Trinity River Restoration Program

Decision Support System Workshop

March 29-31, 2016

Supplemental Materials

Trinity River Restoration Program Goals and Objectives

Big Questions and Objectives Workshop Summary

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TRRP DSS Workshop

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Trinity River Restoration Program – The Big Questions

Introduction

Collaborative, large-scale, and long-term natural resource projects face many challenges to implementation. Technical complexities, budget and logistical constraints, and competing objectives all make it difficult to effectively implement adaptive environmental assessment and management (AEAM). It is easy to become caught up in the technical details of smaller, more tangible tasks whereas it is difficult to make decisions in relation to broader scale tasks that may involve interaction across a variety of components and have larger implications on the program as a whole. A guidance strategy that has been found useful by a variety of programs is to articulate a short list of key questions or decisions (e.g., EPA Data Quality Objectives approach (US EPA, 2000), Skaha Lake re-introduction 'Big Questions' (Alexander and Pickard, 2009), and the 'Platte River Implementation Program 'Big Questions' (Smith et al. 2011)) which help to focus the direction of the program.

A short list of Big Questions for the Trinity River Restoration Program (referred to hereafter as the Program) should improve focus and guide all aspects of the overall AEAM Program including: design, implementation, monitoring, synthesis, data management, and communication. The questions are a reminder of the big picture, (i.e., what is the point of the Program) which can often be forgotten when dealing with technical details. If used to guide all technical working groups, these questions provide a common focus that will facilitate integration among these teams. This approach forces managers to think about how data will be used before they are collected, rather than asking what questions can be answered after the data are collected. They provide a useful framework for Program reports thereby improving the ability to communicate complex scientific hypotheses, analyses, and results across technical teams and to the Trinity Management Council (TMC), Trinity Adaptive Management Working Group (TAMWG), and public. The Big Questions do not replace any of the existing work done by the Program. Rather they provide an overall umbrella under which all aspects of the Program operate and report back to.

This report describes the approach used to generate Big Questions for the Program, proposes a short list of Big Questions, and suggests how the Program should use these questions.

Approach

The questions should relate directly back to management decisions so as to catalyze adaptive management loops. They should be seen as an integrated set of questions and not taken independently. They should be flexible enough to allow for the evolution of greater specificity of objectives. They should be broad enough to guide all aspects of the Program. They should not simply be a bottom up aggregation of the Integrated Assessment Plan (IAP, 2009) assessments. The questions should be straightforward, using plain language to communicate the central questions of the Program.

Stepping back and reflecting on the primary goals and uncertainties of the Program led us to propose two categories of Big Questions. First, a short set of questions derived directly from the Record of Decision (2000) as well as the more recent Master Final Environmental Impact Report (FEIR) (reference). These long term questions are focused on the scale of the 'Program as a whole'. Questions at this scale are essentially 'permanent' (within the world of the Program) as they will remain consistently relevant over time. While still incorporated into the AEAM framework these questions may require evaluation over long time scales (e.g. 20 to 30 years).

The second category of questions, are evaluated on a shorter time-scale. These are focused on high priority current uncertainties, and should have an associated management action. These short term questions are meant to motivate a frequent evaluation of critical management uncertainties, leading to an adjustment of future actions. This should involve a comparison of observed outcomes to predicted responses and specific objectives. Such questions are considered 'temporary' (within the world of the Program) as they are expected to be asked and answered within defined, relatively short time frames (annual to 5 years).

BIG QUESTIONS

The "Big Questions" (Table 1) identify critical uncertainties that are at the heart of the Program's need for AEAM implementation and should form the basis for testing of Program management strategies. All Program actions should be directed toward answering these "Big Questions". The Big Questions were not organized by priority, but rather by temporal sequence and/or discipline. For example, fish habitat is mentioned before fish production because it is hypothesized that fish habitat must be restored before the fisheries objectives can be met.

TABLE 1. THE PROGRAM'S "BIG QUESTIONS"

Long term questions (Spatial Scale: upper 40 miles[1]; Temporal Scale: 20 to 30 years)
1. Are Program actions rehabilitating the river itself, restoring the attributes that produce a healthy alluvial river system?
2. Are Program actions on track to produce a sufficient area of suitable salmonid rearing, spawning, and adult holding habitat to meet Program objectives?
3. Are Program actions increasing natural production of healthy salmonid smolts, and on track to meet Program objectives for natural: smolt outmigrants, escapement, and harvest?
4. Are Program actions sustaining or enhancing the riparian community structure including: vegetation, fish, and wildlife?
5. To what extent do in-basin and out-of basin factors beyond Program control (e.g., extreme climatic events, hatchery practices, lower Klamath conditions, marine survival) influence the system's response to Program actions?
Short term questions **(Spatial Scale: variable; Temporal Scale: annual to 5 years)**
6. Which channel rehabilitation actions are most effective at creating and maintaining fish habitat?
7. Are flow and sediment actions meeting annual objectives for each water year? a. Are flows and volume of coarse sufficient to create and maintain fish habitat?

[1] With the exception of Big Question 5, where the spatial scale encompasses the entire life-history.

b. Are flows creating conditions necessary for fish survival across life stages (e.g. temp, velocity, depth)? c. Is fine and coarse sediment effectively routed through the system?
8. Are watershed restoration actions and sediment ponds effectively reducing fine sediment introduction to the Trinity River?
9. How are Program actions impacting wildlife populations within the Program area?
10. Is the Program effectively implementing Adaptive Environmental Assessment and Management (AEAM)?

Long Term Questions

1. **Are Program actions rehabilitating the river itself, restoring the attributes that produce a healthy alluvial river system?**

   Program management actions (i.e., flows, sediment management, watershed restoration, and mechanical actions) are intended to increase fluvial geomorphic processes to prevent detrimental riparian encroachment and increase the topographic and structural complexity of the river channel through time (e.g., IAP Objectives 1 and 5). Together, these management action outcomes are expected to increase and maintain high quality fish and wildlife habitat. This question is focused on alluvial processes while Questions 2-4 are outcome focused.

