Meeting Notes
Tahoe Science Advisory Council

Thursday September 20, 2018
10:00 AM – 1:00 PM

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

Participants: Alan Heyvaert (DRI), Adam Watts (DRI), Geoff Schladow (UCD), Max Moritz (UCB), Ramon Naranjo (USGS), Pat Manely (PSW), Todd Ferrara (CNRA), Zach Hymanson (CNRA), My-linh Nguyen (NDEP), Alison Toy (UCD), Paul Work (USGS), Ed Parvin (USGS), My-linh Nguyen (NDEP), Alison Toy (UCD)

Meeting Summary:

A. Wildfires in the West (Pages 1-4): Max Moritz and Adam Watts discussed the some of the consequences of the exceptional wildfires the western US has experienced, and placed this information in a larger spatial context. They presented brief overviews of the research they are involved in, and how that information relates to conditions we are experiencing in the Tahoe basin.

B. Science Council work plan implementation (Pages 4 – 7). The Council received an overview of the current work plan, and the status of various work categories in the plan. The work plan includes total funding of $450K and covers the period August 2018 – July 2020. The substantive projects were discussed in detail.

C. Lake Clarity Science to Action work plan (Pages 7-13). This work plan has been initiated at the request of the Bi-State Executive Committee co-chairs. (See the August 2018 Executive Committee meeting notes for more details.) A lengthy discussion occurred among Council members regarding the initiation of this work plan. Agency representatives also participated in this discussion.

D. Substantive projects update (Pages 13 - 14). Brief updates on three active projects were provided: 1) data specifications for use in adaptive management (lead: Alan); 2) Decision support framework for the UTR (lead: Geoff); 3) technical evaluation of SEZ standards (lead: Steve).

E. Council member updates on relevant science topics (Page 14). Paul Work (USGS) was introduced as the newest Council member. He is replacing Ed Parvin.

Meeting Notes:

1. Welcome, agenda review, introductions (Alan)

The agenda was reviewed with all meeting participants. No changes were made to the agenda.

2. Wildfires in the West (Adam/Max)

a. Max's presentation:

- Climate change and forest adaptation are major thrusts of his work. They have examined different fire regimes in different areas. Working with global data sets that show forest fires are occurring across the world. We are focused on a small part of the USA, but it really functions differently across the world. Different drivers control fires to different degrees. How humans come into the mix and mucked up the system. Coupled systems, natural systems and human communities, this is the Wildland Urban Interface (WUI). One of the technical advancements, where we see fire and conditions obvious in the optimal ranges for fires compared to marginal areas. Adopted species distribution modeling for fire distribution modeling. Figured out different parts of the world are sensitive to different conditions. Temp in wettest, in warmest etc. take all 16 projections and obtain a mean, which isn't necessarily as helpful. So we model agreement, how many of the projections agree on whether or not there will be more or less fire. Examine anthropogenic ignitors, these factors are just as important as the bioclimatic factors, need land development scenarios.

- Land-use models are important when predicting fire regimes. There are now a whole different set of models that can do better with winds. Alex Hall at UCLA is in charge of downscaling models and modeling extreme fire. Take past Santa Ana events and model what areas are more prone to extreme wind events. Drive these models, dynamical downscaling to get a picture of what future fire wind corridors look like.

- Look at forest loss itself. Drought stress, beetle kill, etc. Where are those environments where forest change is happening? Southern ranges seeing a transition to dryer area. Across the Sierra we are seeing loss of alpine forests. Dry western conifers will be emerging in areas. Transition to facilitate the change.

b. Adam presentation:

- Atmospheric sciences focus on what's happening with weather and smoke. Public recreation/scenic aspects, many disappointing days in the Tahoe Basin in 2018 due to smoke. Land cover change and water quality can be directly impacted. Also short term and long term human health impacts. In the future think about tourism and economic effects.

- Recent work with indirect impacts, erosion, water quality following fire, bare soils, and transported deposition. All can be affected if there is a fire within the basin. Looking at importance of atmospheric deposition effects on watershed from sources outside the basin. What is the effect compared to other deposition sources (e.g., in-basin fires or in-basin emissions).

