



Trinity River Restoration Program

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Trinity Adaptive Management Working Group

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May 25, 2011

Brian Person, Chair
Trinity Management Council
c/o Trinity River Restoration Program office
P.O. Box 1300, Weaverville CA 96093

Dear Mr. Person and TMC members,

The Trinity Adaptive Management Working Group recommends approval of the TRRP 2012 budget presented to the TAMWG on May 17. In general, and with some variations among member opinions which I'll be happy to discuss at your May 26 meeting, the TAMWG recommends that the 20:30:50 ratio between allocations for administration, science activities, and implementation activities be maintained as closely as possible, both in the adopted budget and in actual expenditures.

TAMWG members seem pleased with the science work-plan development process for 2012. Members recognize that the project prioritizations may need to be revisited once the "funding line" is finalized.

Informally (there was no motion), if assessment of adult holding conditions in the river is not assigned as high a priority by TRRP as the Guide Association has urged, we suggest that a statement be made available to the public explaining program scientists' perspective on the issue.

Arnold Whitridge
TAMWG chair

Trinity River Restoration Program (Program)
Fiscal Year 2012 Budget Descriptions by Program Activity
May 2011

Program Administration

The spending target for Program administration costs is generally accepted to be about 20 percent of the total Program budget and has averaged 21 percent in the last ten years. The proposed spending level for 2012 is approximately 19 percent. This Program activity no longer accounts for U.S. Fish and Wildlife Service (Service) science staff costs and includes data management and maintenance for the first time. Other spending adjustments for 2012 include a 1.8 percent increase in year over year spending per the Department of Labor's Economic Cost Index for state and local workers for the 12 month period ending March 2011, an increase in technical assistance to tribes, and a decrease in office operations due the cancellation of the office expansion in 2010.

The Program administration activity covers the administrative and program wide activities. The administrative costs include: 1) salaries for the Executive Director, Secretary, Procurement Specialist, Budget Technician, fifty percent of both the Implementation Branch Chief and Science Coordinator, and other Service administrative personnel; 2) infrastructure costs such as rent, communications, and utilities; 3) logistical costs including transportation, travel, and relocation of new employees; 4) support from other offices including IT, contracting, construction, etc.); 5) miscellaneous costs including supplies, printing/reproduction, equipment, travel and training.

FY2013 Budget Activity Plan definition:

This sub-activity includes program administration elements for all aspects of the Restoration Program, including salary and benefits, office operations, travel, vehicle expenses, supplies and materials, both office and field equipment, and support costs for the Trinity Management Council. The Trinity Adaptive Management Working Group is chartered and funded by the FWS. This sub-activity is an essential element of implementing Reclamation's share of the larger Trinity River Restoration Program that is supported by a 1998 solicitor's opinion, and is being conducted in partnership with multiple tribal, Federal, State, and local entities.

Budget Line Items:

AEAM Team

Reclamation and Service Program Management Personnel

Program Administration

Office Operations, Other USBR Offices, Data Management and Maintenance,
Public Education and Outreach/Website

Trinity Management Council

Primary Members: Time, travel, and per diem costs for 8 principle TMC members to attend four 2-day Quarterly Meetings per year, plus one special 2-day called session, for purposes of directing TRRP activities. Time, travel, and per diem costs for 8 principle TMC members for program coordination.

Alternates and/or Technical Representatives (2 maximum, does not include project labor): Time, travel, and per diem costs for technical representatives to attend four 2-day Quarterly Meetings per year, plus one special 2-day called session, plus 12 technical team meetings for purposes of coordinating with TRRP staff.

Non-Project Specific Document Review and Coordination with TRRP Staff: Time, travel, and per diem.

Non-Project Specific Support (prorated based on % use for TRRP): Office supplies, computers, other equipment, vehicles, other items needed to conduct TRRP related activities, and indirect costs. Costs will vary by TMC member depending on specific types of assistance provided. Does not include technical and support costs for specific projects.

Technical Assistance to Tribes

The Tribes will provide Reclamation with policy guidance and technical expertise needed to implement the ROD and assist in the rehabilitation of the Trinity River and restoration of fish and wildlife populations in the Trinity River Basin, including activities to implement an AEAM program. Allowable costs include Administrative staff, oversight by senior fisheries biologists, critical safety and technical training of staff, office utility expenses, building maintenance, office supplies and equipment, and other critical non-project-specific operational support expenses not otherwise covered by indirect costs associated with specific projects, but necessary for the Tribe to effectively participate and contribute to the Program.

Trinity Adaptive Management Working Group

Covers administrative and member travel costs.

Rehabilitation Implementation

The spending target for Implementation costs is generally accepted to be about 50 percent of the total Program budget and has averaged 45 percent over the last 10 years. The implementation costs have met or exceeded the 50 percent target twice since implementation projects have begun. The proposed 2012 spending level is 47 percent, slightly less than the target, but is an increase over the average which is made possible by a recent increase funding levels. The proposed implementation budget is expected to allow the Program to construct non-controversial channel rehabilitation projects, maintain status quo on gravel augmentation, accelerate watershed restoration activities, and make funding available for anticipated Phase 1 review and Phase 2 activities.

