. While evidence suggests that an increase in fish diversity is positively correlated with healthy environmental conditions, the drivers of local fish populations are still poorly understood. A potential component impacting fish communities is the littoral coverage and complexity of large woody debris. Known to provide shelter as flow varies and create hydrologic features against the shoreline that supply species with areas for rest and refuge, woody debris is an important ecosystem feature supporting fish populations. However, the turbidity of the Ohio River can often make measurement of woody debris difficult. Currently, it is quantified by visually counting wood along the shoreline of sampling zones to provide a qualitative approximation of coverage. While this method is easily performed, its applications are unclear, and relationships between woody debris and fish are inconclusive despite anecdotal observations of increased catch near woody habitat. Thus, there is a clear need to develop methods to better quantify available habitat in the river, informing the use of the mORFIn and improving its accuracy. The use of sonar side-scan to capture habitat imagery has been shown to provide a more accurate quantification of woody debris in reservoir systems compared to the current visual-based protocol. We aim to determine whether the employment of side-scan sonar to assess submerged woody debris coverage in the Ohio River could potentially provide a more efficient and accurate method to estimate habitat, improving resulting mORFIn scores and creating a clearer image of the current state of each section of the river. We will use recreational side-scan sonar equipment to survey 10–20 miles of river shoreline and capture imagery of submerged woody debris on the Ohio River near Cincinnati, Ohio. At the same time, counts of shoreline wood will be made and recorded along the same stretch of river. We will process sonar imagery in GIS, counting wood structures and delineating the area covered by wood. We anticipate a significant difference in the accuracy of woody debris quantification between the side-scan sonar and visual collection method. This could potentially provide a more efficient and accurate method of habitat assessment for ORSANCO protocol, resulting in more precise mORFIn scores and a better method of protecting the Ohio River.

Authors: Tyler Johnson, Lauren Pintor, Mazeika Sullivan, and Brian Zimmerman

Affiliation: The Ohio State University

Title: Determining the distribution and abundance of a rare Ohio fish, the Popeye Shiner

Human development has adversely affected virtually all natural ecosystems, but freshwater ecosystems are among the most heavily impacted. Water pollution, habitat destruction, and direct exploitation for drinking water create tremendous stress for aquatic organisms, and nearly a

quarter of freshwater fish worldwide are considered threatened. This study aims to examine the current distribution and habitat preferences of the Popeye Shiner *Notropis ariommus*, a small fish native to the southeastern USA with a very narrow distribution in Ohio, found only in Scioto Brush Creek in Scioto and Adams counties. In order to determine the distribution and relative abundance of the Popeye Shiner within Scioto Brush Creek, we selected sampling sites distributed throughout the creek. A total of 4,771 fish comprised of 70 species were captured, including 183 Popeye Shiners. Popeye Shiner catch per unit effort (CPUE) was positively correlated with drainage area (r^2 = 0.355), supporting previous reports that the species is found predominantly in small to medium rivers and is absent from headwaters. Some sites were previously sampled in 1985 or 2006, so Popeye Shiner abundance (percent of total catch) was compared between sampling events. At 1985 sites that were repeated, Popeye Shiner comprised 15.5% of total catch in 2023 compared to 4% in 1985. At repeated 2006 sites, Popeye Shiner comprised 4.3% of total catch in 2023 compared to 0.88% in 2006. Further data analysis will examine factors including water temperature, riparian land use, and habitat quality for significant associations with Popeye Shiner abundance. Results will be shared with state and federal agencies to better inform future policy and management decisions about the species.

Authors: Mikayla Kindler[1], Dillon Weik[1], Christine Mayer[1], Eric Weimer[2], Lucas Nathan[3], John Dettmers[4], Ryan Young[5], and Tammy Wilson[6]

Affiliations: 1–The University of Toledo, 2–Ohio Department of Natural Resources, 3–Michigan Department of Natural Resources, 4–Great Lakes Fishery Commission, 5–U.S. Fish and Wildlife Service, 6–U.S. Geological Survey

