

SUMMARY OF PHYTOPLANKTON MONITORING AT FALLEN LEAF LAKE,
TAHOE WATERSHED, CALIFORNIA.

Paula J. Noble¹, Sudeep Chandra², and David K. Kreamer³

¹Department of Geological Sciences and Engineering, University of Nevada, Reno, NV 89557 USA

²Department of Natural Resources and Environmental Science, University of Nevada, Reno, NV 89557 USA

³Department of Geoscience, University of Nevada, Las Vegas, NV 89154 USA

A limnological monitoring program was established at Fallen Leaf Lake in 2009 in order to provide modern baseline data for interpreting a Holocene paleoclimate signal from diatom-rich cores. Fallen Leaf Lake is a small (5.2 km²) and deep subalpine lake that fills the Glen Alpine glacial valley at the south end of the Lake Tahoe basin. It is a dilute transparent lake, with secchi depths ranging from 8-15m, and develops a deep chlorophyll maximum (DCM) at 40m that is dominated by diatoms. We have observed a 5-6 month period of summer stratification, with the epilimnion reaching a maximum depth of 17.5m in August. Monthly samples were taken from late April-November in 2009, and continue semiannually. These data support previous work that the lake is N limiting to N-P co-limiting, and provide seasonal and spatial information on the ambient phytoplankton. Strong vertical partitioning of species occurs during stratification, and *Cyclotella bodanica* and *Dinobryon* are the dominant summer epilimnial taxa. A seasonal succession is observed and the early spring is dominated by *Asterionella formosa*, *Aulacoseira subarctica*, *Urosolenia eriensis*, and *Fragilaria tenera*. In the late spring, *U. eriensis* and *F. tenera* concentrations drop off, possibly tied with drops in N and P derived from snowpack, and *A. subarctica* is relegated to depths of 40m and deeper. *A. formosa* and *Tabellaria fenestrata* persist throughout the summer, being dominant components of the CDM. In late summer, large blooms of *Cyclotella rossii* become the successor species in the DCM, and persist until deep mixing in the late fall. Some interannual variation has been observed. In 2010, *T. fenestrata*, occurred in significantly lower concentrations. One possible explanation is that *T. fenestrata* may be more responsive to nutrient pulses, and the prolonged cool temperatures in spring 2010 served to mediate the flow of runoff and nutrients, favoring the growth of other spring species, such as *F. tenera* and *A. formosa*.

Work on the diatom record of the surface sediment and cores is in its initial stages, but large variations in % *Aulacoseira subarctica* are observed down-core, as well as variations in % of araphid phytoplankton, and ratios of the various cyclotelloids. Variations in the abundance of *D. stelligera*, low mantled *Aulacoseira* species, and % periphyton down core may be related to inputs from higher in the watershed, where these taxa reside. They are not observed as live cells in the lake, but instead are washed in during spring runoff. One significant distinction between the modern and fossil flora is the high percentage of araphid pennates. *A. formosa*, very abundant in the modern system, has been tied to anthropogenic eutrophication in other western alpine lake systems. It is hoped that the monitoring data will be useful in interpreting fossil diatom

assemblages that may reflect past variations in stratification, inflow conditions, and trophic status.

POSTER PRESENTATION