STAKEHOLDER MEETING & WEBINAR TO DISCUSS PROGRESS AND INVITE INPUT ON MERCED RIVER RESTORATION STUDY

November 1, 2017, 1:00pm -- 4:30pm

Center for Collaborative Policy

815 S Street, 1st Floor, Large Conference Room, Sacramento, CA, 95811

Meeting Purpose : Update stakeholders on study progress and invite input related to next steps

Meeting Goals

- Develop shared understanding of the river study findings to date;
- Cooperatively develop criteria for evaluating mitigation measures designed to reduce the hydrological and geomorphic impacts of Sugar Pine Bridge (the "defined criteria for success," per MSRP, p. 8-215).

Recommendations and Next Steps

- If the project is funded for the remainder of the next and final phase of the study, proceed over the next year to define an array of potential mitigation measures, the degree these measures should benefit of the river, measurable attributes, and the thresholds for determining if these measures are in fact successful. Currently, the team has only sufficient funding to begin that work at a preliminary, conceptual level.

Meeting Highlights

- Derek Booth reviewed and answered questions on status of the study of Merced River Restoration, which is intended to deepen understanding of Merced River hydrology and geomorphology, develop restoration and mitigation options, and assess the degree to which those options will improve riparian and river conditions).
- While the genesis of this study was characterized by discussion of whether Sugar Pine Bridge might need to be removed, and whether there might be other river restoration activities that could achieve similar benefits, meeting participants do not particularly want to pursue direct with/without bridge comparisons at this point.
- Rather, meeting participants agreed that they prefer to defer to the UCSB Team on recommendations regarding how much river restoration work is "enough," including the choice of metrics for assessing effectiveness of potential mitigation measures.
    - The team from the University of California, Santa Barbara (UCSB) Bren School is focusing on geomorphic attributes, following broad agreement that available biological metrics are not particularly well-suited to this evaluation.
    - The UCSB team will also consider the factors of cost and time.

- The National Park Service must and will consider historical and cultural values of Sugar Pine Bridge in deciding how to proceed; however, the appropriate time to do is after this study is complete. This study focuses just on the natural science aspects of the situation.

Welcome and Opening

Dr. Marci DuPraw, Managing Senior Facilitator with the Center for Collaborative Policy, opened the meeting and webinar at 1pm. Dr. DuPraw introduced Associate Facilitator Stephanie Horii, who gave a brief explanation of the controls for the webinar system for those participating remotely. Dr. DuPraw then gave the floor to Mr. Joe Meyer, Chief of Yosemite National Park's Resources Management and Science Division, to review the context for this meeting.

Mr. Meyer welcomed everyone to this meeting and webinar. He noted that the National Park Service does not want to remove Sugar Pine Bridge; rather, it is focusing on how to keep the bridge and mitigate its effects. Citing the Request for Proposals that lead to the current study, Mr. Meyer reminded participants that the study is structured in four phases:

1. Evaluate scientific questions regarding the impact of the bridge;
2. Identify measurable attributes and thresholds for success;
3. Develop potential mitigation measures; and
4. Install and evaluate mitigation measures.

Mr. Meyer noted that the first of these phases is complete, and that the second one is in progress. He explained that, in addition to cooperatively developing criteria for evaluating mitigation measures to reduce the hydrological and geomorphic impacts of Sugar Pine Bridge at this meeting, stakeholder thoughts on bridge management options are also welcome. However, Mr. Meyer made clear that the National Park Service would not be making any decisions at this meeting – that in fact, decisions on these matters still may be years out.

Dr. DuPraw reviewed the agenda. She emphasized the importance of participation after the second presentation to elicit suggestions from participants regarding criteria to use in evaluating alternative ways of reducing the impacts of Sugar Pine Bridge. Dr. DuPraw also mentioned that the meeting was being recorded, and introduced Assistant Facilitator Corin Choppin, who would be taking notes to produce this meeting summary. Finally, Dr. DuPraw introduced Dr. Derek Booth, UCSB Principal Investigator, who gave both presentations for this meeting.

Merced River Study Findings

Dr. Booth presented the Merced River Study findings. (See Addendum 1 for Dr. Booth's slides.) The detailed study contains contacts who have worked on the project, the project timeline, slides that illustrate flow the geomorphology of this reach of the river and various restoration projects along the river.

Discussion:

- Question: Please clarify the riparian restoration elements illustrated by Slides 18-20.
    - Response: Any project of this kind requires the removal of nonnative invasive plants and replacement with fast growing species found along the river to prevent the soil from washing out. Slides 18-20 illustrate revegetation taking place between the logs in the photos (not the logs themselves). These areas have been planted with indigenous shrubs, ground cover, willow wands, alder and cottonwood.