The Rehabilitation Implementation costs include: 1) salaries for six fulltime equivalents including a Project Engineer, Environmental Specialist, Realty Specialist, Project Manager, Civil Engineering Technician, and fifty percent of both a Physical Scientist and Implementation Branch Chief; 2) floodplain structures monitoring, relocation, mitigation and repair; and 3) environmental compliance/mitigation, realty support, design and construction costs to implement channel rehabilitation, gravel augmentation, and watershed restoration projects.

FLS Projects planned for implementation in 2012 include repair activities at Bucktail and Poker Bar bridges, update of the system wide one dimensional hydraulic model that predicts flood elevations, construction of the Upper Junction City Rehabilitation and Lower Steiner Flat Rehabilitation Sites, installation of an Engineered Log Jam at the Hocker Flat Rehabilitation Site, purchase of large wood for rehabilitation sites, annual gravel augmentation at quantities and locations to be determined, and completion of \$1 million of watershed restoration projects. *check proposals*

FY2013 Budget Activity Plan definition:

This sub-activity includes rehabilitation and restoration construction elements of the Program, including planning, environmental compliance, design, and implementation of habitat improvement projects, sediment management, and gravel introduction. It is an essential element of implementing Reclamation's share of the larger Trinity River Restoration Program that is supported by a 1998 solicitor's opinion, and is being conducted in partnership with multiple tribal, Federal, State, and local entities. Specific activities include floodplain lowering/re-contouring, side channel development, gravel augmentation, large woody debris placement, riparian establishment, and other geomorphic and aquatic habitat enhancement activities.

Budget Line Items:

AEAM Team

Salaries for Implementation staff

Floodplain and Structures

FEMA/Trinity County Flood Compliance and Floodplain Structures Relocation, Mitigation, Repair

Channel Rehabilitation

Planning - Environmental reviews, permits, cultural resource compliance, and CEQA compliance

Realty - Realty Acquisitions (Contracts and Easements)

Design - Design data acquisition and Engineering plans and specifications

Implementation - Channel rehabilitation sites, large wood supply, and CEQA mitigation

Watershed Planning and Implementation

Coarse Sediment Management

Science

The spending target for Science costs is generally accepted to be about 30 percent of the total Program budget and has averaged 34 percent over the last ten years. The proposed spending level for 2012 is 34 percent in line with historical averages, albeit above the target of 30 percent. A reduction in spending on science and monitoring is not recommended base on the current emphasis on accelerating reports and publications that can be used to document results of Program management actions.

Science and monitoring costs include: 1) salaries for 1.5 Physical Scientists, a Hydraulic Engineer, several Fish Biologists, and fifty percent of the Science Coordinator; 2) administrative costs including Science Advisory Board activities, expert and sub-Program reviews, a bi-annual science symposium, and other adaptive management support; and 3) a balance of monitoring and assessment projects as described in the 2012 Science Work Plan (see attached).

FY2013 Budget Activity Plan definition:

This sub-activity includes predictive modeling, monitoring, analysis and evaluation for the Restoration Program, including both short-term monitoring and longer-term studies critical to the adaptive environmental assessment and management premise of the program. It includes those elements of Reclamation's share of the larger Trinity River Restoration Program that are supported by a 1998 solicitor's opinion, and is being conducted in partnership with multiple tribal, Federal, State, and local entities. With the assumption of funding responsibilities for many of the fisheries related tasks by the FWS since FY2009, Reclamation's primary focus is on physical monitoring (flows, temperature, and sediment transport) and fisheries assessments that are closely linked to the mitigation hatchery at Lewiston Dam.

Budget Line Items:

AEAM Team

Salaries for Reclamation and Service Science Personnel

Science Program Administration

Science Advisory Board, Expert and Sub-Program Reviews, TRRP Bi-Annual Science Symposium, AEAM Procedures

