

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 Thome (USGS), Alan Heyvaert (DRI), Geoff Schladow (UCD), David Jenkins (USFS-PSW)

Agenda

1. Welcome, introductions, agenda review (Co-chairs)
 - Brad Crowell starts with the intention to bring more attention to issues at Lake Tahoe. Looking forward to working with Wade and all 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 Larsen for helping to lead the effort. Wade also acknowledges all the work everyone is doing to help improve resource management.
 - Introductions all around
2. Public Comment (Co-chairs) NO
3. Council program status update and discussion
(Robert Larsen, CNRA)
 - Strong partnership between science and resource management
 - Dr. Charles Goldman brought the highlight to Tahoe and raise attention that eventually brought the TRPA about.

- The TMDL program (one of the most scientifically robust programs in the USA) required both states to identify reasons for clarity loss.
- Recently the partnership has been evaluating the nearshore of Tahoe. It needed comprehensive monitoring plan to determine how to assess the nearshore.
- Review of threshold standards.
- TSAC is next iteration of the science-resource management partnership. A 4th formal work plan 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 from UNR. Paul Work replaced Ed Parvin this year from USGS.
 - Agency science partnership is key. Members of this group are meeting more frequently, increasing community-science engagement.
- 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
 - The lake itself rapidly responding to the alarm of the drastic change in clarity and the forests.
 - Forest management and health are very important. Understanding how to gear management actions to achieve greatest results.
- Wade wants to know more about the thresholds.
- Joanna explains that these were adopted over 40 years ago, developing goals to measure progress and prepare regional plan where the implementations worked towards that goal. In 1982, over 150 threshold standards were adopted and 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 to systematically review all standards and bring it up to date. Incrementally prioritizing areas for updates and working with council for these updates.
- Mridul asks about the availability for public comment and publishing of review? Yes, different levels of approval from different groups are available.

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. Entire purpose of TRPA is to maintain these

thresholds. Focus of regional plan but everything we do. Also establishing standards of Environmental Improvement Plan (EIP), invested upwards of 2 billion over the last 20 years aimed at attaining and maintaining standards. Make sure they are achieved through the development of a regional plan, make sure it is compliant, lead EIP plan which is active restoration plan. In 1997, the EIP was sanctioned and kicked off to implement programs.

- Most standards are over 40 years old. Nine primary categories that run the gambit of Tahoe, i.e. Air quality, recreation, scenic quality resource from almost 700 viewpoints.
- These needed a fresh look to see that the standards are achieving what it is meant to do and see if it is bound by the best science.
- Science council is helping to drive action. Science Council products are being then compared with agency action.
- Past three years, council helps us with something and then helps us implement it.
- Had 170 standards in 2017, that didn't look anything like a standard and things that do look like standard. Assessing the science against best practice. After that, TRPA completed that assessment and identified standards that didn't live up to the best practice. Then went back to the Science Council to find out if we answered questions correctly, needed validation from the council.
- Council saw a number of opportunities to improve threshold standards. Had a series of recommendations that addressed areas that could be enhanced and start living up to best practice.
- Mid-way through last year, we adopted 1st round of technical corrections and reorganization of standards overall.
- Cleaner so people have an idea of what the goals, but didn't change the overall protection of the system.
- Earlier this year, TRPA adopted a 2nd round of technical clean-ups. Of the 170 there were 70 standards that needed update because of overlap. Have updated about 30 in the first go.
- What should standards look like in the future? In 2017, the Council looked at management systems around the world to find best practices of standards and managing these actions to work towards these standards. This was a major lit review.
- Building off that effort the council provided specific recommendation to improve TRPA practice for adaptive management in the basin.
- TRPA governing board adopted that practice for future thresholds. No longer

adopting a standard that does not have baseline. Which was not the case in 1980.

