

Meeting Agenda
Bi-State Executive Committee
Monday August 19, 2019
1:30 – 3:30PM
Tahoe Center for Environmental Sciences Room 141
291 Country Club Drive
Incline Village, NV 89451

Executive Committee in attendance: Brad Crowell (NDCNR, co-chair), Wade Crowfoot (CNRA, co- chair), Joanne Marchetta (TRPA), Paul Dodd (UCD), Ronald Tjeerema (for Helene Dillard) (UCD), Mridul Gautam (UNR), Kumud Acharya (DRI), Mark Sogge (USGS), Valerie Hipkins (USFS- PSW), Elizabeth Williamson (CNRA), Jim Lawrence (NDCNR), Darren, Alan Heyvaert (DRI), Geoff Schladow (UCD), David Jenkins (PS), woman next to Pacific Southwest Station USFS.

Agenda

1. Welcome, introductions, agenda review (Co-chairs)
 - Brad Crowell introduces, more attention to issues at Lake Tahoe. Looking forward to working with Wade and the discussions today.
 - Wade is super excited, glad to be in Tahoe and be a part of this meeting. Responsible for resource stewardship, all natural places. Governor is really passionate about using science, thinks this is a great entity and happy to chair. Energized by increased resources to enable more science and use that to inform management of the resource. It is critical to demo how the science is used to manage the basin. Critical role in a critical moment, we have made a great difference in Tahoe but there are challenges foremost climate change. We need leadership and science to help protect gems of the country.
 - Brad thanks Bob for helping to lead the effort. Wade also acknowledges all the work everyone is doing to help improve resource management.
 - Introductions
 - Public comment about anything about something not on the agenda, no.
2. Public Comment (Co-chairs) NO
3. Council program status update and discussion (Robert Larsen, CNRA)
 - Strong partnership between science and resource management
 - Started with Dr. Goldman, raising the alarm

- Highlight Tahoe, raise attention that brought the TRPA about.
- TMDL required both states to identify reasons for clarity loss.
- One of the most scientifically robust programs in the USA
- Evaluating the nearshore of Tahoe. Needed comprehensive monitoring plan
- Review of threshold standards
- TSAC is next iteration of partnership. 4th formal workplan to be considered. Contemplates new resources. Stable contracts in place.
- CO-chairs have stayed the same through the whole time.
- Adrian Harpold recently replaced Scott Tyler. Paul work replaced Ed Parvin this year.
- Agency science partnership is key. Members of the reps "regional managemtn teach are meeting more frequently.
- Working on Protocol document, how the council functions, roles of members, roles of co-chairs. Next coming months a draft will be available.
- Three main focuses, Threshold updates, Lake itself rapidly respnding to the alarm of the drastic change in clarity, and the forests. Forest management and health are very important. Understand how to gear management actions to achieve greatest reports.
- Wade wants to know more about the thresholds.
- Joanna adopted over 40 years ago, developing goals to measure progress and prepare regional plan to implement towards that goal. 1982 threshold standards were adopted over 150 being attempted to model.

Never been able to track all those and now they're 30-40 years old and based on outdated science.

Governing board made it a priority following the comprehensive regional planning update, systematically review all standards and bring it up to date. Incrementally prioritizing areas for updates and working with council for these updates.

- Mridul Gautam asks about the availability for public comment.

4. TRPA Threshold update - progress, next steps, and discussion (Dan Segan, TRPA)

- 2015 the governing board directed us to engage in a comprehensive update of our threshold standards. Focus of regional plan but everything we do. Establishing EIP, invested upwards of 2 bil, attaining and maintaining standards. Make sure they are achieved (develop. Regional plan, lead EIP plan which is active restoration plan). 1997 the EIP was sanctioned and kicked off to implement programs.
- Most standards are over 40 years. 9 primary categories that run the gambit of tahoe, I.e, Scenic resource quality from almost 700 viewpoints.
- Need fresh look to see that the standards are achieving what it is meant to do
- Science council is helping to drive action. Science products and then agency is in orange.
- Past three years, council helps us with something and then helps us implement it.
- Had 17s standards in 2017, that don't look anything like a standard and things that do look like standard. Assess against best practice. After that, completed assessing standards that didn't live up to standard. Then went back to the Science assessment again.
- Saw a number of opportunities to improve threshold standards. Address areas that could be enhanced and start living up to best practice.
- Mid-way through last year, we accepted 1st technical corrections and ...
- Cleaner so people have an idea of what the goals, but didn't change