- He is putting together bibliography at DRI, looking at a few projects on fire and fire-related topics in the basin. You'll see a lot of people who are related to DRI

who have worked in the basin. Tim Brown did a 2013 project for SNPLMA on MET data and forecasts for prescribed burns. Climate Eco Applied group applied this tool to try and build a management friendly tool for prescribed burn managers. There's one product that is updated (hourly) in real-time by Climate Ecosystems Fire Applications group. Hourly map of fire data, Color coded map by county in California. Can go back years or hours.

- Will be doing more airborne, high resolution air quality, using low cost measuring tools and utilizing citizen science. Transects across Lake Tahoe, so that you can understand the data when inversions form, their causes and impacts, and potentially take data and incorporate the meteorological data. Take data and use to advise prescribed burns management, pre- and post-burn.

- Think about the important questions we have. How do prescribed fire models differ, improvements to forecast burn days, reduce unwanted impacts of prescribed burns. Contributions and effects transfer of materials in and out of basin, compared with other atmospheric material. Sensitivity of economic activity to air and water quality. Fire Science still largely in a paradigm of responding to fire, challenge is to manage in advance of fires. Some of the maps attempts to predict what fires could look like.

- Question: Zach – Tom Cahill during Science Consortium period said air quality in the Tahoe basin has been unusually pristine because of humans' activity to suppress wildfire, i.e., the smoky-the-bear phenomenon. With the increases in fires we are seeing throughout California, will we see a reversion of that and get back to air quality that is more typical? That is, more smoky days in the Tahoe Basin? When fires weren't suppressed they were smaller and longer. Now they are bigger and sometimes longer. Adam asks, are summers smoky forever? Legacy of suppressing fires, thinks predictions are correct, more uncontrollable smoke. He hope that we can see a time when the smoke impacts are similar to pre-European conditions: Long in duration, but light in intensity.

- Max agrees in the absence of fire suppression and even without climate change, prehistoric air quality was probably pretty bad. Most of fires scientists and managers are saying to use more wildland fire or prescribed fire as a tool to reduce smoke intensity/duration. Being exposed to that is really unhealthy. Health and Economic effects from these burns, we are going to have to use fire more as a tool. Study the smoke impacts more carefully. Think about how to adapt to a smokier future.

- Adam says we need to be thoughtful about engaging in a conversation with the public about fire. Would you prefer dense and uncontrollable with danger to life and property, or do you like it all year around as we try to catch up? No sustainable good approach to managing wildfire that doesn't involve extreme amounts of smoke people aren't used to. Air quality and land management reflected in prescribed burning, something to think about. Case in Oregon dealing at statewide level.

- Worst air quality in the USA in Reno in 2018, led to people escaping to Tahoe. Is there a data set to go back to the previous 15-20 years, has there been health warnings for Incline, SLT, etc? Ramon wants to know that it won't be as bad here, but there will be a transfer of people for tourism to escape intense smoky season. Ramon's family came at least 3 times this summer to escape.

- From Nevada side, probably correlations to be performed from tree ring research, extent of past fire to roughly correlate of what the air quality might have been. In terms of data, EPA airnow.gov shows data courtesy NDEP, not sure how far back it goes. Data from Nevada are particularly coarse, picking up readings from Carson City. Daily thing from app, Minden worse in the nation. Tahoe City, SLT, Carson, and Minden. Many times unbearable in the basin and better elsewhere, would be interesting to see the pattern says Patrick. What is the feedback from land managers regarding interest in your work? Critical out of basin issue. Basin should be interested in impacts on tourism especially from fires outside of the basin.

- Seral stage forest at coarse spatial data is not accounting for land use history. A finer and finer spatial scale, you could use those for frequency predictions. Something much more specific to predict fire behavior variables. Talk about the forests as if they have all been through fire suppression, but there's a lot of nuance there, need to also realize there's much to do with their harvesting history. Look at areas like Blackwood canyon that aren't harvested, they have also been suppressed but look very different compared with areas that have been harvested. Bigger fire-resistant trees are susceptible to beetles in drought stress conditions. Spaced trees with not too much understory. Beetle kill is a big complicating factor.

