ATTACHMENT #3

**Trinity River Restoration Program**
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MEMORANDUM

TO: Trinity River Adaptive Management Working Group (TAMWG) Members

FROM: Ernie Clarke, Science Coordinator, Trinity River Restoration Program (Program)

SUBJECT: Science Program Report

**Overview**

This report discusses the major activities that have occurred since September 2010 and major initiatives now underway:

- Trinity Management Council Workshop Page 2
- Scientists' Retreat Page 4
- Fiscal Year 12 Work Planning Page 5
- Reviews Page 10
- Work Groups Page 13

**Trinity Management Council Workshop**

Date: September 23, 2010.

Elements:

| | | |
|---|---|---|
| 1. | Stalnaker | TRRP Concepts/Vision. |
| 2. | Franklin, McBain, Polos | TRFES: Background, Strategy, and Recommendations. |
| 3. | Faler | TRRP Implementation Summary (2003-2010). |
| 4. | Smith (Headwaters Corp.) | Where Art Thou, Adaptive Mgmt? – Making "Learning by Doing" Meaningful. |
| 5. | Krause | Evaluation of Trinity River Adaptive Management. |
| 6. | Panel discussion. | |

Summary:

1. Stalnaker.
    a. Purpose: Establish a common understanding of the underpinnings of the Program and consider where it stands relative to the original concept.
    b. This was a update of a June 2009 TAMWG presentation.
    c. Described:
        i. TRFES foundation studies, major conclusions and recommendations.
        ii. Why Adaptive Environmental Assessment And Management?
        iii. Organization.
    d. Reflections:
        i. AEAM Team not utilized as independent scientific staff directly advising the TMC.
        ii. Not executing of science goal, i.e. to test the fundamental science based assumptions upon which the TRRP strategy was developed.
        iii. Slow to design and conduct habitat evolution assessments over 40 miles and experiments within alluvial reaches.
        iv. Slow to implement Peer Review and RFP process.
2. Franklin, McBain, Polos
    a. Purpose: Develop a common vision for the TRRP concerning the restoration of the Trinity River Fishery Resources as recommended in the TRFE.
    b. Described:
        i. Problem (decline of fish populations).
        ii. Legislative and administrative actions through December 2000.
        iii. Trinity River Flow Evaluation.
        iv. Differences from flow study (e.g. number of side channels, use of large wood).
3. Faler
    a. Purpose: To provide insight into Program office perspective on implementation of the Record of Decision.

b. Described:
    i. Status of implementation.
    ii. Comparison of planned versus actual phase 1 rehabilitation activities.
    iii. Struggle to implement a science-based decision making process.
    iv. Questions facing the Program:
        1. Pause between phases 1 and 2 in channel rehabilitation?
        2. Whether or not the evolution in design techniques is appropriate?

4. Smith
    a. Purpose: Provide a perspective on adaptive management informed by his in the Platte River Recovery Implementation Program.
    b. Other involvement: Comprehensive Everglades Restoration Program; Missouri River Restoration Program; Middle Rio Grande Endangered Species Collaborative Program; and PhD student in Adaptive Management.
    c. Described:
        i. Elements of successful Adaptive Management:
            1. Science does not control the process – it informs management and policy decision-making.
            2. Governance structure = shared decision-making.
            3. Systems approach – large scale, long time, hard thinking.
            4. Rehabilitation (not restoration) – focus on form and function.
            5. Engage everyone.
            6. Analyze, then SYNTHESIZE = tell the AM story!
            7. Build strong links to decision-making.
        ii. Platte River Recovery Implementation Program.

5. Krause
    a. Purpose: Evaluate the Adaptive Environmental Assessment and Management in the Program.
    b. Described the fundamentals of Adaptive Environmental Assessment And Management.
    c. Evaluated examples Adaptive Environmental Assessment And Management essentials.
        i. Quantifiable prediction made that is relevant to management?
        ii. Experiment conducted to test prediction?
        iii. Learning documented in peer reviewed report?
        iv. Learning communicated?
        v. Management response to learning?
    d. Finding: Need to refocus TRRP on doing ASSESSMENT.
        1. Assessment = synthesis analysis, not monitoring reports.

