

THE OKLAHOMA CONSERVATION COMMISSION'S ROAD TO HIGH-QUALITY DATA

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The Oklahoma Conservation Commission Water Quality Division (OCC) took to the streams in southern Oklahoma en masse in early April for "Fish School 2019." Fish School, a yearly field training on fish taxonomy, identification, and sampling, is a critical component of quality assurance and management for the OCC water quality programs. Fish School is a spring board for collecting high-quality data, which form the foundation for effective management decisions, and it offers a time for seasoned professionals to share their knowledge. Taught by the Commission's senior Monitoring Specialists, training highlights included:

- Laboratory style overview of the fishes of Oklahoma with emphasis on life history and distinguishing physical features. The primary focus was on species likely to be found in the upcoming basin to be worked in the south central and southwest areas of the state.
- Review/training on electro-shock and seine techniques in fish collections with "hands on" experience with a variety of species.
- Review/training on in-stream habitat assessment protocols.
- Testing on fish identification. Students were expected to correctly identify larger fish, photo-document fish for release, and know which fish must be preserved and submitted for taxonomic identification.

The agency's monitoring, education, and quality management staff hone their skills in fish identification and habitat assessment before the intense summer field season gets underway. The Commission's Monitoring Specialists sample over 250 wadeable streams across Oklahoma through the Rotating Basin Monitoring Program. Chemical, physical, and biological sampling is conducted on targeted sites in five watershed basins across the state in five years. The staff monitors each basin for two years, rotating to a new basin every year until conclusion of the five-year cycle. More information about the Rotating Basin Program is below.

Photos by the author.

Cheryl Cheadle is the volunteer coordinator for the Oklahoma Blue Thumb Water Quality Education Program. She previously worked with Blue Thumb from 1992–2016 and during her two years away was a naturalist (primarily working with fifth graders) at the Camp Loughridge Outdoor Classroom in Tulsa, which provides quality outdoor science-based experiences for children to participate in. Cheryl is committed to helping children and adults form meaningful connections with nature that help them become stewards of our land, water, and wildlife.

The Commission's Blue Thumb Water Quality Education Program crew makes up a substantial percent of those attending Fish School. The Blue Thumb staff works to train and support volunteer citizen scientists who perform monitoring on their home creeks. These volunteers generate data on water chemistry each month, benthic macroinvertebrate collections biannually, and fish and habitat assessment every five years. As overseers of the volunteers and their data, Fish School is a critical part of Blue Thumb's annual preparation for summer field work. All biological and habitat data are collected by volunteers and staff members working together. This is part of the Blue Thumb quality assurance protocols.

In addition to Rotating Basin and Blue Thumb staff, OCC data administrators and quality assurance staff attend Fish School. When you spend a great deal of time inputting data (plus running data through metrics programs and interpreting results), the massive amount of information covered at Fish School fills in important gaps in understanding streams and provides insights on the data entered.

Fish School sets the bar that allows OCC to build a solid foundation of baseline data. Baseline data are of great benefit to the State of Oklahoma because it enables detection of trends



Figure 1. Using fish shocking equipment and netting the stunned fish provides an efficient way to ferret out fish in difficult locations. Both large and small fishes are stunned by the electric field for quick observation, then they are returned to their home.



Figure 2. Wetlands Specialist Sarah Gallaway displays a lovely female Longear Sunfish *Lepomis megalotis*. She viewed attending Fish School as another way to close the gap that can exist between data origination and data management.



Figure 3. Performed in conjunction with a fish collection, in-stream habitat assessment involves recording data at transects every 20 meters over a 400-meter reach of the stream. Some information is based on conditions at the transect, and some is based on the full 20-meter area. Water width, water depth, substrate type, instream cover, bank erosion, and canopy are some of the recorded parameters. For this unit at Fish School, participants work both independently and in teams to complete the habitat form, which is then compared to the average score of the instructional staff.

in water quality, including improvements in several Oklahoma streams. The Water Quality Division has documented over 90 “success stories” where streams have improved in profound ways after the installation of conservation practices. Continued data collection is essential to demonstrating success, as water quality tends to improve gradually after the implementation of best management practices; short-term monitoring would not capture long-term improvements.

Because of the mass of information gathered by both Blue Thumb volunteers and the OCC Field Crews, it has been possible to designate high-quality streams within all 12 of Oklahoma’s

Omernik Level III ecoregions. This has allowed the Commission to determine what fish species and their relative abundances are likely to occur in a healthy stream. These “high-quality streams” offer a template for comparison, and therefore a quick and easy numerical guide. Is finding a total of 120 individual fish of five different species a good collection? That question can be answered by comparing collected data to reference data from a composite of high-quality streams in the same ecoregion. Because we have the data for comparison, and if we know that the high-quality sites produce on average a fish collection resulting in 274 individuals from 14 species, then it is not difficult for even the novice ecologist to know there may be chemical, physical, or biological conditions that are negatively impacting the stream. These numbers do not indicate any real scenario, they are used only to provide an example.

So Fish School brings together the OCC staff members who have a hand on the data. Fish School brings these people outdoors and into a creek. There we are all reminded that entire ecosystems might need help, or maybe do not need help, based on the story told by the data. Fish School inspires the crew to do the job of data collection with great attention to detail and at the end of the day, every OCC staff member can feel satisfied, when contemplating “Did I do my best by this stream?” Our best is what every Oklahoma waterway deserves. Fish School is a big factor in getting us there.