- Adopted a 2nd round of technical clean-ups.
- Identified 70 standards that needed update, have only done about 12 so far.
- What should standards look like in the future. Council looked at systems around the world to find best practice of standards and management actions to work towards these standards. Lit review.
- Building off that effort the council provided specific recommendation to improve TRPA practice.
- TRPA governing board adopted that practice. No longer adopting standard that does not have baseline. Which was not the case in 1980s
- Tiering off S2A plan, looking at revisiting water quality standards today and make sure its based on the best science.
- 1st modification on the standards in 6 years, reduced (check Impact slide)
- Zeroing in common goals
- Standards in 1982 were in paragraph form. Made it clear by having a specific way to refer to specific standard, a numbering system. Focus in on the goal, what are we driving towards.
- Brad asks number of thresholds to relate to goal. How many goals?
- In old system if we have a standard that hit multiple goals it was listed multiple times. Set the goal once, clear water quality it doesn't have to live in multiple parts of the system. Each threshold standard is an independent goal,...
- Brad, these represent broader ecosystem goals. Yes.
- Are you adding more? Not yet, working on streamlining.
- Joann says it's a mix of ultimate, interim, aspirational, policy goals etc. With new standards, we are going to work through 146 and some will go into other buckets Some is data we might want to have, monitoring we might want to do. Find system that measures outcomes. At the end of this we are hoping for

25-30 as opposed to 100.

- Paul asks of the 146 how many are being monitored.
- Last year we did 100 of 172.
- Is it retrospectively, some measurable outcome.
- TRPA money contributes to about 40, other organizations
- Wade clarifies it is an ongoing process to pare down. Is there a timeline? Living update that updates over time
- Joanne says living update, something potentially updated every 5 years. Going for a more adaptive system that approaches it a more real-time. Also an affordable monitoring system, we value what it takes to monitor all standards 20? mil back in 2006. Closer to 2.5 million annually. How should we best spread these resources.
- Unknown woman, any commonality for the removed resources
- Dan says we have numeric standards like mercury shouldn't be over this amount, management based on action, and policy standards of... most that we eliminated refer to the two latter. Also removed lots of repetition, to make it more straightforward.
- Jim says moving forward over the next year. Thoughts on focus area? Vegetation, Sustainable rec? There is a large number in need of evaluation.
- Dan thinks the area with TSAC are sustainable rec with working group. 150k in budget to engage with next group over time. Develop metrics to measure
- Also measuring updates to VMT. Working with TSAC in water quality realm because 2SA plan, ensure that we have right standards in right bin.
- Forest health stand vegetation, use work to identify new standards for health.
- Bob says the science support for critical update

has been important. To see the progress that has been made.

- Wade says TRPA staff and maybe council assessed other organizations. Were there best practices from other organizations, did you learn anything?
 - Alan says it was interesting, looking at systems that manage other ecosystems. There were some commonalities, most strikingly is that everyone is struggling with the same problem. Tendency to take on too many metrics, everyone in same boat, over loaded about what to report on and manage. Many of them have looked at the Tahoe Basin and used Tahoe as the template, many quite a bit different, ours is regional management. Others are charged with managing resources. Some of the solutions are adopting smart goals. Make it specific, measurable achievable, realistic, and timebound. This has helped with Dan, finding standards that conform to that criteria. Find opportunities to work with standards to make sure they conform with these types of characteristics. What are the ideal characteristics of things being tracked etc. Those are the types of things we pulled out of that program so far.
 - Mardrig, BMP, smart tests make no sense. Measurement of load, etc.
 - Alan says bring science to bear, serve as demo for.
 - Common sense update that unfortunately takes a process to update says Brad.
 - Alan says is it still relevant for nitrogen deposition.
5. 2018 Lake Tahoe Clarity – science planning and discussion (Geoff Schladow, UCD)
- Clarity is a major motivation for the last 1-2 years. Climate because it is a major driver implementing natural and effectiveness of management actions. Come up with Science to action, what does TSAC

think the role of science should be in advising management.