- Tiering off S2A plan, looking at revisiting water quality standards today and make sure it's based on the best science and practices.
- 1st modification on the standards in 6 years, only the 5th modification of standards since original adoption, down to 146 standards.
- Zeroing in on what is important and what are common goals.
- Standards in 1982 were in paragraph form. This made this unclear as to exactly what a standard was. Made it clear by having a specific way to refer to specific standard, adopted a numbering system, and is now clearly numbered. Focus in on the goal and what are we driving towards.
- Brad asks number of thresholds to relate to goal. How many goals?
- In old system, if we have a goal that a standard that hits multiple goals it was listed multiple times. Set the goal once, for example clear water quality doesn't have to live in multiple parts of the system. Working towards simplifying goals. Each threshold standard is an independent goal.
- Brad asks if these represent broader ecosystem goals. Yes.
- Are you adding more? Not yet, working on streamlining at this point
- Joanna says it's a mix of goals: ultimate, interim, aspirational, and policy goals. With new standards, we are going to work through 146 and some will go into other buckets. Some is data that you might need, some are interim performance standards or other goals we might want to have or monitoring we might want to do. Find system that seeks to measure 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 30-40, others are the result of partners in the basin.
- Wade clarifies it is an ongoing process to pare down. Is there a timeline? A 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 in more real-time. Also an affordable monitoring system because we value (\$20 million) what it takes to monitor all standards. Budget is closer to 2.5 million annually. How should we best spread these resources?
- Is there any commonality for the removed standards?
- Dan says we have three main types of standards that are numeric standards

like mercury shouldn't be over this amount, there are management standards directed to some goal or action and policy standards that are aspirational. Most that we eliminated refer to the two latter that didn't have a way for us to measure objectively. Also removed lots of repetition, to make it more straightforward.

- Jim says moving forward over the next year. Thoughts on focus area? Vegetation, sustainable recreation? There is a large number in need of evaluation. What are your thoughts on focus areas going into the next year?
- Dan thinks the area with TSAC are sustainable rec with working group. \$150k in budget to engage with that group over next year. Develop metrics to measure recreation experience.
- Also actively engaged in updates to VMT standards. Working with TSAC in water quality realm because that's the focus of the Science to Action (S2A) plan, ensure that we have right standards in right bin.
- Forest health stands (vegetation) especially with the Tahoe WEST working group, use work to identify new standards for forest health.
- Bob says the threshold area has been very important and science support for this critical update has been important. It has been great to see the progress that has been made and is moving forward.
- Wade says TRPA staff and maybe council assessed other organizations. Were there best practices from other organizations, did the team gain insights from other resource management groups?
- 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 are quite a bit different, ours is regional planning and management. Others are charged with managing resources. Some of the solutions are adopting smart goals. Make it specific, measurable, achievable, realistic, and time-bound. This has helped with Dan, finding standards that conform to that criteria. Find opportunities to work with these special standards to make sure they conform with these types of characteristics. What are the ideal characteristics of things being tracked for things like sensitivity? Those are the types of things we pulled out of that program to inform what we have done so far.
- Mridul says that Dan talked about BMPs, why BMPs? The smart tests make no sense. Measurement of load, etc.

- Alan says bring science to bear and improve management. If we are successful here, we will serve as demo for other programs around the country.
- Common sense update that unfortunately takes a process to update says Brad.
- Alan says extensive study looking at BMPs and how things have changes since they were initiated. It is still relevant for different things like nitrogen deposition.

5. 2018 Lake Tahoe Clarity – science planning and discussion (Geoff Schladow, UCD)

- Clarity is a major motivation in council work for the last 1-2 years. The Council has found that climate is a major driver implementing both natural response and effectiveness/ineffectiveness of management actions. Came up with Science to Action (S2A) vision, what does TSAC think the role of science should be in advising management agencies.
- Three topics include recent trends in clarity. Overall annual clarity (the standard which the basin lives up to), the negative trend has stopped. Has flattened up, but when broken up, there are gains in winter, but there is a decline in summer.
- Looking for drivers of the 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 was 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 inter-annual variability. But it is declining. Still not enough to say it is going to get better in the long-term.
- Few of ideas of what is being looked at responsibility: a whole 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 is staying closer to the surface.
- Lake is warming. The changing in surface water temperatures is an effect from climate. Run-off temperature does not affect Tahoe, is less than 1% of the total amount of water in the lake.