Available: (1) Presentations, (2) Recording of the session. Contact Ernie.

**Scientists' Retreat**

September 20 - 21, 2010

Summarize topics covered (see my TMC presentation)

1. Over 30 participants.
2. Started with participants listing successes of the Science Program.
3. Ended with suggestions from the facilitator (Chris Moore of CDR) on how we can develop a stronger program:
    - Recognize success.
    - Set realistic expectations / agendas. The group is ambitious. Inability to achieve ambitious goals leaves the group feeling frustrated and unproductive.
    - Maintain collaborative rather than adversarial relationships.
    - Maintain focus / listen actively. There is a high degree on not listening and speaking off point.
4. Agenda was developed based on consideration of the previous assessments and pre-Retreat interviews that lead to identification of 20 key themes.
5. Topics
    - Scientific underpinnings of the program
    - Organizational refinement
        - USFWS / Reclamation Memorandum of Understanding
        - DOI staff roles table
    - Process for tribal / partner involvement
        - Decision making process
        - Work planning
    - Work groups
        - Identify needed groups
        - Members, coordinator responsibilities, procedures
        - Refocus on technical issues
6. Follow up:
    - Charter development
    - Establish practices
    - Implementation of work planning process
    - Facilitation training

## Fiscal Year 12 Work Planning

The Trinity River Restoration Program (TRRP) science work plan will:

- Clearly establish and communicate the priorities of the science program.
- Define reporting dates and products, which can be shared with the Trinity Management Council, the Trinity River Adaptive Management Working Group, and other interested parties.
- Allow science to drive budget decisions.
- Permit and document adjustments based on learning and / or changing priorities.

Work plan fundamentals:

- Discipline specific work plans will be developed by TRRP work groups.
- A comprehensive work plan will be developed by the Interdisciplinary Team (IDT) based on the discipline specific submissions.
- Work plans will be overarching. Details will be developed through the creation of Request for Proposals (RFPs), Independent Government Estimates (IGEs), and proposals.
- Work plans will be guided but not limited by the Integrated Assessment Plan.
- Work plans will identify projects that are recurring. Additionally, work plans will identify projects best accomplished by TRRP partners and those which are to be competed through the RFP process.