- Recent trends in clarity. Overall annual clarity (standard basin lives up to), the negative trend has stopped. Has flattened up, but when broken up gains in winter, but a decline in summer.
- Decline in summer clarity, UCD regularly measuring secchi, ~25 readings a year. A linear decline varying year to year. Late 90's it flattened and might be improving.
- Near 60 foot reading lowest clarity ever measures. Lot of science and lot of money spent, why did we miss it. Reasons from that were addressed last year. Most recent reading over 70 feet.
- Winter months, show a definite improvement. Most of funding has been targeting that clarity. A lot of good work needed to trap water in detention basins. Inter annual variability still getting better and better
- 3 months of summer with every more interannual variability. But it is declining. Still not enough to say it is going to get better in the long time.
- Few of ideas of what is being looked at responsibility: range of processes not just one thing. No dominant process.
- Potential drivers: late and large snowmelt from the good old days, fine particles would bring it down to the denser, colder layers. Taken out of play. But the increasing situation of early and snow melt, means water hasn't had time to set-up no warm stratified layer. SO similar density of water, this plume of pollutants are staying closer to the surface.
- Lake is warming. Looking at surface water temperatures
- Brad asks for clarification
- It's getting warmer every year. In an average year it is less than 1% of the total amount of water in the lake.
- 1 deg celsius change in surface temp. One influence is stratification. Warmer light at top, more resistant to mixing is quantifiable. Over last 50 years, length of time of stratification has increased by almost a month on average. Lots of work looking

at future climate scenarios. Probably double over the next 50 years. We know the trajectory of change.

- Stratification changes effect multiple things. Cyclotella position in the water column, really small. Concluded main source of clarity loss is the fine particles because it interferes with light. But because of stratification. Large algae sink out, smaller have no competition and remain floating at the top of the water column. So we are seeing drop in summer clarity.
- Final driver is related to stability, deep mixing. Every year most lakes mix from top to bottom. Many years when Tahoe does not mix from top to bottom. Because of this stability, the stratification is longer, winter is shorting, so we are prone to not have mixing. Consequences that the science community still wants to explore.
- Summarize in a few bullets (TSAC vision slide) biggest role for science to play an updated numeric modeling approach, modeling tools are critical.
- We want to look at other issues. Because while clarity is great, there are other issues that are affecting clarity from year to year.
- Separate impacts from TMDL projects, climate change, etc. Food web modifications, a whole range of things that can be adopted with this modeling approach over time.
- Idea of identifying gaps in knowledge, what is missing in the models, a guide for future work and science or pointing to gaps in the data. Maybe some things we are monitoring can be scaled back.
- Brad, asks with surface temps warming and increased stratification. Even if we were 110% successful with TMDL, would it matter if it doesn't mix?
- Geoff says it does matter. One thing you can do on it. Place greater emphasis on nutrient reduction because clarity is important. But now with threat of oxygen, we reduce bio growth but greater emphasis of the nutrient availability. Anoxic spots. 2047 coldest winter. It's like buying insurance
- Madic is a murky lake an unhealthy lake? It's a different lake. Will it die?
- Geoff says Tahoe is an oligotrophic lake, think of it

