

TOWARD A SIERRAN STREAM DISCHARGE FORECAST BASED ON TULARE LAKE-LEVEL RECONSTRUCTIONS (3E)

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The CSU Bakersfield Tulare Lake project team is studying outcrops, trench exposures and cores of lake sediments to build a high resolution record of lake-level change for Tulare Lake over the past 10,000 years. Because the level of Tulare Lake has been shown to be closely related to the collective discharge of its four major Sierran feeder rivers (Atwater et al., 1984), this record will also represent stream discharge into the southern San Joaquin Valley throughout the Holocene. Eventual comparison of this record with a growing database of Pacific sea-surface temperature (SST) records will establish a link between SSTs and Sierran river discharge, a link that will be exploited in forecasting Sierran discharge over the next few decades in response to expected changes in SSTs driven by global climate change. Initial lake-level results are based on trench exposures from near Kettleman City, on the NW edge of Tulare Lake (Negrini et al., 2006). Despite low temporal resolution, the overall lake level history has been confirmed by studies on lakes in southern California indicating that the observed climate events are regional (Kirby et al., 2011). Ongoing work is focused on increasing the temporal resolution to decadal in scale over the past millenium or two. This new work includes studies on lake sediment cores from the Kettleman City sites and outcrops exposed near the SE margin of Tulare Lake in a borrow pit on the Pixley National Wildlife Refuge. The core-based studies show that the relative lake levels inferred from geochemical (e.g., inorganic carbon %, C/N ratio) and geophysical (grain size) measurements on continuously deposited deep water sediments are consistent with results inferred from studies of exposed sediments in trenches (e.g., transition from laminated deep lake sediments to organic-rich sediments deposited in a nearshore marsh setting). Because the measurements on core samples are taken every cm or so down the core, they have the potential to provide data points representing every ~30 years.

Key words: Tulare Lake, paleodischarge, Holocene, forecasting, hydrology