OKLAHOMA CONTINUES TO BE NUMBER ONE IN IMPROVED WATERBODIES!

There are many causes that contribute to streams being included on the state’s impaired stream list. The State of Oklahoma has seen amazing partnerships formed among the USDA Natural Resources Conservation Service, the OCC, local conservation districts, municipalities, and landowners who decide they want clean streams flowing through their property.

Water quality monitoring is essential to identifying not only problems that exist but also improvements that result from conservation and other resource management efforts. In the case of Oklahoma’s stream success stories, water quality monitoring continues to demonstrate that stream health can be achieved right in the working lands of America!

For more information and to learn what actions are helping these streams to improve, go to: <https://www.epa.gov/nps/success-stories-about-restoring-water-bodies-impaired-nonpoint-source-pollution#ok>

OCC’S ROTATING BASIN MONITORING PROGRAM

Summer of 2019 began the 18th year of OCC’s Rotating Basin Program, and the 21st year of statewide ambient monitoring. Data gathered through water chemistry sampling, fish collections, benthic macroinvertebrate collections, and habitat assessments serve to:

- Determine overall stream health and beneficial use attainment of streams.
- Collect information on type, extent, and sources of non-point source pollution.
- Prioritize areas for conservation implementation and evaluate success of those efforts.
- Gather data for planning and implementing future projects.



Figure 4. Senior Monitoring Specialist Wes Shockley describes how the anatomy of this Spotted Bass *Micropterus punctulatus* differs from a Largemouth Bass *M. salmoides*, even giving participants the chance to feel little Spotty's tongue for a tooth patch.



Figure 6. The whole Blue Thumb team went to Fish School. While Blue Thumb staff are educators, most are also experts at the field-based fish identification and instream habitat assessments. Expertise in the field supports their roles as data collectors and educators.



Figure 5. Monitoring Coordinator Jason Ramming completes his instream habitat assessment form, the results of which will be averaged with other senior staff as the standard for comparison for trainees.



Figure 7. Warmouth *Lepomis gulosus*.



Figure 8. Flathead Catfish *Pylodictis olivaris*.



Figure 9. Green Sunfish *Lepomis cyanellus*.



Figure 10. Redear Sunfish *Lepomis microlophus*.

The information gathered through the Rotating Basin Program is critical for multiple program needs including: the state's integrated water quality report, nonpoint source pollution assessment, watershed prioritization, and conservation effects assessment. As part of the OCC's agreement with the US EPA in receipt of Clean Water Act 319 funding, Fish School is part of the state's quality assurance plan. Fish School sets the stage for the crew to assess both fish and habitat with calibrated eyes. In the case of new staff members, the event serves as an introduction and provides a sound foundation to accomplish quality field work. Field crew

leaders are expected to pass both habitat and fish identification exams with no less than 98% accuracy.

OCC's stream data have been central to strengthening partnerships (such as with the USDA Natural Resources Conservation Service, local conservation districts, and landowners) that have led to controlling erosion, reducing nutrient runoff, and preserving precious soil moisture for use where it counts: on cultivated fields and grazing lands. Monitoring has found streams in trouble, and monitoring has documented the streams recovering and returning to a healthy condition.

FishMap.org

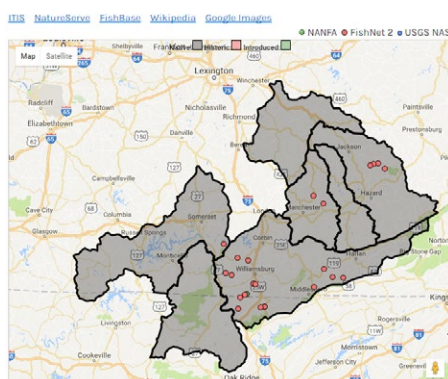
FishMap.org is for anglers, aquarium hobbyists, scientific researchers, or anyone else with a passion for fishes who wants to visually explore species' ranges or learn what species are in their local waters. The site is dedicated to spreading knowledge and respect for all fish species.

FishMap.org combines numerous data sources to provide a better view and more complete understanding of fish species distribution. It uses data from NatureServe, the National Atlas, the USGS water resources and Nonindigenous Aquatic Species programs, FishNet2, iNaturalist.org, GBIF, and iDigBio.

FishMap.org is sponsored by NANFA. Users can submit their own data to the portal to help map species distribution, so FishMap.org has been working with NANFA members to create an additional database of fish sightings and collections (currently nearly 30,000 records and growing).

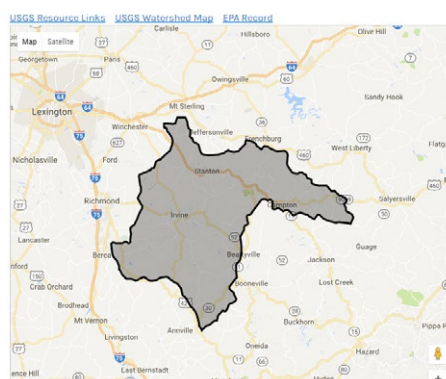
Range and Collection Data

Arrow Darter - *Etheostoma sagitta* Native Fish



Explore Watersheds

Upper Kentucky Watershed - 05100204



Compare Ranges

Range of the *Ashy Darter* (*Etheostoma cinereum*) vs. the *Arrow Darter* (*Etheostoma sagitta*)