- as a desert. Green murky lake represents jungle
- Brad says where is the level between an aesthetic value versus ecosystem health.
- Clearlake example, 3 feet of clarity. Clarity not a good indicator of health.
- Under most conditions clarity is an indicator.
- Brad says there will be more variance in Tahoe because of climate change. When is it time to raise an alarm? We raised the alarm two years ago? Clarity and ecosystem health. Ecosystem health levels. We could introduce water clarity by introducing quagga mussels. Do not improve clarity for clarity's sake.
- Wade says clarity as an indicator of human impact of lake. What's the optimum ecosystem health or are we going for the natural ecosystem health?
- Clear lake goes beyond, Brad wants to go past the extra effort of 80 feet of clarity if the biological resources don't change. Is it better to have better outcomes through forest investments or transportation issues.
- Geoff says this is why the modeling approach is appropriate. WE are trying to provide management agencies with the tool so you can use it to figure out where you want to go.
- Kumud says Depends on where you want to go, how far back are you trying to get that clarity to
- Bob says standard how much money do you want to spend and when is it enough? Not raised in context of TMDL? Now the conversation is understanding the system to learn whether or not the goal is achievable and under what standards.
- Madrig, you want the lake to be healthy. But what is being spent could be spent on the forest .
- Alan another consideration is the secchi is an integration indicator. Aggregate issue. Annual clarity is related to many things like nearshore. Effects are manifested in nearshore, clarity, color of water, periphyton, etc. all responding to same drivers... nutrients from streams. Not just interested in clarity, have to consider in how things are connected. Worth exploring of how things are connected.
- Kumud is clarity affected by the entire basin.

- Alan says TMDL was originally built to address. Lake clarity would then approve.
- Kumus says you have to talk about it in a 2-prong approach. You must talk about the watershed.
- Bob says things have changed dramatically with zooplankton coupled with climate change not necessarily directly related to urbanization.
- Geoff says not just the load, but where the load is going into the lake. Climate is evolving, all factors are changing, smaller load may have different impacts.
- Brad, with all climate changes showing decreased snowpack and increased rain. How does that change the loading in the lake.
- Jason says it is a good question that the science community that can help. If it's raining maybe less traction, roadway degradation.
- Brad asks Any effort in more innovative research? When to not put traction braces on, when to..
- Jason says definitely, high tech sweepers spreaders where to determine where the materials go. Now can preset to stick, sodium solution, so you don't need traction braces. Little things going a long way.
- Bob says local government has been working hard on that. But it is clear that a lot comes from roadways. Caltrans used to be 12-14 metric tons, now reduced to 1 metric ton. Seen a big shift, dramatic load reduction, importance of continuing the work, but science work needs to be done to...
- 3 biggest gaps in science knowledge? Asks Brad.
- Geoff thinks it's this modeling tool. Only practical model for the questions being answered... Getting that down is one thing. Is clarity just an aesthetic value then is it worth it? But it's not, when the lake was super clear, really clear waters allow UV penetration hard to reproduce. But with clarity loss you have a functioning group of organisms (?). How it's linked and what it would cost. Third is the 10 million for monitoring for science monitoring, new monitoring tools that are free (satellite data) product is free, the brainpower is not.
- Kumud tool being you a 1 dimensional tool, use SI3D, based on trim. Advantage is that it is free and

in the public domain and can be modified to suit the position.

6. 2019 Council work plan – review, discussion, and approval (Alan Heyvaert, DRI)

- Take opportunity that Alan and Geoff are just here representing the council many organizations and scientists in and out of the basin. Sudeep Chandra and Pat Manley also here. Not just representing a specific viewpoint, but the varying group of opinions... answering 10 really penetrating questions to give our best professional judgement. Based on scientific fact that we like to base opinion at the time. Need to address science plan. Is this a red flag or is this in the range of what we expect based on the interannual fluctuations. Apply this same approach here, so that if we are out of range we can figure out what to happen using more advanced science tools. Why we are in or out of compliance.
- Lake Science to Action is a direct result of the meeting last year. Guide our resource management of reporting. Are we out of the guidelines and if so, why. Continue to do work on TRPA threshold standards. How to improve threshold management system. Council operations.
- S2A committee (sub) develop plan to present to entire council. Identifying climate change as primary driver of change in the basin. Seeing improvement in clarity in winter but not in summer which we think it is due to climate change. New tools to develop new strategies help us inform management. List of things in 3 time scales to help report in the near-term. Addressing things in the long term. Enough advance notice to take appropriate management approaches.
- 4 dominant projects working on based on L2A science planning. 1) Analysis of summer and winter clarity divergence. Assemble all existing data and investigate probable cause and establish linkages. Product will be tech doc to explain findings and policy brief that condense science into useful management document. Make science recommendations useful to management