- 1-degree Celsius change in surface temp. One influence it is exerting 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 doable 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 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, is it all for naught? Would it matter if it doesn't mix?
- Geoff says it does matter. What can you do about it? One thing you can do is place greater emphasis on nutrient reduction because clarity is important. But now with threat of oxygen, we reduce biological growth to greatest extent possible and put greater emphasis of the nutrient availability. There are anoxic spots and then 2047 coldest winter. The idea of TMDL didn't consider oxygen this of it like buying insurance for when it has the ability to mix.
- Mridul 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 a jungle or a tropical area. If you're a bass fisherman you want a green murky lake.

- Brad asks is there a point at which clarity level goes from an ecosystem indicator to an aesthetic value? Where is that?
- Example: Clearlake has a Secchi value of about 3 feet of clarity. Clarity is not a good indicator of health here. Under most conditions clarity is a good indicator. Somewhere between the 70+ feet and the 3 feet it might not be a useful indicator.
- Brad says there will be more variance in lake clarity because of climate change. When is it time to raise an alarm? We raised the alarm two years ago? Was it necessary in terms of clarity and ecosystem health? Where is the sweet spot between the two?
- Geoff says we could introduce water clarity by introducing quagga mussels. You would improve clarity but ruin ecosystem health. Do not improve clarity for clarity's sake.
- Wade asks if clarity is an indicator of human impact of lake? It becomes less clear with greater impact. What's the optimum ecosystem health? Seems like we are going for the natural ecosystem.
- Clear lake goes beyond what the baseline ecosystem threshold; Brad wants to know if we go past the extra effort of 80 feet of clarity and if the biological return is minimal, maybe efforts should go into forest resources. Is it better to have better outcomes through forest investments or transportation issues?
- Geoff says this is why the modeling approach is appropriate and what we are hoping will answer. If you want 100 feet of clarity this is what it will take. 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 It 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? That question was 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 circumstances.
- Mridul, 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 integrating indicator. Integrating a lot of factors, it is an aggregate issue. Annual clarity is related to many things like nearshore. Lots of changes in mid-lake that people don't see but these effects are manifested in nearshore, clarity, color of water, periphyton, etc. All responding to same drivers like amount of nutrients from streams. Not just interested in clarity, have to consider how things are connected. Worth

exploring in the context of how things are connected.

- Kumud is clarity affected by the entire basin. Hasn't the watershed been changing?
- Alan says TMDL was originally built to address this. Lake clarity would then improve.
- Kumud says you have to talk about it in a 2-prong approach. Can't just talk about the lake you must talk about the watershed.
- Bob says everything is different and things have changed dramatically with things like zooplankton coupled with climate change that is not necessarily directly related to urbanization.
- Geoff says TMDL is just about the load, but it is not just the load, but where the load is going into the lake. Climate is evolving, all factors are changing, a smaller load may still have disproportionate 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 with. If it's raining maybe less traction, roadway degradation, more run-off etc. It's a really good question.
- Brad asks Any effort in more innovative research management practices? When to not put traction braces on, when to street sweep, etc?
- Jason says definitely, high tech sweepers/spreaders really target where the materials go. Now can pre-wet it to stick to the road, sodium solution, so you don't need traction braces and less retrieving efforts. It is little things going a long way.
- Bob says local government has been working hard on that. But it is clear that a lot of fine particles come from roadways. Cal trans used to be 12-14 metric tons, now reduced to under a 1 metric ton. Seen a big shift, dramatic load reduction, importance of continuing the work, but acknowledge that science work needs to be done to better understand what the drivers are.
- 3 biggest gaps in science knowledge? Asks Brad.
- Geoff thinks it's this modeling tool. Only practical model for the questions being answered. The changes we are advocating for now would have taken six months to run a 3-year simulation, that is no longer the case. Getting that down is one thing. Is clarity just an aesthetic value then is it worth it? But it's not, understanding that when the lake was super clear, the connection was AIS. There were no AIS and the really clear waters allow UV penetration made it hard for organisms to reproduce. But with clarity loss you have a functioning group of organisms and the micro-environments. How is it linked and what is

the cost? Third is the 10 million for monitoring to be used for science monitoring. There are a lot of new monitoring tools that are free (for example, satellite data) where product is free, but the brainpower is not.

