Blog: Forage Fish Surveys at ACLT and Beyond

November 22, 2024 By Community Relations Manager

Note: This blog contains two parts:

Part 1 expands upon an article written by CCCC Member Emily Dunsmore in the Fall 2024 Edition of the Watershed Observer, ACLT's quarterly newsletter. Read the article here (pg. 10).

Part 2 explains how volunteers from various "Friends of Watersheds" Groups are expanding the fish forage surveys beyond the properties managed by ACLT.

"Small fish and aquatic bugs, called 'forage' species, are the unsung heroes of the aquatic ecosystem of Parkers Creek and beyond. These small fish and aquatic insects are the main food source for the larger predator fish and are chronically understudied in fish surveys. Surveys that do focus on forage species are usually limited to sandy beach habitats. This has left a critical gap in the knowledge of the forage species present in other ecosystems."

Emily Dunsmore-2024 Fall Newsletter

Part 1: Three Fish of Clark Creek

By Emily Dunsmore, 2023/2024 CCCC Member

This summer, ACLT started its first forage survey in the non-tidal waters of Clark Creek. Of the fish caught during this forage survey, there were three notable species that highlight just how important forage fish are to the ecosystems they inhabit.

Mummichog (*Fundulus heteroclitus)*

Mummichog are a species of Killifish, which is part of the Cyprinodontidae family. They're one of the most common small fish found in shallow aquatic habitats in the Chesapeake Bay. They were the second-most common fish caught during ACLT's first forage survey. Often found in schools, this fish is an opportunistic feeder that eats a wide range of foods, including insects and aquatic worms, but most notably, mosquito larvae.

Mummichog were the first fish sent to space! As part of a mission in 1973, two mummichog and 50 mummichog eggs were sent to NASA's space station, Skylab, to study the effects of microgravity on fish (Smithsonian National Zoo &

Conservation Biology Institute, 2024). Mummichogs can live in a vast variety of conditions and are found in both fresh and brackish water. They have a high pollution tolerance and a swim bladder that can act as a "primitive lung." They can manually fill their swim bladder with air in conditions with little to no dissolved oxygen. This fish has little value to humans either commercially or recreationally, but they are often used in research due to their ability to tolerate a wide variety of conditions. They are often used in studies exploring the sensitivity of fish to environmental stressors (Schulte, 2013). Despite having little inherent value to humans, these small fish are an essential part of the Chesapeake Bay watershed food web. Mummichog, along with other small fish, are a key food source for larger, commercially-valuable fish and for predatory birds.

Brown Bullhead Catfish *(Ameiurus nebulosus)*

When you imagine a catfish, usually you'd imagine a large fish that would be impossible to find in a minnow trap. However, the small, juvenile catfish were a very common catch in the late summer!

Brown bullhead catfish are a native, bottom-feeding fish that are common in the freshwater and brackish streams that are tributaries of the Chesapeake Bay. They can grow up to 20 inches in length and usually prefer slow-moving, soft-substrate waters. They use their whisker-like barbels on the underside of their mouth to sense and find prey, which can include algae, insects, and other fish (Chesapeake Bay Program, 2024). As small fish, juvenile brown bullheads school in shallow water and are a food source for larger predator species including birds, perch, sunfish, and even snapping turtles.

American Eel (*Anguilla rostrata*)

The American eel has long fascinated humans due to its complex and mysterious life cycle. As the Chesapeake Bay region's only catadromous fish, it lives most of its life in rivers, estuaries, and lakes before making the long, arduous journey to the Sargasso Sea to reproduce and die. These fish are carnivorous and often eat insects, fish eggs, and frogs. American eels are an immensely valuable species. They can serve as an indicator species due to their sensitivity to low dissolved oxygen (Hill, 1969), and they are an important food source for larger predatory species of fish and birds. These eels can also be an important host organism for native mussel larvae, which attach to the gills of eels temporarily, and

then eventually drop off and burrow into the substrate. These native mussels play a large role in filtering the water of the Chesapeake Bay (Maryland Department of the Environment, 2024).

American eels are listed as endangered by the International Union for Conservation of Nature (IUCN), due to a dwindling population as a result of both human and non-human causes. Barriers to migration, habitat loss, and climate change are only a few of the threats to this species (IUCN Red List, 2020). Despite being listed as endangered by the IUCN, the U.S. Fish and Wildlife Service's assessment in 2015 found that it did not meet the standards to be listed as endangered under the Endangered Species Act, despite having depleted population numbers (IUCN Red List, 2020).

The American eel was my most surprising (and most slippery!) species found during the forage survey. Although they are common to find in the Chesapeake Bay and its tributaries, it was interesting to find them in Clark Creek, so far inland from Parkers Creek and the Bay. Finding them in Clark Creek really showcased how far these fish travel from where they are born in the Sargasso Sea, about 650 miles away.

Part 1 References

Part 2: Friends Groups Take on Forage Surveys

Since April, the Friends groups of Southern Maryland have been participating in forage surveys to learn what fish are in their waterways and to expand the overall knowledge about forage species in different Chesapeake Bay tributaries. ACLT has helped form and coordinate six watershed Friends groups in Calvert County: Friends of Hunting Creek, Friends of St. Leonard Creek, Friends of Mill Creek, Friends of Hellen Creek, Friends of Fishing Creek, and Friends of Hall Creek. Of these six Friends groups, three have begun forage sampling, often off of Friends group members' personal docks.

"Forage," which is defined as small fish and invertebrates that sustain and feed a larger aquatic predator population, is chronically understudied in fish surveys. Additionally, all of the surveys focused on forage species in the Chesapeake Bay have primarily been done with seine nets on tidal, sandy beaches, meaning that other kinds of habitat have not been properly sampled. This has led to a critical gap in knowledge about forage species. This data gap inspired the creation of "forage surveys" across the Chesapeake Bay region, led by Morgan State University's Patuxent Environmental Aquatic Research Lab (PEARL) and spearheaded by Dr. Tom Ihde. In years past, four other organizations have participated in these forage surveys, with sites in tidal waters as far north as Havre de Grace and as far south as the James River. This year, after two training sessions led by Dr. Ihde, the Friends

groups joined the forage sampling effort, effectively adding three new watersheds to PEARL's dataset.

Of the six Friends groups, three have taken up forage surveys in their watershed: Friends of Hunting Creek, Friends of St. Leonard Creek, and Friends of Mill Creek. Because these are citizen science surveys, they are dependent on citizens having access to waterways. Luckily, many active members of the Friends of Mill Creek and Friends of St. Leonard Creek have waterfront properties. As of July 2024, there are three citizens sampling three sites in St. Leonard Creek, and three citizens sampling six sites in Mill Creek. The Friends of Hunting Creek has fewer active members with waterfront property, so a core group of four members has joined together to sample one site. Because the forage surveys are citizen-led, there is flexibility for samplers to conduct surveys as frequently or infrequently as they are able. Some of the Friends groups' forage samplers have conducted surveys daily or weekly, while others have committed to once a month.

Forage sampling is a great way to participate in citizen science efforts, get to know which fish species are in nearby waterways, learn how to identify fish, and add to the information available about forage species in the Chesapeake Bay Watershed as a whole. Additionally, it is relatively inexpensive to conduct forage sampling because almost all of the supplies (except the data sheets) are reused every time sampling occurs, making it a relatively accessible way to get involved with citizen science.

Want to get involved with forage sampling? Email Mary (mary@acltweb.org) to learn more.