

Lake Tahoe Total Maximum Daily Load Stream Channel Focus Team Meeting Summary

September 11, 2007, 2:30 am – 5:00 pm

Session 1 objective: Discuss potential options for reducing stream channel sources of fine particles, nitrogen and phosphorus to Lake Tahoe

Meeting Attendees: Virginia Mahaceh, Craig Oehuli, Mike Rudd, Nicole Beck, Elizabeth Harrison, Cyndie Walck, Tim Hagan, Scott Carroll, Jennifer Quickel, Hannah Schembri, Kim Gorman, John Reuter, Chad Praul, Bob Larsen, Doug Smith, John Riverson, Larry Benoit, Jeremy Sokulsky, Jack Landy, Michele Sweeney (facilitator), Dave Roberts, Rebecca Bryson (note-taker)

Summary of the Presentations

Introduction and Opening Statements

The facilitator opened the meeting by explaining that that this was the first meeting of the Stream Channel Focus Team, comprised mainly of agency staff. She noted that there are three other focus teams meeting: Atmospheric Deposition, Urban and Groundwater, and Forest Uplands. The objectives of the meeting are:

1. To update the Focus Team on the latest TMDL-related research and answer any initial questions and clarify the materials presented,
2. To get feedback from the Focus Team on how the information is organized and presented prior to the first public presentation,
3. To receive input on potential options for reducing stream channel sources of fine particles, nitrogen and phosphorus to Lake Tahoe, and
4. To provide recommendations on additional research needed or policy matters raised by proposed pollution controls.

Water Board Presentation:

Bob Larsen, the Project Leader from the Lahontan Regional Water Quality Control Board (Water Board) gave a brief overview of the TMDL process and findings to date. This presentation and the most recent documents produced by the TMDL can be found at: http://www.waterboards.ca.gov/lahontan/TMDL/Tahoe/Tahoe_Index.htm.

Stream Channel Experts' Presentation

Virginia Mahacek, from Valley & Mountain Consulting, the leader of the Stream Channel SCG presented the team's findings. Their presentation is available at the URL listed in the previous paragraph. A summary of their analysis can be found in section 4.2 of the Lake Tahoe TMDL Pollutant Reduction Opportunity Report, also available at the URL above.

Question and Comment Session

Bank Stabilization vs Channel Restoration: Cyndie Walck pointed out that bank stabilization may be more effective at reducing erosion at a spot location; however, failure often occurs where the protection ends. Therefore, one would have to stabilize the entire channel bed to be effective. She suggested that the comparison of load reductions in Tier 1 and Tier 3 is not representative because while the stabilization effort may increase the bank's strength, it does not necessarily decrease the stream power and so it transferred the problem to the next non-stabilized stream reach.

Virginia pointed out that it was not possible to analyze the response of all treated/untreated areas. She noted that in general stone toe treatments are considered to be 80% effective at the spot and 50% overall. She stressed that these treatments are relatively cheap and if the team was to consider only the potential water quality impacts, this approach is considerably more cost-effective. She suggested that it is necessary to consider this approach in certain areas where restoration is constrained by property ownership or access issues.

She explained that because the funding did not come through in time for advanced CONCEPTS modeling, this remains one of the least understood aspects. She noted that the data from her team's analysis was the first attempt to consistently quantify application of PCOs in the streams (and it could only be validated for the entire stream level).

Here Virginia stressed that as part of the overall TMDL pollutant budget estimates, stream channel inputs represent only a small fraction of fine sediment particle. However, the costs associated with decreasing those inputs – even if the Channel Restoration approach is employed - are the most cost-effective when compared to the PCOs for other source categories.

Future studies/considerations:

- Need better quantitative monitoring data to improve the effectiveness of the BSTEM and CONCEPTS modeling approach. However if there is no data from field measurements, then it is not possible to validate the modeling results.

Cost/Benefit Ratios- Impacts to Wildlife: Jennifer Quickel asked for clarification regarding the water quality cost/benefit ratios for Tier 1, 2 and 3 improvements and asked about the implications of the cost/benefit ratios are in terms of wildlife impacts.

