

Meeting Notes  
Tahoe Science Advisory Council

Wednesday November 28, 2018  
10:00 AM – 2:00 PM

Tahoe Center for Environmental Sciences, first floor Rm 119  
291 Country Club Drive  
Incline Village, NV 89451

**Participants:** Scott Tyler (UNR), Alan Heyvaert (DRI), Geoff Schladow (UCD), Max Moritz (UCSB), John Melack (UCSB), Joshua Wilson (PSW), Ramon Naranjo (USGS), Paul Work (USGS), Zach Hymanson (CNRA), My-linh Nguyen (NDEP), Alison Toy (UCD), Bob Larsen (LRWQCB), Dan Segan (TRPA), Bryan Cash (CNRA), Jack Landy (USEPA), Jason Kuchnicki (NDEP), Patrick Wright (CTC)

**Meeting Summary**

1. Science Council Operations (Pages 2-3): The Council agreed to continue its bimonthly meeting schedule in 2019. The next Council meeting is January 11, 2019. The January meeting will include a discussion of future Council direction. The Council's 2019 travel reimbursement fund of \$2,500 was approved. A new contract between UCSB and TRPA was finalized. This contract will allow UCSB scientists to receive funding if they participate in a substantive project. Zach Hymanson's time as the Council's Program Officer ends on December 31, 2018. Efforts are underway to back-fill this position.
2. Substantive Projects Update (Pages 3-4): Alan has substantially completed the products from the Data Specifications for Use in Adaptive Management Project. Minor editing of the final report is underway. Initiation of the Upper Truckee Decision Support Framework project has been delayed to February 2019. Work on this project will extend into summer 2019. The Peer Review Committee has not received any requests for review. A Peer Review Guidance document is under development. Council members are continuing to work on proposals and other details need to initiate two SNPLA-funded projects: one dealing with sustainable recreation, and the other dealing with landscape-level effects on Lake Tahoe ecology.
3. Lake Clarity Science to Action work plan (Pages 4-17). A Council subcommittee has prepared a first draft of the Science to Action plan. The draft plan was discussed in two meeting segments: first with Council members, and second with Council members and agency representatives. Individual remarks and observations are provided in the detailed meeting notes.

## Meeting Notes

### 1. Welcome, agenda review, introductions (Alan)

Alan welcomed the meeting participants, and reviewed the agenda. All participants introduced themselves. Alan noted that the Lake Clarity Science to Action Plan will be the main topic of discussion.

### 2. Council Operations (Various)

#### a. 2019 Council meeting schedule

All attendees agreed to stay with this bimonthly meetings schedule; however, a regular meeting date was not set. The next Council meeting was set for Friday January 11, 2019, 10 AM – 2 PM. (ACTION)

#### b. January meeting agenda

Several items were identified as potential topics for the January meeting: 1) A discussion with Darren Thom (USGS) about preparing a list of priority science projects for LTRA funding; 2) Update on CA and NV administration appointments, and CA budget; 3) Environmental Improvement Program revision/update; 4) Special topic presentation from one or more Council members; and 5) Continuing discussion of the Lake Clarity Science to Action Plan. Alan and Geoff will prepare an agenda for distribution in early January. (ACTION)

#### c. Council funding and contracting

The Council's 2019 travel budget was approved. Up to \$2500 in travel reimbursements is available for all Council members who request reimbursement to attend regular Council meetings, or special meetings and workshops organized by the Council. The reimbursement process remains the same through TRPA.

A new Contract between TRPA and UCSB is in place. The contract will support John Melack's work on the Upper Truckee River decision support framework. There is still no contract for PSW. Josh requested an off-line discussion with Zach after the meeting for more information. (ACTION)

#### d. Back-filling for Zach's duties

Zach's work with Council officially ends December 31, 2018. The intention was for the CA Tahoe Conservancy to fill a new position before the end of the year. 50% of this position's effort would be dedicated to supporting the Council. However, filling this position has been delayed. Nevada officials are investigating the potential for a new revenue stream that could provide NV state funding to the Council and the support position Zach has occupied. Nevada officials have requested that California hold off on recruiting for this position until it is determined if this funding will become available. Zach has been working with TRPA and Natural Resources Agency representatives to get all contract and administrative matters completed, so the Council should be able to continue normal operations at least through June 2019.

Geoff asks what the plan entails between the state of NV and CA for Zach's replacement. Zach says the proposed idea is for share funding for a full-time position. Zach has averaged about 15% time over the period he has worked with Council. Geoff notes that funding a full-time position would require about the same amount of money as the Council now receives annually from CA (i.e., \$150K). Geoff thinks it's a bad idea to dedicate a full-time State position to support the Council. He would like to maximize the amount of funding available to support additional science work, and minimize the funding for a support position.