available. 2) Lake CLatiy. Sub models to inform lake clarity model and projections. Developed 20 years ago for the TMDL, served well, but now with changes we need better spatial representation through modeling. To these hydrodynamic and nutrient loading. 3) Evaluate landscape-scale changes. Watershed is critical to function and how it looks. Watershed is small and relatively pristine. Algal growth is really load. This has changed because the forest has changed, it was logged, second growth forest, now manage forests for fire control. Angora fire destroyed over 200 homes, large scale at the time, but now seems small in comparison. Lake Tahoe West Partnership, led by CTC and other partners to see what is happening on the west shore and the impacts on the forests. Developed scenarios, look at these and use the info developed and supplement with additional tools, and assess impacts on the lake. Only way to do this is the model to evaluate your data. Test these scenarios. 4) Annual data synthesis and assessment. WE do collect a lot of data on a myriad of metric. Over 100 metrics. This info is collected in various forms and in various timescales in different locations. It is time to intergrate this information, working in a collaboratively to assess the data and report on what it tells us. Rather than reporting a year later in bits and pieces. Integrate data and use to max value. Get scientists together, bring agency staff members, to discuss data and determine where it's going and project what are we expecting in the next 6 months, year, etc. Anticipate changes likely to occur so we can give advanced warning when we are expecting to see changes from things like a big snow year or earlier runoff. Look at data and develop tools to develop finding to give to management agencies so they are prepared to handle them.

- Brad says this last one is key to the broader...
- Alan says it's the council's attempt to keep communication open with agencies. Keep everyone informed. Understand context in which information is made available. DO you make a

distinction between management users.

- TIE steering committee, TSAC has a seat, where are we going, what progress has been made. Considering things like TRPA regional/forest plan.
- Modifying one tool over another.
- Where does the money come from?
- Alan says the council collectively identified as priority, in terms of who is doing the work, it varies. There is a synopsis in the work plan. On page 6, synopsis of each project. Funding comes from State of California (budget change proposal to bring money in this year because available in July) and federal funding leftover from SNPLMA, sold lands in the las vegas areas and some of that money came to capital/science projects in Tahoe. The leftover money is being used to fund the landscape change projects.
- Kumud asks is SNPLMA 2.0 is coming back, but maybe a few years away.
- Jim says there is a new SNPLMA funding for fuels reduction in the basin. Alan is referring to the original lake tahoe restoration act.
- Alan says the more successful projects have multiple sources.
- Threshold update, mentioned that we will continue to support as a priority. Will continue to build and support.
- Sustainable rec is a priority topic, ~25 million visits to the basin, ~ 10 million vehicles. Huge load on such a small watershed. How to manage recreation. Continue to work with TRPA for better management application.
- Council operations, continuing operations, now need to scale quality of productions. Technical peer-review committee. Some will go out to individual institutions, external peer-review. Important function for science council. Day to day operations. Ongoing technical support, workshops and collaborations for example forest health subcommittee. Haven't heard a lot of the forests yet, but we have been focused on the lake because of 2017. Now the same things to do for the forest, subcommittee led by Pat Manley develop coherent strategy for work that needs to

be done to sustain forest health and wildfire.