AEAM Science and Monitoring Projects

Per the 2012 Science Work Plan

2012
Science
Symposium
year

1998
solicitor's
opinion
CVPA is
on continuation
authorization

123 or V

Summary of Program Budgets/Spending 2002 through 2012

Fiscal Year	Program Administration	Percent of Total	Implementation	Percent of Total	Science	Percent of Total	Total	Comments
2002	4,062,399	40%	2,841,000	28%	3,309,821	32%	10,213,220	Office opens
2003	2,666,338	26%	3,815,000	38%	3,677,603	36%	10,158,941	Cableway gravel augmentation
2004	2,935,000	20%	8,083,750	56%	3,312,070	23%	14,330,820	Bridges (Salt Flat, Bucktail, Poker Bar, Biggers)
2005	1,957,554	30%	2,629,176	40%	2,015,334	31%	6,602,064	Poker Bar road, Chancellor road, house relocation & Hocker Flat
2006 *	1,829,765	17%	4,415,324	40%	4,731,858	43%	10,976,947	Canyon Creek
2007	1,729,000	19%	4,214,000	45%	3,353,000	36%	9,296,000	Indian Creek
2008 *	1,874,000	18%	4,726,000	45%	3,869,700	37%	10,469,700	Lewiston-Dark Gulch
2009 *	2,750,425	20%	5,459,011	40%	5,597,444	41%	13,806,880	Sawmill
2010 *	2,662,807	16%	9,625,613	57%	4,727,934	28%	17,016,354	ARRA \$'s
2011	2,996,000	20%	6,314,000	42%	5,690,000	38%	15,000,000	Lowden, THG & Reading
2012	2,900,000	18.6%	7,400,000	47.4%	5,321,000	34.1%	15,621,000	
Totals	28,363,288		59,522,874		45,605,764			
Averages	2,578,481	21.2%	5,411,170	44.6%	4,145,979	34.2%	12,135,630	

* Based on actuals at varying times in the fiscal year. Years without asterick are budgeted amounts, not actuals.

data management in program admin.

Trinity River Restoration Program
Draft Fiscal Year 2012 Work Plan

Work Group	IDT ranking	Fate	Project Title
General	Above line	Existing	Streamgaging
Fish	1, 2	Inv. Plan	Assessing effects of restoration on Chinook Salmon and Coho Salmon rearing habitat.
Fish	3	Inv. Plan	Spring and fall Chinook and coho salmon and fall-run steelhead run-size estimation using mark-recapture methods.
Fish	4, 5, 13, 25, 26, 33	Inv. Plan	Trinity River juvenile salmonid outmigrant monitoring program
Fish	5	Inv. Plan	Trinity River Juvenile Chinook Salmon Disease Assessment
Temperature		Sub-group	Annual Operations Process (Reservoir forecasting (DWR & CVO); Reservoir modeling (CVO & TRRP); River modeling (TRRP & USFWS); River temperature tracking)
Temperature	6	Market	Cold Water Pool Volume Analysis
Temperature	7	Sub-group	Temperature Model Support
Fish	8, 31	Inv. Plan	Trinity River Chinook salmon redd and carcass survey
Fish	9	Inv. Plan	Monitor harvest of naturally produced fall Chinook
Physical	10	Existing	USGS Geomorphic Assessment
Rip. / Wildlife	11	Inv. Plan	Map and Quantify Riparian Vegetation
Rip. / Wildlife	12, 29, 39, 45, 54, 55	Existing con.	Wildlife Monitoring and Assessment
Fish	14, 22	Inv. Plan	Trinity River juvenile salmonid spatial and temporal density
Physical	16	Inv. Plan	Implementation monitoring and analysis
Physical	17	Inv. Plan	Geomorphic monitoring and assessment of bed scour and mobility
Physical	20	Existing	Sediment monitoring
General	Above line	Other	Water year specific activities
Fish	21	Inv. Plan	Trinity River Hatchery Chinook Coded Wire Tagging
Fish	21	Inv. Plan	Develop cohort reconstructions for Chinook and coho evaluate cohort performance or year class strength, and population growth rate.
Fish	21	Inv. Plan	Klamath-Trinity River fall/spring run Chinook scale age analysis
Fish	23	Sub-group	Juvenile salmonid survival: Coho salmon spawner success and limiting life stages.
Rip. / Wildlife	24	Market	Trinity River Foothill Yellow-legged Frog Egg Mass Surveys
Fish	27	Inv. Plan	Monitor harvest of naturally produced spring Chinook
Rip. / Wildlife	28, 34	Market	Monitor the distribution and abundance of western pond turtles
Physical	30	Market Res.	Test and Evaluate Side Channel and Alcove Parameters
Fish	32	Inv. Plan	Adult Fall-Run Chinook Salmon Disease Assessment
Rip. / Wildlife	35	Inv. Plan	Model how proposed WY2012 streamflows will affect hardwood
Fish	36	Sub-group	Range of Thermal Heterogeneity, a Simple Data Collection and Analysis
Physical	40	Inv. Plan	Linking sediment supply to channel complexity
Physical	40	Inv. Plan	Retrospective evaluation of topographic changes at Rush Creek and
Physical	41	Inv. Plan	Quantifying Channel Complexity
Fish	46	Market Res.	Map and quantify the extent (area) of available adult holding habitat at rehab sites and throughout the mainstem
Rip. / Wildlife	53	Sub-group	Riparian PITAs 3, 4, 5
Fish		Sub-group	Limiting factor analysis for the South Fork Trinity River spring Chinook salmon population
Temperature		Market Res.	Lewiston Appraisal Study

TRRP Draft Fiscal Year 2012 Work Plan

Title: Streamgaging

Scale: River system

Assessment Type: Evaluate long term progress; provide short term feedback

Principal Investigator: US Geological Survey

Co-Investigator(s): Andreas Krause, Reclamation

Issue: Stream flow data is required for dam operations, temperature compliance and modeling, sediment transport computations, scour/mobility monitoring, riparian monitoring / modeling, hydraulic modeling, channel rehabilitation design, habitat mapping, rotary screw trapping, and a variety of other activities.

