

Preliminary Results of 2009-2012 Pool Change Analysis

Technical Brief

Prepared by D. Gacuman, January 10, 2013

NOTE: This is a preliminary draft that has received no review of any sort.

Background

The Trinity River Restoration Program (TRRP) implements the channel rehabilitation and gravel augmentation activities prescribed in the Trinity River Mainstem Fishery Record of Decision issued by the U.S. Department of the Interior (ROD 2000). At present, TRRP has completed about half the mechanical rehabilitation projects called for in the ROD, and has also been adding variable quantities of gravel to the river on a near-annual basis since 2006.

Various public stakeholders have long expressed concerns that gravel additions to the river could result in the filling of some of the deep pools used as holding habitat by adult salmonids. Concern over the potential for pool filling intensified in late 2010 when a perception became widespread among local fishermen that holes and runs were filling with sediment throughout the river. TRRP responded to this public input by eliminating mobile gravel placements from its 2012 channel rehabilitation projects and suspending high-flow gravel augmentations during the 2012 spring flow release.

In addition, TRRP responded to the stakeholder concerns by initiating efforts to investigate the status of pools and holes of interest to the fishing community to evaluate whether widespread changes in pool depths are indeed occurring, where they are occurring, and why. Timely reporting of any findings regarding these issues is critical for TRRP and stakeholders to make informed decisions about upcoming rehabilitation activities. Although these investigations are ongoing and reports have not yet been written, much of the data reduction and analysis is complete. This technical brief summarizes the information and results that are currently available. A more comprehensive report will be prepared later.

Analysis Methods

Changes in pool depths over two different time periods were evaluated using different analysis methods. One analysis provides an historical context by considering pool depth changes over multiple decades using historical data sources, and the other evaluates recent changes in pool depths with an analysis of 3 sets of bathymetric sonar data collected since 2009. Only results connected to changes since 2009 are reported here.

The first of these 3 sonar data sets was collected over about a 3-month period spanning November 2009 through mid-January 2010. These data were collected to be included in a new system-wide terrain model that was being developed with terrestrial and bathymetric LiDAR flown in early April 2009. The bathymetric LiDAR used in that effort was found to be unreliable in water deeper than about 3 feet, so Graham Matthews and Associates

(GMA) was engaged to obtain bathymetric sonar data in as many relatively deep areas of the river as possible prior to the onset of the winter storm season. Collection was performed with a single sonar transducer (with integrated GPS) mounted on a jet boat or raft. This effort resulted in the acquisition of patches of sonar data in more than 160 locations scattered throughout the 40-mile TRRP project area.

A second set of sonar data was collected in the summer of 2010 and in the early winter of 2011, prior to any large winter storm events and before the 2011 flow release. These data were collected specifically to support this pool change analysis, so particular pools were identified for survey. By this time GMA had upgraded their sonar collection methods to include simultaneous collection with 2 transducers, so these surveys resulted in much higher data density than the 2009 surveys. This effort resulted in the acquisition of 59 patches of sonar data.

The final sonar data set was acquired in the summer of 2011 and in the early winter of 2011, prior to any large winter storm events and before the 2012 flow release. GMA was initially asked to survey a large number of deep areas to support this pool change analysis. This survey effort was later expanded to include nearly complete bathymetric coverage to support the development of a new system-wide terrain model that is currently under development. GMA again upgraded their sonar collection methods, and by completion of this larger effort had the capacity to simultaneously collect data with up to 7 transducers. This final data set is therefore extraordinarily dense and covers a large area. A subset of 119 patches of sonar data was extracted from this very large data set for use in this pool change analysis.

The spatial extents of these 3 sets of sonar were intersected by overlaying polygons defining the patches in a GIS. The result was 141 polygons in which data available from different years overlapped completely. These include 93 polygons in which data from 2 of the years can be compared (2009-2010, 2009-2011, or 2010-2011) and 48 polygons in which all 3 years can be compared, for a total of 237 comparisons. Where possible, the locations are assigned commonly-used names or names corresponding to nearby landmarks. Otherwise, they are named according to their river mile location. All but a few of the 141 locations correspond to areas of relatively deep water, and a preliminary classification assigns most of them to one of the following pool types: hole, trough, convergence, backwater, or pool. However, no attempt is made to delineate the boundaries of what is or is not adult holding habitat. Instead, depth characteristics are assessed over whatever portions of the channel that happens to be included in the overlapping data.

The comparisons themselves are achieved by gridding the sonar data for each year in each polygon in a GIS to create sets of co-registered grids with a 3-ft pixel resolution. A nominal baseflow water surface elevation assigned to each polygon area was then used to compute water depth for each grid pixel. The depths were then exported to text format and processed with a Perl script to compute depth histograms and summary statistics such as mean depth, the standard deviation of depths, and depth quantiles.

Preliminary Results

The depth characteristics of the surveyed areas can be effectively displayed with cumulative frequency curves of bed depth. Some examples illustrating how different types of change are reflected in the curves are given below.

Figure 1 shows the fraction of the bed area that exceeded the specified depth in each of the 3 years at Junction City Hole, a location that has seen little change in recent years. The curves shown on Figure 1 can be used to infer depth quantiles indicating a general lack of net change at Junction City Hole. For example, the median depth in 2009 of 8.5 ft decreased to 8.3 ft in 2010 before increasing to a maximum of 8.65 ft in 2011. Similarly, the 75th-percentile depth ranged from 11.9 to 12.7 ft, and the 90th percentile depth ranged from 16.2 to 16.9 ft, with the minimum and maximum values also occurring in 2010 and 2011, respectively. The average depth ranged between 9.15 and 9.46 ft with the net change from 2009 to 2011 totaling just 0.11 ft (deeper).

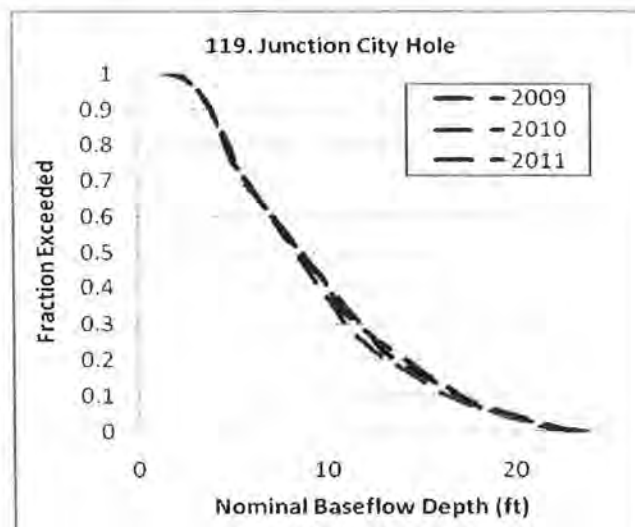


Figure 1: Depth exceedance curves for the Junction City Hole.

Wellock Pool provides an example of a pool that experienced extreme aggradation (Figure 2). Those curves indicate little change between 2009 and 2010, but clearly show the transformation that occurred during the 2011 flow release. Prior to the release, the median, 75th-percentile, and 90th-percentile depths were 4.3, 5.07, and 5.76 ft, respectively. After the release, they were just 0.8, 1.9, and 4.2 ft.