Alan says he wants to see a proper balance between Council administration, and support for substantial work by the members. This deserves more deliberation. How the Council functions in the future also is something we want to consider. We have spent the last two years becoming established, but the Council's work has been in response to agency-identified priority topics, for the Council to address expeditiously. Alan believes there is more that the Council could do and agencies would like to see this, i.e. greater return on investments, more interactions. How do we do this? We need to discuss this internally, there is limited bandwidth, and we all have lots of other responsibilities. Alan would like to have further discussions with the Council: what options or approaches are available to the Council in the next couple of years. Just thinking ahead strategically. Zach suggests this could be an agenda item for the January meeting. Alan agrees. (ACTION). It was noted that the MOU establishing the Council is on the Council web site. All members were encouraged to review the MOU.

e. New work orders

Zach mentioned the work order to evaluate decision support systems for the TRPA Threshold Evaluation System is yet to be prepared. Alan and Pat have indicated they will lead this effort. Alan says this has been put on the back burner, while higher priority things get going. It is the next priority. Now that Josh is here we can speak directly to some of the elements we want.

Alan asks how will phase 2 of the Science to Action work proceed in Zach's absence? The current work order only covers phase 1, which ends in January. Zach will work with Alan and Geoff to prepare the phase 2 work order, and obtain the proper approvals. (ACTION)

**3. Substantive project updates<sup>1</sup>:** Status and next steps (Various)

- Data specifications for use in adaptive management. Alan says the substantive work is done, but he wants to make a few changes after the thresholds working group meeting. He will finish the report in the next couple of weeks. Once completed, he will send it to Council members and Alison for posting on the Council website. (ACTION)
- Geoff says the start of the Upper Truckee project has been pushed to occur February - June because of the Lake Clarity Science to Action project. John asks to clarify: the work by the subgroup was supposed to end by June and then iterations with the agencies after that. The planned activities extend through August, main document needed to be done before that. Geoff thinks that's correct. Meetings with agencies occurring throughout the period, and at some point, it will be taken to the UTRWAG. That is all

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<sup>1</sup> Active projects: 1) data specifications for use in adaptive management (lead: Alan); 2) Decision support framework for the UTR (lead: Geoff)

phase 1 work. The second phase would focus on testing the conceptual model, and prove it produces new and meaningful information to managers. In phase 2 the conceptual model would be codified into decision support tool. John just wanted to confirm that after June there will be interactions with agency members and stakeholders that will decide the usefulness. Geoff agrees, at some point and time they will sign off and say whether it's useful or not.

- Alan suggests we consider finalizing these projects in advance of the 2019 Tahoe summit. The Council will need time to get the notice out, set up relationship with agencies, and advocate for support. Zach also notes communicating these products will be important for the executive committee meeting.
- Dan Segan mentioned SNPLMA secondary list science projects that Council representatives are spearheading. Dan says Devin Middlebrook has reached out to USFS about funds for sustainable recreation for Council work. \$175K might be coming to the Council for this project. There is an internal document that outline what the tasks might entail. Alan clarifies there are actually two projects, the sustainable recreation project is further along, because we are using the initial work plan that was part of a TSAC project. Alan provides further details for the group: two science projects were selected to receive Southern Nevada Public Lands Management Act (SNPLMA) leftover funds: one project covers the subject of sustainable recreation, and the other covers the topic of landscape scale interactions between watershed functions and Lake Tahoe ecology. Both are in the final stages of approval. So a total of about \$400K might be coming in to support both projects. The project leads will need to work with USFS to get documents set-up. These projects are likely to start in 2019, but that may depend on what comes out of the Science to Action plan.
- Scott mentions that the Peer Review Committee (PRC) is ready. Zach will send Scott a peer review guidance document in early December. This document will specify the PRC functions and processes. (ACTION)

#### **4. Lake Clarity Science to Action plan (Geoff/Alan)**

The subcommittee's draft plan was discussed in two meeting segments: first with Council members, and second with Council members and agency representatives. Individual remarks and observations are provided for each segment.

##### **a. Discussion with Council members**

- Geoff began the discussion by reminding everyone that a subcommittee has been established to develop this plan. The subcommittee is comprised of Alan, Zach, Mike Dettinger (USGS), Ramon, Geoff, and Steve. The group met in September to discuss the approach, review existing efforts, begin development of a conceptual model, and identify initial recommendations. Ultimately they need to organize all this information in a way that is meaningful to agency representatives. Thoughts and comments from Council members are summarized below.
- Alan reviewed the work order: Subcommittee largely consists of existing water quality experts with exception of UNR. There are two phases of work. Phase I (the current effort) aims to develop an initial framework with recommendations for both short- and

long-term science efforts to improve the information base. Today, the subcommittee is looking for feedback on the overall approach, to make sure that we haven't missed anything, not misrepresenting anything, and all perspectives have been represented before we bring the agency members back in. Is it honest in terms of scientific representations, what we think is necessary. Want to develop a report that is directly relevant to the topic. After feedback from Council members we will bring in the agency representatives to hear their feedback. We will use the comments today to revise the draft plan. Phase I wraps up in January, and that product will be presented to the resources agencies and the TIE steering committee. Then in Feb – June bigger workshop on how to implement the recommendations. A final draft plan also will go out to external peer-review. This second phase will wrap up in June.