2. **Are Program actions on track to produce a sufficient area of suitable salmonid rearing, spawning, and adult holding habitat to meet Program objectives?**

   The current quantity and quality of available habitat within the upper 40 miles is thought to limit natural production. Program actions are intended to restore the aquatic habitat conditions necessary to meet natural production objectives for salmonids (e.g., IAP Objective 2). Rearing habitat was identified as the critical bottleneck at the time of the Trinity River Flow Evaluation Study (TRFES, 1999) and therefore is the priority focus for rehabilitation. However, as the river restoration progresses other habitat needs could potentially become limiting.

3. **Are Program actions increasing natural production of healthy salmonid smolts, and on track to meet Program objectives for natural: smolt outmigrants, escapement, and harvest?**

   The cumulative effects of Program actions are intended to result in improved spawning, incubation and emergence success, as well as increased growth rates, size at age and juvenile production of salmonid populations (e.g. IAP Objective 3). Increased natural production will be necessary to achieve both Program adult escapement targets and the desired restoration of harvest opportunities to affected tribal and non-tribal fisheries (e.g., IAP Objective 4).

4. **Are Program actions sustaining or enhancing the riparian community structure including: vegetation, fish, and wildlife?**

   Combined Program actions are intended to promote patchy, diverse, heterogeneous riparian vegetation throughout the river corridor on constructed and naturally created floodplains while reducing detrimental riparian encroachment. This should provide useable habitat for riparian and aquatic birds, and other target wildlife species (e.g., IAP Objective 5). Enhanced aquatic and riparian habitat complexity is expected to benefit target wildlife species, maintaining (or even increasing) population abundances and (for riparian and aquatic birds) species diversity (e.g. IAP Objective 6). Additionally, healthy floodplain forests is part of the restoration strategy that will influence channel morphology, provide nutrients to the river, cover for fish, cool air and water temperatures, providing desirable water temperature variability (off-channel habitats, alcoves, etc.) and ultimately benefit all riverine and riparian dependent organisms.

5. **To what extent do in-basin and out-of basin factors beyond Program control (e.g., extreme climatic events, hatchery operations, lower Klamath conditions, marine survival) influence the system's response to Program actions?**

   There are many in-basin and out-of-basin factors that are outside the direct control of the Program that could affect habitat responses or negatively influence the productivity of Trinity River native fish or wildlife populations. While the Program may not be able to manipulate

these factors it is important to incorporate these factors in synthesis these factors, they must be considered during analysis and interpretation of results to ensure that effects resulting from Program actions, are not obscured.

Short Term Questions

6. **Which channel rehabilitation actions are most effective at creating and maintaining fish habitat?**

   Channel rehabilitation projects should be regularly assessed to evaluate the relative success of the different design elements (e.g., alcoves, berm notches, side channels, high flow scour channels, flattened tailings, terraces etc.) and the overall rehabilitation site design in creating and maintaining fish habitat. Such evaluations are critical for informing design decisions around yet to be constructed rehabilitation sites, or for tweaking existing designs of rehabilitation projects that have already been implemented.

7. **Are flow and sediment actions meeting annual objectives for each water year?**
   a. **Are flows and volume of coarse sediment sufficient to create and maintain fish habitat?**
   b. **Are flows creating conditions necessary for fish survival across life stages (e.g. temp, velocity, depth)?**
   c. **Is fine and coarse sediment effectively routed through the system?**

   Regular evaluation of scheduled flows and coarse sediment augmentation is required to assess whether the combination of recommended flows and sediment augmentation is achieving its full range of intended functions (e.g., in high flow water years scour and mobilize the channel bed, transport coarse and fine sediment through the mainstem, maintain/expand created habitat at channel rehabilitation sites, initiate bank erosion in other areas of the river, etc.; in all water years provide seasonal flows and habitat that can sustain all life stages of fish and target wildlife populations).

8. **Are watershed restoration actions and sediment ponds effectively reducing fine sediment introduction to the Trinity River?**

   Reducing fine sediment in the Trinity River is expected to improve the survival and development of salmonid eggs. Sediment ponds are used to trap fine sediment from tributaries preventing it from entering the Trinity River. Upslope watershed restoration projects (e.g., road decommissioning) throughout the basin are expected to reduce the source of fine sediment.

9. **How are Program actions impacting wildlife populations within the Program area?**

   Program actions (i.e., flow, sediment management, rehabilitation site construction, or watershed management) are expected to have a long term beneficial impacts on wildlife populations, however there may be short-term detrimental impacts which need to be mitigated to ensure the benefits are realized.

10. **Is the Program effectively implementing Adaptive Environmental Assessment and Management (AEAM) as per the Record of Decision?**

    AEAM is a core component of the Program strategy. Adaptive Management principles should be incorporated into all facets of the Program at all scales (e.g., setting targets, evaluating management actions, and the Program as a whole). Is the Program implementing each of the components of an AEAM Program adequately?

    The components of an AEAM Program:

    - Define measureable goals and objectives;
    - Document/evaluate baseline conditions with respect to goals and objectives;
    - Develop testable hypotheses of how to achieve goals and objectives through management actions;
    - Predict river response to management actions before implementing management actions;
    - Implement, monitor, and evaluate management actions;
    - Re-evaluate objectives, refine hypotheses, improve models, and improve management;

- Continually self-examine AEAM science and management via external peer review.

Recommended Next steps

While the Big Questions are intended to provide overall focus for management actions, they are insufficient on their own inform decisions about the allocation of Program resources for monitoring. Several important steps should be incorporated into future investigation plans.