- Question: Is the sediment seen in these slides tied back to the relatively recent rock fall event?
    - Response: The 1996 Happy Isles event was downstream of the confluence, so that event did not affect the area covered in the study. The stones in this reach are well rounded, although there are some angular rocks coming off the cliffs that will eventually get broken down. The vast majority of the sediment is fluvially processed.

- Question: Please elaborate on Slides 33 and 34, which show terraces along the river.
    - Response: The terrace is about 6 feet above the bottom of the river. (See yellow arrows in the slides.) This is more of a separation than you would expect to see between the active floodplain and river bottom. This raises the question of whether something has gone on in this river that has led to a pronounced episode of floodplain abandonment and thus terrace formation. The 1864 blasting of the El Capitan moraine may have been a factor, but likely does not explain it all. Human de-snagging efforts may be another factor; removing logs and debris for aesthetics or transportation reasons tends to "smooth" the river, leaving it with more energy to move sediment; this causes the river to etch a deeper groove into the river bottom. The river is unable to spread out across the floodplain as frequently as it formerly did.

- Question: Is it possible that ditches that were built to drain the floodplain, and/or the bridges, might have contributed to this phenomenon?
    - Response: Many things could have contributed to it, including visitor use, gravel removal from the bed of the river, and ditches that were dug to drain the area prior to putting in roads. However, the overall level of incision observed in this reach of the river did not arise from localized impacts, but rather systemic changes – most likely, very widespread de-snagging (e.g., removing thousands of downed trees from the river).

- Question: What would you expect the effect of flood events like the 1997 floods to have been on the channel (e.g., increased deposits or scouring)?
    - Response: Alluvial systems like the Merced River – i.e., those that create their own channel form -- are very resilient. You might see large changes the year immediately following a flood, but if you average out those influences over time, they tend to self-correct. Smaller, more common events have more effect on shaping the river than rarer, larger events. The most irrevocable change we see in systems like this occur if the river scours too far below its surrounding flood plain; then the flows can never get out. This forces all the water to stay in the river, even at high flows, and that creates a self-reinforcing feedback cycle. However, that is not widespread here to such an extreme degree.

- Question: What exactly happens as a result of de-snagging, which leads to incision?
    - Response: The water flows faster and transports correspondingly greater amounts of sediment. This can be buffered by riparian vegetation, and if you have more snags in the flow, much of the energy of the flow will run into snags and dissipate. Snags often dissipate more than half the energy of the flow. However, heavy visitor foot traffic can damage riparian vegetation and so reduce its effectiveness at lowering flow energy.

Criteria for Successful Mitigation

After a short break, Dr. Booth gave a second presentation to stimulate discussion on how to measure the effectiveness of potential mitigation projects. (See Addendum 2 for Dr. Booth's slides.) This presentation reflects the progression of the study from Phase 2 to Phase 3. It covered an array of possible approaches to mitigating the potential deleterious effects of Sugar Pine Bridge and various types of metrics that could be used to measure the effectiveness of mitigation projects (i.e., geomorphic, riparian, and biological).

Discussion:

- Question: Have logs been placed in many points along the river (as shown in the slides), or just a couple targeted spots?
    - Response: There are few areas of the river that would not benefit from some sort of treatment. Even if you were to try to do projects at all those locations, however, you could not do them all at once. When you start one, it needs to be built within one season. Thus, prioritization is vital. The most important spots are those where projects are needed to protect infrastructure. However, it is beyond the scope of this project to create a systematic prioritization of such locations. The Park Service has already engaged in much prioritization.

- Question: Regarding the bank lowering and floodplain reconnection slide, what kinds of flows might occupy the side channels shown?

- Response: Water moves into the lower elevations first. In the vicinity of Sugar Pine and Ahwahnee bridges, the lower channels can move baseball-sized gravel through. The higher elevations are wet and flowing, but they are perched above the riverbed, so they are not major sediment-carrying channels. Annual or semi-annual floods may not seem very dramatic, but over time are the primary determinants of the channel form. We study these processes in detail through hydraulic modeling.

- Question: Are quantitative or qualitative measurements better?
  - Response: Both quantitative and qualitative metrics have their place, depending on your goals. In the context of this study, Dr. Booth prefers qualitative metrics. In some of the early work on this project, the team considered hydraulic variables as possible measures of effectiveness; however, Dr. Booth sees hydraulic metrics as one means to an broader, more comprehensive end.

