Impacts of Climate Change on Food Resources of Native Gobiid Fishes and Atyid Shrimp in Hawaiian Streams

Progress

This project is designed to accomplish the following objectives: 1) provide a food web analysis based on two critical native faunal species in Hawaiian streams along a naturally occurring precipitation gradient; 2) quantify effects of flow rates on food resource availability for both species; 3) determine if resource limitation is leading to interspecific competition; and 4) provide data on effects of altered flow rates due to climate change, invasive species, and water diversions, that will help assist in conservation and restoration efforts.

To meet these four objectives, the field work and the sampling of invertebrates and the food resources was completed by August 2013. The native gobiid fish were excluded due to permitting constraints, and non-native caddisflies were substituted as a proxy for the food web. All samples were analyzed by a mass spectrometer for stable carbon and nitrogen isotope signatures by April 2014. Preliminary data analysis was completed by April 2014 and will be finalized by August 2014.

Preliminary results point to possible resource partitioning between male and female atyid shrimp in high flow streams, but not in low flow streams. In the high flow stream, the male atyid shrimp appear to be feeding on filamentous algae while the female shrimp appear to be feeding on biofilm. In the low flow stream, both the males and the females appear to be feeding on biofilm.

Student Support

Graduate student, Michael Riney, is currently in the data analysis stage and will be submitting his M.S. thesis prior to graduating in December 2014. He has given two oral presentations based on his research through this project: “Hawaii Ecosystems Conference, July 2013” and “Tropical Conservation Biology and Environmental Science Conference, April 2014”.