- Pat appreciates the presentations. Recognize the fact the Lake Tahoe West is tackling a lot of those issues to a degree, a lot of work left to be done. Modeling smoke related to prescribed and wildfire predictions. The entire basin is being modeled. Beetle populations, future climate scenarios and succession of fire growth and addressing some of the questions being addressed like Zach's. To what degree or dynamic are canceling out or contributing to recovery effort. Economic team led by Sam Evans, Potts, Holland, bringing smoke modeling. Integrated modeling effort. End of calendar year. If you want more information let Pat know.

- Geoff points out an underutilized resource in basin two Improve air quality stations: one on West Shore at DL Bliss State Park, and one at LTCC. Start looking at data go back a number of years, chemical signals, and not sure who funds these. Maybe something that will go on, monitoring efforts are needed.

- Alan thanks Max and Adam and says this is the approach for future meetings more than just bureaucratic and more inclusive of science. Hope to continue to at future meetings. If there are other questions, please contact Adam or Max directly.

- Action item for next spring, have Lake Tahoe West Science team come in and give a presentation to the council.

- Alan agrees especially as we think about more integrated approached to tracking and monitoring change especially when it comes to decision making. Talk to Pat and her colleagues and see if we can put something together in the next few months.

3. Council work plan implementation (Alan/Geoff) 45 minutes

- Zach provides work plan summary: 2-year works plan extending through June 2020. $450k total budget, half the first year, half the second. Work plan is funded at $150k/year state fiscal year, every July. July 2017 was first appropriation. Second just happened July 2018. Literally have $300k in the bank. Last appropriation July 2019 is dependent on next State budget. Budget is still in formation; appropriation has not occurred but expected.

- The work plan is broken down in 4 areas: 1) Operational support $52k over 2 years (this funds Alison's time, Council and Executive Committee meeting support, meeting rooms and equipment, website, contract between TRPA and UCD extended through June 2020, all in place. 2) Technical assistance $40k for 2 years, funding for peer review services come out of there. Peer Review Committee led by Scott Tyler, and there is a contract in place between UNR and TRPA to support that work. No money transferred yet, but must preserve some funding for PRC services. Technical assistance funding could support workshop or technical support work, most flexibility here. 3) Skipping ahead, to TRPA admin/fiscal support $40K for 2 years. This funds the services of Dan Segan and TRPA admin and legal staff to manage TSAC contracting and financial matters. TRPA has established a number of technical services with TSAC member institutions, which are the vehicles to fund much of the TSAC members' project work. 4) Substantive projects, $290K for 2 years. This is the main area of the work plan for discussion today.

- Alan – Hoping to initiate a workshop or two, funded through technical assistance. One could occur sometime in the fall with Environmental Improvement Program (EIP) working group presentations. TSAC did this last year, bringing leads from working groups and present on their issues and questions they have. Working with people out in the field actively managing systems. Found it useful so we are going to repeat in greater depth and use to develop some potential funding opportunities with them to address specific needs. Probably pushing this back into Spring 2019 at this point due to work on Lake clarity issue. The bigger push are the substantive projects. Good feedback from last TRPA Threshold update projects from executive director Joann Marchetta. She found those to be useful work products, good to work directly with TRPA. Will continue those in the next few years. Another project is the Upper Truckee decision support framework, which Geoff is leading.

- Geoff discusses Upper Truckee decision support framework project. The subcommittee was assembled late last year. We want to accomplished several things through this task: goal to address this desire to have a more holistic view of how the basin works, how monitoring fits within this holistic view, try to view gaps, difficult to do the entire basin, but if you can do it to the Upper Truckee watershed then it would be tractable and expandable to the whole basin. Initial workshop last December at UNR. What we are endeavoring to create is a schematic of how different elements of the watershed works, i.e., runoff from different parts of the watershed, meadow, urban, fire, etc. How they connect to different parts of the environment. Come up with linkages and determine drivers. To rank understanding of certainty of the science that embody these various linkages and try to identify where uncertainty lies where there are missing critical data. 2nd phase is to take that and put a more formalized decision support framework on it. Building the structure first, testing manually, and then decision support system. Once it has been identified and validated, running through this schematic with a proposed capital project to evaluate its goals and routing it through. Is it going to have consequences, is it reversible, what are the unforeseen impacts? Monitoring comes into play, once you identify linkages and have a network, start to see what monitoring can potentially accomplish more than one goal. Start process of rationalizing monitoring, something that came out of the thresholds review. Long-term goal from that, make thresholds more meaningful. That's where we have been for a while, top priority for this 2018-19 year, until urgency with 2017 low Lake clarity came up. Upper Truckee project is pushed back to restart in January. Given urgency of other task, don't want to move too quickly.