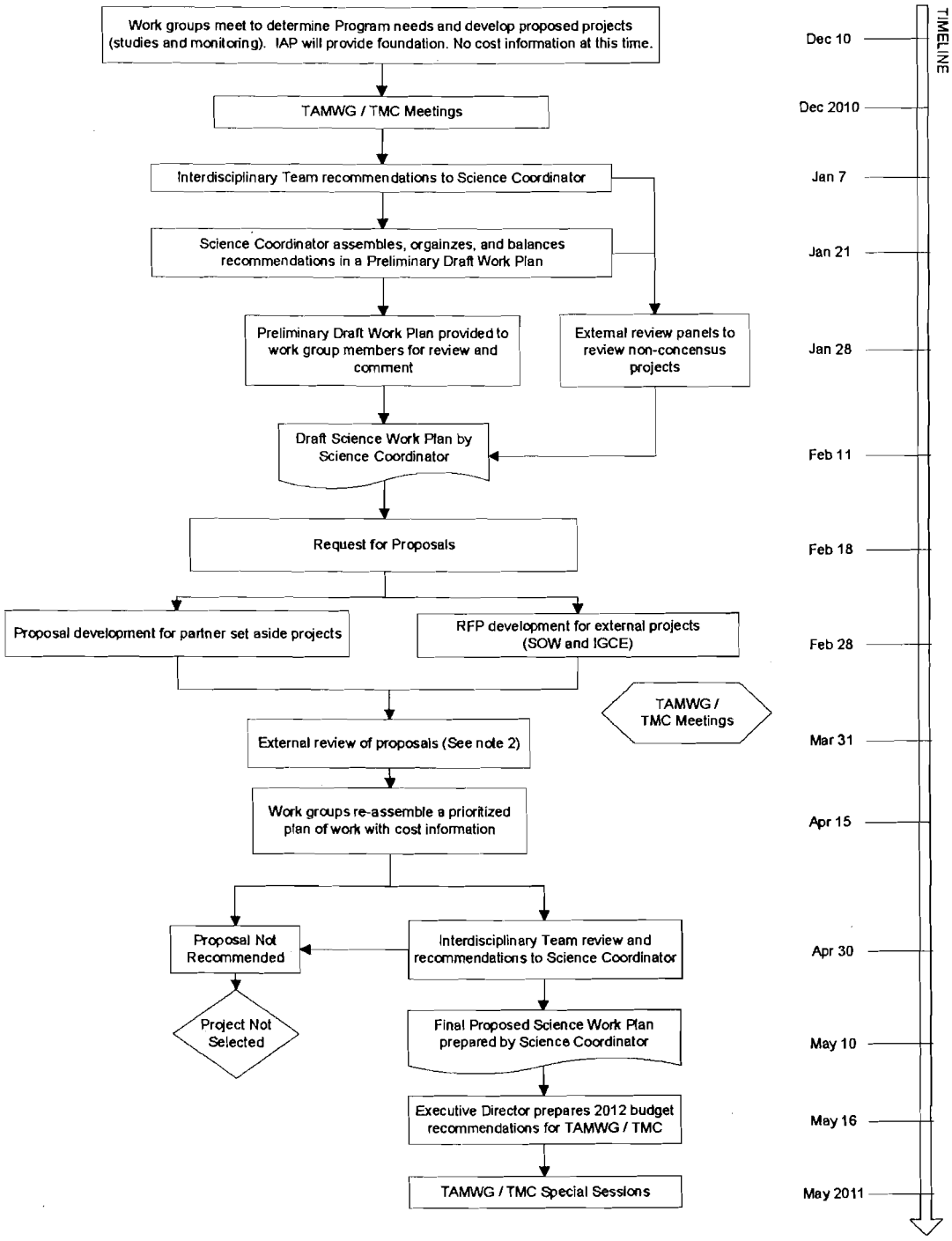
Work plan contents:

- Cover sheet including the work plan's major goals and a prioritized list of elements
- Summary (2-pages maximum) of each element including: (1) objective, (2) project scope (with analysis and metrics), (3) technical approach, (4) schedule, (5) organization / responsibilities, and (6) deliverables / tasks.

Priorities

1. Assess / Report on existing information
    a. Develop a series of reports synthesizing information
    b. Create a set of performance measures
2. Implement work group changes
    a. Membership
    b. Focus on technical issue
    c. Document disputes
3. Institute reviews systematically
    a. SAB programmatic review
    b. Independent peer review of reports, study plans
4. Execute the new work planning process

## Science Work Plan Development Process




Notes:
(1) Recurring or on-going projects may not be subject to this full process.
(2) Program intends to have all 2012 proposals reviewed by expert review panels, except rotary screw trap projects which were reviewed in 2010.

Example prioritized list (for December 10 deadline; from fish work group):