1. **Identify which Big Question is being addressed**

2. **Identify specific uncertainties within the Big Question and describe how reducing these will help to answer the Big Question**

3. **Identify and describe the data needs to address this uncertainty**

4. **Define quantitative targets for the question**
   Targets are a necessary part of an AEAM framework. Without clear targets, it is impossible to determine the monitoring effort required to evaluate each of the Big Questions. Targets imply the spatial and temporal scale at which monitoring needs to occur and the level of effort or precision required. The targets themselves may require periodic testing and re-evaluation.

5. **Quantitatively describe the spatial / temporal bounds of the problem including the expected response time**
   This information is critical to informing the spatial and temporal scale of the monitoring design which has significant implications for the allocation of effort. How frequently should monitoring occur? At what scale should data be collected (e.g., rehabilitation sites or system-wide)

6. **Document and quantify the precision necessary to adequately answer the question or uncertainty**

How well do you need to answer the question? This depends on the target or effect size you would like to be able to detect. Generally speaking it takes less effort to be able to identify a big change. However, for some of the shorter term questions that are trying to address uncertainties in the management actions, it may be important to be able to detect smaller changes to ensure the Program is tracking in the right direction.

7. Integration of assessments

Identify important linkages among assessments and be aware that in some cases an 'orphaned' assessment may provide little or no value as a stand-alone evaluation, although when paired with several others it is very useful. Funding decisions should acknowledge these relationships.

8. Describe the expected outputs and corresponding analyses

What would you do with the data if you had it? This is a useful exercise to ensure that all the necessary data are collected to complete the analyses and that none of the data are unnecessary. This is also useful to ensure that the outputs resulting from the monitoring will actually help to answer the Big Question. Because a particular dataset has always been collected is not a sufficient justification for it to continue to be collected.

9. What are the implications of different outcomes?

What would you do differently if you reduced this uncertainty? Would you adjust a management action (e.g., flow, sediment, or rehabilitation site construction)? Would you revise your sampling design (e.g., spatial scale, frequency, or intensity)? Would you revise your targets? Would you revise your performance measures or analytical approaches?

10. Synthesis report

It is recommended that the Program's annual report include: 1) a summary of what was done in the current year; 2) a summary of performance measures (current year and historical); and 3) a synthesis section which describes how the results of all of the

individual activities and assessments come together to tell a story about the Big Questions.

The recommended next steps are derived both from experiences in the Trinity River Restoration Program and with many other large complex monitoring projects. The process of addressing these steps will provide sufficient detail to decide on the appropriate allocation of resources. In other words, how much effort will it take to answer the question, at the right spatial and temporal scale, with sufficient precision? While all of these steps are important, in many cases they won't all be able to be addressed immediately. When a step can't be addressed immediately (e.g., due to a lack of quantitative targets), it then becomes the focus of the current investigation plan. For many assessments the IAP already addresses steps 3, 5, & 7 however in most cases steps 4, 6, & 8-10 have not yet been formally incorporated.

References

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TRRP Objectives Workshop

Meeting Summary
Trinity River Restoration Program (TRRP) Objectives Workshop
Trinity County Library, Weaverville, CA
May 22, 2013

Participants

U.S. Bureau of Reclamation (USBR): Robin Schrock (TRRP Executive Director), DJ Bandrowski (TRRP Implementation Branch Chief), Andreas Krause (TRRP), Rod Wittler (via teleconference)

U.S. Fish and Wildlife Service (FWS): Ernie Clarke (TRRP Science Coordinator), Joe Polos, Nicole Athearn, Charles Chamberlain

Hoopa Valley Tribe (HVT): George Kautsky, Robert Franklin, James Lee

Trinity County: Judy Pflueger

Yurok Tribe: Tim Hayden, Aaron Martin

California Department of Fish and Wildlife (CDFW): Andrew Jensen, Wade Sinnen, Steve Cannata (via teleconference)

California Department of Water Resources (DWR): Scott Kennedy

U.S. Forest Service: Bill Brock

National Oceanic and Atmospheric Administration (NOAA) – National Marine Fisheries Service (NMFS): Seth Naman, Ann Garrett, Wes Smith

Atkins: Tom St Clair (facilitator), Rebecca Burns (note taker)

Pre-Workshop Preparation

The email announcement for the workshop (Appendix A)invited attendees to two webinars on the Integrated Assessment Program (IAP) objectives and the structured decision making (SDM) process. These webinars were held on May 8 and May 10, 2013, respectively, and the presentations are included as Appendix B. The email announcement also included a pre-workshop assignment for attendees to identify the purpose of each of the IAP objectives in order to identify any redundancies and separate fundamental and means objectives. The pre-workshop assignment is included as Appendix C.

Desired Outcome

A refined, consolidated list of objectives that distinguishes between fundamental and means objectives.

Summaries for Agenda Items

1. **Introductions, Meeting Objectives, Ground Rules and Agenda Review**

Ernie Clarke opened the workshop by welcoming everyone and introducing Nicole Athearn, Tom St. Clair and Rebecca Burns, the workshop facilitators.

Tom St. Clair asked everyone to introduce themselves, then presented the workshop objectives, and ground rules and expectations (Appendix D) and reviewed the workshop agenda (Appendix E).

2. **Lessons Learned from other Adaptive Management Applications**

The purpose of this agenda item was to present lessons learned from other natural resource management programs on defining and specifying objectives, including explicitly stating stakeholder objectives.

Tom St. Clair presented a brief example from the Comprehensive Everglades Restoration Program (CERP) where the purpose of an established restoration project was modified, resulting in the need to reevaluate the project's objectives.

Rebecca Burns presented lessons learned from four case studies that were included in the Decision Support System (DSS) Literature Review Atkins recently prepared for the TRRP. The presentation is included as Appendix D.

Robert Franklin and Wade Sinnen questioned the purpose and relevance of presenting these examples, given that the TRRP has already defined its objectives. Tom St. Clair responded that these examples were presented so that attendees could recognize the challenges that other programs have faced in specifying and reevaluating objectives. Robert Franklin pointed out that stakeholders were not represented at the workshop to define stakeholder objectives. Robin Schrock responded that the Trinity Adaptive Management Working Group (TAMWG) was invited to the workshop, but they opted to leave this process to the technical staff and are more concerned with implementation (i.e., the way projects are built to meet objectives). Stakeholder concurrence and involvement was added to the "Parking Lot" of topics to be addressed later.