Virginia asked people to look at the table on the last page of the handout (below), which contained no actual values. For the top three streams, the average cost is \$30,000/MT under the Tier 1 (Channel Restoration) option. For the Tier 3 (Bank Protection Option) the average cost was about \$1300/MT. So, Channel Restoration is 30 times more expensive. She noted that these calculations were not per mile, but for the total (Cost/MT reduced). She clarified that the \$30,000 average is based on the numbers that for Blackwood, the estimated cost would be approximately \$28,000, Upper Truckee would be about \$44,000 and Ward would be about \$18,000 for an average of \$30,000. Jennifer

noted that she was less concerned about the total estimated costs, and more concerned with the potential impacts to wildlife and how that was not incorporated here. In fact the cost comparisons seem to strongly point to the Bank Protection as the most favorable option. Virginia reiterated that this analysis had focused only on water quality performance as per the charge and Water Board staff stressed that simply having this table does not mean that the Water Board will support Tier 3 Bank Protection implementation. It was agreed that the others values associated with stream restoration had not been calculated or included yet and that this type of assessment of the additional benefits would need to be part of future research.

Length of Stream Treated: Cyndie Walck asked about what percentage of each stream was anticipated to be treated under the bank stabilization option, and noted that she assumed that the full channel restoration would address a larger percentage of the stream. Virginia clarified that for both Tier 1 and Tier 3 treatments, the team assumed the same length of streambank would be treated for each stream. Therefore, the spatial scale is consistent. For Upper Truckee, they estimated that 11km would fall under the category of high to moderate failing of banks. For Blackwood, the number is 7km and for Ward 3 km. These numbers are held constant across treatment tiers. So, on the Upper Truckee, the team analyzed the impacts of using Tier 1 treatments to treat 11km of the Upper Truckee and then analyzed the impacts of using Tier 3 treatments on those same 11km.

Virginia explained, however, that the variation in the cost effectiveness of the PCOs is due to the fact that certain sections will involve different degrees of grading and construction to install and that will affect the costs. In addition, each stream reach produces varying degrees of FS (based on what percent FS there is/how high the banks are) so the reduction varies by stream reach as well and this affects the cost/benefit ratio.

She also explained that in the first cut of her analysis, she tried to be more realistic about including those areas that people had already proposed for full restoration vs. spot treatments. She found, however, that this approach exaggerated the cost difference. The reason for this was that full restorations were proposed in areas where the FS loads are not very high, but they are being proposed in certain location for other reasons, such as wildlife habitat. This approach thus overstated the costs in terms of water quality benefits.

The question was raised whether people agreed with the number that installing rip-rap would be 30 times less expensive than stream restoration. Cyndie Walck stressed that in her experience with the “hard” engineered solutions, wherever the bank protection efforts ends, the river will start unraveling it and there are costs associated with fixing the resulting problems. So even if a bank protection approach is used only on a portion of the stream, 100% of the stream may need to be treated in the future in response.

Virginia pointed out that even if you need to account for those additional costs, the two treatments would still be different by a factor of 10. She stressed that when it comes to water quality benefits the numbers are significant not only because the costs associated with bank protection are less, but also because the expected benefits – to water quality –

are significantly greater. Channel restoration efforts are estimated to reduce loads by 50% while Bank Protection is estimated to reduce loads by 80%. Therefore, it is not only about the total dollars spent, but also the relative benefits to water quality that are quite significant by Bank Protection. She concluded by pointing out that the good news is that there is now good, consistent information from the modeling the team conducted about what it costs to do these types of PCOs in the Basin; the more difficult issue is that no one has put a value on the other non-water quality related benefits.

Overlap with Other Source Categories: Mike Rudd pointed out that efforts to reduce stream loads through channel restoration may also help reduce loads from other sources. For example, recreating floodplains could serve as a sink for upland pollutants before they reach the Lake Tahoe. It may be important to add the value of PCO effectiveness relative to upland sources, but these improvements could be accounted under the upland source categories. Water Board staff noted that the TMDL will help evaluate these overlaps. The Water Board is not advancing any particular set of PCOs; they are simply trying to understand/illustrate what the water quality benefits of various types of PCOs would be and what some of the associated costs would be.

