

# Evaluation of Ogeechee River Water Using Zebrafish as a Biomonitoring Tool

Vinoth Kumar Sittaramane

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**Affiliation:** Assistant Professor, Dept. of Biology, Georgia Southern University, P.O. Box 8042, Statesboro GA 30460

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**Abstract.** Freshwater ecosystems are constantly subjected to environmental, natural or anthropogenic stressors that can have broad and lasting implications on the aquatic community such as abnormal developmental effects and mass kills. The ability to rapidly assess the health of a freshwater ecosystem using biomonitoring tools provides an early-stage opportunity to properly manage a potentially detrimental stressor. Recently, a major fish and organism kill caused by various environmental stressors, occurred in a local freshwater system, the Ogeechee River. This study evaluates the effects of stressors on Ogeechee river streams with acceptable and impaired GA EPD water quality standards using zebrafish larvae as biomonitoring tool. We have identified four streams within the Ogeechee River that fall under category 1-4: all acceptable levels, excess fecal coliforms counts, excess mercury levels, and impaired biological integrity. Briefly, we collected surface water and sediments samples from five different Ogeechee river sites and exposed zebrafish larvae in the samples for five continuous days. The larvae were observed everyday for critical endpoints such as development, hatching, mortality, morphology, heart rate etc. After five days, total RNA was extracted from the larvae and specific biomarker gene expressions were analyzed using Quantitative PCR. Our study has identified that sediments induce higher toxicity than surface water samples. Further, samples from site with both increased fecal coliform counts and mercury levels produce highest toxicity to zebrafish larvae as expected. This early detection of stressors and understanding the subsequent effects will contribute to a growing knowledge base in making appropriate system management decisions.