- Jennifer Montgomery here, working group already there. Wade says to connect with her as you are developing your plan for forest health. Maybe some good overlap. Governor's task force.
- Brad says additionally LTBMU on the subcommittee? Would it be helpful to have person on the committee.
- Pat says working with Davis, what sort of contributions we can make and what kind of testing ground. Lake Tahoe West at how to model into the future. Metric of forests health and bring that to the larger landscape. Additional research needs. Climate adaptation plan, addresses needs in the basin, prioritize needs. Great suggestions, absolutely need.
- Bob says work in council but reach out to external resources. How does the subcommittee function, make sure good coordination with forest.
- Wade says growing philanthropic efforts in basin. Make sure there is connection.
- Joanna question about work on clarity enhancement model. Do we anticipate these model enhancements will be done with this 500k.
- Bob says the first 500k is addressed to identify needs, suspect identify additional needs beyond the resources.
- Geoff says refers to 2-year effort. There will be a model produced that . Actively seek funding from other sources.
- JHoanna wants to know total cost?
- Geoff, says a 3-4 year effort. Total cost 400k over 3-4 years to do new modeling assessment tool on top of the 260k. Ballpark figure.
- Alan says using what we have, will not be an orphan product. Better predictions that address critical gaps in the syste,
- Geoff says the approach with the existing framework what still can be used with modification. Trying to be conservative, frugal, and smart.
- Bob says these are rough framworks for costs. It willg et more specific once contracts are inplace. Steps needed to take to get resources on the ground. General concepts that we hope to

achieve. If there is one that can use less it will be re-allocated to other.

- Pat says we have Lake Tahoe restoration, has yielded robust resource for upland watershed. Folks understand we are not starting from scratch over a million dollars has built up from scratch. Moving along for how it ties into other things that have come up today.
- Bob says regional management team, executive committee sitting here. CO-chairs, Ilzzy Williamson, Jason, Joanna, Patrick Wright. It is not exclusive, just starting team WE will make sure the appropriate reps in the room.
- Wade says surprised and concerned about 2017 clarity, led to a need to understand impacts of clarity based on climate change. Now we solidify what is impacting water clarity and that's where the modeling comes in. Then we see how we can control issues for management. Is modeling actionable science? Understand how we are going to affect clarity?
- Bob says yes, that's correct. Determine actionable science. Solid programs in place now, looking at new existing science to see if changes need to take place we can address. Understand fundamentals to see how we are changing things. Hopefully real-time. Making sure we have info in hand to make informed decision. TMDL has adaptive process to see what changes need to be made.
- Alan adds, you are looking at a few different scales of how things are being developed, ongoing assessment and reporting to TMDL management. Inform near-term management decision. No way to anticipate long-term changes without modeling, which is why we have a time-scale approach.
- Madrigal says you have info about data on runoff, etc. is the information available now?
- Geoff says the current and future model is a subset of embedded models. One is atmospheric produced largely by Caltrans. Anticipates in this review, it will be one that is ripe for update. Things have changed, efficiency of autos has changed, etc. one of the things not on the immediate list for the

next two years but it is on the list.

- Bob looking for approval for work plan. NO official vote needed, previously silence is acceptance.
- Brad says fine with silence is consent. Thanks everyone, Geoff and Alan continuing to co-chair. If there are folks that want to step in, but otherwise happy to keep them on board. Thresholds, lake and forests seem right. Make sure that it is integrated as long as it's all brought together. Nevada is under new administration, Californai historically puts more money, per capita basis etc. Lots of effort from Jim and himself approximately 140K to put forward to support science, tmdl, and gaps. Brad is hopefully to find new revenue sources as well. Looking for opportunities from state or elsewhere to put forth. Think about adding to executive meeting the director of LTBMU, thinks this is a gap. Bi-state consultation on transportation, driver of environmental impacts, complimentary effort keep in mind how all this fits together. With Sustainable rec, critical to look at, places over loved. Last legislation session, new division without ourdoor rec, part will be on sustainable rec. Hope this will add valueu to the sustainable rec. Seems like we are in a good place since we moved forward two years ago.
- Wade says excited to learn. 2 decade enjoying but not understanding. Govenor trying to understand more of Tahoe before he gets here tonight. Excited with all the partnerships. Got a good work plan for the next year, our agency with Lizzy and Wade are going to be really engaged.
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7. Public Comment (Co-chairs)