Relative Emphasis on Stream Channel Inputs: Since stream channel sources of sediment particles are relatively low, will there come a time in the TMDL process where the decision-makers decide that it is not useful to put time and resources into these efforts?

Virginia turned the conversation back to Cyndie's comment that the water quality impacts are not accurately represented. She acknowledged that the team was not able at this time - due to time and resource constraints - to study the response of treated versus untreated areas over time. Originally, the team wanted to use the CONCEPTS model to analyze how each stream channel would respond both spatially and over a sequence of hydrologic events into the future. She acknowledged that these limitations should be considered in any future judgments/decisions about what treatments should or could be done in the Basin.

However, she also noted that the literature on the effectiveness of stone toe treatments do show 80% effectiveness in terms of water quality performance and Channel Restoration efforts only show 50%. Even if these estimations change over time, the costs still remain quite different. The question for the land managers would be whether they really want to opt for the cheaper, more effective option based on the estimated water quality benefits, when it does not provide benefits to other resource areas. It was also pointed out that full channel restoration cannot be applied everywhere as there will be questions of whether the land adjacent to the stream is available in certain areas.

Capturing Upland Load Reduction Benefits: The Focus Team then discussed again the issue of how to capture the estimated load reductions from uplands sources due to channel restoration efforts. John Reuter stressed that he did not have a strong opinion on where it should be included in the TMDL, but that it would be very important to include. He suggested including it with some caveat that the funding was not available at the time

to study this concept in more detail, but that there is a need for further analysis of this issue in the future.

He asked if there was any data available from the CTC project on the rechannelization of the Upper Truckee River that has estimated water quality benefits that could somehow be incorporated into the report until better analysis is available. Bob Larsen noted that the Water Board has asked for this data and but has not received it. If the Water Board does receive questions about this issue, they can always respond that SNPLMA has studies underway to address this issue. Virginia noted that there is no other information out there about water quality and that the Upper Truckee project information will be the first data available.

She also noted that it is only possible to validate the data based on the outputs from the entire stream. There is no data yet that demonstrates the effect on water quality from one specific PCO/treatment option. It was noted that there are a few groups starting to work on this, but it would be misleading to say that someone/some group is currently analyzing this specific issue. John Reuter noted that it will be critical for each of the Source Categories to consider/point out the other benefits associated with the PCOs because the general public does not always make those connections and may just look only at the cost/benefit numbers.

Virginia explained that it is critical to gather more quantitative monitoring data of stream restoration sites because the performance estimates in the literature are so dramatically different – they ranged from <10% effectiveness to >85% for the same PCO. She also explained the costs do assume a certain amount of maintenance to restore bank protections/channel restoration efforts after large flood events, when necessary. Cyndie pointed out again that although these numbers may show 100% effectiveness at the point of installation, 50 feet down the stream, there may be major problems that are not accounted for in this calculation and the resulting analysis.

Virginia stressed again that while it is important, it will be difficult to monitor and collect data for these small-scale projects because there is no way to validate those numbers at a larger scale. It is not helpful to have more data at the project-scale when we cannot validate the numbers to that scale.

Future Studies/Recommendations:

- Need quantitative monitoring of stream restoration projects as a first step for studying many of the following issues and this monitoring is needed over a long time period so that a variety of conditions are captured.
- Non-water quality benefits need to be considered/evaluated; this could be true for other source categories as well (e.g. air quality benefits associated with decreased vehicle emissions)
- When/if funding becomes available for CONCEPTS modeling, the model should be used to evaluate the pollutant reductions associated with restoration (i.e. reconnection of floodplains)

- Use SNPLMA funding to further evaluate the benefits of increased overbank flooding, increased connectivity to the floodplain
- Ensure that potential load reductions of uplands sources related to stream channel restoration are captured somewhere in the TMDL report/analysis – either in this Source Category or one of the Uplands Source Category

Historical Sediment Delivery Rates: Phil Scoles asked whether historical sediment delivery rates have been calculated for Ward, Blackwood and Upper Truckee River and whether it is known how much the human influences factor into the sediment delivery rate. He was concerned about efforts to change loads from natural sources and interfering with natural processes. A participant noted that it is difficult to separate out the causes of disturbances. He also pointed out that when Andrew was here, he could not determine yet at which stage the watershed was in based on a 6 stage theory of river evolution.