Objectives: Provide real-time instantaneous and final quality controlled flow records on Trinity River mainstem and tributaries as shown in the table below.

Location	USGS Gage #	RM	Funded
			By:
Relocation site for Lewiston			
Gage (Near Hatchery)	N/A	111.5	TRRP
Trinity River at Lewiston	<u>11525500</u>	110.9	USGS
Rush Creek*	<u>11525530</u>	107.5	TRRP
GVC near Lewiston *	<u>11525630</u>	104	TRRP
Trinity River below Limekiln			
Gulch*	<u>11525655</u>	98.3	TRRP
Indian Creek*	<u>11525670</u>	95.3	TRRP
Trinity River at Douglas City*	<u>11525854</u>	92.2	TRRP
Trinity River at Junction City*	<u>11526250</u>	79.6	TRRP
Trinity River above North			
Fork Trinity River (Pear Tree			
Gulch)	<u>11526400</u>	73.1	TRRP
North Fork*	<u>11526500</u>	72.4	TRRP
Trinity River at Burnt Ranch	<u>11527000</u>	49.5	TRRP
South Fork Trinity below			
Hyampom	<u>11528700</u>	30.3	TRRP
Trinity River at Hoopa	<u>11530000</u>	14.7	USGS

Methods and Data Analysis: All gaging conducted by the US Geological Survey following their standard methods and protocols.

Reporting Metrics: Provisional real-time instantaneous flow record; final quality controlled flow record for average daily and annual peak

Partnerships/Capacity Building: None.

TRRP Draft Fiscal Year 2012 Work Plan

Title: Assessing effects of restoration on Chinook Salmon and Coho Salmon rearing habitat.

Scale: Bank rehabilitation sites and the primary restoration reach of the Trinity River from Lewiston Dam to the confluence with the North Fork Trinity River (restoration reach).

Assessment Type:

1. evaluates the long-term progress toward Trinity River Restoration Program (Program) goals and objectives
2. provides short-term feedback to improve management actions.

Principal Investigator: Damon Goodman, U.S. Fish and Wildlife Service

Co-Investigator(s): Justin Alvarez, Hoopa Tribal Fisheries; Aaron Martin, Yurok Tribal Fisheries Program.

Cost: \$286,013

Issue: The tasks encompassed within this assessment evaluate changes in rearing habitat availability for Chinook Salmon and Coho Salmon at a variety of scales. Tasks relate directly to the highest priority IAP assessments identified by Program workgroups including:

- 1) Assessment 1H: Map and quantify the extent of available fry/juvenile rearing habitat at bank rehabilitation sites. This assessment was ranked the second priority of the science program.
- 2) Assessment 2H: Map and quantify the extent of available fry/juvenile rearing habitat throughout the restoration reach. This assessment was ranked the top priority assessment of the science program.

Objectives:

Task 1 Assess changes in the quality and quantity of Chinook Salmon and Coho Salmon rearing habitat from Program management actions within the restoration reach.

Task 2 Assess changes in the quality and quantity of Chinook Salmon and Coho Salmon rearing habitat from Program management actions at bank rehabilitation sites.

Task 3 Evaluate effects of large wood at bank rehabilitation sites

Task 4 Photographic monitoring of bank rehabilitation sites

Task 5 Continued implementation of multiyear cross discipline integration and hydrodynamic modeling tasks proposed under FY2010 and FY2011 proposal processes.

Methods and Data Analysis:

Tasks 1 and 2 will be accomplished using rearing habitat mapping methodologies developed and applied on the Trinity River. This data will be analyzed to evaluate changes in quantities of rearing habitat at bank rehabilitation sites and within the primary restoration reach from Lewiston Dam to the confluence with the North Fork Trinity River.

Task 3 large wood will be surveyed at bank rehabilitation sites to document as-build conditions and tracked through time to evaluate changes in quantities, location and effects.

Task 4 photographs will be taken to document the effects of bank rehabilitation site construction and the evolution of these treatments through time.

Reporting Metrics:

Task 1 Report on the status and trend in rearing habitat within the primary restoration reach.

Task 2 Develop and archive pre-construction data at two bank rehabilitation sites. This data will be reported on after post-construction surveys are conducted.

Task 3 Produce a technical memo and associated data files describing the quantities, locations and effects of large wood at bank rehabilitation sites.

Task 4 Provide geo-referenced photographic documentation of the effects of construction and the evolution of conditions at bank rehabilitation sites.

Partnerships/Capacity Building: This project has been developed and implemented as a coordinated effort among Program agencies.

Title: Spring and fall Chinook and coho salmon and fall-run steelhead run-size estimation using mark-recapture methods.