1. Map and quantify the extent (area) of available fry/juvenile rearing habitat throughout the mainstem.
2. Map and quantify the extent (area) of available fry/juvenile rearing habitat at rehab sites.
3. Monitor adult escapement of hatchery and naturally produced spring and fall Chinook, coho and fall steelhead.
4. Monitor smolt outmigrant numbers,Monitor smolt timing.
5. Monitor smolt timing, as well as pre-smolt/smolt size, condition and disease incidence at outmigration (fish in hand).
6. Monitor water temperatures at existing Trinity River temperature stations (supplemented where necessary) to model achievement of species-specific Water Year and seasonal temperature targets for rearing juveniles, outmigrating smolts and spawning adults.
7. Monitor redd distribution, abundance, and densities (includes carcass surveys).
8. Monitor harvest (tribal, sport and commercial) of naturally produced fall Chinook.
9. Pre-smolt/smolt size, condition and disease incidence at outmigration (fish in hand).
10. Monitor fry density and abundance at GRTS sites across upper 40 miles (standing stock assessment).
11. Map and quantify the extent (area) of available adult spawning habitat at rehab sites and throughout the mainstem.
12. Develop cohort reconstructions for Chinook and coho and evaluate cohort performance or year class strength, and population growth rate.
13. Monitor fry density and abundance at rehab sites.
14. Estimate Trinity natural juvenile coho survival (ID temporal and spatial bottlenecks).
15. Monitor smolt outmigrant numbers.
16. Monitor size (length/wt and condition of fry )(fish in hand).
17. Monitor harvest (tribal, sport and commercial) of naturally produced spring Chinook.
18. Monitor pre-spawning mortality to assess the number and proportion of un-spawned or partially spawned female Chinook and coho salmon.
19. Monitor the proportion of hatchery reared to natural smolt outmigrants (best undertaken in conjunction with assessment 4J).

Other work groups provided similar input.

EXAMPLE OF A WORK PLAN ITEM SUMMARY

**Title:** Trinity River Chinook Salmon redd and carcass survey

**Objective:** The goal of this project is to assess the abundance and distribution of spawning spring and fall Chinook Salmon in the mainstem Trinity River and to evaluate the temporal and spatial response of mainstem Chinook Salmon spawning to restoration activities.

Specific objectives are:

1. Assess the spatial distribution of Chinook Salmon redds, particularly in relation to TRRP management actions.
2. Quantify Chinook Salmon natural spawning in the mainstem Trinity River.
3. Quantify pre-spawn mortality for female Chinook Salmon.
4. Quantify and describe spatial distribution of natural and hatchery origin Chinook Salmon spawning in the mainstem.
5. Collect biological data ancillary to escapement (fork lengths for estimating size distribution and jack proportion, scales for age composition, sex ratio, etc.).
6. Address the above objectives for the portion of Coho Salmon spawning that overlaps with the Chinook Salmon survey season.

This project provides information necessary to addresses the following objectives identified in the TRRP IAP (V1.0):

3.1.1 Optimize adult utilization of suitable spawning habitat areas in the mainstem.
3.1.3 Reduce temperature related pre-spawning mortality and protect in-vivo egg viability
3.3.3 Minimize adverse competition between hatchery and naturally produced adult salmonids.
4.1.1 Increase escapement of naturally produced fall Chinook Salmon adults.
4.2.1 Increase escapement of naturally produced spring Chinook Salmon adults.

Hypothesis: The distribution of natural origin Chinook Salmon redds will respond longitudinally and laterally as rehabilitation activities influence fry and juvenile rearing success, gravel distribution and supply, wetted channel footprint, and bar formation.

Assuming channel rehabilitation and other management actions increases available salmonid fry and juvenile rearing habitat area throughout the upper 40 miles by 400% from baseline conditions (an initial interim target), we expect the longitudinal distribution and abundance of redds constructed by natural origin Chinook Salmon to increase substantially. We postulate that the spatial distribution of returning spawners is influenced by the spatial distribution of deposited eggs that successfully rear and recruit to adulthood. Increases in the longitudinal distribution and abundance of redds will be influenced by the annual in-river run size and quantity, quality and distribution of available spawning habitat.