Changes in the shapes of the curves reflect changes in the shape of the pool itself. For example, it can be seen in Figure 2 that the maximum depth decreased relatively little compared to changes in areas of moderate depth. Prior to the release, Wellock Pool was a topographically simple region of moderate depth, that is, close to 70% of the area was between about 4 and 6 ft in depth (the steep slopes of the 2009 and 2010 exceedance curves are indicative of this kind of simple geometry). In contrast, the 2011 exceedance curve has a much lower and more variable slope. The pool contracted in extent due to the deposition of a bar that emerged above the baseflow water surface along the left bank

(hence the negative depths), but maintained a small area of moderately deep water near the right bank. It is relevant to note here that Wellock Pool was created by mechanical dredging in the late 1980s, and the changes that occurred during the 2011 flow release essentially returned the channel geometry at that location to its pre-dredge configuration.

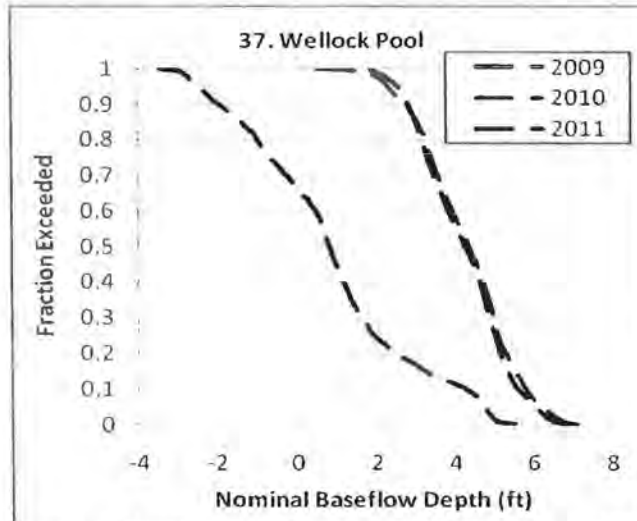


Figure 2: Depth exceedance curves for Wellock Pool.

A third example (Figure 3) shows Alcatraz, a location where more moderate pool filling occurred. This example demonstrates how the kind of pool filling noted by stakeholders is captured by depth exceedance curves. The curves show that Alcatraz deepened slightly between 2009 and 2010 (median depth increased from 7.1 to 7.7 ft), then aggraded significantly during the 2011 flow release. The median, 75th-, and 90th-percentile depths decreased by 2.9, 2.5, and 1.6 ft, respectively, from 2010 to 2011. Again, aggradation was greater in shallower areas, indicating that the size of the pool decreased more than its maximum depths.

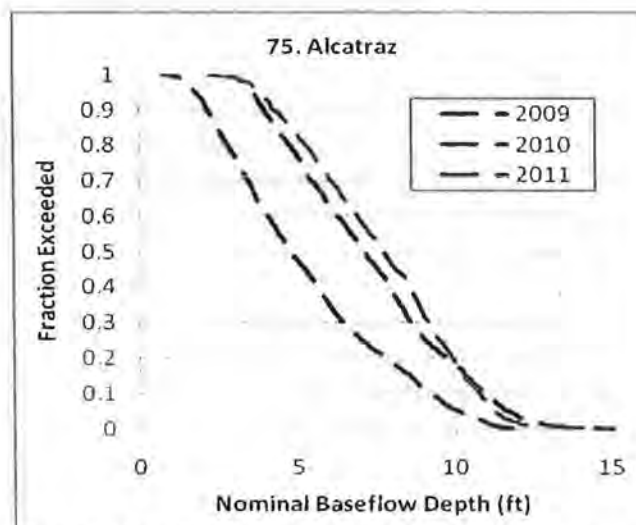


Figure 3: Depth exceedance curves for Alcatraz.

In a few locations, new pool-like areas formed in places where the pre-existing channel morphology was relatively shallow with simple bed topography. The Lowden floodplain convergence area is an example (Figure 4). This is an area at the downstream end of a funnel-like floodplain that was constructed at the Lowden Ranch site and was designed to cause flow convergence and scour at its downstream end. Implementation of the design resulted in an increase in the median, 75th-, and 90th-percentile depths from 3.7, 4.0, and 4.2 ft in 2009 to 4, 4.7, and 5.1 ft in 2011. While these depths are modest compared to the depths found in true “holes,” they are similar to the depths found in areas fishermen often refer to as “steelhead runs.”

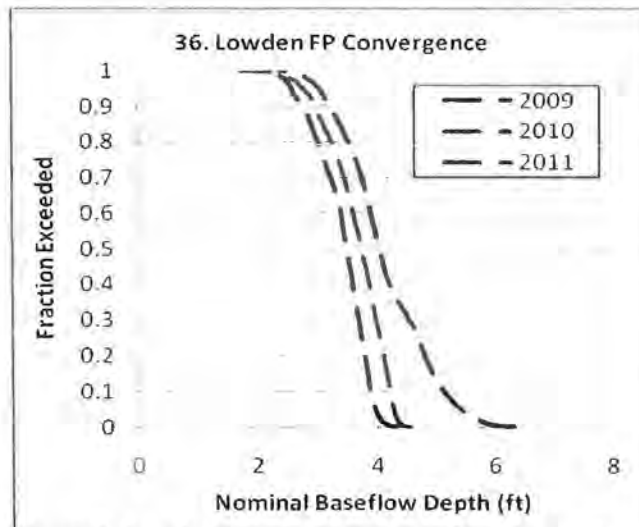


Figure 4: Depth exceedance curves for the Lowden floodplain convergence area.

Several inter-related results can be inferred from the complete set of changes illustrated by all 141 cumulative depth graphs. First, with a relatively small number of exceptions, depth changes were generally small. For example, the average change in the median depth from 2009 to 2011 across all 141 locations was just 0.08 ft (an increase in depth).

Secondly, the exceptions – places where substantial decreases in depth were observed – are generally special locations where the cause of the aggradation is clear. Wellock Pool and Alcatraz, both of which aggraded substantially during the 2011 flow release (Figure 2 and 3), are cases in point. Aggradation in Wellock Pool is clearly associated with the fact that the 2010 rehabilitation actions at Lowden Ranch and Trinity House Gulch were immediately followed by the largest restoration flow release ever implemented on the river. Construction and gravel augmentation at Lowden Ranch greatly increased the gravel supply to Wellock Pool, while channel modifications at Trinity House Gulch significantly reduced the sediment transport capacity at the downstream end of the pool. As a result, the area encompassing Wellock Pool and the upstream end of the Trinity House Gulch site underwent the largest fluvially-driven channel reconfiguration observed on the Trinity River since the pre-dam era.

Aggradation at Alcatraz also appears to be a direct consequence of nearby channel rehabilitation activities. The Reading Creek project, which was constructed in the fall of 2010, included substantial lowering of the inside of a large channel bend adjacent to Alcatraz. Prior to that surface lowering, the bulk of flood flows followed the channel around the bend where it would impinge on the bedrock wall along the right bank at Alcatraz, creating strong turbulence and bed scour. Lowering of the surface allowed a much larger proportion of flood flow to cut across the bend, thereby reducing the potential for scour at the base of the bedrock wall. This cause of aggradation can be inferred at several other special locations where bed aggradation occurred adjacent to areas of surface lowering, including Sawmill Burner Hole, the Bend at Reading Creek, and the formerly deep runs adjacent to the Salt Flat constructed floodplain.

A third result apparent in these data is a clear spatial pattern in which areas of polygons showing net fill occur clustered in particular reaches, while long sections of channel elsewhere are dominated by net scour. The reaches in which fill predominates are often, but not always, in the vicinity of specific types of channel rehabilitation activities. The overall spatial pattern is shown in Figure 5.

