David Herbst Presentation Summary

The nearshore lake bottom or littoral benthic environment of Mono Lake is characterized by calcareous tufa formations interspersed with sand, organic sediments, and inundated salt grass. The habitats support alkali fly larvae and pupae to varying degrees, with tufa providing especially important protective rocky intertidal habitat. Laboratory and field experiments show that salinity is a controlling factor in the growth, development and productivity of the alkali fly. Increasing salinity inhibits growth rates, extends development time, reduces the size at maturity of pupae and adults, and ultimately reproductive success.

Raising Mono Lake from its historic low of 6,372 feet to the 6,392-foot target established in the 1994 Water Board Decision (1631) would increase available tufa habitat while reducing salinity availability from about 100 g/L to 75 g/L. Elevated salinity also suppresses the growth of the preferred algae food resources, increasing the energy demands of salt adaptation (osmoregulation), while limiting food availability. In addition, higher salinity inhibits nitrogen fixation by cyanobacteria, reducing nutrient inputs needed to support benthic algae growth. Collectively, these factors support the expectation that higher lake levels would significantly improve alkali fly productivity and enhance food availability and quality for waterbirds that forage at Mono Lake.

Although alkali flies remain abundant at Mono Lake, their continued presence does not indicate that populations are unconstrained under current lake level and salinity conditions. Monitoring of larvae and pupae abundance and productivity has shown substantial spatial and temporal variability, but studies have generally been limited to short monitoring periods and relatively narrow lake level ranges, making long-term trends difficult to detect. Population monitoring data are still being compiled to provide a more complete understanding of changes over time. Comparisons with other saline lakes inhabited by alkali flies further support the conclusion that lower salinity conditions produce larger individuals and greater population densities across all life stages.