- Zach asks if the document that comes out from Phase 1, is a Council document or a subcommittee document? If it is a Council document, then we need to include time for Council review and official support. You also may need more iterations with the agency folks.
- Geoff and Alan think the plan should be a Council document. If there is a dissenting opinion it would be noted. The document that was sent out is a starting point that really reflects the subcommittee's discussions. Now is one of the times to obtain Council input.
- John Melack notes that it's clear there's a lot of activity going on, but the key is that the data is not being fully integrated or analyzed, that's the message that needs to be made. Unless data is being synthesized there's a lot of lost value.
- Geoff agrees, monitoring has been going on for decades, there was once a scientist Bob Leonard who stayed on top of all the monitoring. However, there has been an increasing gap between what's being funded and what's needed, as the funding has not changed or even declined, and costs have increased. It is time to have a funded data person, a PhD scientist who can regularly analyze the available data.
- Alan agrees. This is a great point, and it was not made in the subcommittee's draft document. We should identify this as a critical need.
- Ramon asks why this analytical need come to the Council? Someone has to do it. Alan notes the Council could initiate, but the council doesn't have the bandwidth to take this on. There's a lot of hands-on work required of the data. It is a big effort and require substantial funding.
- Is there any cross walk between item a1 and b1? Impacts on lake clarity. What existing efforts are happening? Do they want other metrics? Do they only want to monitor what is having the biggest impact, clarity in particular?
- Geoff finds science by committee doesn't really work. Everyone is great at responding to review etc. but a committee is not the right way to analyze a data set. Alan saying council can oversee that someone is actually getting the data and doing the analysis and getting it to the council. There is general agreement.
- Geoff and his team do a great job with the State of the Lake report, but it's a different document, and there is interest in keeping it separate. Are our current programs working? We keep on collecting data that could inform our models, but there's no one performing analyses to see if the data is in agreement with our model. That's where

there is a whole. Alan says the document is aimed at plugging the holes in the basin's data collection and analysis efforts.

- Geoff says the subcommittee came down to 3-4 primary areas of focus. Agencies felt like they were blindsided last year with the clarity loss due to years of drought followed by massive wet winter. So we are recommending an increased reporting effort that would happen in spring each year. Bringing people from the National Weather Service and local scientists. Have a half-day meeting to come up with a briefing for what the expected outcomes are for the remainder of the year. Part of this briefing is looking at past data, clarity metric went this way and that's dependent on this factor. They also could consider what long-term outcomes may occur based on statistical output. This could help inform the rate at which the present is parting from the past.
- John's concern is the science issue, this is a forecast, snow survey does this for water. Making a forecast implies that we can make a forecast and it is a quantitative process with a specific amount of uncertainty. Do you think we can actually do this?
- Geoff notes there was a previous paper that discusses this point, but speaks cautiously because it may not get funded. If it's a value to them then they will fund it. It will either work or not.
- John says there's other statistical methods in forecasting. Just wants to make sure that we still need analysis done to have this briefing. New analysis done to complete this briefing. Right now it says that we just need to come up with the forecast.
- Geoff envisions the experts sitting around the table will come up with what they think will happen, but what we need is an established statistical approach for looking at the data. Maybe we should lay this out as those two extreme for Agencies to consider?
- Alan says this would be built to be operational in its first year, but then improved on year after year. Track sensitivity of estimating important factors and variability. The background work for these kinds of things has to be done to inform the workshop.
- Geoff says the typical approach taken is a regression type approach, year after year re-examining. We are looking for something more sophisticated. Alan thinks this more sophisticated approach will need to be a long-term approach.
- Ramon says this spring forecast is meant to be a timely analysis and heads-up to what conditions may come in the summer. Forecasts will not be timely as you add more complex models, you will get an increase in uncertainty because it is based on limited data. These are just broad ideas of how you would do it and how well it would work in the future.
- Scott asks is this the opportunity to say that this paper from 10 years ago is out of date? Maybe it's time to do a Jassby 2.0 using his paper, additional data, and new analytical approaches. Someone needs to be funded to do this.
- Geoff says at the very least a small group of scientists from different agencies and institutions should take this on. They could look at different data and saying this is what we think will happen. They could also use statistical models to would perform this analysis. It would be up to the agencies, to determine which approach they would prefer.

- Geoff notes the two other categories of recommendations: Science for the Clarity challenge, and long-term identify two time scales. 1) TMDL timeline for improving clarity, reaching threshold and surpassing by 2026 and maintaining that thru 2031. 2) Long-term, focusing on 10 years and beyond. This is taking more of a landscape view, and definitely considering climate change as an important driver.
- Science Clarity Challenge: Recommendations under this category include time-limited studies, pilot project for short periods (1-3 years), and longer-term monitoring. For example, the current TMDL program supports Onsite infiltration primarily through building detention basins, and trapping water for some time to allow particles to settle out. Is this approach just putting the nutrients in the groundwater, and will they appear some unknown time later? Is there maintenance needed to prevent that? 2) Regional storm water monitoring. The original approach was developed by Alan Heyvaert and John Reuter. The agencies have taken this on. What is being monitored now? Is it useful? There is a recommendation to have the peer review committee look at this program. Is it achieving the goals needed? Make sure no conflict of interest. Alan says that only one part is implemented now, it's only set-up to provide data to meet permit requirements. Thinks there is room for improvement, especially since urban run-off is considered a major contributor to clarity loss.
- John asks Scott if he has given much thought about how to do this review? How agencies would feel about an external peer-review? Scott isn't sure what the product we would be looking at. Geoff says that they would put together a document that says what the data is and what they are looking at, and there may be sensitivities. Geoff thinks this is the fairest way to get at what is being done. Alan says they do put out one comprehensive report that discusses the design for the program.
- Scott's initial thought is a two-prong approach. Feedback to group doing work and also to inform the Council. Doesn't think it's too difficult. Should the PRC handle it, or is it for Council review? Geoff thinks it should be sent out. At least to one - three experts, nothing too elaborate.
- John says 3<sup>rd</sup> sentence in this section implies group doing this monitoring are using the results to validate the pollution load reduction model (PLRM). How feasible is that? Zach thinks it's feasible, the model has good documentation, John's trying to scope the work involved, there's a lot that isn't straight forward. John says the group needs to know what the model is and what will really be involved for the review committee. Geoff says we are not asking group to review the PLRM, but they would need to know what it expects for data inputs.
- John's point is that the group needs to know what the model is, not to revise the model. Alan notes that the PLRM is a derivation of SWIMM, that's been tailored to the Tahoe Basin. We would have to provide the reviewers with the necessary documentation. This is just an approach. After buy-in, these approaches are what we will follow-up on. That's when we get into details.
- John doesn't think these are details, rather these are fundamental questions. You've clarified it. You state three things we need to look at, but when we think about this process, we need to have a sense in our mind, how big of a process it's going to be. Two weeks of work, two days of work? A scale of what's expected of the committee.