Scale: System above established sample sites.

Assessment Type: Evaluation of long term progress toward achieving Program goals and objectives.

Principal Investigator: Wade Sinnen, CA Department of Fish and Game.

Co-Investigator(s): George Kautsky, Hoopa Valley Tribe.

Cost: \$623,249

Issue: This study will address population goals for the Program. This study will provide estimates of both naturally- and hatchery-produced components of spring and fall Chinook and coho salmon and fall steelhead escapement and harvest.

Objectives: To determine annual run-size (harvest and escapement) of returning hatchery and naturally produced anadromous salmonids.

Methods and Data Analysis:

Two main stem Trinity River weirs will be deployed to trap and tag fish for the purpose of estimating respective Chinook, coho and steelhead runs using mark-recapture methods. Recapture sampling will occur at Trinity River Hatchery. Harvest rates will be estimated based on the return of tags by anglers. Estimates of hatchery and naturally produced fish will be based on the observed ratios of hatchery-marked to unmarked fish sampled at weirs and recovery of fish at Trinity River Hatchery.

Reporting Metrics:

Hatchery and natural run-size estimates (harvest and escapement), hatchery/natural proportions, age structure, hatchery stray rates, cohort analysis for in-river returns of hatchery produced fish, run-timing, length frequency histograms, incidence of hooking, net and predator wounds.

Partnerships/Capacity Building:

This is a cooperative project with the Hoopa Valley Tribe. Weekly information generated from this project is disseminated to agency, public parties of interest and local media. Additionally, the Department conducts regular public information meetings at the local and state levels to inform stakeholder groups of the type of information we collect and how it is used to evaluate the Program and how it is used in a management context.

Title: Trinity River juvenile salmonid outmigrant monitoring program

Scale: System Wide

Assessment Type:

1. evaluates the long-term progress toward Trinity River Restoration Program (Program) goals and objectives
2. provides short-term feedback to improve management actions.

Investigators: Nate Harris -- Yurok Tribal Fisheries Program (YTF); Paul Petros -- Hoopa Valley Tribal Fisheries Department (HVT); William Pinnix -- U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office (AFWO), Tim Hayden -- Yurok Tribal Fisheries Program (YTF)

Cost: \$773,333

Issue: The goal of this project is to assess the juvenile salmonid abundance, run timing, condition and health; the primary population of interest is juvenile Chinook salmon in the mainstem Trinity River.

Objectives:

- Assess annual abundance of juvenile salmonids in the Trinity River and inter-annual population trends with a particular focus on Chinook salmon (*Oncorhynchus tshawytscha*), through determination of weekly efficiency-based population estimates utilizing mark-recapture methods.
- Assess the response of juvenile salmonid production and emigration timing and duration in response to TRRP restoration actions including managed flow releases to meet juvenile salmonid temperature objectives and physical habitat restoration through channel rehabilitation efforts, fluvial-geomorphic flows, and coarse sediment augmentation.
- Assess health and condition factor (Fulton's K) of outmigrating juvenile salmonids in the Trinity River.
- Refine operations and sampling protocols to improve this assessment as recommended by the juvenile outmigrant technical review.

Methods and Data Analyses:

- Estimate weekly trapping efficiencies and abundance of juvenile Chinook salmon using rotary screw traps.
- Estimate weekly natural/hatchery composition for Chinook salmon, coho salmon, and steelhead.
- Characterize the timing and duration of emigration of Chinook salmon, coho salmon, and steelhead through the Trinity River.
- Characterize size of salmonid outmigrants by life stage.
- Describe trends in relative health and condition factor of juvenile Chinook salmon, coho salmon, and steelhead
- Monitor juvenile green sturgeon catch rates and size distribution (lower trap only).

Reporting Metrics: Quarterly reports and Annual report

Partnerships/Capacity Building:

This project is a collaborative project between the Hoopa Valley Tribe, Yurok Tribe, and US Fish and Wildlife Service. All staff involved with project are local residents. A variety of technical and safety trainings are conducted throughout the course of the project.

Title: Trinity River Juvenile Chinook Salmon Disease Assessment

Scale: This system scale project will be conducted over the entire length of anadromy on the mainstem Trinity, including the lower Klamath River. Samples will be collected at the Trinity River Hatchery and both juvenile fish outmigration monitoring sites (Pear Tree and Willow Creek), as well as various locations from the Klamath/Trinity River confluence to the Klamath estuary.

Assessment Type: This monitoring effort provides ecological knowledge on the condition of outmigrant Chinook salmon populations on a yearly basis as it pertains to infections rates of *C. shasta* and *P. minibicornis*. Data collected during this effort provides feedback for the Trinity River Restoration Program to evaluate the long term goal of reducing clinical disease incidence in Trinity River origin out migrants.

