Lake Tahoe Clarity Science

The Tahoe Science Advisory Council has long focused on Lake Tahoe's clarity, working closely with resource management agencies to respond as conditions evolve.

Lake Tahoe's clarity is not responding in the way the TMDL framework originally anticipated. While water quality improvement efforts such as stormwater management and watershed restoration have undoubtedly made important progress, their exact impact on lake clarity is not well understood.

In recent years the Council and its partners have converged on a coordinated approach to Lake Tahoe clarity science, organized around two focus areas: in-lake processes and watershed loading.

In-Lake Clarity Processes

The lake's biological, chemical, and physical systems are complex, and our understanding of the systems and their interactions has improved since TMDL science was first conducted. Recent in-lake process work has identified several key findings:

- Summer clarity continues to decline while winter clarity improves, pointing to different seasonal drivers
- Biological conditions, including phytoplankton community structure, nutrient limitation, and seasonal productivity, need further characterization
- Particle size distribution, aggregation processes, and temporal variability require additional data
- Shifting physical conditions, including temperature, stratification, and mixing, highlight the need for three-dimensional modeling

To better understand current conditions and explore predictive modeling alternatives, the Council held a two-day workshop in May 2025. The Council also led an independent review of the pelagic monitoring program to identify specific information needs and propose improvements.

Based on the workshop and monitoring review findings, the Council successfully advocated for and secured funding for both in-lake monitoring and modeling tasks. Enhancements to the pelagic monitoring program are underway now to support better system understanding and the next round of clarity model development.

Watershed Loading

The TMDL program's primary focus is reducing the amount of fine sediment and nutrients reaching the lake. Understanding current loading values and the efficacy of implementation investments informs future clarity modeling and guides policy and funding decisions. This topic is less developed than the Council's in-lake work and is now the focus of new investment.

The Council and its partners are building on two recent efforts:

- The Lahontan Water Board is leading a review of the Lake Clarity Crediting Program, including the Pollutant Load Reduction Model (PLRM), considering evolving climate conditions and new scientific and program understanding
- The Council is exploring options for updating loading estimates for Tahoe.

Together, these efforts provide a foundation for targeted watershed model investment to address management loading questions and inform clarity understanding.

Next Steps

Looking forward, the Council partnership is continuing to advance the clarity discussion. While new data are being collected to inform in-lake processes, the Council will direct available funding towards updating load estimates to more accurately assess restoration progress, sharpen adaptive management actions, and support the next generation of clarity modeling.