- Kumud asks about the tool. The tool being used is a 1 dimensional tool, using SI3D, based on trim. Advantage is that it is free and in the public domain and can be modified to suit the conditions.

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, this is a joint effort of everyone on the council. We were tasked of answering 10 really penetrating questions and to give our best professional judgement. Need to address science plan for assessing conditions in the lake so that we can know, is this a red flag or is this in the range of what we expect based on the inter-annual fluctuations? How do the TMDL ranges fit in these ranges? Apply this same approach here, so that if we can answer questions about why we are out of range and we can figure out what to happen using more advanced science tools.
- This work plan represents and does an assessment of what is needed to provide that functionality and where the S2A is informing management.
- Lake S2A is a direct result of the meeting last year. To guide our resource management of reporting why we are in or out of compliance. Are we out of the compliance and if so, why?
- Three years ago we were charged with looking at improving threshold management system. We continue to do work on TRPA threshold standards. How to improve threshold management system?
- Finally, council operations.
- S2A committee developed a plan presented to 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 and for addressing things in the long term. Enough to anticipate and provide advance notice to take appropriate management approaches.
- 4 dominant projects working on based on S2A science planning. 1) Analysis of summer and winter clarity divergence. Assemble all existing data and investigate what probable causes are and establish linkages. The product will

be in the form of technical documents that explain findings and a policy brief that condense science into useful management document that make science recommendations useful to management available. 2) Lake Clarity models for assessing what will happen in the immediate and long-term. There is a number of sub models to inform lake clarity model and projections. Developed 40 years ago for the TMDL, served well, but now with changes we need better spatial representation through modeling of what is happening with the hydrodynamics in the lake. How is biology responding to these hydrodynamic and nutrient loading? 3) Evaluate landscape-scale changes on Lake Tahoe. Watershed is a critical factor to function and how it looks. Lake looks clean because watershed is small and relatively pristine. That has changed, algal growth is really a 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 many homes, large scale at the time, but now seems trivial in comparison. Lake Tahoe West Partnership, led by CTC, PSW-USFS, and other partners to see what is happening on the west shore in terms of climate change, the impacts on the forests and what management practices are available to manage change. Developed forest management scenarios, look at these and use the info and data developed and supplement with additional tools to assess impacts on the lake. Looking at long sections of the west shore and what changes you expect to see. Only way to do this is to model to evaluate your data and use these models to test these scenarios. 4) Annual data synthesis and assessment. We do collect a lot of data on a myriad of metrics. This info is collected in various forms and in various timescales in different locations. It is time to integrate this information, take it as a contemporary basis so that when data comes in, we are working in a collaboratively to assess the data, analyze it, and report on what it tells us. Rather than reporting a year later in bits and pieces. Integrate data and use it to the maximum value. Collect data as it has been done, 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, develop statistical models 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 success.
- Alan says it's the council's attempt to keep communication open with agencies. On-going basis in real-time to keep everyone informed. Understand

context in which information is made available.

- Do you make a distinction between management users?
- Fortunately we have a real robust partnership. TIE steering committee, TSAC has a seat, we meet monthly and deliberate where are we going, what progress has been made, what gaps are there, how do we plan for the next month/year? Considering things like TRPA regional/forest plan, how do these come together? We are there for informational purposes but we can work collaboratively.
- Modifying one tool over another.
- Where does the money come from? How do you determine where funding goes?
- Alan says the council collectively identified these projects as priority, in terms of who is doing the work, it varies. There is a synopsis in the S2A document. On page 6, there is a synopsis of each project. Funding comes from State of California (they passed a budget change proposal to bring money in this year became available in July) and federal funding leftover from SNPLMA, a program that 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-scale 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 someone was asking about our findings from other programs, one important finding was that the more successful projects have multiple sources.
- Threshold update initiative, mentioned that we will continue to support as a priority has had a lot of success and we will continue to build and support.
- Sustainable recreation threshold is a high priority topic for this coming year, ~25 million visits to the basin, ~ 10 million vehicles. Huge load with substantial impact on such a small watershed. How to manage recreation?
- Finally, continue to work with TRPA for better management application.
- Council operations, continuing operations, now need to scale the productions. Technical peer-review committee plays an important role. Some products will go out to individual institutions or external peer-review. Important function for science council. Day-to-day operations including 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 questions. Now the same things for S2A