- That's the next phase says Geoff when we come up with costs for these recommendations. If there's overwhelming opposition, then we won't be doing it. Last sentence of the paragraph, peer-review or expert review? Who are the peers? Of agencies? Of us? Thinks it's just expert rather than peer-review. Make a change in the document. (ACTION)
- Ramon says John has a point, if there is a model they will try to reproduce the figures in the report, in a way that is defensible. It is one thing to look at data collected. It's another thing to see if the data can be put into a model that generates defensible outputs. How cursory is the review going to be?
- Zach says these are all relevant points, given what we know about this program and its importance to TMDL implementation. The model was developed by a consulting firm and is run by agency representatives to estimate the pollution load reduction credits that come from an urban storm water control/BMP project. Ultimately those credits are accepted by the regulatory agency, which then reduces the overall obligation of the regulated jurisdiction identified in its TMDL permit. So in part, the monitoring is to help the agencies determine if the credits given for a project are correct? Zach also notes that it's regional storm water monitoring program, so it's supposed to provide a Tahoe basin-wide view of how storm water improvements are working.
- The question is easy for Geoff: Is it scientifically defensible? We aren't a part of this program, but recommending independent experts comment on it.
- Science in TMDL, took place over a number of years in early 2000s, largest contributor to clarity decline is fine particles from urban areas. But there are also other sources like nitrogen through atmospheric deposition. Two aspects of work proposed says Geoff. 1) Intensive 1-year study by air resources board, came up with budgets for atmospheric deposition. But one year is only one year, and things have changed: The average fleet efficiency is far higher now, auto emissions are different, electric vehicles will continue to change that. It's time to look at a different year. 2) Shoreline erosion, small contributor, the way it was estimated by data at the time, through aerial photographs from 1930s and 1990s, and comparing shoreline changes in specific locations. That could be re-examined. This also is a nearshore issue. Josh what disturbance effects are we missing? Is nearshore affected by motorized transportation, what are other significant contributors? An expert may be able to review and advise. Are we accounting motorized recreation? Other significant contributors that aren't monitored? Are they measurable?
- Geoff says this was addressed in previous TMDL model. Little to believe that land-use has changed. Other than landscape forest changes. Not sure how receptive they will be to looking at that. Zach asks if this is something the conceptual model could be used for? Geoff thinks it could be. This particular project isn't supposed to be so specific.
- Josh wonders about the treatments effects? Alan says there has been conflicting ideas about how focused this is on clarity, vs. how big it is on the entire basin. Trying to constrain it to the Lake by focusing on clarity, and looking at the response of the Lake.
- Zach says the general approach of looking at erosion in undeveloped uplands is to use rain fall simulators. We had a workshop specifically dealing with this issue. Josh says we talk about wildfire, USFS is being more aggressive with prescribed burns, which means more high smoke days.