3. **Brief Introduction to Structured Decision Making**

Nicole Athearn presented an overview of structured decision making and adaptive management, including the characteristics of fundamental objectives, the difference between fundamental and means objectives and the role of monitoring in restoration programs (Appendix F).

Wade Sinnen asked how ambiguous objectives could be grouped and evaluated to determine sensitivity to management alternatives. Nicole Athearn explained that subjective and less tangible objectives can still be measured by asking the proponent to develop a scale (e.g., a teenage boy developing a "coolness" scale to evaluate car options). She added that collaborative processes involving stakeholders, as well as legal mandates and other factors determine which objectives are fundamental depending on the values of the decision maker. George Kautsky asked about the process to assign weights to objectives. Nicole Athearn said the weighting process is absolutely necessary and there are many ways to do this, which all involve discussions with decision makers to obtain concurrence. This topic was added to the "Parking Lot."

4. **Review Results of Pre-Workshop Assignment and Determine Fundamental Objectives**

Tom St. Clair began by asking attendees for their observations on the pre-workshop assignment. James Lee noted that there are other purposes not reflected in the existing objective lists, some which were alluded to but not captured completely. Robin Schrock pointed out the many redundancies resulting from multiple versions of the same objective depending on the author and their discipline. Judy Pflueger agreed and said many of the objectives could have been consolidated, but were split due to wording preferences. Tim Hayden explained that the IAP was written by many authors and its very structure lent itself to organizing the objectives in this manner.

After receiving the completed pre-workshop assignments from a majority of attendees (completed by staff from HVT, FWS, NOAA-NMFS, CDFW, Yurok Tribe, USBR and DWR), Nicole Athearn compiled all of the responses and developed a spreadsheet to summarize the results (Appendix G). Nicole explained the process by which she summarized the information as follows:

a. Consolidated the objectives provided as the purposes for each objective and also included a tally row above each one to indicate how many people gave that as a response. If it is blank, then only one person did.
b. Summarized objectives by how many other objectives had it listed as a purpose, and sorted those from high to low to identify the most popular objectives (i.e., those that were chosen most often).
c. Picked the top 15 objectives (by considering what was a good natural break, which was those with 20 or more objectives citing them), and highlighted those in yellow to consider as higher-level objectives.

Nicole then reorganized the objectives into a new hierarchy, organized by the primary (i.e., most popular) "purpose" objectives identified in the responses (Appendix H). This hierarchy includes Nicole's notes (in purple) to explain her rationale, but no objectives were deleted or reworded. The results of this assignment, as organized by Nicole, identified two fundamental objectives that can be loosely summarized as (1) Facilitate harvest and (2) Restore an ecologically functioning river system, as well as one major group of means objectives related to physical habitat.

Nicole noted that the following objective, which is summarized as the "Facilitate harvest" fundamental objective, had the highest degree of consistency among the respondents:

> Restore adult anadromous fish numbers to pre-Trinity River Dam levels in order to facilitate dependent tribal, commercial and sport fisheries full participation in the benefits of restoration via enhanced harvest opportunities

Wes Smith noted the wording implies that restoring fish numbers is a means objective to facilitate harvest; however, this may not have been the intention of the original authors since the goal of the program is to restore fish numbers. Tim Hayden said the IAP authors recognized that harvest can be facilitated in many different ways so they worded the objective to be specific about how that should be accomplished. There was discussion among the attendees on whether facilitating harvest is a

fundamental objective of the TRRP. Andreas Krause summarized a statement from Jim Peterson's presentation at a symposium held in February regarding how to separate a fundamental from a means objective. He asked the question: if the Program was successful in restoring all of the qualities of a functioning river system, including increased fish numbers, but did not facilitate harvest, would it be successful? In his mind the answer is no and thus harvest is the fundamental objective. Nicole Athearn reminded attendees that there can be multiple fundamental objectives, some of which can be secondary to the primary goal of the Program. Judy Pflueger stated that harvest is a result of the fundamental objective to restore the fish in the river.

5. **Lessons from Klamath Objectives Hierarchy**

The agenda was modified to skip this item and allow more time for discussion of the TRRP fundamental and means objectives. Nicole Athearn's presentation on the Klamath objectives hierarchy is included as Appendix I.

6. **Revise Objectives: Sessions 1, 2 and 3**

Identify Fundamental Objectives

For the remainder of the workshop attendees discussed the fundamental objectives of the Program. George Kautsky asked how the hierarchy created from the pre-workshop assignment differs from the hierarchy in the IAP. Nicole Athearn explained that the exercise identified that some of the six level 1 objectives in the IAP are actually means objective, so there are differences at the highest level of the hierarchy, but the lower levels remained intact.

There was significant discussion among the attendees on whether there are one (restore fish populations) or two (restore fish populations and a healthy river system) fundamental objectives of the Program or whether restoring a healthy river system is a means to restoring fish populations. With a single fundamental objective to restore fish populations, the wildlife/riparian means objectives in the IAP do not fit into the hierarchy; however, they would be encompassed in a healthy river system objective. Robert Franklin explained that the fundamental objective from the Hoopa Valley Tribe perspective is to restore the health of the river which produces fish. Tim Hayden agreed with two fundamental objectives and said there is still ambiguity in defining "harvest."

Joe Polos pointed to Figure 2.1 of the IAP which shows how the objectives link to one another and suggested that the highest level box in the figure is the fundamental objective or overarching goal of the Program:

> Restore and sustain natural production of adult anadromous fish populations downstream of Lewiston Dam to pre-dam levels, to facilitate dependent tribal, commercial and sport fisheries full participation in the benefits of restoration via enhanced harvest opportunities. The TRRP strategy for accomplishing this goal restores and perpetually maintains fish and wildlife

resources (including T&E species) by restoring the processes that produce a healthy alluvial river system.