Principle Investigators: J. Scott Foott, USFWS CA-NV Fish Health Center and Tim Hayden, Yurok Tribal Fisheries Program, Trinity Division

Cost: \$61,322

Issue(s) Addressed: This project addresses TRRP Integrated Assessment Plan (V1.0) issues including:

3. Restore and maintain natural production of anadromous fish populations;

3.2 Increase freshwater production of anadromous fish;

3.2.4 Reduce clinical disease incidence in Trinity River origin outmigrants in the Klamath River to less than 20% within 5 years.

Objectives: The goals of this project are to:

1. Assess the incidence and severity of infection for two significant salmonid parasites, *C. shasta* and *P. minibicornis*, in Trinity River juvenile Chinook salmon migrating through Trinity and the lower Klamath Rivers.
2. These data will be incorporated into the multi-year dataset that will allow for comparisons between water year variables and any future management actions.
3. Recovery of tagged Trinity River Hatchery salmon will allow for an evaluation of exposure duration in both the lower Trinity and Klamath rivers (days at liberty) and disease state.
4. A similar effort for juvenile salmon collected in the Klamath River above the confluence of the Klamath and Trinity (funded through the BOR Klamath Falls Office) will provide a disease comparison between populations.

Methods and Data Analysis:

Task 1. Fish collection: Chinook salmon will be collected for this disease assessment at five sites or areas in the Trinity River and lower Klamath River: (1) Trinity River Hatchery (TRH); (2) upper Trinity River at the outmigrant trapping site above the North Fork Trinity confluence; (3) lower Trinity River at the outmigrant trapping site near Willow Creek, (4) the Klamath River between Pecwan Creek and Blue Creek, and (5) the Klamath estuary.

Task 2. Laboratory Assays and Reporting: Infection rates and severity will be assessed using a variety of techniques including: necropsy, histology, DNA extraction, and QPCR assay. For each sampling location, the

incidence and severity of infection by *C. shasta* and *P. minibicornis* will be compared as well as information from previous years efforts to identify trends within and across years as well as identify areas of concern in infection and severity of infection levels.

Reporting Metrics: Infection rates and severity of infection will be determined for different areas of the basin and the condition of outmigrants entering the Klamath can be assessed and compared to the Restoration Programs goals of less than 20% infection rate. In addition, areas showing high rates of infection will be identified.

Partnerships and Capacity Building:

This project continues to support the Yurok Tribe's goal of developing and expanding its capacity to monitor, assess and manage tribal trust fisheries resources for the benefit of Yurok Tribal members. In addition, this project continues to support the critical partnership between the Yurok Tribe and the USFWS CA/NV FHC and other basin cooperators, including: Bureau of Reclamation-Klamath Falls Office, California Department of Fish and Game, Hoopa Valley Tribe, Karuk Tribe, U.S. Fish and Wildlife Service – Arcata.

TRRP Draft Fiscal Year 2012 Work Plan

Title:	Temperature - Annual Operations Process
Scale:	Trinity River, CVP
Assessment Type:	1. Evaluate long-term progress toward achieving down-river temperature targets; 2. Provide short-term feedback to improve river temperature management actions by testing key reservoir operational hypotheses and reducing reservoir management uncertainties.
Principal Investigator:	Temperature Work Group
Co-Investigator(s):	Rod Wittler (TRRP), Paul Zedonis (USFWS)
Cost:	Staff costs

Issue: The annual process used by the Trinity River Restoration Program to: 1) inform the Program of the hydrologic conditions and predictions of temperature regimes that the Trinity River may experience throughout the year. Annual TRD operations are reviewed in the context of providing suitable water temperatures in the Trinity River throughout the year. Reservoir and river temperature models use forecast TRD operations, river flow, and meteorology to predict (and evaluate) forecast target water temperature regimes in the Trinity River basin.

Objectives:

1. Support the Flow Scheduling Work Group in formulating the annual hydrograph
2. Participate in and coordinate CVP operations via the Sacramento River Temperature Task Group (SRTTG)
3. Forecast CVP operations impact on Trinity River temperatures
4. Coordinate scientific assessments as part of the AEAM process with the other Work Groups.

Methods and Data Analysis:

Task 1. Operations Coordination. At the start of each calendar year, members of the Temperature Work Group (TWG), CVO staff, and Sacramento River Temperature Task Group members will obtain and review hydrologic and CVO operational forecasts. Updated forecast information will be provided to the TWG in a timely basis.

Task 2. Model Coordination. Contemporary water temperature models of Trinity and Lewiston reservoirs will utilize contemporary forecast information (e.g. reservoir storage, diversion patterns, river schedules, etc) from CVO and/or Program flow alternatives (provided by Task 1) to predict daily Lewiston Dam release temperatures from the time of each forecast update to the end of the calendar year. Assessment of the model results are used to evaluate the alternative flow schedules for possible modifications, as well as general operational forecasts from the CVO office.

Task 3. Temperature Monitoring (Tracking). A monitoring program is established at a number of locations to evaluate achievement of species-specific Water Year and seasonal temperature targets for rearing juveniles, outmigration smolts, and holding and spawning adults.