- John notes that clearly lot of issues can be raised about TMDL, but if we are just interested in getting agency buy-in that's stated in the first two sentences, don't want to undermine the TMDL work too much but clearly it needs to be re-examined.
- Are we missing something that warrants changes in the data collection? Josh asks.
- Alan anticipates the peer-review committee taking on a bigger role. Really going to have to reach out and get some external review. Good point between peer-review and expert review. Ramon agrees with just keeping the two sentences in order to emphasize the critical nature. Scott suggests adding, for example. Would it be appropriate to have the TMDL third item listed? Technical broad TMDL review would be an uphill batter. We all agree, that it's time to re-review and looking for opportunities to make some adjustments that will have a substantial benefit.
- Zach says this could be framed as a friendly engagement: here are the strengths and weaknesses of the TMDL. Come up with consensus for how it should be examined. Agencies will agree it needs to be examined. What things have changed at the last 10 years that need to be considered for the TMDL?
- Need science to action, data is useful but not leading to action, so not useful to some perspectives.
- Geoff, much of this is dealing with short-term, next 10 years or so. Addressing the state agencies, whether the TMDL got it right for 2017. Are urban areas the main contributor or do undeveloped upland areas need to greater consideration? No longer have USGS monitoring stations only at the mouth. They advise gauges be re-installed to allow a comparison between uplands and the mouth.
- Scott, worthwhile to point out that monitoring in remote areas is a lot more feasible now. There are simple approaches that don't require too much money.
- Geoff, notes that monitoring of urban areas contribution also is deficient. There is no long-term monitoring of actual culverts that go into the Lake. Not all but a small subset should be monitored. RSWMP program extension to address concerns raised by two states. Set-up permanent culvert station(s) monitoring there and move on.
- Moving on: Geoff mentions recommendation to re-run the clarity model. This model was developed and calibrated more than 10 years ago using data that was collected 15 years ago. They did some work extending calibration, there have been years that include extreme drought and wet years. The recommendation is to re-run model using the extended data sets now available to see if it sufficiently accounts for extreme years, and predicts more extreme years to come.
- Final recommendation is nearshore measurement of periphyton and metaphyton. UCD measures periphyton, but measurement of growth doesn't actually tell us what is driving the growth. They are devising a new sampling approach. This was brought up with a whole nearshore study review a couple of years ago.
- John these instrumented platforms in the Nearshore, do you want to mention the existence of this effort? We didn't include because all the other areas weren't inclusive of the current data collection efforts says Geoff, and most of these platforms do not have

long-term funding: as soon as donors stop, monitoring stops. We are focusing on publicly funded science.

- Bryan asks about urban impacts and culverts for 1 and 2. Since culverts are heavily focused on urban areas, smaller flows but higher concentration, perhaps between the two they should be prioritized. 2 would tell us how much is coming from culverts, but nothing about the upland areas. They relate to urban uplands area, but they are two different monitoring needs.
- Would some pilot work assist in the prioritizations? Alan says pilot projects have already been run. It would be a good idea to look at previous data when uplands were being monitored to see what info can be teased out from that older data.
- Final category of recommendations: Science for long-term. Continuous monitoring of physical processes, thermistor chain data out of student fund projects. Physical measurements seabird two lake profiles, for change in trends, but very little about processes. Establish permanent site with temperature, how physical processes are changing, stratification, currents, and bio effects are being pushed by changes in physical processes. Also looking at DO, losing DO at depths for longer periods with temperature change. We have data to show that it's important.
- Models exist, no one is being funded to monitor, wind data stations have not been well maintained for many years. Having wind data out of calibration is not very useful. Funding is needed to sustain that. Water coming into lake, water budget of watershed itself, likely to change, landscape changes thinking outside of the lake, how to respond to multi-year droughts. Hasn't been done until now.
- Climate modeling, state of CA, came up with best future climate models, they don't change too much, but they are improving especially with regards to drought, we know what will happen with climate change and should be revised into the future.
- General agreement of overall approach for scales of recommendations. John thinks that three parts are good, the last one reads like a large NSF proposal, designed to be a monitoring program that last bit is very science heavy, would endorse it, but requires careful explanation of how it leads to action. First two parts are easier to discuss for near-term, but the third part, it's more challenging. Agencies can easily see the results for the first two efforts, but will the long-term efforts be money well-spent? This has to be brought up.
- Alan says this might be the time to look for broader funding sources and not just lean on local and regional agencies. But it's an overall part of the plan and it's appropriate to be here. But may not be dependent on local and regional agencies.
- Max saw with the water budget, an approach that could integrate fire and climate change implementation strategies. Some sort of process based model that would handle all this, but then there was a disconnect with the transect of lysimeters. It seem like a scale mismatch and super specific. Alan says the lysimeter recommendation could be taken out.
- Geoff says first we need initial conditions. Perhaps lysimeters are inappropriate but you need to start somewhere with what happens with drought.

- Scott says this would be the costliest and most challenging. You have the Lake clarity model, everything should be tied into it, as agency people are being judged on that.
- Geoff says run the clarity model for future climates. We could alter future meteorology, including run off of basin based on past land use. We would keep the same infiltration rates. The assumption is that nothing will change other than temperature and precipitation, groundwater storage is not part of the model.
- What is the effects of precipitation with increasing rain and less snow? It's not Tahoe specific but it is being done across the state says Scott. Maybe it's more about how the water budget will change? Says Ramon.
- Geoff says there's a large tree die-off in the basin during the drought, then concern declined after 2017. People come to Tahoe to see this green environment and agencies will want to respond to people's concerns.
- Alan closes out this part of the discussion: If anything else comes up, please email the subcommittee members. They will make revisions based on today's discussions.

b. Discussion with Council members & agency representatives

Alan and Geoff led a discussion of the subcommittee's first draft among Council members and agency representatives including, Dan Segan (TRPA), Jason Kuchnicki (NDEP), Bob Larsen (LRWQCB), Jack Landy (EPA), and Patrick Wright (CTC). Remarks and observations are summarized below.