DJ Bandrowski agreed that this is the fundamental objective and the six level 1 objectives in the IAP are means objectives. Nicole Athearn noted that this includes multiple fundamental objectives and when a decision needs to be made based on how well alternatives meet the fundamental objective, it is unclear how important one objective is versus another. Wes Smith noted that fundamental objectives can be separated from the overarching goal and metrics can be developed as needed, but otherwise the goal can be left as is. Ernie Clarke agreed with this idea and emphasized the importance of portraying a consistent picture of the Program's objectives.

George Kautsky and Robert Franklin questioned how these objectives will be used as part of a potential DSS. George noted that the complexity of modeling and analysis increases exponentially with the number of objectives. He also raised the issue of the consequences of the DSS on the monitoring program. These topics were added to the "Parking Lot" and will be discussed within the context of the DSS.

Andreas Krause advocated for two objectives: one focused on fish production, one related to inherent value of healthy ecosystem, which includes other objectives, such as wildlife, that are not as important to the Program as fish. There was discussion of a single overarching goal with two fundamental objectives, as stated below:

- **Overarching Goal:** Restore and sustain natural production of adult anadromous fish populations downstream of Lewiston Dam to pre-dam levels, to facilitate dependent tribal, commercial and sport fisheries full participation in the benefits of restoration via enhanced harvest opportunities. The TRRP strategy for accomplishing this goal restores and perpetually maintains fish and wildlife resources (including T&E species) by restoring the processes that produce a healthy alluvial river system.
- **Fundamental Objectives:**
    - Restore and sustain natural production of anadromous fish populations downstream of Lewiston dam to pre-dam levels.
    - Restore the processes and attributes of a healthy alluvial river system.

Two concerns were raised with the proposed fundamental objectives. Steve Cannata raised concern about including the phrase "pre-dam levels," given that historically most of the spring Chinook and coho salmon production occurred upstream of the dam. His understanding of the TRRP goal is to restore habitat for anadromous fish downstream of the dam, but it may not be to pre-dam levels. Several attendees noted that the goal of the mitigation hatcheries is to produce salmonids upstream of the dam. Robin Schrock noted that the targets for spring Chinook and coho salmon numbers are established pre-dam levels for the entire Trinity River that included the area above the dam.

Ann Garrett raised concern about removing harvest from the fundamental objectives, stating that since it is a goal of the Program it should be explicitly stated. Robin Schrock responded that the fundamental objectives are things that the Program can influence and since the TRRP does not manage fisheries (e.g.,

set quotas for harvest), harvest should not be included as a fundamental objective. Nicole Athearn added that, in a DSS, the fundamental objectives include all stakeholder objectives that are considered during decision making and harvest could be included in that category. Attendees agreed to keep the two fundamental objectives as is and include a placeholder for stakeholder objectives (to be determined at a later date) that includes facilitating harvest/fishing.

Eliminate Redundancies

Nicole Athearn quickly summarized her observations on redundancies among the IAP objectives. Different work groups developed the level 2 and 3 objectives in the IAP, resulting in objectives that are related but slightly different from one another. For example, the Fish Work Group established objectives for minimizing impacts to various species, whereas the Physical WG developed related objectives for sinuosity, substrate patch diversity, etc. There are opportunities to consolidate these objectives by specifying fish needs, which then become targets for the Physical Work Group. Nicole also noted that the Conceptual Models Report identifies objectives that were not included in the IAP.

7. **Post-Workshop Activities**

This portion of the agenda was reserved for developing plans to identify linkages between objectives and management actions, and develop quantitative metrics for each objective, the third and fourth objectives of the workshop. The work groups will be responsible for completing these activities, with coordination by the Interdisciplinary Team (IDT). Ernie Clarke said he will work with the Work Group Coordinators to develop a realistic schedule for completion.

8. **Wrap-Up, Review Outcomes and Next Steps**

The four action items for the work groups that emerged from the discussion were:

1. Reduce redundancies among means objectives;
2. Review the Conceptual Models Report to identify any missing objectives;
3. Identify linkages between objectives and management actions; and
4. Develop quantitative metrics for each objective.