- Question: Is there a particular variable that is the driver for the health of the river?
  - Response: Yes – hydrology and sediment are the primary drivers for the health of a river. However, in this situation, we know that those variables are not impaired, by virtue of a largely undisturbed contributing watershed, and so we do not need to address their impairment in the study. In this situation, the geomorphic variables are the ones that most needs attention.

- Question: Is there funding available to implement a solution? Is cost a factor in selecting the mitigation measures in this situation?
  - Response: The National Park Service is not focused on cost or selecting mitigation measures at this stage; we are just studying the situation.

- Comments:
  - It might not be possible to use all the possible metrics – e.g., due to funding constraints. Therefore, it might be good to hone in on some key criteria.
  - The Park Service has consistently prioritized amphibians over fish -- partly due to the fact that the river contains "listed" amphibian species, but not listed fish species. We might want to prioritize amphibians over fish in the river as part of any selected biologic criteria.
  - Riparian area cover would be another biological criterion… plant diversity might not be as important.
  - It usually takes a longer period of time to gather data on biologic criteria than geomorphic criteria.
  - A biologic criterion would require a good baseline, which we likely do not have. We would need to establish a baseline before we could initiate any treatments if the goal was to document change.

- Question: When we started this process, people were asking the question whether we could improve the river by removing the bridge. Should we use that scenario as a point of reference for measuring the effectiveness of alternative mitigation methods – i.e., evaluate the changes in riverine conditions if the bridge were to be removed and then look at tools to produce a net improvement to the river that exceeds what we projected would occur by removing the bridge?
    - Response: If you picture the river either with or without the bridge, and reflect on some of the mitigation measures that we are examining, it feels as though we would be comparing apples to oranges. Dr. Booth prefers to consider multiple treatments that could increase the health of the river rather than zero in on one mitigation approach targeted on matching or exceeding the effects of removing the bridge.

- Comments:
    - It would be difficult to turn things back to a natural state, considering that the bridge is such a popular spot. I would favor qualitative metrics that combine natural values with the scenic beauty that the bridges enhance.
    - Bridges have a cultural value; the Park Service's goal is to protect and retain them. The goal of this project is to improve river conditions while maintaining the cultural values of the bridges. We cannot forget the cultural component when we choose criteria.
    - The mandate for the study is framed around "river values," which includes riparian and water quality.
    - There is also a requirement to minimize negative effects before mitigating.
    - The original goal of the study (in the Merced River Plan) was to study the extent of impacts associated with the bridge. There is a legal mandate to follow the Merced River Plan.

Dr. Booth observed that there are two different dimensions to what we need to do: 1) determine how we should characterize and quantify the benefits that are likely to accrue from a holistic restoration approach; and 2) Determine how we will know when we have done "enough" – i.e., relative to what? The easy approach would be to model what would happen if we removed the bridge. However, all meeting attendees expressed discomfort of pursuing such a cut and dry comparison. All attendees agreed that they prefer to look to the UCSB team's expertise and recommendations as to what is "enough."

Concluding Comments

Dr. Booth highlighted next steps in the study. He anticipates that it will take approximately one year to define an array of potential mitigation measures, the degree these measures should benefit of the river, measurable attributes, thresholds for success, and associated metrics for determining if these measures are in fact successful. Currently, the team has only sufficient funding to begin that work at a preliminary conceptual level.

Mr. Meyer offer four points in closing:

1. Bridges have historical value, are nationally registered properties, and are part of the historical Outstandingly Remarkable Values of the Merced River;
2. The goals for this study are anchored in the MRP;
3. When describing aspects of the river, we need to be careful with words such as "impairment,"" degradation," "derogation," and "adverse impact," as those words and phrases have specific legal meanings.
4. The Park Service wants to focus on improving conditions of river values, rather than discussing removal of bridges.

Participants

1. John Buckley, Central Sierra Environmental Resource Center
2. Kitty Henderson, Historic Bridge Preservation
3. Brian Turner, National Trust for Historic Preservation
4. Greg Stock, National Park Service
5. Jim Roche, National Park Service
6. Kimball Koch, National Park Service
7. Madelyn Ruffner, National Park Service
8. Kathleen Morse, National Park Service
9. Joe Meyer, National Park Service
10. Derek Booth, UC Santa Barbara

Facilitation Team

1. Marci DuPraw, Center for Collaborative Policy
2. Stephanie Horii, Center for Collaborative Policy
3. Corin Choppin, Center for Collaborative Policy