Development of a risk model to determine the expansion and potential environmental impacts of Asian clams in Lake Tahoe

Principal Investigators: Sudeep Chandra and Marion Whitman

Annual Accomplishments Update (October 1, 2008-September 30, 2009)[1]:

Completed two benthic surveys along three transects ranging from 2 to 40 meter water depths in variable population density clam sites (Zephyr Cove, Nevada Beach, Marla Bay). These transects are a repeat of 2008 endeavors to characterize the Asian clam distribution in these portions of the Lake. Another set of two transects in these locations are scheduled to be carried out in 2010 in order to understand the expansion of the Asian clam bed population density. Over 50 sediment hand cores in Asian clam beds were processed for nutrient and chlorophyll content, as well as distribution of Asian clams within the sediment column by size and frequency. Sediment porewater samples for nutrient analysis, sediment particle size distribution, ultraviolet (UV) light penetration, 25 temperature probes, 4 dissolved oxygen meters, 1 fluorometer, and bimonthly chlorophyll a sampling have been carried out in variable population density clam sites (Marla Bay, Glenbrook Bay, Lakeside Marina site). An Asian clam growth experiment was installed in June and first measurements were conducted in September. This experiment used clams collected from Marla Bay and placed in Marla Bay and at the Lakeside Marina site to understand differential growth rates in two distinct environments (both have Asian clam present). Laboratory experiments on the feeding rates of Asian clam were carried out in August 2009. Results showed that Asian clam cleared approximately 4 gallons of Lake Tahoe in a 24 hour period. Multiple repeats of this experiment were carried out with a variety of permutations (Asian clam with sediment, without sediment, variable clam sizes, variable time periods, etc.). Two ADCP (acoustic Doppler current profilers) were installed at a deep (20m) and shallow (5m) depth in Marla Bay to study water current movement and velocities in high density Asian clam beds. A laboratory experiment on the impact of Asian clam excrement on the growth of two filamentous algal species was carried out at the UC Davis Tahoe Environmental Research Center (TERC) laboratory this summer. The algal samples were collected from Marla Bay, and contained Zygnema sp., the dominant Asian clam bed filamentous algae species in 2008, Cladophora glomerata, the dominant filamentous algal species in 2009, and a variety of single celled algae species that are currently being identified at UC Davis campus by experts. Currently, researchers from both the UC Davis and UN Reno laboratories are engaged in data processing and analysis of the field and laboratory endeavors from this period. Preliminary findings of these studies have been reported by Dr. Marion Wittmann of UC Davis and Dr. Sudeep Chandra of UN Reno to the Lake Tahoe Aquatic Invasive Species Working Group, Lake Tahoe Aquatic Invasive Species Coordination Committee, the California Lake Management Society, and to Lake Tahoe Federal Advisory Committee.

[1] This document is an intermediate progress report, not a final report; consequently, any results should be considered preliminary and should not be cited. Please contact the principal investigators or the Tahoe SNPLMA Science Program Coordinator if you have questions.

Progress Report: October 1 to December 31, 2009

Data analysis of field collections carried out from May through November 2009 is currently underway. The results of this work will be presented at the Tahoe Science Symposium, March 2010, to the GLOW conference, also to be held at the Tahoe Center for Environmental Sciences in August 2010, as well as to professional ecology meetings in North America and in Europe (Lake Littoral Zone Conference, Lake Konstanz Germany, ASLO, and SIL).