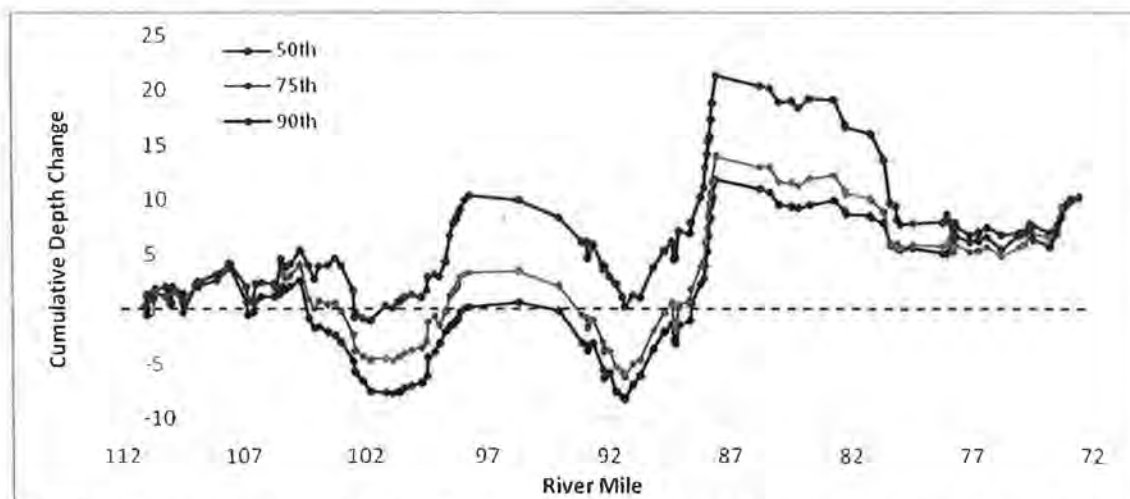


Figure 5: Cumulative change in median, 75th-percentile, and 90th-percentile depths from upstream to downstream for all 141 areas analyzed.

The pattern of scour and fill shown in Figure 5 can be considered at several spatial scales. At a relatively large scale, 7 stream segments with different scour/fill characteristics can be identified. The most upstream segment (Segment 1) extends from near Lewiston Dam to River Mile (RM) 104.65 (near the downstream end of the Lowden Ranch rehabilitation site) and corresponds to the Lewiston area. This segment shows an irregular pattern of net scour and fill that, at a finer spatial scale, can be linked to specific rehabilitation actions. Substantial areas of fill in this segment are located in the reach just upstream from Cemetery Hole and adjacent to the constructed Salt Flat floodplain with the Dark Gulch project boundaries. Substantial fill is known to have occurred at the Sawmill Burner Hole, but is not shown on Figure 5 because it occurred prior to 2009. Cemetery Hole itself is also missing from the graph because sonar collected at that location in 2009 was of insufficient quality for this analysis. A rudimentary point-to-point comparison using

the 2009 data suggests moderate fill in that hole between 2009 and 2010, whereas comparison of the higher-quality data from 2010 and 2011 shows that the hole deepened slightly in 2010-2011.

Segment 2 extends from Wellock Pool to RM 101.8, which corresponds to Snell Pool (which is the next pool downstream from Society Pool). This segment shows a consistent tendency for fill, although in most cases the magnitude of the fill is small. The exceptions are at Wellock Pool itself and a formerly-deep run in the center of the Trinity House Gulch rehabilitation site that is referred to here as “Little Tree.” Those two spots account for fully half of the total net fill measured for the entire segment.

A switch to consistent pool scour just downstream from Snell Pool defines the beginning of Segment 3, which extends downstream for 6 river miles through the remainder of the Poker Bar canyon to the upstream part of the Indian Creek backwater pool at RM 95.75. This existence of this long stretch of river characterized by pool scour is a strong indication that any local excesses of gravel that may exist in the Lewiston area have not propagated downstream through Poker Bar Canyon.

The 4th segment apparent in Figure 5 is a stretch of river from RM 94.1 (the Hwy 299 bridge at Douglas City) to RM 91.5 (‘Skeletor’ hole, off Steiner Flat Road) that is characterized by consistent fill. The upstream end of this segment is immediately downstream from Weaver Creek and Indian Creek, both of which contribute significant sediment loads to the river. Sediments delivered from these tributaries that have accumulated over the past 50 years have only recently been activated by increased flows and other changes. However, locations with relatively large amounts of fill include the vicinity of Alcatraz (Figure 3) and a portion of “The Bend” near the mouth of Reading Creek. Both of these locations are adjacent to terrace areas that were lowered as part of the Reading Creek Rehabilitation project in 2010.

Segment 5, which is dominated by net scour, begins at Skeletor and extends through the Junction City canyon to RM 87.6 near Dutch Creek. Net fill was observed at only one location within this nearly 4-mile stretch – just downstream from Goat Hole where bank erosion caused an eddy hole to migrate to a new position.

A tendency for minor net pool filling resumes in Segment 6, which begins at Dutch Creek where the river emerges from the canyon and flows across a wider, more alluvial valley bottom, and ends with the Upper Junction City pools located upstream from the Dutch Creek Bridge. At the time of data collection, TRRP had conducted no restoration activities within this segment or within 5 miles of its upstream boundary.

The final segment, Segment 7, extends from the Junction City Hole, located just downstream from the Dutch Creek Bridge, to the North Fork Trinity River. This segment exhibits no consistent trend toward either scour or fill.

Preliminary Summary Conclusions

Pools in two relatively long segments of river between Lewiston Dam and the North Fork Trinity River are dominated by scour. Pools in three other river segments show a tendency toward minor fill, while pools in two additional reaches show no consistent tendency either way. Overall, pools appear to have maintained approximately constant depths over the study period with perhaps a small bias toward scour.

Larger amounts of fill were observed at a relatively small number of pools and runs in the Lewiston and Douglas City areas. In nearly all cases, fill at these locations can be directly linked to rehabilitation actions, and in particular to the lowering of terraces adjacent to the pools with or without associated gravel placement. This information has been incorporated into current rehabilitation designs, which explicitly consider the potential effects of terrace lowering and channel widening on pool maintenance.

Minor amounts of fill at various other locations in the study area are probably the result of natural fluvial processes, such as recent activation of sediments delivered from tributaries and increased bank erosion due to ROD flow releases.

Reaches dominated by net scour separate areas where fill is prevalent, suggesting that the effects of any recent local increases in the gravel supply due to gravel augmentation have not propagated far downstream. In particular, the long river segment dominated by scour between Douglas City and Junction City is strong evidence that minor pool filling detected in the Junction City area is unrelated to upstream rehabilitation activities.

References

ROD. 2000. *Record of Decision: Trinity River mainstem fishery restoration final environmental impact statement/environmental impact report*. U.S. Department of the Interior, Washington D.C.



TRINITY RIVER RESTORATION PROGRAM

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MEMORANDUM

TO: ROBIN SCHROCK, EXECUTIVE DIRECTOR; ERNIE CLARKE, TRRP SCIENCE COORDINATOR
FROM: ANDREAS KRAUSE, CHAIR OF PHYSICAL WORKGROUP
SUBJECT: 2013 COARSE SEDIMENT AUGMENTATION RECOMMENDATION
DATE: 1-6-13
CC: PHYSICAL WORKGROUP

This memorandum summarizes the 2013 coarse sediment augmentation recommendation developed by the Physical Workgroup on November 28, 2012.