- Alan says there's been a change in prioritization, reviewing research monitoring activities in the basin in relation to clarity and overall ecosystem health. And developing answers to 10 questions from the Executive Committee. Science assessment as to where we are at in terms of our knowledge of how the system functions, knowledge gaps for making informed decisions that eventually lead to management action. This is priority for next several months. Expecting to form a subcommittee that can think about a holistic approach focusing on lake ecosystem and peripheral elements that impact the ecosystem. Air quality, fires impacts, forest health, and other things happening in the air- and water-shed impacting the lake. That's the big push between now and the end of the year. Other project is to continue to provide targeted research. Threshold update initiative, a TRPA priority.

- Dan recaps focus is now on Threshold system structure including work to date. Removing redundancies that the board adopted, removed 23 existing standards considered to overlap. Considered a success. Alan leading project how we organize not just standards but reporting systems, system structure task, have a proposed systematic structure expecting board to adopt. How evaluation of standards feeds into overall decision support framework. Council support in implementation of that structure. Council has provided technical products related

to the review of existing standards for SEZ's, VMT, and sustainable recreation. Request council engagement over next year in SEZ s and sustainable recreation.

- Pat to step in when Geoff is finished with the first phase of the Upper Truckee River decision support framework. Alan says we were really busy last year, now know how it works a little better. Take some pressure off the leads. Good to bring expertise outside of the council. Especially within your organization. Technical service agreement not just members of council but all members of your organization. Master agreement set-up with organizations. Delivery should incorporate time for council review. The ideal presentation, full council needs to take a look and have opportunity to provide comments. Keep mindful of that. Looking to reinvigorate that process.

- Patrick Wright says last EIP ran from 2008-2018. Out of date and thinking of execs is that it needs updating, given next summer we will have two new governors. Kim Carringer will coordinate, and see how EIP has evolved. Largely a list of cap projects initially, then went programmatic with a guiding document and inter-agencies around team, what will be interesting thru Upper Truckee threshold, Lake Tahoe West, now moving further away from these silos, how does the new EIP reflect that? Interesting question for the council to discuss. Zach was around when the last EIP update occurred. More work on linkage between EIP performance measures and thresholds, probably the key.

- Dan thinks when we say help implement new system for thresholds, includes part of that is EIP measurements and reporting on other initiatives. Closer integration of the various program elements. Alan says the idea is to describe how the system should look going forward. Action item: engage with TIE Steering Committee to develop an approach or strategy for how TSAC interacts with the EIP coordination committee.

- Zach wants to close the loop on substantive project line item, $290k funding available for 2 years, translates into ~$145k for each year. Where is the council in this first year: $75k for Upper Truckee project, lake clarity action plan, no budget in place yet, but in the realm of $50-75k range. Part of work plan will include workshops, separate funding for that from Technical Assistance, amounts not nailed down yet. Some substantive project money to be reserved for threshold update work. With those three, likely the $145k will be consumed and going a bit into technical assistance for the first year. Second year not as well defined, we can always pull a little from that if needed.

- Two more technical assistance contracts still in the queue: PSW and USGS (California Science Center). So that the entire body of the council can be accessed for work. Ongoing effort, hopefully get done this year. Update any existing technical agreements. Dan says they go through 2020, think about it for next work plan, this time next year, especially with slower organizations.

- Discuss Zach's phase out. Todd says we are aware of political mortality, has been discussion with California Tahoe Conservancy (Freeman and Wright) about what the next iteration of program manager will look like. No agreement yet, will get done and can transition appropriately, November meeting there will be more to say.