**Project Scope:** This assessment is based on recurring annual surveys which occur between Lewiston Dam and Weitchpec. Changes over time in the distribution and abundance of spawners and redds will be examined using trend analyses and spatial analyses. These analyses will be dependent on annual spawning and redd distribution surveys. The following metrics were identified in the TRRP IAP (V1.0): ***Density of redds*** per longitudinal river segment or reach, or tributary, ***Longitudinal distribution and abundance of redds*** in the upper 40 miles, ***Number of redds/spawning habitat*** in association with reach or river segment, ***Redd Superimposition*** (e.g., ratio of spawners to constructed redds, index of clustering, distance between redds). and ***Number (proportion) of un-spawned or partially spawned females.***

**Technical Approach:** Redd and carcass surveys will be conducted by raft in 14 contiguous survey reaches from Lewiston Dam to Weitchpec. This project will provide estimates of in-river escapement (by week and season) using (1) the Petersen mark-recapture estimator and (2) the Schaefer estimator. Redd coordinates (xy) will be provided in GIS shapefile format and on hardcopy aerial photos.

**Schedule:** Field work will occur from September through mid-December. Results will be reported periodically over the season on the Arcata Fish and Wildlife Office's website.

**Organization / Responsibilities:** Traditionally, this work has been accomplished by a group of Program partners: U.S. Fish and Wildlife Service, US Forest Service, California Department of Fish and Game, Yurok Tribal Fisheries Program, Hoopa Valley Tribal Fisheries Department. These organizations jointly have the expertise and experience to efficiently section complete the necessary work.

**Deliverables / Tasks:** This project will provide: (1) Redd coordinates (xy) will be provided in GIS shapefile format and on hardcopy aerial photos (2) estimates of in-river escapement by week and for the entire season for the mainstem Trinity River. Results will be reported in an annual multiagency report. The draft report will be provide by March 2012. The final report by July 2012.

## Reviews

In progress:

1. The 2009 juvenile density pilot study draft report (POC: Ernie Clarke).
2. 2011 juvenile density investigation plan (POC: Ernie Clarke).

Future:

1. Fiscal Year 2011 Sub-Program Review: Adult monitoring projects (POC: Joe Polos).
2. Work planning:
    a. SAB review of Fiscal Year 2012 draft work plan (POC: Jennifer Faler).
    b. The Program intends to have all internal proposal reviewed by an expert review panel with the exception of rotary screw trap work which was just reviewed. Scopes of work and cost estimates for outside RFPs will also be reviewed by expert review panels. IDT needs to develop process (POC: Ernie Clarke).
3. SAB programmatic review - a review of the overall AEAM Organization by the SAB, per the Implementation Plan, is planned for Fiscal Year 2011 (POC: Jennifer Faler).

Past:

| **Scientific Advisory Board Review** | | |
|---|---|---|
| Trinity River Restoration Program Anadromous Fish Habitat Assessment | Scientific Advisory Board | 2006 |
| Integrated Assessment Plan version 0.9, 0.98 | Scientific Advisory Board | 2006, 2008 |
| TRRP Juvenile Salmonid Outmigrant Monitoring Evaluation | Scientific Advisory Board | 2007 |
| **Independent Expert Reviews** | | |
| ***To assure scientific credibility all monitoring and studies will be awarded through a competitive process using RFP's and independent outside review panels.*** | | |
| Sediment Monitoring Program | USGS / expert panels | 2004, 2009 |
| Juvenile Salmonid Outmigrant Monitoring Evaluation - Phase I & II | North State Resources, Inc.; ESSA Technologies, Ltd.; Simon Fraser Uni. | 2008, 2009 |
| Site Specific Habitat Assessment (RFP and proposal) | Anonymous reviewers | 2008 |
| A preliminary evaluation of the performance of methods used to estimate spawning escapement of Chinook salmon in the Trinity River | David Hankin (Humboldt State University) | 2009 |
| **Peer-Reviewed Journal Articles** | | |
| ***Peer Review is a process that journals use to ensure the articles they publish represent the best scholarship currently available. When an article is submitted to a peer reviewed journal, the editors send it out to other scholars in the same field (the author's peers) to get their opinion on the quality of the scholarship, its relevance to the field, its appropriateness for the journal, etc.*** | | |
| Gaeuman, D. (in review). Mitigating downstream effects of dams: Discussion of Gordon Grant's keynote paper. In Gravel-bed Rivers 7, Citation not yet available. | Anonymous scientific journal reviewers | In review |