Task 4. Reporting Annual reports will be generated to document Tasks 2 and 3.

Reporting Metrics: Performance – as reported in the programmatic Performance Measures exercise (Hemphill), we intend to report on the long-term performance of the program in meeting the down-river (Douglas City, North Fork Trinity River confluence, and Weitchpec) temperature targets expressed in the Flow Study.

Sensitivity – as reported in the programmatic Performance Measures exercise, we are developing normalized metrics including long-term meteorology, lake levels, down-river temperatures, and developing relationship(s) that demonstrate the dependence of the targets on the volume of cold water in Trinity Reservoir.

Partnerships/Capacity Building: This process informs the entirety of the program regarding temperature performance and sensitivity.

TRRP Draft Fiscal Year 2012 Work Plan

Title: Cold-Water Pool Analysis

Scale: Trinity reservoir, Trinity watershed above Trinity Dam; Lewiston reservoir

Assessment Type: 1. Evaluate long-term progress toward achieving down-river temperature targets;
2. Provide short-term feedback to improve river temperature management actions by testing key reservoir operational hypotheses and reducing reservoir management uncertainties.

Principal Investigator: Temperature Work Group

Co-Investigator(s): Rod Wittler (TRRP) Paul Zedonis (USFWS) Seth Naman (NMFS).

Cost: ~\$25,000

Issue: The cold-water pool in Trinity reservoir is crucial for meeting the downriver temperature targets established in the Record of Decision, and WR 90-5. Management of the cold-water pool could be illuminated with an analysis of the long-term behavior of the cold water volume in Trinity reservoir as a function of seasonal meteorology, annual inflow, annual reservoir demand, and operational patterns.

Objectives:

To evaluate the relationship between Trinity Reservoir volume and Trinity Reservoir release temperature. We will develop/evaluate end-of-month carry over storage targets for Trinity Reservoir. By optimum, we mean the carry over storage that, based on the cold-water pool volume analysis, yields the most certainty that we will be able to meet temperature management targets i.e.,

- a. Optimum end-of-October carry over storage target for meeting water temperature targets within year
- b. Optimum end-of-October carry over storage target for meeting water temperature targets between years of less than normal inflow
- c. Develop recommendations as input for CVO planning and management

The analysis will seek to correlate cold-water volumes with actual inflows, actual meteorology, basin exports, river releases, operational environment (CALSIM II), and other yet to be selected independent and dependent variables.

Methods and Data Analysis:

The Temperature Work Group continues to define and refine the scope for this analysis. Is it a simple correlation? Should it include a risk assessment (risk of not meeting downstream temperature targets?) The Work Group awaits the issuance of a similar analysis conducted by NOAA as part of an updated Biological Opinion for the Trinity River (expected summer or fall, 2011).

Reporting Metrics:

Performance – as reported in the programmatic Performance Measures exercise (Hemphill), we intend to report on the long-term performance of the program in meeting the down-river (Douglas City, North Fork Trinity River confluence, and Weitchpec) temperature targets expressed in the Flow Study.

Sensitivity – as reported in the programmatic Performance Measures exercise, we are developing normalized metrics including long-term meteorology, lake levels, down-river temperatures, and developing relationship(s) that demonstrate the dependence of the targets on the volume of cold water in Trinity Reservoir.

We will also be studying the impact of cold-water transmission through Lewiston reservoir combined with the exports through the Carr tunnel to the Central Valley.

Partnerships/Capacity Building:

The temperature behavior of the Trinity reservoir-Lewiston reservoir-Trinity River system is relatively well understood, but not extremely well known. Everyone strives to meet the down-river temperature targets – the question arises as to the dependency of those targets on the volume of cold water behind Trinity Dam, and the transmission of that water through Lewiston reservoir. The tools maintained by the Temperature Work Group are very useful for demonstrating temperature response to both short-term and long-term operational scenarios. These demonstrations will foster strong communication and understanding between the program partners, and should facilitate development of alternative management schema as part of the adaptive management process.