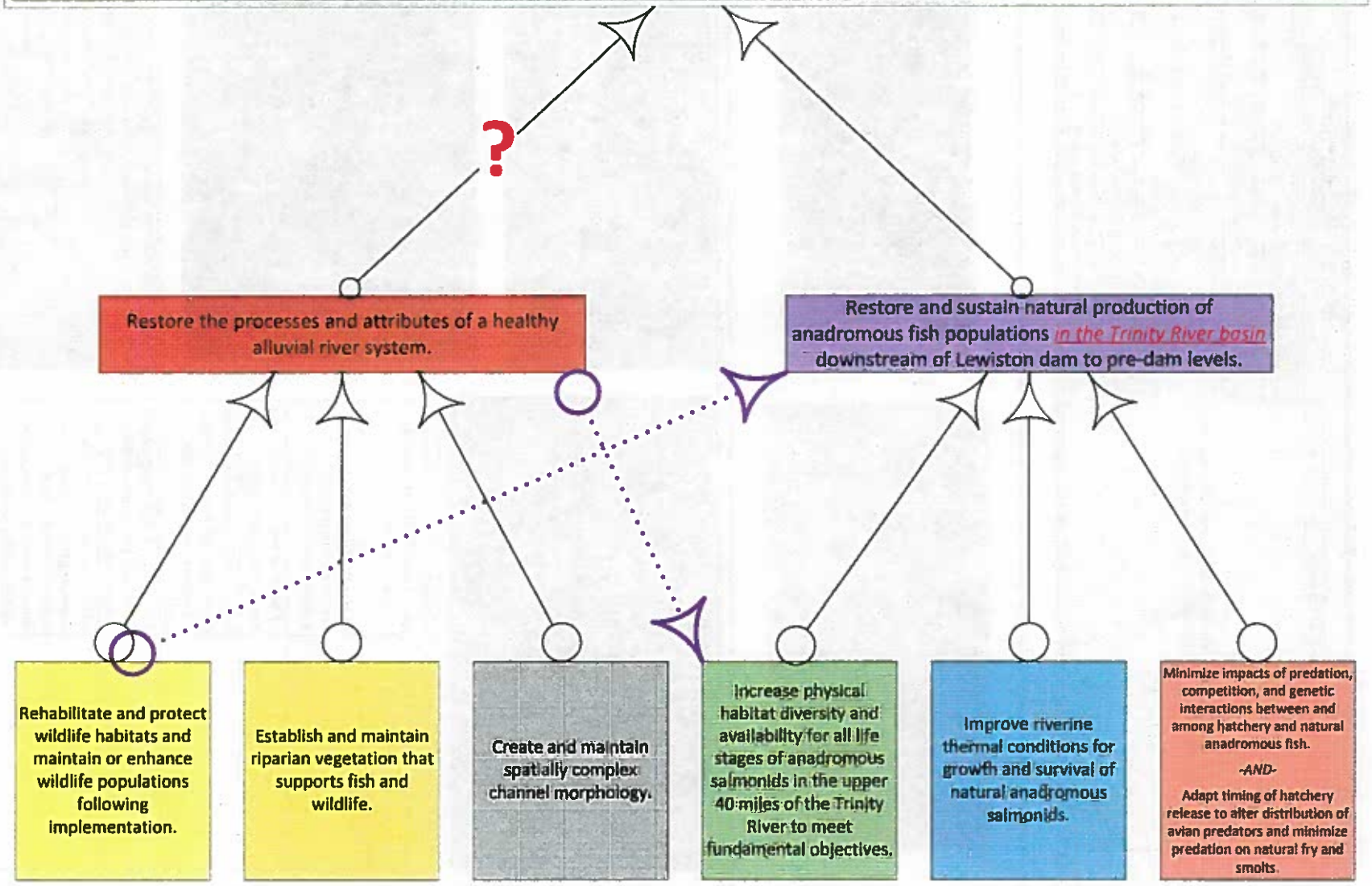
Robin Schrock noted that many objectives are simply to increase a particular species' population or an attribute of the river. These objectives should be revised to specify the meaning of "increase," including whether it applies to the project or system scale (i.e., future ideal conditions).

Adjourn

The meeting was adjourned at 4:30pm.

OVERARCHING GOAL

Restore and sustain natural production of adult anadromous fish populations downstream of Lewiston Dam to pre-dam levels, to facilitate dependent tribal, commercial and sport fisheries full participation in the benefits of restoration via enhanced harvest opportunities.
The TRRP strategy for accomplishing this goal restores and perpetually maintains fish and wildlife resources (including T&E species) by restoring the processes that produce a healthy alluvial river system.



Fisheries Fundamental Objective(s)	
Fundamental Objective	**Species Specific Fundamental Objective**
Restore adult anadromous fish numbers to pre-Trinity River Dam levels in order to facilitate dependent tribal, commercial, and sport fisheries full participation in the benefits of restoration via enhanced harvest opportunities	Increase naturally produced fall-run Chinook salmon adult production to the extent necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity
	Increase naturally produced spring-run Chinook salmon adult production to the extent necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity
	Increase naturally produced coho salmon adult production to the extent necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity
	Increase naturally produced steelhead adult production to the extent necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity
	Increase naturally produced green sturgeon adult production to the extent necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity
	Increase naturally produced Pacific lamprey adult production to the extent necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity

Attributes of Alluvial River Ecosystems:

1. Spatially complex channel morphology.
2. Flows and water quality are predictably variable.
3. Frequently mobilized channel-bed surface.
4. Periodic channelbed scour and fill.
5. Balanced fine and coarse sediment budgets.
6. Periodic channel migration or avulsion.
7. A functional floodplain.
8. Infrequent channel-resetting floods.
9. Self-sustaining diverse riparian plant communities.
10. Naturally fluctuating ground-water table.

1. Create and maintain spatially complex channel morphology	1.1. Increase physical habitat diversity and availability (to achieve Fish Habitat objective 2.1, Riparian objectives 5.1 & 5.2, and Wildlife objectives 6.4.1 & 6.5.1)
	1.2 Increase coarse sediment transport and channel dynamics
	1.3 Increase and maintain coarse sediment storage
	1.4 Reduce fine sediment storage in the mainstem Trinity River

Increase physical habitat diversity and availability	Increase/maintain salmonid fry and juvenile rearing habitat
	Increase/maintain spawning habitat quantity and quality
	Maintain or increase adult holding habitat from baseline conditions in the mainstem Trinity River

6. Rehabilitate and protect wildlife habitats and maintain or enhance wildlife populations following implementation	6.1 Maintain Trinity populations and species diversity of birds using the riparian zone in the Program area
	6.2 Maintain Trinity River riverine bird populations and species diversity in the Program area
	6.3 Minimize impacts of riverine bird predation on fry and smolts
	6.4 Increase population size, survival, distribution, and recruitment success of Foothill Yellow-legged Frogs (FYLF)
	6.5 Increase population size, survival, distribution, and recruitment success of Western Pond Turtle (WPT)
	6.6 Minimize adverse impacts to additional native riparian or aquatic associated wildlife from Program activities. Focus on wildlife species associated with a healthy river ecosystem, not necessarily all species

	Improve thermal regimes for rearing growth and survival of juvenile steelhead, coho salmon and Chinook salmon
Improve riverine thermal conditions for growth and survival of natural anadromous salmonids	Improve thermal regimes for outmigrant salmonid growth and survival (dependent on water year)
	Provide optimal temperatures to minimize pre-spawning mortality, protect in-vivo egg viability, and improve spawning success of spring and fall-run Chinook