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| Viparelli, E., D. Gaeuman, P.R. Wilcock, and G. Parker (accepted). A model to predict the evolution of a gravel bed river under an imposed cyclic hydrograph and its application to the Trinity River. Water Resourc. Res. | Anonymous scientific journal reviewers | In production |
| Gaeuman, D. and S. Pittman, 2010. Relative contributions of sand and gravel bedload to acoustic Doppler bed-velocity magnitudes in the Trinity River, California. In Bedload Surrogate Monitoring Technologies, J.R. Gray, J.B. Laronne, and J.D.G. Marr, eds. U.S. Geological Survey Scientific Investigations Report 195-207. | Anonymous scientific journal reviewers | 2010 |
| Fuller, T. E., Pope, K. L., Ashton, D. T. and Welsh Jr., H. H. , Linking the Distribution of an Invasive Amphibian (Rana catesbeiana) to Habitat Conditions in a Managed River System in Northern California. Restoration Ecology, no. doi: 10.1111/j.1526-100X.2010.00708.x | Anonymous scientific journal reviewers | 2010 |
| Welsh, H. H. Jr., G. R. Hodgson, J. J. Duda, J. M. Emlen, 2010. Faunal assemblages and multi–scale habitat patterns in headwater tributaries of the South Fork Trinity River – an unregulated river embedded within a multiple-use landscape. Animal Biodiversity and Conservation 33.1: 63-87. | Anonymous scientific journal reviewers | 2010 |
| Gaeuman, D., E.D. Andrews, A. Krause and W. Smith, 2009. Predicting fractional bedload transport rates: application of the Wilcock-Crowe equations to a regulated gravel-bed river. Water Resourc. Res., 45, W06409, doi:10.1029/2008WR007320. | Anonymous scientific journal reviewers | 2009 |
| Brown, R. A. and Pasternack, G. B. (2009), Comparison of methods for analysing salmon habitat rehabilitation designs for regulated rivers. River Research and Applications, 25: 745–772. doi: 10.1002/rra.1189 | Anonymous scientific journal reviewers | 2009 |
| Gard, M. (2009). "Demonstration Flow Assessment and 2-D Modeling: Perspectives Based on Instream Flow Studies and Evaluation of Restoration Projects." Fisheries 34(7): 320-329. | Anonymous scientific journal reviewers | 2009 |
| May, C. L., B. Pryor, T. E. Lisle, and M. Lang (2009), Coupling hydrodynamic modeling and empirical measures of bed mobility to predict the risk of scour and fill of salmon redds in a large regulated river, Water Resour. Res., 45, W05402, doi:10.1029 | Anonymous scientific journal reviewers | 2009 |
| McCarthy, S. G., J. J. Duda, et al. (2009). "Linking Habitat Quality with Trophic Performance of Steelhead along Forest Gradients in the South Fork Trinity River Watershed, California." Transactions of the American Fisheries Society 138(3): 506-521. | Anonymous scientific journal reviewers | 2009 |
| Brown, R. A. and G. B. Pasternack (2008). "Engineered channel controls limiting spawning habitat rehabilitation success on regulated gravel-bed rivers." Geomorphology 97(3-4): 631-654. | Anonymous scientific journal reviewers | 2008 |

