

Seasonal and Vertical Phytoplankton Distributions at Fallen Leaf Lake Observed From 2009-2011 Monitoring Data, Tahoe Basin, California, USA

Paula J. Noble

Professor

University of Nevada, Reno

Department of Geological Sciences and Engineering, MS 172

Reno, NV 89557-0138

noblepj@unr.edu

Sudeep Chandra, University of Nevada, Reno

David K. Kreamer, University of Nevada Las, Vegas

A monitoring program was established at Fallen Leaf Lake (FLL) to provide baseline phytoplankton data for ongoing paleolimnological research. FLL is a dilute, transparent lake that develops a deep chlorophyll maximum (DCM) at 40m dominated by diatoms. We observed a 5-6 month period of summer stratification, with the epilimnion reaching a maximum depth of 17.5m in August. In 2011, stratification was late and shallower, and the maximum depth of the epilimnion and DCM shifted vertically to 12.5m and 30m, respectively. Strong partitioning of species occurs between the epilimnion and hypolimnion, and *Peridinium*, *Puncticulata* (*Cyclotella*) *bodanica*, and *Dinobryon*, were the dominant summer epilimnial species. A seasonal succession was observed, where the early spring was dominated by *Asterionella formosa*, *Fragilaria tenera*, *Aulacoseira subarctica*, and *Urosolenia eriensis*. *A. formosa* and *Tabellaria fenestrata* persisted into the summer, becoming dominant components of the DCM. Interannual variability was observed in the dominant araphid, varying from *T. fenestrata* in 2009, to *A. formosa* in 2010, and *F. tenera* in 2011. In late summer, large blooms of *Cyclotella rossii* succeeded the araphids in the DCM and persisted until deep mixing in the late fall. 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 nitrogen deposition in other western alpine lakes and may not be a good analog for past conditions. These monitoring data will be useful in interpreting past changes in stratification, inflow conditions, and trophic status.