- Zach says his work is now focusing on getting infrastructure and work orders in place so TSAC can do its work. That is the number one priority. Getting notes in place to close out the year in good order. Glad to see the group is coming together. Will be considered emeritus member at large.

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

    - Geoff provides background and brings the Council up to date. Came out of worst clarity result in 2017. Met with Lahontan and NDEP. Agreed it was wise not just to present data, but to present why that happened. Examination of the data largely links the low clarity to 5 years of drought, immediately followed by a heavy and wet winter 2016-2017, as well as physical changes in the lake linked to climate change. Entire TSAC had opportunity to look at that white paper. Meanwhile, secretary Laird and director Crowell also concerned about those numbers and listed 10 questions to address, as a result based on existing monitoring what emerged was a request asking TSAC taking a fresh look at the monitoring, look for overlap and things that are unnecessary, and look for what isn't being measured that might be more predictive, allocate resources in the future to accommodate future changes. What is needed to provide answers that we were unable to answer? We will take a broader look at monitoring.
    - A request to all for any participants, Alan and Geoff are committed, Ramon has stepped forward, Mike Dettinger from USGS has also offered and has reviewed the paper, John Melack said he could not participate. Think about it and get back to Alan or Geoff about availability. If you don't have the interest or time just say that, then the pestering will stop.
    - Other thing important to consider, understanding there is some time urgency here, depending on what the conclusions are, there might be state of CA and NV budget changes to get funding for new monitoring and new applied science that is considered critical. Both states need preliminary report and finding by the beginning of 2019. By end of the year, a draft document is needed.
    - Homework for everyone, decide whether or not you want to be part of the subcommittee and let us know. Tell us, what monitoring you are aware of that you or your colleagues or institution are currently doing. What kind, frequency, how long has it been going for, going to last? The more the better. Don't want to go on the assumption that Geoff and Alan know it all. Please let us know. To agencies, what monitoring do you do either through your agency or contracted out. By October 1 please. That is the 1st thing.
    - Questions and answers about monitor reporting:
        - Q. Only on-going? A. no, things that were terminated because of lack of funding. Knowing the short comings is useful too.

        - Q. Do you want to know about costs? A. Yes, if your institution has costs, provide this amount also, to the nearest 10k per year.
        - Q. What agencies are contributing money? A. Let us know where the monies come from pleasel.
        - Q. Is this just water quality monitoring? A. Everything and anything. It is a tall order.
        - Q. How far back do you want historical? A. Don't go back further than 10 years.
    - Bob says it has been done, information has been compiled before.
    - 3-4 lines on what you're doing on stream monitoring
    - Paul suggests someone create a template. An excel sheet with location, parameters, data, and costs.
    - Alan to work with Alison to create a template to be dispersed to council members.
    - Zach asks are you interested in things like project monitoring? Blackwood restoration project happened from 2010-2014, etc. This is where it gets difficult, and these efforts have collapsed. Alan thinks it is likely this is covered in the agency compilation. Project scale is useful and interesting, but it's not a prime directive.
    - Zach suggests routine monitoring is the first priority. Small discreet one off sampling is too much.
    - Pat, with the 10 questions, last question was about the environmental factors affecting the lake, we put forth all of our ideas, but final version did not reflect that. Wondering what the scope is, all agree in concept there are ways and linkages. Not sure if this was being included, plays into anything to contribute. Lake Tahoe West, efforts to round up monitoring and summary, haven't seen what has been put together or what it encompasses. Will work with National Forest Foundation to work on getting a copy to Geoff and Alan. Needs to know if PSW has anything to contribute.
    - Geoff says there is recognition that the entire watershed is affecting the lake. For example, meadow monitoring, we don't want to know the results of the monitoring, just want to know if it is happening and duration.
    - Alan says past effort ended up being too long a list of items, and was not integrated in the way needed. Saw that integration being a legitimate part of what we're doing now. Use this phase 1 as the opportunity to bring those ideas back in and develop integration. Yes, a list that's being developed to be forwarded.
    - Pat for clarification. The forest and fire monitoring efforts, those would be of interest or might be?
    - Alan says if there's a list, then great we can look at it and pull out relevant parts. Assemble info individually and put some time and effort, you make the informed decision whether or not you think it's relevant to lake condition and water quality. Pat to potentially follow-up offline.
    - Geoff says next couple of weeks in this info, at same timeframe we will have working group formed. Take next 6 weeks to review, organize it, look for duplication (not expecting to find too much) primarily looking for gaps especially in the context of the question as that were asked of us. Produce draft document at that point with pre-draft recommendations. This will be mid-November, then

