Submerged aquatic macrophytes – Ecosystem engineers in New Mexico mountain streams
Effects of forest fire in the Rio Grande aquifer system

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Purpose of Study

This study aims to determine if disturbances and nutrient inputs resulting from the Las Conchas fire and subsequent summer monsoons have caused consequential changes in the nutritional content of SAMs (submerged aquatic macrophytes) present in the East Fork Jemez River, an important headwater area for the Rio Grande in central New Mexico. The study will document the effects of catastrophic forest fires on SAMs in the context of climate change given that climate change is predicted to have a variety of negative effects on hydrologic systems in the southwestern U.S. including more frequent, higher intensity forest fires.

Study Underway

Samples collected in a basin strongly affected by the Las Conchas fire, the East Fork Jemez River, will be analyzed for tissue nutrient concentrations of carbon, nitrogen, and phosphorus. The resulting data will be compared temporally to samples from periods before and after the Las Conchas fire as well as comparisons within and between species. These data will be used to create estimates of ecosystem energy flux (through carbon) and combined with other data (e.g., continuous dissolved oxygen data, photosynthetically active radiation, temperature, and barometric pressure) to estimate ecosystem metabolism rates (gross primary production and community respiration).

Benefits

Critical headwater zones that supply surface water for human consumption are typically in high montane areas that are expected to undergo significant changes due to climate change. These ecosystems also are often rich in SAMs. Understanding the effects of catastrophic forest fires on the growth and composition of SAMs will provide valuable new information on the recovery of these key components of primary production and respiration in mountain headwater streams of New Mexico.

Virginia Thompson is a PhD candidate in the Biology Department at UNM. She plans to graduate in May 2015. She received a master's degree in biology from UNM and a BS in biology from the University of Washington. In this photo she shows one of her study plant species (Elodea canadensis) and a pizometer cluster that she designed for an experiment where she was trying to see if there was a connection between groundwater inputs/gaining reaches and single-species stands of the plants that she studies.

Virginia Thompson in the UNM BioAnnex Analytical Chemistry Lab, where every step of the sample processing is done, from cleaning plants straight from the field to putting them through specialized equipment to determine the carbon content of the prepared plant samples.