Title: Grass Carp growth histories for Lake Erie

Invasive Grass Carp have been documented in Lake Erie since the mid-1980s but were assumed to be triploid fish escaped from aquaculture, until spawning was confirmed in 2015. A multi-jurisdictional partnership implemented a removal plan in 2018, with increasing effort since. Removal efforts have resulted in low catch rates, suggesting Grass Carp are difficult to capture and likely rare. Therefore, supplementary biological data obtained from aging structures can help indicate regional trends in Lake Erie population demographics. Somatic growth rate can suggest how Grass Carp interact with food resources and potential impacts on wetlands. Age-at-maturity is an important factor in estimating potential recruitment. Here, we describe somatic growth based on length-at-age by ploidy and sex for fish captured in 2021 and 2022. We fit the von Bertalanffy Growth Function (VBGF) by using back-calculated growth estimates derived from the Biological Intercept Model. Across all fish, average age-one growth was 170.7 mm, and age-at-maturity was estimated to be 3–4 years. Females achieve a final length of 8.8% larger than males, and diploids grow faster than triploids up to ~age 11. Slower growth rates may indicate that triploid fish have a lower environmental impact than diploids. However, the age at which triploids enter the lake system is unknown; therefore, slower growth observed may occur in an aquaculture setting, not in Lake Erie. Estimated age-at-maturity occurs around age 3, before grass carp are estimated to be fully recruited to current removal gear (~age 5) and earlier than reports from other systems (4–5 years). However, growth estimates from VBGF must be compared to ongoing gonad analysis for validation.

Authors: Isabella Leisgang and Ken Petren

Affiliation: University of Cincinnati

Title: eDNA metabarcoding urbanization analysis of macroinvertebrate and fish communities in Southwest Ohio

Environmental DNA (eDNA) metabarcoding is a growing method under analysis for more efficient biodiversity monitoring. Using eDNA to specifically assess freshwater macroinvertebrate diversity can not only exponentially decrease the amount of time currently taken to identify collected individuals but can increase the frequency of monitoring throughout watersheds. Ephemeroptera, Plecoptera, and Trichoptera (EPT) are recognized by the EPA as indicator macroinvertebrates for stream quality. Their sensitivity to pollution and diverse taxonomic families make them great representatives of a stream's ability to support a functioning ecosystem. Southwest Ohio has a diverse array of streams with various degrees of urbanization. The Great Miami, Little Miami, Whitewater, and Mill Creek watersheds consist of many differently characterized bodies of water that allow for urbanization vs. rural comparisons of macroinvertebrate communities. I hypothesize that the more urbanized the stream, the lower the concentration of EPT. Although current methods have proved this hypothesis, it is important that this hypothesis be replicated with eDNA metabarcoding, to understand if this is a reliable method for biodiversity analysis. So far, there is some evidence to suggest that EPT numbers and overall biodiversity seen by eDNA in larger mainstems, are impacted by drainage area size, while tributaries are impacted more by urbanization. Sampling must be repeated to assess experimental errors such as: filter paper DNA retention, seasonality effects, and primer resolution. Once these variables are addressed, eDNA may have the capability to greatly expedite the speed at which biodiversity monitoring occurs for all freshwater communities.

Authors: Alexandra Marshall and Jeff Miner

Affiliation: Bowling Green State University

Title: Fish passage structures in reconstructed wetlands: Balancing cost of construction against limitation to movement

At Ottawa National Wildlife Refuge and other wetlands being reconnected to Lake Erie, large (~4-m wide by 5–8-m length) concrete connections with expensive grating and closures (~$400K) appear to allow unencumbered movement of fishes. These often have grating over much of the top to allow for vehicle traffic and to let light into the passageway. A second type of structure using 1–1.5-m diameter black corrugated pipes, also with flow control and carp exclusion, are being installed because they are an order of magnitude less expensive to install (~$40K). These latter structures are often 10–15 m in length and create a much different light environment. We will be quantifying fish movement patterns through both structures to compare the efficacy of each on movement under diurnal and nocturnal conditions. We hypothesize that, especially for small fish, movement will be impeded by the latter reconnection, but more so during diurnal periods than at night.