water quality are slated to be done for the forests, subcommittee led by Pat Manley to develop coherent strategy that identifies priorities for work that needs to be done to sustain forest health and wildfire.

- Wade says check out the Governor's forest task force, specifically Jennifer Montgomery with the science/forest health working group already there. Connect with her as you are developing your plan for forest health. Maybe some good overlap.
- Brad says additionally LTBMU on the subcommittee? Would it be helpful to have a representative on the committee?
- Pat says working with UC Davis, determining what sort of contributions we can make and it can be kind of a testing ground for ideas. Lake Tahoe West is first opportunity at how to model into the future. Metric of forests health and bring that to the larger landscape. Definitely additional research needs particularly in Tahoe. Climate adaptation plan, addresses specific needs in the basin, prioritize needs. Yes, great suggestions and an absolutely need.
- Bob says there is a lot of work within the council but we are working to reach out to external resources. How does the subcommittee function and make sure good coordination with forest efforts?
- Wade says growing philanthropic efforts in basin. Make sure there is connection.
- Joanna asks a question about work on clarity model enhancements. Do we anticipate these model enhancements will be done with the existing \$500k?
- Bob says the first \$500k is being allocated for major tasks to address the and identify needs. Suspects that once additional needs are identified beyond the current resources.
- Geoff says refers to 2-year effort. There will be a model produced that will aide actively seek funding from other sources or extending sources.
- Johanna wants to know total cost?
- Geoff, says a 3 to 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, it will not be an orphan product and enhancements will allow better predictions that address critical gaps in the system.
- Geoff says the approach is with the existing framework what still can be used with modification. Trying to be conservative, frugal, and smart.
- Bob says these are rough frameworks for costs. It will get more specific once contracts are in place. 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 research resource for upland watershed. Understand that we are not starting from scratch, over a million dollars has built up from scratch. It is moving along available if people are interested in how it ties into other things that have come up today.
- Bob says regional management team and executive committee sitting here. Co-chairs, Lizzy Williamson, Jason Kuckniki, Jim Lawrence, 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 need to solidify what is impacting water clarity and that's where the modeling comes in. Ultimately, that will help us understand what and should be under our control for lake clarity. I like S2A, I get worried about modeling and wonder, is modeling actionable science? What I learned is the important need for fundamental understanding. Understand how we are going to affect clarity.
- Bob says yes, that's correct. Determine actionable science. There are solid programs in place now, looking at new science in the context of actionable science to see if changes need to take place that we can address. Understanding fundamentals to see how we are changing things. To make informed decisions hopefully in real-time. TMDL has adaptive process to see what changes need to be made and is a great foundation and forum.
- Alan adds, you are looking at a few different scales of how things are being developed, ongoing assessment, and reporting to the TMDL management. Really to inform the near-term management decision. No way to anticipate long-term changes without modeling, which is why we have a time-scale approach.
- Mridul, says you have information/data on runoff. Change over the years, is the information relevant and available now?
- Geoff says the current and future model is a subset of embedded models. One is atmospheric produced largely by Caltrans (2002-2003). Anticipates in this review, it will be one that is ripe for updating. Things have change, efficiency of autos has changed, etc. one of the things that is 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, as previously done, 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, California 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, that is a driver of environmental impacts, complimentary effort. Keep in mind how all this fits together. With sustainable recreation, this is critical to look at, places are over loved. Last legislation session, new division without outdoor recreation, part will be on sustainable recreation and soon up and running. Hope this will add value to this issue. Seems like we are in a good place since we moved forward two years ago.

- Wade says excited to learn. Two decade enjoying but not understanding. Governor 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)