have stakeholder workshop, anyone from TSAC and various agency reps with interest in topic, NGOs and the like. Will present/produce something for people to react to, this is what's being done, this is what's missing, easy opportunities that take little to a lot of funding and get everyone's input. Based on outcome of that, create a final phase one report to be given to Secretary Laird and Director Crowell. Does that meet the needs?

- Todd says yes. Both Director Crowell and Secretary Laird are looking for input from science community relative to all water quality and TMDL activity in the basin. How can we do better with monitoring, with the available resources currently being used. What could we do differently if we were to restructure some of those? A la carte menu. We know what the universe is now, how to improve on that?
- Geoff inquires Agency reps who are here today, any thoughts on this proposed work plan?
- Bob says it is exciting and interesting. The TMDL is arguably most successful collaboration between agency and science. What are the questions we are trying to answer? Don't want to jump forward with more monitoring. What is goal and purpose? Seems what do we know about clarity what has changed about understanding of clarity since TMDL. Think of TMDL framework we invested bit of money and time $10 million and 10 years. There's a detailed conceptual model, predictive model, interested to know the gaps with respect to the current understanding and direction we are heading. Just a little daunting, being proposed as a cattle-call of all monitoring. From TMDL management perspective, like opportunity to participate in this process, clear implications for our policy, opportunity to have further discussions, loading assessments after TMDL, have lots of information and we understand the gaps. Seems like an appropriate step.
- Geoff agrees it does seem like a cattle call, but just trying to round up what information is there. We have 3 specific questions that science community felt data was unavailable to answer. Is it possible to answer the questions? Hopefully what will also emerge are other bigger questions.
- Bob says we haven't had the opportunity to revisit clarity model and put in context of what we know. Low targets set to achieve. Love an opportunity to have further conversation and wants to know the opportunity to participate, Geoff says Mid-November stakeholder meeting is set for that, but it does not preclude any other meetings, would welcome yours and all agencies and groups input to this process.
- Bob says priority for agency, will participate, and would appreciate before stakeholder meeting. Geoff notes this.
- Dan asks if there are plans to rerun clarity model as part of this exercise. This was used to developed TMDL. How well do predictions hold up with the current tools? Seems like model was designed to answer one of the unanswerable questions. How much worse clarity had it not been for the effort of EIP. Dan was surprised not to see this explicitly.
- Geoff says not planning to run clarity model as part of this project, not part of the scope, it is a tool that could be used. This project is to look at measurements being made. Can talk about data offline, about some of the data the clarity model that could address clarity data concerns.