Authors: Augustus McAnally[1], Taher Fletcher[1], Jeremy Pritt[2], and Michael Booth[1]

Affiliations: 1–University of Cincinnati, 2–Ohio Department of Natural Resources, Division of Wildlife

Title: Employing recreational side-scan sonar to evaluate habitat and fish catch rate relationships across Ohio reservoirs

Understanding the effects of physical habitat on sport fish population characteristics in reservoirs is important for both fisheries management and conservation, however, comprehensive habitat data is rarely available. Moreover, assessing these systems with the most efficient and cost-effective practices is critical. While the use of side-scan sonar to quantify physical habitat in freshwater systems has become increasingly common, few projects have compared reservoir-wide habitat metrics with catch rates of sport fish populations. Using a recently developed habitat assessment protocol, we are using recreational side-scan sonar to quantify littoral habitat in 15 inland reservoirs across Ohio. Aquatic habitat features consisting of woody debris, aquatic vegetation, and substrate are manually classified for the entire accessible littoral zone of each reservoir. We used reservoir-wide habitat metrics to explain variation in standardized annual electrofishing catch rates of black bass *Micropterus* spp. collected during the spring. Using proportional size distributions (PSD) for quality and preferred size classes, our project will analyze catch per unit effort (CPUE; fish/hr) and habitat variables among lakes. The study aims to highlight potential habitat factors driving variation in fish populations among lakes to evaluate whether habitat improvement can provide a management lever for sport fish populations in reservoirs as aging and habitat degradation occurs.

Authors: Madeline Schumacher and Lindsey Bruckerhoff

Affiliation: The Ohio State University

Title: Multiscale drivers of Beaded Darter occupancy in the Ouachita Highlands

The Beaded Darter *Etheostoma clinton* is an endemic species of conservation concern to the upper Ouachita and Caddo Rivers in Arkansas, USA, but little work has been done to assess its distribution and life history since its description in 2012. Due to its restricted range and perceived low site abundance, comprehensive assessment of potential drivers of occupancy would be valuable to inform the conservation of the species. We designed a sampling protocol using a multiscale framework and executed it in the summer of 2023. Of the 36 sites sampled, Beaded Darters were detected at 10 sites (7/19 in the Ouachita, 3/17 in the Caddo). Preliminary analyses suggest Beaded Darters were evenly distributed across different watershed sizes, water depth, and velocity. Further work includes an additional summer of sampling to increase spatial coverage and developing multiscale occupancy models to identify watershed and local habitat drivers of occupancy.

Author: Paul Seong

Affiliations: Case Western Reserve University

Title: Fish inventory of 2023 suggests improved fish diversity and water quality at Old Woman Creek

The Old Woman Creek Estuary is a freshwater estuary that serves as an important habitat and spawning ground for many Ohio fishes. Over the summer of 2023, I used fyke nets as my collection method to collect fish living in Old Woman Creek to assess the biodiversity of fishes in the estuary, and to look at the prevalence of each fish species found, especially when comparing native species

to invasive species like Round Goby *Neogobius melanostomus*, Common Carp *Cyprinus carpio*, and Goldfish *Carassius auratus*. I also compared this study to two earlier studies conducted by Scott Hoffman and Ben B. Brammell that also collected fish from the estuary to examine long-term trends of the change in the estuary. While the 1981–83 study conducted by Hoffman was able to find native Northern Pike *Esox lucius*, neither Brammell's study conducted during 2002–04 nor my study was able to find Northern Pike. Both Brammell and my paper found Round Gobies, which were unreported in Hoffman's paper, showing a recent introduction of the invasive species in the Lake Erie watershed. Nonetheless, many of the species that I captured, native or non-native, were robust in terms of weight and total length suggesting that the estuary itself is a healthy water system that is conducive to harboring healthy fish specimens.

Author: Michael Sovic

Affiliations: Freedom Genomics LLC

Title: How can DNA help? A summary of genetic methods for informing conservation and management of biological systems

DNA is well known for storing the code that underlies traits of an individual, and for serving as the vehicle by which that code is passed along generations. But the information in DNA goes beyond coding directly for traits. History is written in to DNA as a by-product of how the code is modified and transmitted over time. Signatures recorded as levels and patterns of variation across the genome allow inferences ranging from the identity of an individual in a current population to characteristics of that same population as it existed long ago. While DNA can provide a wealth of information for specific questions, other questions are beyond the scope of genetic analyses, and indeed, DNA is best viewed as one tool in a larger analytical toolbox. Even within the types of questions for which DNA is well-suited, not every piece of DNA in a genome is equally informative. As a result, it's helpful to tailor a genetic dataset to the specific goals of a study. Methods for generating DNA data continue to evolve, and a growing availability of high-throughput technologies has greatly expanded the scale of datasets we can produce. These larger datasets have potential to not only increase analytical power, but in some cases allow researchers to address types of questions that were previously out of reach. This presentation will summarize and compare common methods for generating DNA-based data and provide some examples of how such data can be used to inform conservation and management of groups of interest.