5. Establish and maintain riparian vegetation that supports fish and wildlife	5.1 Promote diverse native riparian vegetation on different geomorphic surfaces that contribute to complex channel morphology and high quality aquatic and terrestrial habitat *(achieve Fish Habitat objective 2, Fish Production objective. 3.1, and Wildlife objective 6.1)*
	5.2 Prevent riparian vegetation from exceeding thresholds leading to encroachment that simplifies channel morphology and degrades aquatic habitat quality *(achieve Fish Habitat objective 2.1, Wildlife Objectives 6.2 & 6.4)*
	5.3 Recover riparian vegetation area equal or greater than disturbed by physical rehabilitation *(achieve Wildlife Objective 6.1)*

Status as on 7/23/14: *No changes proposed in this set of objectives.*

Level 1 Objectives	Level 2 Objectives	Level 3 Objectives
1. Create and maintain spatially complex channel morphology	1.1. Increase physical habitat diversity and availability (to achieve Fish Habitat objective 2.1, Riparian objectives 5.1 & 5.2, and Wildlife objectives 6.4.1 & 6.5.1)	1.1.1.Increase the size, frequency and topographic relief of bar/pool sequences
		1.1.2 Increase channel/thalweg sinuosity
		1.1.3 Increase geomorphic unit and substrate patch diversity
	1.2 Increase coarse sediment transport and channel dynamics	1.2.1 Increase and maintain target coarse sediment transport rates
		1.2.2 Frequently exceed channel migration, bed mobilization, and bed scour thresholds
		1.2.3. Encourage bed-level fluctuations on annual to multi-year time scales
		1.2.4 Route coarse sediment through all reaches
	1.3 Increase and maintain coarse sediment storage	1.3.1 Increase bars, side-channels, alcoves, and other complex alluvial features
	1.4 Reduce fine sediment storage in the mainstem Trinity River	1.4.1 Transport fine sediment through mainstem at a rate greater than tributary input
		1.4.2 Reduce fine sediment supply from tributary watersheds
		1.4.3 Encourage fine sediment deposition on floodplains

Status as on 7/23/14: *Objectives were incorporated in the "habitat" cluster (green font), "temperature" cluster (blue font), or deleted as redundant or irrelevant (strikethrough).*

Level 1 Objectives	Level 2 Objectives	Level 3 Objectives
~~2. Increase/improve habitats for freshwater life stages of anadromous fish to the extent necessary to meet or exceed production goals~~	~~2.1 Increase and maintain salmonid habitat availability for all freshwater (in-river and tributary) life stages (linkage to Riparian Objectives 5.1.2 & 5.2)~~	2.1.1 Increase/maintain salmonid fry and juvenile rearing habitat in the upper 40 miles of the mainstem Trinity River by a minimum of 400 % following rehabilitation of fluvial attributes
		2.1.2 Increase/maintain spawning habitat quantity and quality to 2,550,000 square feet in the upper 40 miles of the mainstem Trinity River
		~~2.1.3 Create channel form that reduces loss of fry to stranding in the upper 40 miles of the mainstem Trinity River following rehabilitation during high flows~~
		2.1.4 Maintain or increase adult holding habitat from baseline conditions in the mainstem Trinity River
		2.1.5 Minimize physical impacts to lamprey habitat
		~~2.1.6 Minimize physical impacts to other native fish habitats~~
		2.1.7 Maintain or increase tributary habitat
	2.2 Improve riverine thermal conditions for growth and survival of natural anadromous salmonids	2.2.1 Provide optimal temperatures to improve spawning success of spring and fall-run Chinook salmon
		2.2.2 Improve thermal regimes for rearing growth and survival of juvenile steelhead, coho salmon and Chinook salmon
		2.2.3 Improve thermal regimes for outmigrant salmonid growth and survival (dependent on water year)
		~~2.2.4 Minimize temperature impacts to other native fish habitats~~
	~~2.3 Enhance or maintain food availability for fry and juvenile salmonids~~	~~2.3.1 Increase and maintain macroinvertebrate populations (*achieve Fish Production objective 3.1.1*)~~

Status as on 7/23/14: *Objectives were incorporated in the "fish production" cluster (purple font), "hatchery" cluster (red font), deleted as redundant or irrelevant (strikethrough).*

Level 1 Objectives	Level 2 Objectives	Level 3 Objectives
~~3. Restore and maintain natural production of anadromous fish populations~~	3.1 Increase spawning, incubation and emergence success of anadromous spawners	3.1.1 Optimize adult utilization of suitable spawning habitat areas in the mainstem within 3-4 brood cycles following rehabilitation of fluvial river processes
		~~3.1.2 Optimize adult utilization of suitable spawning habitat areas in tributaries within 3-4 brood cycles following rehabilitation of fluvial river processes~~
		~~3.1.3 Reduce temperature related pre-spawning mortality and protect in vivo egg viability of anadromous spawners in the mainstem Trinity River~~
	~~3.2 Increase freshwater production of anadromous fish~~	3.2.1 Increase fry abundance, growth, physical condition, and health from baseline conditions in the mainstem Trinity River within 3-4 brood cycles following rehabilitation of fluvial river processes
		3.2.2 Increase outmigrant juvenile life stage abundance, growth, physical condition and health from baseline conditions in the mainstem Trinity River within 3-4 brood cycles following rehabilitation of fluvial river processes
		~~3.2.3 Improve juvenile fish production as a function of water temperature and habitat flow relationships from baseline conditions in the mainstem Trinity River within 3-4 brood cycles following rehabilitation of fluvial river processes~~
		~~3.2.4 Reduce clinical disease incidence in Trinity River origin outmigrants in the Klamath River to less than 20% within 5 years~~
		3.2.5. Reduce fry stranding in the upper 40 miles of the mainstem Trinity River by 50% following rehabilitation fluvial river processes
		3.2.6 Reduce non-native fish predation on naturally produced fish by 50% in the mainstem Trinity River within 3-4 brood cycles following rehabilitation of fluvial river processes *(linkage to Wildlife objective 6.3)*
	3.3 Minimize impacts of predation, competition, and genetic interactions between and among hatchery and natural anadromous fish	~~3.3.1 Limit impacts of hatchery fish predation on naturally produced juvenile salmonids to less than 20% over the 40 miles~~
		3.3.2 Increase proportion of Natural Influence (pNI) to 0.7 or greater

