REVIEW CHARGE
Invasive Mysis Shrimp Control to Recover Lake Clarity and Ecosystem Health

Background
Researchers with the University of California, Davis Tahoe Environmental Research Center (TERC) believe Lake Tahoe's water clarity may be influenced by native zooplankton populations. Observed clarity improvements coincident with declining Mysis populations and rebounding native zooplankton in Emerald Bay led the group to apply for and receive funding to plan, test, and optimize a strategy for restoring Lake Tahoe's clarity by reducing the abundance of Mysis shrimp. Monitoring in Emerald Bay performed by TERC suggests native zooplankton have a high grazing rates that could improve clarity. According to the project scope of work, removing Mysis would allow recovery of native zooplankton and improve both clarity and overall ecological health at Lake Tahoe.

The project sought to remove Mysis shrimp from Emerald Bay and demonstrate the related water quality improvement potential. Improving lake clarity, restoring native Cladocera zooplankton populations, "climate-proofing" Lake Tahoe, and increased sport fish size were all listed as expected project benefits. TERC estimate that project success would require a 50-70% reduction in Mysis population. Quantitative project performance metrics were listed as:

1. Mysis population density based on vertical net tows and echo sounding
2. *Daphnia* and *Bosmina* population density based on vertical net tows and echo sounding
3. Secchi depth
4. Fish size data from fishing guides and net tows
5. Comparison of similar measurements from Lake Tahoe

Contract documents suggest findings from Emerald Bay would be used to develop a strategy for controlling Mysis throughout Lake Tahoe.

Review Need
Resource management agencies seek an 'independent review' (see *Tahoe Science Advisory Council Guidance for External Peer Review*) of the project findings. The policy and resource investment implications of the purported restoration approach are numerous, and agency partners need sound, peer reviewed science findings to inform water quality management decisions.

Documents for Review
Schladow, S.G., Sadro, S., Chandra, C. 2020. Invasive Mysis Shrimp Control to Recover Lake Clarity and Ecosystem Health Final Report.

Agreement CTA 17 018L – Contract between the California Tahoe Conservancy and the University of California, Davis (Exhibit A, pages 2-4).

Review Questions
1. Does the project report and/or associated analyses provide evidence that Mysis can be reduced in Emerald Bay using boat trawling and echosounder methods?

2. Does the project report and/or associated analyses provide evidence that anthropogenic Mysis removal led to subsequent increases in native Cladocera populations in Emerald Bay?

3. Does the project report and/or associated analyses provide evidence that increased Cladocera populations can improve clarity at Emerald Bay?

4. Does the project report and/or associated analyses provide evidence that the dynamics between Mysis, Cladocera, and clarity in Emerald Bay would hold true for Lake Tahoe?

5. Does the project report and/or associated analyses offer evidence that pursuing lake-wide Mysis control is a potentially successful method for improving Lake Tahoe's clarity?

Charge

As noted, this will be a traditional independent technical peer review. Two to three reviewers will be selected by the Tahoe Science Advisory Council Peer Review Committee chair. The reviewers will have no affiliation with ongoing work in the Basin and have appropriate experience and knowledge of limnology and associated food web dynamics.

The Peer Review Committee chair will send the technical product and review charge to reviewers, and each reviewer will prepare a written review responding to the review charge and questions. The technical experts will be expected to complete their individual reviews within three weeks of receipt of the documents. Incomplete or inferior reviews will be returned to the reviewer for revision.

The product will be a report compiling the reviewers' assessment of the final project report as defined by the review questions above. A report will be released to the public within four weeks after receipt of the final peer review product.

The peer review report will inform the future direction of resource management agency policy and investment decisions. In response to peer review findings, TERC will either revise the final report to address errors and/or omissions (where possible with available data), provide a simple response to comments, or reconsider the project results and conclusions.

Timeline

August 2020 – Select reviewers, agree upon process, assemble materials.
September 2020 – Conduct review and compile results.
November 2020 – Publicly release review and present initial findings to the full Council.

Personnel & Budget

Project TSAC lead: Peer Review Committee (A. Harpold, Chair)
Project agency lead: TBD
Contributing scientists: TBD
Total project allocation not to exceed: $3,500

References