BACKGROUND

Trinity and Lewiston dams trap all coarse sediment supply above Lewiston Dam. Restoration of fluvial processes will require the continued input of coarse sediment as gravels and cobbles are moved and redeposited from increased high flow releases creating the necessary habitat for different anadromous fish life stages. The Record of Decision (ROD) (USDOI, 2000) directs implementation of a coarse sediment augmentation program below Lewiston Dam to balance the coarse sediment transported during high flow releases. Three different coarse sediment augmentation recommendations have been made.

1. The ROD recommended an annual average of 10,300 cubic yards of coarse sediment augmentation with water year specific volumes ranging from 0 to 67,000 cubic yards. The recommendations were based on sediment transport estimates developed using limited data available in 1997.
2. McBain and Trush (2007) developed concepts for both short-term and long-term coarse sediment augmentation programs and explored possible augmentation sites, placement methods, and coarse sediment supply sources. The wide range of water year specific coarse sediment augmentation volumes recommended by the ROD was logistically problematic; therefore, the document recommended annual augmentation volumes be based on a long-term average developed using an updated sediment budget.
3. Gaeuman (2008) recommended a simple long-term annual average augmentation of 6,700 cubic yards. The recommendation considered sediment transport estimates, a target grain size distribution of the bed surface, and cost optimization.

The actual coarse sediment augmentation recommendation developed by the Physical Workgroup for a given year considers a variety of objectives and other factors including, but not limited to, the sediment balance, water year type, site specific opportunities and constraints, the ability of a site to accommodate more coarse sediment, logistics, regulatory compliance, and recent scientific information.

2013 COARSE SEDIMENT RECOMMENDATION

The Physical Workgroup considered two types of coarse sediment augmentation projects for 2013: injection during springtime high flow releases and bar supplementation during summertime low flows.

High Flow Injections:

Pending the water year type, the Physical Workgroup recommends that up to 3,000 cubic yards of coarse sediment augmentation occur during the spring 2013 high flow releases at two locations:

- 1) Lewiston Weir (River Mile 110.2) – up to 2,000 cubic yards.
- 2) Lowden Ranch (River Mile 104.9) – up to 1,000 cubic yards.

Experience from high flow injections conducted at these sites in past years indicates the recommended volumes should mobilize and transport downstream during most water years. High flow injections at other sites were considered but not recommended this year due to site-specific and regulatory constraints.

Potential Summertime Placements:

The 3,000 cubic yards of high flow coarse sediment augmentation recommended for 2013 is less than half of the amount recommended by either the ROD or Gaeuman (2008). The Physical Workgroup discussed the potential to approach the recommended quantities with additional coarse sediment augmentation during the summertime low flows when bars and floodplains are exposed and easily accessible. Three potential sites for bar supplementation were identified: Lewiston Cableway (River Mile 110), Upper Sawmill (River Mile 109.1), and Lower Sawmill (River Mile 108.8). The workgroup also discussed the possibility of modifying the constructed floodplain across from the high flow injection site at Sawmill Point (River Mile 108.6). Basic engineering designs at the proposed summertime sites are needed before the Physical Workgroup can make any recommendation to augment coarse sediment at those locations. The Physical Workgroup will further consider potential summertime coarse sediment placements at their next meeting on February 26, 2013.

FUTURE PLANS

Over the course of the next year the Physical Workgroup plans to review, update, and unify the long-term coarse sediment augmentation recommendations. A review of the existing coarse sediment augmentation recommendations, program documents, and environmental permits will be conducted. Several pieces of information that will soon become available will also be considered, including: measured sediment transport rates in 2011 during the largest restoration flow release on record, system-wide pool depth changes since 2009, and the findings from the Scientific Advisory Board Review of the TRRP Channel Rehabilitation Strategy (i.e. Phase 1 Review). The update may also consider refinements to coarse sediment management objectives and to the high flow release magnitude, duration, and objectives.

REFERENCES

Gaeuman, D. 2008. Recommended quantities and gradation for long-term coarse sediment augmentation downstream from Lewiston Dam, Trinity River Restoration Program, Technical Report TM-TRRP-2008-2. Weaverville, CA.

McBain & Trush, Inc. 2007. Coarse sediment management plan, Lewiston Dam to Douglas City-Trinity River, CA. Prepared for the Trinity River Restoration Program, April 2007.

U.S. Department of Interior. 2000. Record of Decision - Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement / Environmental Impact Report. December 2000.



Trinity River Restoration Program

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Memorandum

To: Robin Schrock, TRRP Executive Director

From: TRRP Design Team Work Group, through WG Coordinator DJ Bandrowski

Subject: Design Team Technical and Policy Guidance Request to the TMC and IDT

Date: December 12, 2012

At the TRRP Design Team Work Group (Design Team) conference call held on December 4, 2012, there was considerable discussion about potential risk of change in pool depth at Goat Hole contained within the Lorenz Gulch Channel Rehabilitation Site. There are various questions surrounding existing pool depths on the Trinity River mainstem that have been identified by the Design Team, stakeholders, and program partners that form the basis of our request for guidance to the Trinity Management Council (TMC). The questions have technical and policy/political related aspects and may need input from other technical workgroups through the facilitation of the Interdisciplinary Team (IDT). The questions identified for the TMC and IDT are listed below:

TMC

1. How should the Design Team incorporate stakeholder input into the design process with relation to setting goals and objectives?

IDT

2. Should the Design Team consider existing pools and adult holding habitat associated with these pools as a goal and objective within the channel rehab design process?
3. What are the biological and ecological considerations that Design Team should use in regard to existing pool and adult holding habitat? It is recommended that the fish workgroup take-up this issue.
4. How is adult holding habitat being affected by our management actions? It is recommended that the fish workgroup take-up this issue.
5. How are our management actions affecting physical attributes (depth, area, substrate, and topographic diversity) of adult holding habitat? It is recommended that the physical workgroup take-up this issue.
6. How do we revise the goal-setting process with regard to preservation of existing, high-quality habitat features?

The TRRP is in the process of developing quantitative information on pool evolution using bathymetric topography. Those preliminary analysis results will be available in early January and can be used to help inform some of the questions above.

The September 2010 MOU states that the "...workgroups are not responsible for resolving non-technical or policy issues", and the September 2010 Science Retreat developed a process flow chart for the TRRP to improve their decision-making process, including the role of policy and non-technical issues for the workgroups. Please refer back to this document for further clarification.

CONSENSUS – Is a process through which a group makes a decision (w/o voting) that all members can support.

It is a group decision, supported by all group members, which is based on:

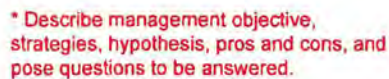
- ❖ A thorough understanding of all relevant information;
- ❖ Active participation by all group members;
- ❖ An understanding of different perspectives, concerns, and needs;
- ❖ A creative effort to accommodate the different needs; and
- ❖ A willingness to raise and understand disagreements and address the underlying needs manifested in disagreements.