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| Andrew P. Kinziger, Eric J. Loudenslager, David G. Hankin, Eric C. Anderson, John Carlos Garza. Hybridization between Spring- and Fall-Run Chinook Salmon Returning to the Trinity River, California. North American Journal of Fisheries Management 200828:5, 1426-1438 | Anonymous scientific journal reviewers | 2008 |
| Pasternack, G. B., M. Bounrisavong, et al. (2008). "Backwater control on riffle-pool hydraulics, fish habitat quality, and sediment transport regime in gravel-bed rivers." journal of Hydrology 357: 125-139. | Anonymous scientific journal reviewers | 2008 |
| Bartholomew JL, Atkinson SD, Hallett SL, Zielinski CM, Foott JS. Distribution and abundance of the salmonid parasite Parvicapsula minibicornis (Myxozoa) in the Klamath River basin (Oregon-California, U.S.A.). Dis Aquat Organ. 2007 Dec 13;78(2):137-46. | Anonymous scientific journal reviewers | 2007 |
| Benson, R. L., S. Turo, et al. (2007). "Migration and movement patterns of green sturgeon (Acipenser medirostris) in the Klamath and Trinity rivers, California, USA." Environmental Biology of Fishes 79(3-4): 269-279. | Anonymous scientific journal reviewers | 2007 |
| Hilldale, R. C. and Raff, D. (2008), Assessing the ability of airborne LiDAR to map river bathymetry. Earth Surface Processes and Landforms, 33: 773–783. doi: 10.1002/esp.1575 | Anonymous scientific journal reviewers | 2007 |
| Pearse, D. E., C. J. Donohoe, et al. (2007). "Population genetics of steelhead (Oncorhynchus mykiss) in the Klamath River." Environmental Biology of Fishes 80(4): 377-387. | Anonymous scientific journal reviewers | 2007 |
| Pasternack, G. B., A. T. Gilbert, et al. (2006). "Error propagation for velocity and shear stress prediction using 2D models for environmental management." Journal of Hydrology 328(1-2): 227-241. | Anonymous scientific journal reviewers | 2006 |
| Wheatcroft, R. A. and C. K. Sommerfield (2005). "River sediment flux and shelf sediment accumulation rates on the Pacific Northwest margin." Continental Shelf Research 25(3): 311-332. | Anonymous scientific journal reviewers | 2005 |
| **Value Engineering Studies** | | |
| ***Value engineering is concerned with optimising the conceptual, technical and operational aspects of a project's deliverables. Value engineering utilises a series of proven techniques during the implementation phase of a project.*** | | |
| Indian Creek Channel Rehabilitation Project 50% Design, Trinity River Restoration Program, Central Valley Project | Bureau of Reclamation | 2006 |
| Lewiston - Dark Gulch Channel Rehabilitation, 30% Design, Trinity River Restoration Program, Central Valley Project | Bureau of Reclamation | 2007 |
| Trinty River Restoration Project - Sawmill, Upper Rush Creek, and Steel Bridge Sites - 30% Design | Bureau of Reclamation | 2008 |
| Phase II Conceptual Design Value Engineering Study, Bureau of Reclamation, Trinity River Restoration Program, Phase II | CH2M HILL and ENTRIX | 2010 |

## Work group report

Recent activities have centered around: (1) constituting groups with subject matter expects identified by TMC members, (2) identifying coordinators, (3) developing discretionary charter language, (4) developing FY12 work plans, and (5) identifying performance measures. Items 1 – 4 are summarized below. Item 4 was discussed above.

Work group members (coordinator in bold, back-up in italics, * = interim appointment)

Fish: *Tim Hayden* (Yurok Tribe), Nina Hemphill (Reclamation), **Joe Polos** (USFWS), Wade Sinnen (CA Department of Fish and Game), George Kautsky (Hoopa Valley Tribe), Samantha Chilcote (U.S. Forest Service), Seth Naman (National Marine Fisheries Service)

Physical: Scott McBain (McBain & Trush, Inc., consultant to the Hoopa Valley Tribe), **Andrea Hilton** (Hoopa Valley Tribe), Mark Smelser (CA Department of Fish and Game), Teresa Connor (CA Department of Water Resources), Rocco Fiori (Fiori Geosciences, consultant to the Yurok Tribe), Conor Shea (USFWS), Andreas Krause (Reclamation), Dave Gaeuman (Reclamation).

