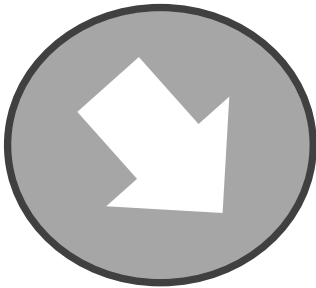


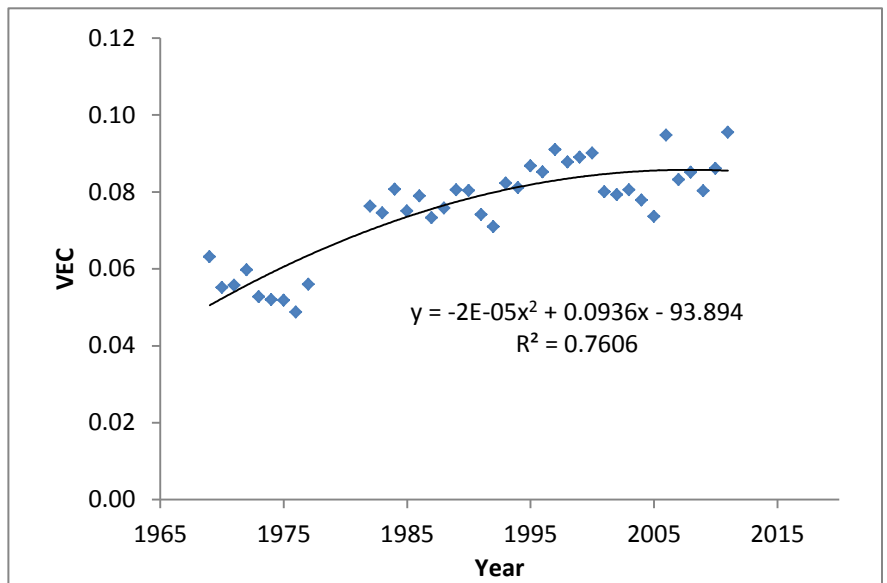
Pelagic Lake Tahoe: Annual Average Vertical Extinction Coefficient (VEC)

Reporting Icon



Status (2011): No determination
Trend: Moderate decline
Confidence: High

Trend



Map



VEC monitoring locations in the Lake Tahoe Basin.

Vertical extinction coefficient (VEC) is a measure of water clarity, specifically defined as the proportion of light that is absorbed and scattered per meter of depth. The blue data points are the depth integrated average annual VEC values from 1969 to 2011. There is a gap in the data where an instrument malfunction occurred between 1977 and 1982. The CA and NV VEC standard of 0.08/m could not be incorporated into this analysis because the standard is interpreted to be a maximum single measurement, while the data points are annual averages.

* The VEC annual average values should be considered provisional, as the quality assurance process is still on-going.

Data Evaluation and Interpretation

- Relevance:** Lake Tahoe is world-renowned for its exceptionally clear blue waters and has been a designated Outstanding National Resource Water since 1980. The aesthetic and environmental quality of Lake Tahoe contributes ecological, social, and economical value to the surrounding region, particularly in the form of outdoor recreational tourism and scenic beauty. However, deteriorating water clarity poses a threat to the ecological and economic value of Lake Tahoe. The vertical extinction coefficient (VEC) is a measure of water clarity, specifically defined as the proportion of light that is absorbed and scattered per meter of depth. Higher VEC values represent less clarity. While Secchi depth is a more commonly referenced measure of clarity in the Basin, VEC provides valuable insight into the biological integrity of the water body because it measures light penetration at much greater depths, which is important for aquatic plant growth and the vision of fish.
- Status:** The status of the VEC indicator is not determined because the depth integrated annual average values cannot be compared to the regulatory standard of 0.08/m, which is broadly interpreted as a maximum single measurement. The 2011 annual average VEC was .0955/m, while the 5-year average of annual average VEC from 2007 to 2011 was .0860/m.
- Trend:** The trend of annual average values is a moderate decline, as depicted by the polynomial trend line in the graph above. However, the declining trend is declining at a decreasing rate and there is no significant trend over the past 5 years.
- Confidence:** Overall confidence for this status and trend analysis is high based on high confidence in both the status and trend determinations.
 - Status:** Confidence in the status is high based on the use of accepted and consistent data collection, storage, and analysis protocols. Monitoring and data quality control plans have also been implemented to ensure data consistency and validity (PAR

Monitoring Plan Draft, 2009). Instrumentation has advanced over the years and historical data has been recalibrated to reflect this improved accuracy. Data has been collected consistently since 1982. Lastly, the monitoring sites are considered to be adequately representative of the water body and are also used for the collection of other lake indicator data, such as temperature and Secchi depth.

- **Trend:** The statistical significance of the 1969 to 2011 polynomial trend line is considered high, with an R^2 value of 0.76. Data has been collected consistently over the last four decades, however an instrument malfunction that occurred between 1977 and 1982 required data over this time period to be omitted from the data set. The incomplete portion of the data set is now more than 30 years old and has little impact on the long-term trend.
- **Human and Environmental Drivers:** Urban and forested runoff, atmospheric deposition, and stream channel erosion are the largest contributors to the deterioration of lake clarity through nutrient and fine sediment particle pollutant loadings. Lake Tahoe is particularly vulnerable to runoff because of its naturally steep slopes, erodible soils, and most of the built environment is at lake level. Nitrogen and phosphorous accelerate the growth of algae, which, in conjunction with fine sediment particles, scatter light and reduce water clarity.
- **Monitoring Approach:** Data is collected every 7 to 14 days year-round from the Lake Tahoe Profile Index station and the Mid-lake station. Data was provided through 2011 by UC Davis Tahoe Environmental Research Center researchers.
- **Monitoring Partners:** Every year UC Davis Tahoe Environmental Research Center and the Tahoe Regional Planning Agency enter into a contractual agreement to conduct light transmittance monitoring, which is completed as part of the Lake Tahoe Interagency Monitoring Program.

Supporting Information

REFERENCES

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