MEETING GROUND RULES/GUIDELINES

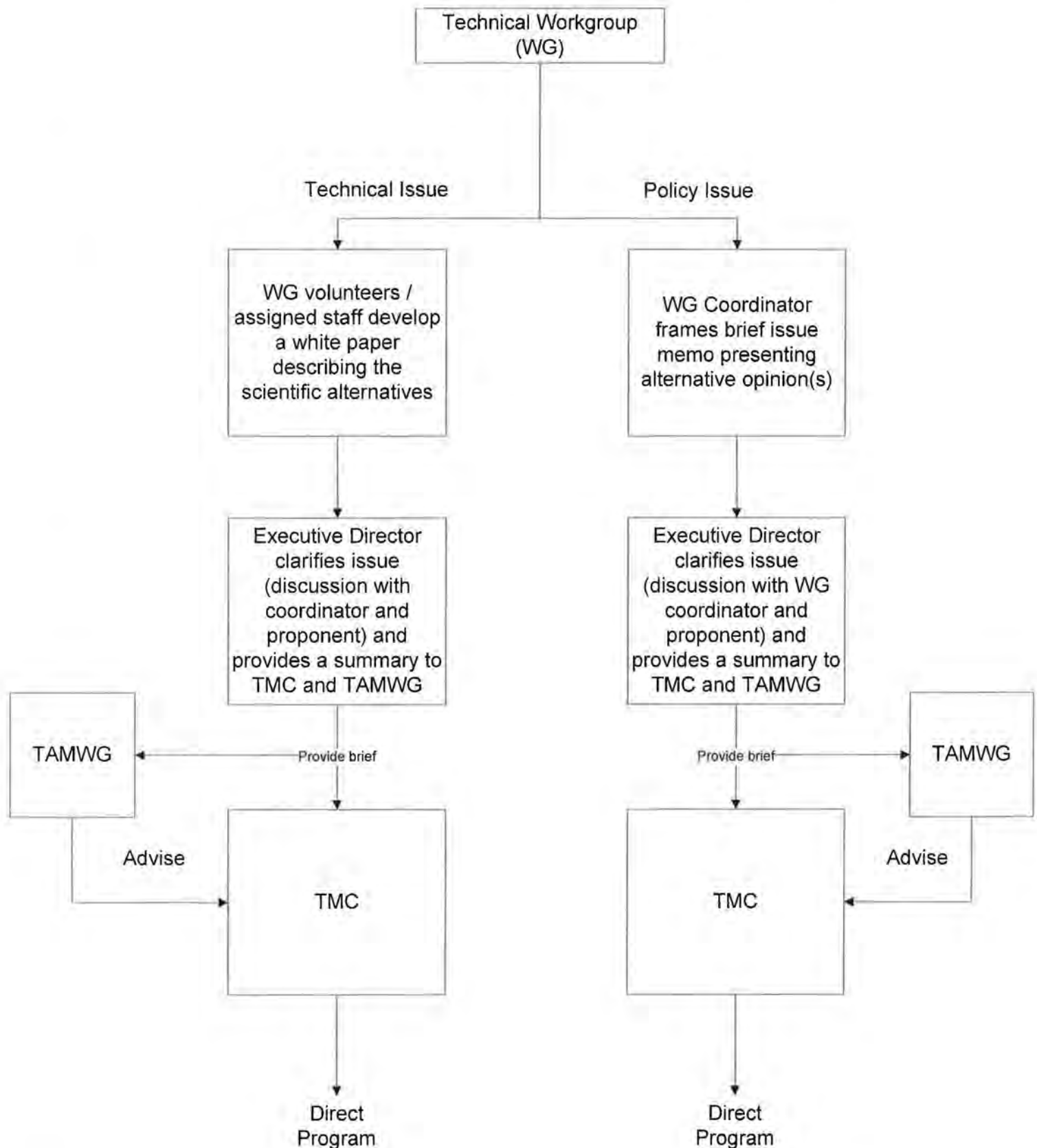
(use best efforts to)

- ☐ Be present/focused/be prepared
- ☐ Avoid interruptions
- ☐ Listen before responding
- ☐ Be future orientated
- ☐ Stay on agenda – avoid policy debates
- ☐ Keep an open mind
 - Willing Suspension of Disbelief!!
- ☐ Raise disagreements openly and constructively
- ☐ Arrive on time/stay till end
- ☐ Avoid assumptions – Ask!
- ☐ Be clear about goal (“products”)

2010



Decision Making Process *Proposed 1/2013*



TRRP Implementation Update

Prepared for: Trinity Adaptive Management Workgroup (TAMWG)

By: DJ Bandrowski

Date: January 10, 2013

Design and Implementation Activities:

- Design Team is working on 2013 Channel Rehabilitation Project Designs (Civil and Reveg) – To be completed by end of January 2013. HVT Design Group developing Douglas City design; Yurok/Federal Design Group developing Lorenz Gulch design.
- 2014 design process will start after the Phase I Review roll-out in the end of January or beginning of February 2013. A Phase II Plan will be developed in coordination with the SAB to support the remaining channel rehabilitation Phase II projects.
- Design Team developed eleven goals/objectives and associated metrics to support the 2013 design effort.
- Joint Stakeholder/Design Team meeting was held on November 14th, some of the TAMWG members were present. Stream Project alternative analysis tool was used to incorporate designers metric results and stakeholder/partner priority for the goals/objectives. This new design process created an opportunity to engage/communicate with stakeholders at the 10% conceptual design stage and to help optimize the project designs.
- Design Team and other workgroups met with Darcy Pickard, ESSA Technologies, regarding Channel Rehab Effectiveness Monitoring and Analytical Framework. The meeting was focused on design data gaps, monitoring needs (pre and post design/implementation), effective timelines for data synthesis, and developing building blocks for future design process that will be incorporated into a larger Decision Support System (DSS) recommended by the SAB. Design Team has submitted a memo to the TMC and IDT for guidance on technical and social/stakeholder concerns regarding adult holding habitat within the TRRP design process.
- TMC asked the Design Team to re-evaluate the Indian Creek Bank Naturalization Project using more analyses including 2D hydraulics, bank stability, evolution prediction for erosion, and sediment transport. New analyses will be presented at the TMC meeting in January after an internal review by Design Team.
- Bucktail Bridge Design and Environmental Compliance is underway, completion planned for June 2013, with anticipation moving toward potential bridge replacement by Trinity County in 2014.

Planning

- Phase I Review being conducted by TRRP Scientific Advisory Board (SAB) is moving forward with good momentum with a draft report planned for roll-out to program partners in March 2013 timeframe. Program partners will have one month for official comments back to SAB
- Peter Wilcock and Jock Conyngham conducted a workshop in August on the "Stream Project" – Alternative Analysis Framework that will be used as part of the future design process. The development of the "Stream Project" is a collaborative effort between John Hopkins University, National Center for Earth-Surface Dynamics (NCED), USACE-ERDC, and the Intermountain Center for River Rehabilitation and Restoration (ICRRR).
- Lorenz Gulch and Douglas City will be re-designed between September and January 2013 using a revised design process and coordinating closely with the Scientific Advisory Board (SAB) and the pending recommendations from the Phase I Review. Both projects will be planned for implementation during the summer/fall of 2013.
- TRRP is in continued Coordination with Dept of Water Resources and Trinity County regarding the new FEMA 100 year floodplain study, which is planned for roll-out in first quarter 2013.

- Realty coordination and Rights-of-Entry access documents are underway for 2013 monitoring activities
- Bureau of Reclamation archeologists are in the process of conducting 40 mile planning and analysis study for to facilitate future Phase II implementation projects. Report out in draft in early 2013.

Infrastructure Improvements:

- Well-Grant program has been very successful in 2012 with 29 new applicants. TRRP office has been very engaged in coordination activities assisting landowners with various steps of the Well-Grant program process including: water rights, environmental permits, facilitating with regulatory agencies, etc.
- Bucktail Bridge Cost Benefit Analysis was completed by CH2M HILL in coordination with Design Team and Trinity County Department of Transportation (TCDOT) in December 2012. New design will start in January 2013 and is scheduled for end of June 2013 timeframe with implementation planned for 2014.