- Dan says the scope of the call for data, what part of water quality you are trying to understand? Things that might not relate to clarity and trying to figure out an overall monitoring framework. Geoff says Agencies that fund monitoring decide higher priorities will lead to re-allocating funds. Always accused of asking for more and more funding. Once we answer what are the cost and what they yield, presumably will be able to make those decisions.
- Bob asks if the purpose is to address unanswered question or monitoring needs or existing monitoring? If we are trying to answer these questions, using framework and numeric model to do so, it makes sense, but this is not the direction being taken.
- Geoff says we are not running the model as part of this process. It may turn out that the consensus, we have all the monitoring we need, we might need to analyze it differently, use a new model, but the first charge was to look at monitoring overlap and gaps.
- Alan says this is the charge. Consider whether other things should be looked at. We are just looking at what is being done, ID critical elements that help answer lake ecosystem health questions, are there critical info gaps that we are currently not doing? With a focus on clarity, but we do want to look at overall health holistically. Looking to see what is done, identify critical elements that answer question about overall lake ecosystem health, and are there critical needs to advise management.
- Geoff says clarity was merely the catalyst. More to it than just clarity.
- Zach says think of it in relation to environmental quality many constituents come back to Lake clarity and are interrelated.
- Ramon, response to white paper, was this the only feedback? We need to understand ecosystem health and do we have the data to respond to that? Do we have an ecosystem health metric? Has one been established for Tahoe? You could say that clarity is a metric for ecosystem health but there are a lot of different components more sensitive. If we can't define what ecosystem health is, might be difficult to come up with a plan.
- Alan says that's what we are doing, moves beyond clarity. Not capturing what's going on. Cannot come up with a metric for ecosystem health. What do you need to be tracking to report about changes in the ecosystem health? Look at what is being done, identify what is appropriate and look at integrating across programs, discuss in a more integrated way rather than individual metrics. Is there anything important that we aren't doing? That's the a la carte part of this. Major gaps and find linkages to assemble those in some meaningful way to be presented to the agencies as basis for recommendations.
- Dan asks about process. Part of long-term monitoring contracts with TRPA, Lahontan and UC Davis with water quality monitoring. Looking for modifications targeted toward lake clarity, and more broadly towards lake health. Broader discussion within council efforts or separate effort?
- Geoff thinks, reporting on what is being collected for TRPA and Lahontan. Those items where we suggested changes from a to b. Those contracts are subsets, examples of existing monitoring going on in the basin. Dan asks if TSAC would be reviewing those and commenting recommended changes and checking on contents of contracts? Geoff says it could very well be.

- Zach asks what's the approach here? What are the monitoring programs trying to inform? Will the subcommittee be thinking about that as well? Thinking multi-pronged approach. Efforts to understand existing monitoring that could be useful and to clarify the questions that these programs should be or are intended to answer.
- Geoff thinks those three questions are starting points, if we have some conclusions or suggestions that are broader than those questions. That will be floated at internal mid-November workshop to get community feedback. We realize we have a perspective but agencies have specific needs too. Come up with solutions that meets agency needs and science scrutiny. Whatever comes out of this internal workshop, the plan after is to send out document for external review, external to the basin. So it gets peer-review and it may change on the basis of that to be brought back to the agencies and iterate on that solution.
- Ramon says he sees value in using the model as an informative tool to identify sensitive processes. We should be monitoring x but not sensitive to clarity or health, need something that supports the science recommendations. Obviously measuring fine sediments is one, are you doing enough? Other things sensitive that should be recommended for broader investigation evaluation for that parameter or process.
    - Geoff agrees, yes funding is being utilized but the data is not being used. Two states want to make sure that money is being used as efficiently as possible.
    - Alan says we don't need to run the model to know what is sensitive to change. Sensitivity analysis has been done before.
    - Made simplistic assumptions about groundwater. Annual inflow? USGS has done studies that may allow for some refinement.
    - Conceptual model that was developed for clarity. If we are reviewing as this effort in addressing clarity and understanding clarity it will be useful. But it sounds like it is a much broader discussion than just clarity.
    - Alan says feel free to join subcommittee, we will be moving this forward. Action item assemble information and useful data your institution have been doing routinely. Work with Alison to create template in excel to get out to members. Get back to us by Oct 1.
    - Zach says still need to get work order in place. We have master work order developed, but we need to complete individual work orders for the subcommittee members. Figuring out who is involved and then institution sign-off on individual budgets for each work order. Geoff out of country by 1st, but by then we will know who is involved and what is needed to support their involvement. No money flows until dates dialed in and contracts in place.
    - Good point, obviously some work orders can go into place quickly, others will take more time says Alan. Alans says we need institutional assignment document and work order. Then going thru bureaucratic channels.
    - Dan says we can issue work order quickly. If we identify a minimum allocation of time and/or resources for each agency that we know is going to be extended, we prefer to sign those work orders immediately get

