

SALINITY VARIATIONS IN MONO LAKE, EASTERN CALIFORNIA, AND FORMATION OF Tufa TOWERS IN MIXING ZONES BETWEEN LAKE WATER AND GROUNDWATER

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California's Mono Lake is known especially for the myriad tufa towers that dot its shoreline. Russell (1889) observed fresh water entering the lake through tufa tubes and proposed that the towers form where freshwater springs enter the lake and supply Ca ions that react with highly saline lake water to form CaCO_3 precipitates. Rosen and Coshell (2004) stated that groundwater inputs are necessary to supply Ca for tufa growth and nutrients for algae that mediate tufa growth. We have tested this hypothesis by measuring the Na concentrations of surface water samples in and around Mono Lake. Thirty-seven 10 mL samples were collected in plastic bottles from various settings: creeks feeding the lake, shoreline locations without tufa towers at varying distances from stream inlets, and among tufa towers at the South Tufa and Old Marina sites. Samples were diluted 1:1000 and analyzed for Na via DCP spectrometry. Creek samples have negligible Na concentrations, and samples taken hundreds of meters from creeks or tufa towers typically have concentrations near average lake water. Samples from among the tufa towers, however, range widely in salinity, from highly dilute to highly saline. Freshwater creek inputs aside, there is a distinct negative correlation between salinity and tufa tower development, consistent with input of low-Na groundwater. We conclude that there is significant ongoing groundwater input into the tufa tower sites.