TMC Watershed Update

2012 Watershed Implementation (Funding TRRP \$492,300; Match: \$627,000)

- Middle Trinity Road Decommissioning & Upgrades (4.4 miles) – Sediment Reduction
- Union Hill Road Improvement – Sediment Reduction
- Indian Creek Phase II – Sediment Reduction
- West Weaver Watershed Rapid Assessment – Sediment Reduction
- Conner Creek Mitigation – Sediment Reduction & Fish Passage
- Browns Creek Roads Assessment – Sediment Reduction

****All work from above completed and working on Final Report****

2013 Watershed Implementation (Funding TRRP: \$496,000; Match \$115,500)

Project Title: Sidney Gulch USFS Compound Site Feasibility Study (Northwest CA R&D Council, & 5c's)

Project Type: Fish Passage, Riparian, and Wildlife Habitat Feasibility Study

Funding: Requested: \$90,580 Match: \$13,938

Project Title: Conner Creek Mouth Fish Passage Enhancement Feasibility Study (Northwest CA R&D Council, & 5c's)

Project Type: Fish Passage and Wildlife Habitat Feasibility Study

Funding: Requested: \$50,161 Match: \$8,373

Project Title: Lower East Weaver Creek Habitat and Infrastructure Project (Northwest CA Resource & Development Council)

Project Type: Sediment Reduction

Funding: Requested: \$75,935 Match: \$27,039

Project Title: Mainstem Sediment Reduction Project through Road Inventory Improvement or Removal (TCRCD)

Project Type: Sediment Reduction

Funding: Requested: \$260,000 Match: \$50,000

Project Title: LiDAR Data Acquisition (TCRCD)

Project Type: Habitat Enhancement and Sediment Maintenance

Funding: Requested: \$20,000 Match: \$16,000

TMC Watershed Update

2014 Proposed Watershed Work: (Funding TRRP \$500,000; Match \$225,000)

Project Title: Browns Creek Road Sediment Implementation Project Phase 1(Northwest CA Resource & Development Council/ 5c's)

Project Type: Sediment Reduction

Funding: Requested: \$199,518 Match: \$45,000

Project Title: Trinity River Forest Road Maintenance Phase 1 (US Forest Service)

Project Type: Sediment Reduction

Funding: Requested: \$165,591 Match: \$165,500

Project Title: Grass Valley Creek Road Upgrade (TCRCD)

Project Type: Sediment Reduction

Funding: Requested: \$95,591 Match: \$0.00

Project Title: Agricultural Practices on Sediment & Nutrient Deliveries in Watersheds (Watershed Research & Training Center/ 5c's)

Project Type: Sediment and Nutrient Impacts from agricultural processes

Funding: Requested: \$10,000 Match: \$10,000

Project Title: Schofield Gulch Sediment Reduction Project (Northwest CA Resource & Development Council/ 5c's)

Project Type: Sediment Reduction

Funding: Requested: \$29,300 Match: \$4,500

Current list of potential projects for FY 2014 or additional funds in FY2013 (Funding FY 2014 TRRP \$ 780,119) (Additional Funding \$395,539)

Project Title: Browns Creek Road Sediment Implementation Project Phase 2(Northwest CA Resource Conservation & Development Council/ 5c's)

Project Type: Sediment Reduction

Funding: Requested: \$similar to phase 1 Match: \$similar to phase 1

Project Title: Trinity River Forest Road Maintenance Phase 2 (US Forest Service)

Project Type: Sediment Reduction

Funding: Requested: \$similar to phase 1 Match: \$similar to phase 1

Project Title: Sidney Gulch Fish Passage

Project Type: Fish Passage – Culvert Replacement on Weaver Bally Loop Rd

Funding: Requested \$146,937 Match \$49,326

Project Title: West Weaver Creek

Project Type: Sediment Reduction and wildlife habitat feasibility study

Funding: Requested \$185,558 & Match \$96,000

Project Title: Weaver Creek Road Inventory

Project Type: Sediment Reduction 107 miles of roads to inventory and prioritize

Funding: Requested \$63,044 Match \$12,114

TMC summary: 2013 TRRP Science Symposium
Symposium theme: Science behind the Phase I Review

Overview of related events during the week of January 7, 2013:

- **Jan 7** Public presentation of: 1) TRRP Overview (Schrock), 2) Phase I Review Overview (Merigliano), and 3) Q&A (moderated).
- **Jan 8** Series of public presentations by SAB members and support contractors based on the Phase I review.
- **Jan 9** Meeting between SAB members, support contractors, and technical workgroup members to discuss appendices, presentations, and next steps.
- **Jan 10** TAMWG meeting included Phase I Review Overview from SAB

Phase I Review Purpose:

- Scientific review and assessment of the initial phase of implementation activities in reference to TRRP's foundational documents
- Evaluate the channel rehabilitation projects and gravel augmentation program implemented from 2005 through 2010
- Develop a review document to serve as a foundation and direction for the second phase of implementation.

SAB approached the review using four spatial scales:

- **System** (the river and bottomland from Lewiston to N. Fork)
- **Reach** (a stretch of river having similar characteristics)
- **Site** (a rehabilitation project, such as Sawmill Gulch)
- **Design element** (e.g., side channel, lowered flood plain, etc.)

Phase I Review report elements:

- **Main report**
- **App. A High Level Indicators** - Synopsis of TRRP performance measures
- **App. B GRTS Analysis** - Trends in habitat and redds
- **App. C Analysis of Channel Rehabilitation Sites** - Geomorphic and flow context followed by a review of each Phase I project
- **App. D Methodology for Data Frame Development**
- **App. E Analysis of Habitat-Geomorphic Relationships using the Data Frame** - Relating many system-wide and project level aspects to each other to understand biological trends and river behavior.
- **App. F Analysis of Riparian Vegetation Dynamics** - Erosion and deposition of channel margins and vegetation transitions
- **App. G Changes to the Channel Rehabilitation Project Design process during Phase I**
- **App. H Decision Support System** - A guide to making management decisions using an integrated suite of empirical and simulation models

AGENDA

Trinity River Restoration Program's Phase 1 Review

Agenda for TRRP Science Symposium

Tuesday, January 8, 2013

Johnson's Steakhouse, 160 Golf Course Road, Weaverville, CA 96093



Time	Topic	Presenter
8:30	Welcome and opening remarks regarding the Phase 1 Review	Robin Schrock - TRRP
8:45	Overview of the Scientific Advisory Board's (SAB's) approach to the Phase 1 Review	John Buffington - SAB
9:30	Actions that facilitated Phase 1 implementation	John Buffington - SAB
9:45	Break	
10:00	System-wide: High-level indicators of Program performance	John Ferguson – Anchor QEA
10:20	System-wide: Analysis of generalized random tessellation stratified (GRTS) data (2009 – 2011)	Rich Hinrichsen-Hinrichsen Env. Services
10:40	System-wide: Riparian vegetation dynamics including erosion and deposition of the channel margin	Mike Merigliano - SAB
11:00	System-wide: Temporal-spatial characterization of juvenile fish habitat	Jim Peterson - SAB
11:30	Discussion (facilitated by Jeff Morris)	
12:00	Lunch	
13:00	Mechanical channel rehabilitation: Geomorphic context	Tom Lisle - Stillwater Sciences
13:20	Mechanical channel rehabilitation: Results related to Integrated Assessment Plan (IAP) Objective 1: Create and maintain spatially complex channel morphology	Jay Stallman - Stillwater Sciences
13:40	Mechanical channel rehabilitation: Results related to IAP Objective 2: Increase/improve habitat for anadromous salmonids	John Ferguson - Anchor QEA
14:00	Mechanical channel rehabilitation: synthesis and conclusions	John Buffington - SAB
14:20	Discussion (facilitated by Jeff Morris)	
14:50	Break	
15:00	Decision Support System framework for adaptive management	Jim Peterson - SAB
15:50	Summary of Phase 1 review findings and recommendations for Phase 2 Program implementation and discuss the future programmatic review	Chris Jordan - SAB
16:30	Discussion (facilitated by Jeff Morris)	

Table 1. Crosswalk between Phase I Review report elements, date draft was provided, and Science Symposium presentations.