Status as on 7/23/14: *Objectives in this suite were "outcome" based. Moved to fundamanetal fish objective.*

Level 1 Objectives	Level 2 Objectives	Level 3 Objectives
4. Restore and sustain natural production of anadromous fish populations downstream of Lewiston Dam to pre-dam levels, to facilitate dependent tribal, commercial, and sport fisheries' full participation in the benefits of restoration via enhanced harvest opportunities	4.1 Increase naturally produced fall-run Chinook salmon adult production to the extent necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity	4.1.1 Increase escapement of naturally produced fall-run Chinook salmon to 62,000 adults
		4.1.2 Increase harvest of naturally produced fall-run Chinook salmon adults
	4.2 Increase naturally produced spring-run Chinook salmon adult production to the extent necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity	4.2.1 Increase escapement of naturally produced spring-run Chinook salmon to 6,000 adults
		4.2.2 Increase harvest of naturally produced spring-run Chinook salmon adults
	4.3 Increase naturally produced coho salmon adult production to the extent necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity	4.3.1 Increase escapement of naturally produced coho salmon to 1,400 adults
		4.3.2 Increase harvest of naturally produced coho adult salmon adults
	4.4 Increase naturally produced steelhead adult production to the extent necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity	4.4.1 Increase escapement of naturally produced steelhead to 40,000 adults
		4.4.2 Increase harvest of naturally produced steelhead adults
	4.5 Increase naturally produced Pacific lamprey adult production to the extent necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity	4.5.1 Increase escapement of Pacific lamprey adults
		4.5.2 Increase harvest of Pacific lamprey adults
	4.6 Increase naturally produced green sturgeon adult production to the extent necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity	4.6.1 Increase escapement of green sturgeon adults
		4.6.2 Increase harvest of green sturgeon adults

Status as on 7/23/14: *No changes proposed in this set of objectives.*

Level 1 Objectives	Level 2 Objectives	Level 3 Objectives
5. Establish and maintain riparian vegetation that supports fish and wildlife	5.1 Promote diverse native riparian vegetation on different geomorphic surfaces that contribute to complex channel morphology and high quality aquatic and terrestrial habitat *(achieve Fish Habitat objective 2, Fish Production objective. 3.1, and Wildlife objective 6.1)*	5.1.1 Increase species, structural, and age diversity of riparian vegetation to improve and maintain wildlife habitat
		5.1.2 Encourage establishment of riparian species on surfaces within the future channel migration corridor that will recruit LWD
		5.1.3 Encourage establishment of vegetation that provides habitat for anadromous fish, aquatic organisms and aquatic / riparian wildlife
	5.2 Prevent riparian vegetation from exceeding thresholds leading to encroachment that simplifies channel morphology and degrades aquatic habitat quality *(achieve Fish Habitat objective 2.1, Wildlife Objectives 6.2 & 6.4)*	5.2.1 Manage flows, coarse sediment augmentation, and channel rehabilitation that cause sufficient riparian plant mortality along low water margins to prevent channel simplification leading to degraded fish habitat
	5.3 Recover riparian vegetation area equal or greater than disturbed by physical rehabilitation *(achieve Wildlife Objective 6.1)*	- no level 3 objective required, as level 2 objective is sufficiently specific

Status as on 7/23/14: *No changes proposed in this set of objectives.*

Level 1 Objectives	Level 2 Objectives	Level 3 Objectives
6. Rehabilitate and protect wildlife habitats and maintain or enhance wildlife populations following implementation	6.1 Maintain Trinity populations and species diversity of birds using the riparian zone in the Program area	6.1.1 Enhance quality and maintain quantity of riparian bird nesting and foraging habitats *(linkage to Riparian objective. 5.1)*
	6.2 Maintain Trinity River riverine bird populations and species diversity in the Program area	6.2.1 Enhance quality and maintain quantity of riverine bird nesting and foraging habitats *(linkage to Physical objective 1.1, Fish Habitat objective 2.3.1, Fish Production objectives 3.2.1 & 3.2.2 and Riparian objectives 5.1 & 5.2)*
	6.3 Minimize impacts of riverine bird predation on fry and smolts	6.3.1 Adapt timing of hatchery release to alter distribution of avian predators and minimize predation on natural fry and smolts *(achieve Fish Production objective 3.3.3)*
	6.4 Increase population size, survival, distribution, and recruitment success of Foothill Yellow-legged Frogs (FYLF)	6.4.1 Increase population size, survival, distribution, and recruitment success of Foothill Yellow-legged Frogs
		6.4.2 Increase quality and quantity of breeding and rearing habitat for Foothill Yellow-legged Frogs (linkage to Riparian objectives 5.1 & 5.2)
	6.5 Increase population size, survival, distribution, and recruitment success of Western Pond Turtle (WPT)	6.5.1 Increase population size, survival, distribution, and recruitment success of Western Pond Turtles
		6.5.2 Increase structural and thermal diversity of aquatic habitats used by various age classes of Western Pond Turtles
		6.5.3 Increase recruitment of younger age classes of Western Pond Turtles
	6.6 Minimize adverse impacts to additional native riparian or aquatic associated wildlife from Program activities. Focus on wildlife species associated with a healthy river ecosystem, not necessarily all species	6.6.1 Discourage invasive species