

Water Quality Factors for Laurel Dace Habitat Improvement: Dr. Dungey's Lab

The Laurel Dace (*Chrosomus saylori*) minnow species was listed as Endangered by the U.S. Fish and Wildlife Service (FWS) in 2011. Since then, degraded habitat has resulted in the extirpation of the species from three of six previously occupied streams. According to the [Tennessee Aquarium](#), the Laurel Dace is in the “top 10 most-imperiled fish in North America.” In 2021, Laurel Dace persisted in the predominantly forested watersheds of Bumble Creek and Youngs Creek, but the southern metapopulation was no longer detected at Cupp Creek. The purpose of this research is to determine the water quality of the occupied and unoccupied streams for potential habitat of the Laurel Dace.

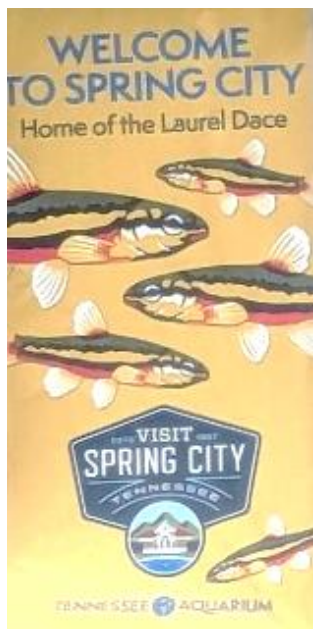


Figure 2. Laurel Dace Day in May

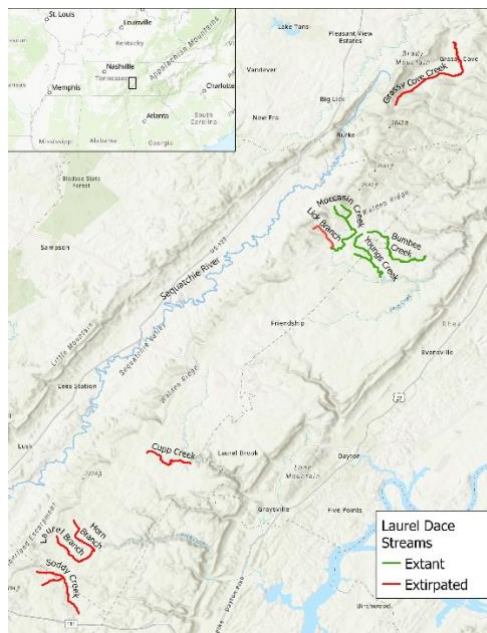


Figure 1. Historic range of Laurel Dace (TNACI).

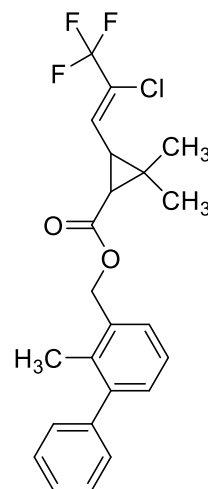


Figure 3. bifenthrin.

While the FWS is currently conducting their [five-year review](#) of the status of the Laurel Dace, their water quality measurements are limited. The goal of our study is to enhance the efforts of the FWS and the Tennessee Aquarium Conservation Institute (TNACI) by providing a panel of chemical analyses which will enable the determination of water quality (WQI) and also identify any pollutants of concern (e.g. nitrate, phosphate, pesticides). Our objectives are to: 1. Establish sampling sites in collaboration with TNACI 2. Conduct monthly sampling at streams inhabited and uninhabited by Laurel Dace 3. Measure WQI factors: dissolved oxygen, pH, temperature, biological oxygen demand, turbidity, conductivity, TSS 4. Determine concentrations of anions (nitrate, soluble reactive phosphate) 5. Identify and measure pesticides (bifenthrin, trifloxystrobin, abamectin, pyraclostrobin, etc.)

Students will learn field techniques and chromatography. Our results will help FWS and National Resource Conservation Service scientists understand how the surrounding environment affects the stream water quality to inform their recovery plan.