Phase I Review report element	Date draft was provided	Relevant presentation(s) (presenter)
Main report	-	All
<i>App. A</i> High Level Indicators	12/7/12	System-wide: High-level indicators of Program performance (Ferguson)
<i>App. B</i> GRTS Analysis	12/7/12	System-wide: Analysis of GRTS data (Hinrichsen)
<i>App. C</i> Analysis of Channel Rehabilitation Sites	12/21/12	Mechanical channel rehabilitation: Geomorphic context (Lisle) Mechanical channel rehabilitation: Results related to Integrated Assessment Plan (IAP) Objective 1: Create and maintain spatially complex channel morphology (Stallman) Mechanical channel rehabilitation: Results related to IAP Objective 2: Increase/improve habitat for anadromous salmonids (Ferguson)
<i>App. D</i> Methodology for Data Frame Development	12/7/12	Overview of the SAB's approach to the Phase 1 Review (Buffington)
<i>App. E</i> Analysis of Habitat-Geomorphic Relationships using the Data Frame	-	System-wide: Temporal-spatial characterization of juvenile fish habitat (Peterson)
<i>App. F</i> Analysis of Riparian Vegetation Dynamics	-	System-wide: Riparian vegetation dynamics including erosion and deposition of the channel margin (Merigliano)
<i>App. G</i> Changes to the Channel Rehabilitation Project Design process during Phase 1	12/7/12	-
<i>App. H</i> Decision Support System	-	Decision Support System framework for adaptive management (Peterson) Summary of Phase 1 review findings and recommendations for Phase 2 Program implementation and discuss the future programmatic review (Jordan)

January 7 overview:

- More than 40 people attended in Weaverville; participants included:
 - Public, 1 Reporter
 - >14 Current employees of TMC agencies, 3 TAMWG members
 - Collaborators (e.g. Water Board staff) , former employees, former TAMWG members, significant others of current employees, Phase 1 review support contractors
- PDFs of the two presentations (Schrock; Merigliano) are available; event taped
- SAB presentation emphasized the Phase 1 Review approach
- Q & A session included several questions about the SABs findings

January 8 overview:

- More than 60 people attended in Weaverville or via Webex; participants included many of the folks from January 7 plus additional employees of TMC agencies.
- PDFs of the 11 presentations (Schrock; Merigliano) are available; event taped
- Technical presentations shared evaluations conducted and preliminary findings

January 9 overview:

- More than 50 people attended in Weaverville or via Webex; participants included many of the folks from January 8.
- Included Structured Decision Making tutorial to build-on the SAB's Decision Support System presentation and recommendation
- Included a topic by topic review – in some cases presenters were seeking clarification; in others TRRP staff had questions or comments on information shared.

SAB provisional recommendations:

- Better articulate program and stakeholder objectives and explicitly identify the relations among objectives.
- Similarly, scientific disagreement should be explicitly incorporated into the process using alternative models that represent the alternative scientific hypothesis about system dynamics.
- Treat rehabilitation projects as experiments and use them to formally test the hypotheses and goals articulated by the ROD and IAP.
- Conduct more controlled experiments (restoration designs) within and between sites to better evaluate designs and elements
- Integrate workgroup activities to better achieve specific Programmatic objectives.
- Streamline the internal review process of Program reports to disseminate findings more rapidly to increase the publication rate in peer-review journals.
- Generalize approaches and results to make them applicable to other systems (move beyond the case study of the Trinity)
- Implement and use a Decision Support System

Next steps for the Phase 1 Review:

- SAB is incorporating input received last week into the draft report.
- TRRP staff is invited to provide comments on materials presented to date to the SAB.
- SAB is developing a schedule for release of the main report plus all appendices for a TRRP review. Given the volume of materials, Program will be provided a one month period.

SAB Phase I Review Public Meeting, January 7, 2013--Public Comment/Question Summary

1. **Are there more fish? Are channel rehab actions making more fish in the Trinity River?** Given the data we were working with, the question we addressed was more "Is the TRRP affecting the resource in such a way as to produce more fish?", and the data shows that the Program seems to be moving in that direction. Because the analyses are particular to just the 40-mile project boundary, the findings do not factor in those conditions outside of that boundary. Having said that, the ROD calls for an increase in salmonids--not just juvenile salmonids but fish of all life stages—and more data is needed to answer your questions. Yes, there are more smolts but the variability in numbers and short time series of fish monitoring makes it difficult to attach this increase to restoration projects. Smolt to adult returns need to be compared with returns in adjacent northwest rivers rather than just adult numbers.
2. **What is the bottom line that will result in more fish, more harvest, more economic benefit for the community?** Cost/benefit is difficult to determine, but I believe the Secretary's comments concerning the ROD indicated that cost was secondary to the overall goal of getting the fishery back for the tribes, commercial users, and sport-fishermen. The projects are producing more habitat but how that translates into fish is problematic.
3. **What is the story on sediment load that is coming from non-intentional introduction?** There has been a reduction of fine sediments, yes, that has been shown. Has it had an effect on the fish? It follows that if sediment is smothering spawning beds, eggs/fry, and there is less fine sediment, then it stands to reason that more fish will come from this scenario.
4. **How realistic is it to try to restore conditions to "pre-dam"?** If we presume that fish production is directly linear to the amount of habitat restored, then the relationship is a 1:1. But a continuum of connected pockets of habitat might have a multiplying effect rather than a simple 1:1 effect, so variability in the different types of habitat could result in proportionately larger numbers of fish. At least that has been seen in other wildlife populations. Remember, the goal is not a "pre-dam river" but the "pre-dam fishery" in terms of numbers of fish from a scaled-down river.
5. **How much habitat was lost?** Before the dam there were pools, numerous holding spots for adult fish that were determined by temperature. Shallow areas for rearing, areas of suitable gravels for spawning are other examples of what we would call habitat. It could be said that other areas never were suitable for habitat. So the total area of river lost may not translate into area of habitat lost. We would need to analyze how much of the total river was being used as habitat to know that.
6. **Is there a significant increase in adult Coho/steelhead?** There are mixed results, based on species, especially since the life cycles and habitat needs for both species are so different. But there does not seem to be the significant increase we see in fall Chinook from the analyses done so far.
7. **Is a 16% difference in habitat over 11 years statistically significant, in your opinion?** This is a number that was presented sans the error bar, so the number may or may not be higher. But the more important question may be whether the number is *biologically* significant. Numbers of smolts have increased 70% while habitat just 16% as measured by our analyses.
8. **When will the Review be in final form?** Finalized recommendations need to come after meeting with the Program partners this week. We are presenting some draft findings to let

the partners know where we are in the process, to get additional data in some cases to try to fill in some data gaps, and time for the SAB to review the analyses.