- Alan clarifies this is a first draft document. The subcommittee is expecting to make additions and revisions, and produce additional iterations. The subcommittee need assistance identifying problematic areas. Did we miss anything? This is an open discussion. They do plan to put more detail into this framework for distribution and review before the next Council meeting (January 11<sup>th</sup>). Phase 2 of this project will include a workshop, further discussion of the details of the plan, and external peer-review in March-April. The complete plan will be done in June. In the current draft we have grouped recommendations into three different time scale: one more immediate on an annual approach, a mid-approach thinking on the timeline of the clarity challenge, and a longer-term perspective, which is important in terms of climate change, and the changes we expect to see in the Sierras and in the Tahoe basin.
- Geoff, welcomes people to jump in with comments.
- Dan enquires about process. Is the intention is to have the document externally peer reviewed? Alan says, yes in phase 2. Outline in appendix b, of the draft you have is the document to be produced in January. It will be further developed during phase 2. We want to make sure we identify the best approaches, and haven't missed anything in the process of putting this together. This report outline you are talking about is a document for January. The details are what will be built out, costs and what will be done.
- Dan says the summary of existing programs and the background information aren't here by design, but they will all be reviewed in the end? This is just focusing short and long term changes and justification for monitoring. Supporting document will be built around that? Alan says yes.

- Alan says they plan on presenting a draft to the TIE steering committee. A science date is scheduled in March, and it will be presented to them. At that point it will have largely taken shape but still a draft that can change. We also expect to present it to the bi-executive committee.
- Bob asks what kind of agency input they would like or expect? How much of our investment is warranted? Alan says we are likely to make changes based on discussion today, and will send it out to the full Council and agency members and welcome full feedback.
- Bob says the Lake Tahoe Total Maximum Daily Load program (TMDL) was developed through a coordinated effort between agency and science representatives. We understand the benefit of greater coordination. This document would benefit from tighter discussion with scientists. There is value in agency inclusion, we can help inform this process.
- Alan says that we are constrained by the time line given to us by the Executive Committee. We do want to make sure everyone has time to provide written comments. A subcommittee will think about these comments and potentially make the changes. Maybe mid-December have opportunity to re-disperse and get a second round of feedback. So by January people will have two opportunities to provide feedback. No group feedback again until the January Council meeting.
- Patrick Wright has a radical suggestion, consistent with Bob's comment. He likes that the draft recommendations move against political uproar of a single year. But what's missing is the connection between this and the agency programs and efforts. Perhaps a parallel effort to have agency map out regulatory process, monitoring, evaluation, and talk about where the data is weak and strong and where the Council could fill it. I am thinking of a grid that shows area of low and high confidence. It's not just the TMDL that only focuses on deep water clarity, there is the broader storm water plan, the climate action plan, and the watershed restoration program. What are the agencies' initial ideas for how to narrow the gap? The first thing regulatory people will ask is how does this tie into the TMDL?
- Bob says the two states have invested a lot into Lake clarity and the TMDL. We have difficulty seeing where this Council effort fits. Foundation of TMDL drives agency action, clarity is most affected by fine particles from urban areas. It would be most helpful to put this plan into the basic conception of the TMDL.
- Alan thinks this is a great suggestion, and it would be great to have agency representatives prepare a management map for lake conditions. It would need to be more encompassing. For example, AIS is important in its own right, as well as native species. Do we want to keep them in Tahoe? Nearshore clarity, related to lake clarity but some things are different. If we could get a road map put together by agency members, we can build from there.
- Bob suggests starting with the TMDL. Alan says that it's something the agency members need to start. Initially there are strong clear documents explaining the basis and research. Things in the documents tie back into TMDL, making those connections should be fairly straightforward. Agency perspective can provide additional context what we are doing with clarity is anchored with documents and processes out there. Look to

agency colleagues to put together something that represents what's being done in the basin, in terms of the different programs. How they are working, what is the time-line, etc. (ACTION). This is something that can be done independently while the Council and subcommittee works on this plan.

- Alan discusses the subcommittee's proposed approach: Three different timescales to address. 1) shorter-term (annual) similar to dealing with TSAC providing input as best as possible to the 2017 clarity loss. But we want to be better prepared to address and anticipate future clarity results. 2) Looking out up to 10 years on the clarity challenge: what do we need to do to be collectively ready for conditions and questions 10 years from now? The approach suggests we need to work at that scale. 3) Then longer-term monitoring to document and understand the climate change impacts that occur. Do agency members have any problems with this three-time scale approach?
- Jason has specific comments about each time scale but no problems with the overall approach. Keep in mind the clarity challenge and plan towards the future, if it doesn't look like we will reach the goal we need to know.
- Dan says the tiered approach he likes it in general, there is a natural sequence, potential events that supersede, it is important to know what activities need to be done and understanding what additional monitoring will tell us, and how it will change uncertainty. This is something he wants to see, some of what Bob and Patrick wants to see is part of step one, although the document seems to be focused on step two. So step one still needs to happen.
- Alan says we are preparing summaries of existing monitoring efforts. We are reviewing specific for what additional monitoring associated with those efforts are needed.
- Dan says the question the agencies get asked is "Are you being good stewards of the monitoring monies being spent?" Can you start with that? Are we maximizing the returns on our investment, or does the current allocation need to be readjusted?
- Geoff says that's where the discussion started. Reviewing what's being done. The general consensus is that it's all fine, nothing here should be stopped, including in-lake, nearshore, etc. This will be better described in the next draft. Not going to find anyone from the science community who says there is too much monitoring. Comment about whether some future study shows we are never going to attain clarity goal we should give up, no. Tahoe will always continue to be managed, what will the issues and challenges be? Perhaps there are other measurements that are more attainable. Clarity is a great integrator of lake health but it is not meant to address all management of all aspects as we see them.
- Bob asks if there is a reason why RSWMP (Regional Storm Water Monitoring Program) is specifically identified for review? Geoff says, the science community has not been involved, so we do not know how that program handles data collection and analysis. Bob disagrees, there was significant science involvement in planning and software development with DRI. Alan says that DRI was involved in setting the RSWMP up initially. DRI participated in the technical advisory committee meeting during the design, but DRI is not involved with data collection or analysis. DRI did set-up programming for onsite monitoring. DRI's work was programmatic. They are not saying substantial change is needed. They are just saying the RSWMP bears some review in relation to