Virginia suggested that this question also applies to the uplands sources and she asked whether this was discussed in the other Source Categories. She noted that whether or not to treat a specific source is a policy question. However, if the natural sources make the problem difficult to treat from an engineering perspective, then land managers may choose to not treat it – not because it captures natural sources, but because it is more difficult/costly to treat. In this case it is a technical question, not a policy question.

Here Cyndie Walck raised the question that if 80% of the current loads are “normal” or naturally occurring, then do we want to reduce the loads by 80%, or is 50% through channel restoration more appropriate and reflective of natural conditions. Virginia acknowledged that yes, these changes would lead to major decreases in all sediment sources, which is a trade-off that would have to be assessed.

Framing the Issue: Cyndie noted that while it is ok to present the numbers in this format to a technical group familiar with the trade-offs, she cautioned against presenting the data in this form to the public that might be more inclined to focus on the bottom line. A participant stressed that for this reason it is critical for the people participating in this meeting to attend the public meetings in order to raise these important considerations.

Sue Norman also pointed out that the information in chapter 6 should be included much earlier in the report and that this would ease people’s concerns because it discusses how the larger benefits of stream channel restoration should be considered. The TMDL team noted that this information is available in the Executive Summary of the Pollutant Reduction Opportunity Report. Sue stressed that it will be important for Water Board staff to help clarify the TMDL process because others are not as steeped in the process.

Positive Benefits: Craig Oehrli then announced that one major benefit of the analysis today is that it has already encouraged USFS to develop monitoring plans early in the project process. He is the project lead for the Blackwood project. In the past, they would have not considered the floodplain sediment modeling that they are now

considering in the pre-project phase and so this data will be available in the future. And interestingly, his team is also facing similar concerns about uncertainties and variables as mentioned here. He emphasized the need for further research to quantify the benefits of floodplain reconnection for reducing sediment and nutrient inputs from the UTR Blackwood/Ward watersheds overall.

Virginia noted that although the team was not charged with developing a model to evaluate how the stream channel PCOs might impact other Source Categories, her team did develop a conceptual framework for doing so, which can be found in the appendix of their report. Virginia ended on an encouraging note by concluding that having the numbers and the appendices of data with the standardized descriptions of PCOs should be very useful. As well as having regional-based, local estimates about how to scale costs is a valuable resource. Finally, her team's analysis has emphasized the need to have more quantitative data on a project scale.

Summary of Future Studies/Considerations

- Start collecting better quantitative monitoring data to improve the effectiveness of the BSTEM and CONCEPTS modeling approach.
- Determine a way to characterize/quantify non-water quality benefits; this could be applicable to other source categories as well
- Use CONCEPTS modeling as available to evaluate
 - additional load reductions in other source categories/upland areas resulting from stream channel restoration
 - additional benefits beyond water quality performance, where possible
- Assess water quality benefits associated with overbanking and increasing the connectivity with the flood plain

Next Steps

The facilitator thanked the Focus Team for their input and emphasized the importance of the Focus Team members' attendance at the follow up meetings outlined below:

September 27th 8am to 5pm: Pathway Forum Workshop

October 11th 8am to 5pm: TMDL Focus Team Meeting (with all Teams Together)

October 25th 8am to 5pm: Pathway Forum Workshop

December 6th: 8am to 5pm: Pathway Forum Workshop

February 7th: 8am to 5pm: Pathway Forum Workshop and Focus Team Mtg Final