Wild. / Rip.: Justin Alverez (Hoopa Valley Tribe), **Samantha Chilcote*** (U.S. Forest Service), John Bair (McBain & Trush, Inc., consultant to the Hoopa Valley Tribe), Jennifer Carlson (CA Department of Fish and Game), Jamie Bettaso (USFWS) , Nina Hemphill (Reclamation), Eric Peterson (Reclamation), Brandt Gutermuth (Reclamation), Shane Quinn (Yurok Tribe), Chris West (Yurok Tribe), *Sherri Miller** (U.S. Forest Service).

Flow: Robert Franklin (Hoopa Valley Tribe), Joe Polos (USFWS), *Tim Hayden* (Yurok Tribe), Teresa Connor (CA Department of Water Resources), Larry Hanson (CA Department of Fish and Game), James Montesi (National Marine Fisheries Service), **Andreas Krause** (Reclamation), Susanne Baremore (Trinity County).

Temp.: Robert Franklin (Hoopa Valley Tribe), Paul Zedonis (USFWS), Tim Hayden (Yurok Tribe), Teresa Connor (CA Department of Water Resources), Mike Berry (CA Department of Fish and Game), Seth Naman (National Marine Fisheries Service), **Rod Wittler*** (Reclamation), Susanne Baremore (Trinity County), Eric Wiseman (U.S. Forest Service).

IDT: **RIG Branch Chief, Science Program Coordinator**, and appointed representatives of the following TRRP work groups: Flow, Temperature, Physical, Fish, and Wildlife / Riparian. Additionally, any TRRP partner organization not represented in the above appointments will have a seat on the IDT.

Work Group Charters

- Background: A draft charter template was shared at the Scientists' Retreat. The intent of the charter is to identify the mission of various work groups and establish common expectations and standards across groups.
- Work group task: Consider 3 discretionary elements of the charter: Purpose, Objectives, IDT representative.
- Example purpose statements (temperature team):
    - The purpose of the Trinity River Temperature Work Group is to make management recommendations that will help ensure water temperatures in the Trinity River are sufficient to meet the needs of native aquatic species. The work group will provide technical support to the Trinity River Restoration Program & Sacramento River Temperature Task Group regarding all aspects of water temperature management for the Trinity River. The work group will evaluate how Trinity River Restoration Program (TRRP) management actions and Trinity River Division (TRD) facilities and operations impact water temperatures in the Trinity River. The Work Group will: (1) track water temperatures in the Trinity River; (2) assess the operational capabilities of the TRD in order to utilize the best management of coldwater storage and transmission to meet water temperature objectives in the Trinity River in all years; and (3) evaluate physical, operation, management, and other options within TRD that could enhance temperature management.
- Common objectives:
    - Develop science-based management recommendations for the Program.
    - Address priority technical uncertainties and information needs.
    - Coordinate with other work groups and contribute towards synthesis and integration of Program science information through participation in the Interdisciplinary Team (IDT)
- Example of work group specific objectives (temperature):
    - Provide input to the annual flow scheduling process.
    - Participate in and provide recommendations to the Sacramento River Temperature Task Group.
    - Assess modifications to TRD facilities & operations for improved management of coldwater resources.
    - Conduct inter-annual analyses to develop management strategies to deal with drought.
    - Address temperature issues listed in the IAP that impact the aquatic ecology of the Trinity River.
    - Track water temperatures in the Trinity River
    - Recommend alternative operations to CVO for TRD facilities at times when water temperatures are exceeding targets
    - Assess how TRRP activities alter the temperature regime of the Trinity River

Performance Measures

| | |
|---|---|
| Goal: | Develop a small set of performance measures that are determinants of success. |
| Status: | Work groups have identified tentative lists. |
| Next steps: | Work groups to refine lists / apply measures / mock up results.<br>Comprehensive set by end of FY. |
| Suggestion: | Share preliminary results in March meeting. |