the TMDL. There could be a perception of conflict of interest if the Council does the review, so an external review is recommended.

- Dan asks for an explanation of how this is different from the pelagic zone monitoring. Bob contends the document should look at monitoring holistically, and provide holistic Council feedback. Calling out only RSWMP for review seems to be an outlier in monitoring discussion, what are we doing for tributaries, pelagic, littoral, etc. Alan reminds everyone that the resulting plan will have external review during phase 2.
- Jason asks if the science to action plan includes the nearshore? Alan says Nearshore yes, AIS maybe not. Jason wants to make sure that nearshore monitoring is represented and gets reviewed. It is important for overall water quality health. Can you develop a budget for this, and scaled to what is available? Not just one program, but scale everything back and looking at areas of the nearshore not being examined. Alan says yes, we know what's being done and spent, we need to reach out for more detail, RSWMP, nearshore, littoral, and pelagic will be included in the document that gets fleshed out, but this draft just provides broad strokes. General comments that it sounds good, making an accounting for what needs to be done.
- Ramon advocates for building a conceptual model for clarity and see what the important drivers are. Where the areas of studies fit into the model.
- Geoff asks about nearshore modeling and the resulting recommendations from that effort. These were not implemented. Should we go back and recommend what's not being done? Seems like we keep being asked to do the same thing over again. What is needed and what is the point? Jason thinks the point of this assessment is to look at all the monitoring programs holistically instead of looking at individual pieces.
- Ramon says that is what we are trying to do. But we went directly to monitoring needs without outlining what is being done. Need to work with agency members about what you think is being done. The monitoring program information sheets Geoff requested a while ago should help with this.
- Bob states the conceptual model for clarity was been done 10 years ago. \$10 million dollars was spent on the science and technical efforts, and an entire program has resulted. Go back to those fundamental assumptions and use that as a starting point. Appreciates the organizational structure, the phasing and time period. The TMDL provides a good framework for measuring clarity and this document is looking to revisit physical parameters to understand drivers of clarity. Scattered source analysis that aren't anchored in, what did we do to analyze in the past? Keeps coming back to the structure of the TMDL as a starting point. The Clarity model tells us how it would respond, how the system is responding, is it still valid? I don't know. Difference in climate, biological factors, etc. other things driving clarity not included in TMDL. That's very important content! Are nutrients a more important driver of clarity than previously thought? This would be a big shift in the drivers of clarity, and how we respond to that. Organizational suggestions, link it back to TMDL and put a lot of this information in this framework, what are the drivers and causes of clarity. Then describe what do we need to redo: different spatial analysis, different pollutant source analysis, or? What is lacking and how we can fill it?

- Geoff says the recommendations in the document address what Bob is asking for. Yes, Bob says, but it's a structural issue with the document. I can read that too, but not everyone will have the perspective to understand that. All in agreement that some restructuring of the document is needed.
- Alan says there are things that aren't addressed in the TMDL, for example nutrients and periphyton growth. It's important, but in terms of lake condition not directly related to mid-Lake clarity. A little restructuring and looking at how the TMDL structure is important to imbed, be cognizant, however, that's not the whole thing. Representing work that is currently going on, no discrediting, just making best decisions based on best information available. Does the available information change our understanding of the progress that we are making? We are trying to do this efficiently. Phase 1 endpoint comes in January 2019. If we can represent this structure then we will have accomplished what needs to be done for the first phase.
- Jason likes Bob's approach. Being able to document or show where things have changed. What fundamentals are now questioned? Strategically building on the old, no need to start over.
- Zach asks about the statement of objectives for each water quality monitoring program. He shows a one-page document Alan received from Jason. He wants to confirm these objectives have been reviewed and accepted by Bob, Dan, and Jack, so the Council can use them in reviewing the existing monitoring programs. Bob does not believe he has seen the document. Zach says it would be useful to the subcommittee if it could receive a statement of monitoring objectives that all agencies agree with. Jason says the fundamental question is can the monitoring be improved to fulfill more objectives, and answer questions more explicitly.
- Alan states he is not supportive of taking existing funds being spent on monitoring, and reallocating to other subjects. Bob disagrees, he is not interested in trading. If the algal growth potential (AGP) bioassays are not useful then yes, let's discontinue them. But that doesn't automatically mean the money will be reallocated to other monitoring. We need to establish and justify a need. The first question is: Are we doing the right thing to begin with?
- Alan (and Geoff) has a problem with fine tuning. Incremental amounts of money selected for fine tuning will give small pieces that will not amount to enough to do anything different. We eliminate things, and scale things back, and then we are back to 2017. Then we still lack the data needed to definitively answer questions. We will do it, but at the same time, unless additional funding to support work then Alan is unsure why we are doing this. There's an assumption to take a bigger look and augment existing programs, not just cutting it back. Look at what we are doing, making sure we are good stewards, set the stage to be more prepared to address future challenges.
- Geoff says this assumption drives the timescale proposal. Why are we rushing to spend \$50k to try to improve the TMDL program? It's a mismatch of effort. Dan says that we can affect the existing money spent on the programs immediately, whether more money come in is far less certain. Useful to continue to advocate for programs with Science Council advice. But it's also useful information is it better to monitor one creek versus another.