9. How do you see your Review defining the success of the Program?

- Tells the public if the program is working
- Identifies additional opportunities to improve the projects
- Describes what has been learned from the river and this feedback identifies what works and what doesn't work
- Can identify subtle changes related to flow dynamics and other effects that may take longer than anticipated

10. Further value?

- Provides summation of all the information available, valuable even without recommendations.
- Allows for course corrections within the program.
- The very fact that the Program is pausing to compile findings, to examine where it is in the midst of all the day-to-day planning, designing, implementing, monitoring, etc., etc., to say "How are we doing? What does it all look like?" is critical to success. This is central to effective adaptive management and should be commended in and of itself.



TRINITY RIVER RESTORATION PROGRAM

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Technical Workgroup Summary December 2012

Updates have been prepared by the Trinity River Restoration Program technical workgroup coordinators at the request of the Trinity Management Council and the Trinity Adaptive Management Working Group. The quarterly Technical Workgroup Summaries will also be posted at: http://www.trrp.net/?page_id=1762 (update of webpage in progress). Workgroup meeting summaries are also posted on trrp.net (see: http://www.trrp.net/?page_id=70)

Workgroup: Flow

Coordinator: Eric Peterson

- The Flow workgroup has formed a subgroup to address hypotheses and design proposals for variable baseflows. Progress on these topics will include consultation with other workgroups.
- The timing of juvenile outmigration was a significant consideration for recommendations on hydrograph descending limbs during the Flow Study and Fish Workgroup members are participating in the analysis of subsequent data that is currently underway.
- In response to a request for information on the October baseflow transition (450 to 300 cfs), the workgroup developed a 1 page briefing for future use in responding to questions from the public.
- The Water Year 2012 flow recommendation "binder" document is available on the ODP: <http://odp.trrp.net/Data/Documents/Details.aspx?document=1871>
- The Water Year 2012 implementation report is being drafted.
- Planning is underway for Water Year 2013 flow scheduling.

Workgroup: Temperature

Coordinator: Rod Wittler

- The Temperature workgroup is looking forward to using the new temperature model (W2) for Lewiston reservoir analyses. We expect delivery from Watercourse Engineering soon.
- The Temperature workgroup is considering modifying the primary temperature performance measure. The new measure under consideration will be simpler and more easily interpreted. The workgroup continues the process of picking effective performance measures.
- The Temperature workgroup continues to investigate potential analyses of climate change impacts to river temperatures below Lewiston dam.
- The Temperature workgroup is supporting the outmigrant timing study being conducted by Flow and Fish workgroup members (mentioned above) by supplying temperature data.

Workgroup: Interdisciplinary**Coordinators:** Ernie Clarke / DJ Bandrowski

- The Interdisciplinary team holds monthly teleconferences to facilitate coordination and information exchange between workgroups. For instance the group is pulling together information from various technical workgroups to respond to Design Team questions related to pool depth and adult fish holding habitat.

Workgroup: Design**Coordinator:** DJ Bandrowski

- The Design Team is working on 2013 Channel Rehabilitation Project Designs (Civil and Revegetation). The Hoopa Design Group is developing the Douglas City design; the Yurok/Federal Design Group is developing the Lorenz Gulch design.
- The 2014 design process will start after the Phase I Review roll-out in 2013. A Phase II Plan will be developed with the Scientific Advisory Board to support the remaining channel rehabilitation Phase II projects.
- Design Team developed eleven goals/objectives and associated metrics to support the 2013 design effort.
- A Joint Stakeholder/Design Team meeting was held on November 14th. A Stream Project alternative analysis tool was used to incorporate designers' metric results and stakeholder priority for the goals/objectives. This created an opportunity to engage with stakeholders at the 10% conceptual design stage and to help optimize the project designs to meet multiple objectives.
- Design Team and other workgroups met with Darcy Pickard, ESSA Technologies, regarding development of a Channel Rehabilitation Effectiveness Monitoring and Analytical Framework. The results will be incorporated into a larger Decision Support System recommended by the Scientific Advisory Board. Design Team has submitted a memo to the Trinity Management Council and to the Interdisciplinary Team for guidance on technical and social/stakeholder concerns regarding adult holding habitat consideration within the TRRP design process.
- Trinity Management Council asked the Design Team to re-evaluate the Indian Creek Bank Naturalization Project. New analyses will be presented in January after an internal review by Design Team.
- Bucktail Bridge Design and Environmental Compliance is underway, completion planned for June 2013, with anticipated potential bridge replacement by Trinity County in 2014.

Workgroup: Physical**Coordinator:** Andreas Krause

- Pool analysis is underway now that the system-wide bathymetry has been received. The analysis will consider approximately 150 pools where repeat bathymetric data is available from 2009 onwards.
- The 2011 sediment transport monitoring report was just finalized and is available on the program website. The implications of this finding will need to be considered by the physical workgroup.
- The workgroup developed a gravel augmentation recommendation for 2013 that will be presented to the TMC in January.
- Work on the geomorphic assessment by the U.S. Geological Survey continues. A final report is expected sometime this spring.

Workgroup: Wildlife and Riparian**Coordinator: James Lee**

- Desired Future Conditions definition draft to be distributed to work groups in January.
- Revegetation Plan and Compliance Strategy nearly completed, draft to be delivered to the California Department of Fish and Game in mid-December.
- Amphibian Research and Monitoring Initiative researchers met with TRRP staff to scope the strategy for foothill yellow-legged frog and western pond turtles monitoring.
- 2012 Avian monitoring report complete (Associations with riparian habitat and constructed floodplain cover for five riparian birds species on the Trinity River, CA, 2002-2011)
- Lower Steiner Flat and Upper Junction City channel rehab site revegetation is completed.

Workgroup: Watershed**Coordinator: Kent Steffens**

- A total of nine watershed projects were proposed to the group for funding. These projects were ranked by each of the stakeholder groups to prioritize projects using the workgroups' funding criteria. Based on current funding 5 of the 9 proposals were selected to move forward with funding and contracting for fiscal year 2013 funds and implementation in 2014.
- Selected projects for funding and implementation now need to be refined further for contracting purposes with detailed budgets and schedules.
- A revised work flow diagram was adopted at the last meeting to bring project proposals to the workgroup sooner in the calendar year, and allow for more discussion and review. This revised flow diagram will be implemented for fiscal year 2014 funds and project selection.
- Based on the ranking and selection process, the group thought the process could be improved or refined. One of the workgroup members is going to have a draft revised funding criteria for the next meeting for the workgroup the review and comment.

Workgroup: Fish**Coordinator: Tim Hayden**

- At their November meeting the workgroup discussed the objectives for the juvenile salmonid density project, performance measures, and status of subgroup tasks (South Fork spring Chinook limiting factors, cohort reconstruction, juvenile survival, and juvenile fish production model).
- In a subsequent meeting, the workgroup supported the suggestion to focus the juvenile salmonid density project partners on supporting data needs for development of a juvenile fish production model.
- In January, the workgroup will discuss the Design Team information request related to adult holding habitat and channel rehabilitation features. The group will also consider preliminary findings from the Scientific Advisory Board's Phase I Review.
- In February there will be a workshop to discuss the newly developed juvenile Chinook salmon production model for the Klamath, and explore priorities for developing a Trinity River component of a basin-wide model.