people going then can issue a second work order when we identify who is doing the bulk of the work.
        - Zach and Alan can put together the master work order that Zach can submit for approval based on what has already been done. Send to Geoff to look at. Council members to participate. Early October period availability to finalize work order, member participation. Geoff will be back October 2nd, has email most of time when away.
        - Zach, says sounds like Bob is the Lahontan person to stay in communication with, Dan is TRPA rep, NDEP will be Jason says My-Linh. When planning this meeting, those three will be contacted.
        - CTC? Try to get a point person there. Patrick says you can try. Try Stewart Roll first.
        - Bob wants to be kept in loop before workshop given the intimate linkage to our TMDL program. Knows both Jason and he would like to be kept in loop.
        - Zach says think about times for subcommittee to work. Workshop Monday November 19th? hopefully won't cause too much grief. Not sure where the location will be. Alison to book room. ACTION
    - Regarding monitoring health. Responses to question was there feedback? Ramon asks.
    - Zach thinks the challenging questions are what we hear around the summit. Then we go back to everything else. The other bigger questions are still out there. It is a challenge. If 2018 clarity comes out good, the questions won't be retracted.
    - Zach encourages Bob and Jason to look at the Lake Clarity challenge, a 5-year average to get to 80 feet. Not very far away and a 5-year average is a big lift. Recommend what kind of info do you want in the next 8 years, questions that will come up related to that. Damned if you do, damned if you don't. If the Lake does better than the challenge then the regulated community may ask for relief: we have achieved the target so we can do less. If the lake does worse than the challenge, then why has the program failed: we've thrown this much money out there why can't you do it?
    - Bob thinks we are eager with the hope to meet both needs. Understand the question with respect to the idea with ecological health. Regulatory standard measuring for some time. Frame conversation to start there. There are climate change variables that we can't adequately assess. Start to incorporate into analysis. Use tools we have. Are we on track, do we need to pivot? The 2017 clarity was eye opener. Have good successful history of using science to manage/advise TMDL process. Looking to close the gap and align closer.

5. Substantive project updates[1]: Status and next steps (Various)

    - Data specification for adaptive management, continuing says Alan. A report has been produced, some edits will be made and sent out to Council members for

[1] Active projects: 1) data specifications for use in adaptive management (lead: Alan); 2) Decision support framework for the UTR (lead: Geoff); 3) technical evaluation of SEZ standards (lead: Steve).

review. Working with Pat to bring in decision support systems. Make part of next iteration of this. When Upper Truckee River is done, they will go in line together and can then go to phase two.

- Decision support upper Truckee River, led by Geoff. Update provided previously.

- SEZ standards led by Jerry Qualls and Steve Sadro. Wrapped up finally with last deliverable, the climate change brief. ~5 page summary about climate change impacts in the basin and wetlands how they might be affected. Waiting for feedback from Dan Segan. Was an interesting process, discussed with Ramon, a lot of analysis has been done some time ago.

- Dan Segan will send comments later today, mostly minor points of clarification needed. There is an evolving task of mapping historic SEZs. Something to include in the scope of the project moving forward. Task has evolved from just recommendations to working through a decision framework or a checklist as to what counts as historic loss. Looking for additional expertise to carry out map and validate it.

- Next meeting November 28th. Revision of EIP might be a worthy discussion says Zach. Another 10am-2pm meeting. Flex ending time based on agenda.

6. Council member updates on relevant science topics (Various)

    - Paul Work introduction: came from Sacramento works for USGS in California Water Science center. Previously in academia, Civil environmental engineering primarily fluid mechanics and sediment transport. Lead team in bay looking at turbidity discharge to get suspended sediment. His USGS team's work driven by invasive species related work, acoustic sensors for sediment and tracking fish movement through the Delta. Not too much time spent in Tahoe, but have lots of interest that can be related, including numerical modeling.

    - Geoff thinks Paul's expertise is going to be very beneficial.

    - Zach says Paul will be replacing USGS rep Ed Parvin.

    - Ed says as long as water quality monitoring continues to be discussed he will still be participating.

    - Geoff says plan is to determine who is interested in water quality monitoring assessment meeting. Expecting to hear from everyone whether they are able to participate or interested. And expectation on documents about monitoring. Just send an email if you don't know of any monitoring.

    - End meeting.