- Alan says that what we set-up now can be replicated year after year. Generally, we can ask the question is it delivering what we need? Jason says yes, continuously looking at improving TMDL program. May have seen periodic, looking for optimization rather than just scaling back.
- Alan says then let's set it up to make it happen again and again. Patrick points out the money is being held out for it, but if you don't make a proposal for it, it won't be there. Agency folks decided to look at the comprehensive monitoring of the basin. Something like Lake conditions, what's the biggest bang for your buck and emphasize it. Certainly money won't be offered if you don't ask for it. Bob says how this will add to what is already being done, is lacking in this document. I have an idea as to why upstream monitoring is useful, but the document doesn't explain that. Patrick likes the three time scales, agency folks will say: Keep it simple and build the case for funding on: 1) Are we focusing on the right things? 2) Are we doing the right things, street sweeping etc.? And 3) are we evaluating effectively? In each of those do we have high confidence that we are doing the right thing, that this is a high priority area, high confidence that this filter works really well, that reducing fine sediment is essential etc.
- Zach says the states have existing Total Suspended Sediments (TDS) standards. Can you get rid of those standards and focus instead on fine sediment? Can you make that kind of change? Bob says it's very difficult to do away with an existing standard, but they don't have to monitor it. Monitoring effort is determined by staff.
- Jack says Blackwood creek does not have its own funding, but there is TDS monitoring conducted by the Forest Service. Bob says that monitoring is not happening. Alan says this is the conversation that needs to be had. Not articulated here, you can make minor changes, but there are definite deficiencies. There's no new sampling techniques to save you a bunch of money. One question we got from the executives: Do we know what proportion of sediment reaching the Lake in 2017 came from the forests or urban areas? We don't know, the picture is that there isn't sufficient monitoring to answer all the questions. Bob says there will never be enough money. What do we need to answer the question to make the justification for asking for more money? What information needs to inform the model? What are the gaps that needs to be filled? The estimates of pollutant loads for the TMDL used a specific number of years, but 2017 was not included. The scientists contend 2017 was more extreme than what is used in the TMDL. If things have changed that much then let's make the change, but Bob doesn't believe that the extreme changes are there. Jason asks that if Geoff is implying that these extreme changes are becoming more typical? The averages developed for the TMDL included hydrology of 1997, some linear regressions were used, but it's not like we don't understand the load that came in from 2017.
- Bob says he would love to further this conversation outside of the normal Council meeting time. It's not working to contribute in this short time period. We need a different approach. We need more time. Science should be continuously contributing, and we should set things up to change where science is going, so its involved at every aspect says Patrick. Alan says yes we would like to be more efficient in our engagement.
- Alan wants something similar to what Patrick was saying. Can this happen to inform what we are doing here? Recast some of this in a meaningful way to be sent out in another couple of weeks. Follow-up with email to lay this out. We are working on a tight



time-frame. Take the opportunity to provide your input, sometimes scientists are reticent and we talk about funding a lot, but we want to work with the agencies. We all want recommendations we collectively buy into.

- Geoff is looking for agreement on next steps.
- Zach, recommends the subcommittee organize a conference call or zoom meeting with agency representatives at some point during the month of December. More quality time for discussion is needed, and it could be useful in addition to written comments. Get that conference call in after the initial round of comments. Alan prefers face-to-face meeting. Alan will try to set something up. (ACTION)
- (ACTION) Patrick asks if Jason and Bob are willing to put in time to look at monitoring from agency perspective. If this is going to be science to action, you have to lay out what the action is. Bob says yes, although no vision of what that looks like. Still thinks TMDL program provides the documentation to look at. Given the timeframe, we can talk about all these other things, but the TMDL is the foundation, in terms of moving forward and determine how it plugs into action, he would be happy to work on that.
- Zach asks if the result chains developed for VMT or SEZs, are a useful framework? Bob welcomes a call to flesh this out, seeing the science piece, but seeing the structure. Patrick agrees TMDL primary focus, communication, this is our understanding based on the work that has been done, and here are some new questions surrounding that. Then go through each question to describe how to address it. Some work is required but not a lot because so much has been done already. Jason thinks it would be fairly easy to do this, but helpful to have scientists weigh in. Scott suggests at least have bullets of something to work on, if something on paper that fits into this document, even if it's just one example. Bob and Jason to touch base and get back to Alan (ACTION).