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- Title:** Temperature Model Support
- Scale:** The Trinity River Restoration Program (TRRP) utilizes several water quality computer based models in a predictive mode. We annually seek to predict the riverine temperatures as part of the Flow Scheduling process.
- Assessment Type:**
1. Evaluate long-term progress toward achieving down-river temperature targets by maintaining computational tools;
 2. Provide short-term feedback to improve river temperature management actions by supporting the testing key reservoir operational hypotheses and reducing reservoir management uncertainties.
- Principal Investigator:** Temperature Work Group.
- Co-Investigator(s):** Rod Wittler (TRRP), Paul Zedonis (USFWS), Russ Yaworsky (USBR-CVO).
- Cost:** Staff costs
- Issue:** The Temperature Work Group conducts annual, or periodic, group evaluation of model(s) performance; requirements; data sufficiency; supplemental data requirements; and general capabilities in light of evolving needs and exigent circumstances. Based on that evaluation, the group will direct the calibration, augmentation, or replacement of the existing models to meet emergent needs.
- Objectives:** The models include:
- HEC-5Q (CVO)
 - Trinity reservoir water quality (primarily temperature)
 - Lewiston reservoir (primarily temperature; recalibrated for WY2009)
 - BETTER – Lewiston reservoir (Inactive)
 - CE-Qual W2 – Lewiston reservoir (primarily temperature; in development 2011 by TRRP)
 - SNTEMP – Trinity River (USFWS; temperature only)
 - RMA 2/11 – Trinity River (temperature only; Fielded 2006 by TRRP; needs calibration and tributary contribution refinement)
- Supporting these models includes three steps – temperature monitoring, model calibration or re-calibration, and model performance evaluation.
- Methods and Data Analysis:** Monitoring information primarily includes on-going collection of reservoir and river temperatures, meteorology, and specific collection of supplemental terrain (shadowing), vegetation, or bathymetric data.
- Calibration, or re-calibration, occurs on an as-needed basis, usually following annual model performance evaluation.

Reporting Metrics: The primary annual product includes a Work Group report on model performance during the preceding water year, including recommendations for future model operations.

Partnerships/Capacity Building: TRRP, USFWS, and USBR-CVO work together to maintain and utilize the suite of temperature models as part of the annual Flow Scheduling process and analysis of performance and sensitivity measures.

Title: Trinity River Chinook Salmon redd and carcass survey

Scale: Mainstem Trinity River, Lewiston Dam to the Trinity/Klamath confluence (Weitchpec)

Assessment Type: This project is intended to monitor the ecological status and trends associated with adult salmonid spawning on the mainstem Trinity River and will evaluate the long-term progress toward achieving Trinity River Restoration Program (TRRP) goals and objectives. The data are also useful for evaluating management actions on a shorter time scale (e.g. influence of newly constructed surfaces, gravel intro, and geomorphic change on localized spawning distributions).

Principal Investigators: Charles Chamberlain – U.S. Fish and Wildlife Service, Arcata Office (AFWO);
Wade Sinnen – California Department of Fish and Game, North Coast district (CDFG);
George Kautsky – Hoopa Valley Tribal Fisheries Department (HVT);
Shane Quinn – Yurok Tribal Fisheries Program (YTFP)

Co-investigators: Samantha Chilcote – Weaverville Ranger District, Shasta-Trinity National Forest

Cost: \$252,757

Issue(s) Addressed:

The Trinity River salmon spawning is expected to respond to Program and hatchery management actions at local rehabilitation site level, intermediate rehabilitation reach, and larger system scale. Monitoring salmon redd and carcass abundance and distribution will inform estimates of total natural mainstem spawning escapement, and reveal temporal and spatial response of mainstem spawning to restoration through time. As the success of redds constructed in the mainstem increases in response to improved rearing habitat conditions, we expect to observe more uniform spawning distribution of natural origin salmon across the system scale, and further departure from the distribution of hatchery origin.

Objectives:

- Assess the spatial distribution of natural and hatchery origin Chinook Salmon redds, particularly in relation to TRRP management actions.
- Quantify Chinook Salmon spawning (natural and hatchery origin) in the mainstem Trinity River.
- Quantify pre-spawn mortality for female Chinook Salmon.
- Quantify and describe temporal and spatial distribution of natural and hatchery origin Chinook Salmon carcasses.
- Collect biological data ancillary to escapement (fork lengths for estimating size distribution and jack proportion, scales for age composition, sex ratio, etc.).

Methods and data analysis:

Redd and carcass surveys will be conducted concurrently. For logistical purposes, the survey area from Lewiston Dam to the mouth at Weitchpec is divided into 14 contiguous survey reaches. Surveys of each reach are conducted using a pair of inflatable rafts, one assigned to each bank. Each raft is staffed by an oars-person and an observer and covers one side of the river (right bank to middle and left bank to middle) as the crews proceeded downstream.

Carcasses locations will be mapped using GPS, and biological data will be collected to determine incidence of female pre-spawning mortality, size distribution, sex composition, and incidence of marked and tagged individuals among the naturally spawning population. Heads of adipose fin-clipped salmon will be removed and retained for later recovery and decoding of coded-wire-tags (CWT's). Estimates of the fractions of total spawners that are of hatchery origin will be derived based on the recoveries of CWT's from carcasses expanded to reflect untagged components of the various release groups represented.

Redd locations will be marked with GPS. Longitudinal spatial representations of redd distribution will be

achieved by 'snapping' redd xy location to the river centerline to assign linear distance from the base of Lewiston Dam. An estimate of the redd count attributable to Chinook Salmon will be generated by applying ratios of spawned female carcasses between Chinook and Coho Salmon utilizing a Generalized Additive Model (GAM) where proportion of redds attributable to Chinook is a smoothed function of distance from dam and survey day. Estimates of redd counts attributable to natural and hatchery origin Chinook Salmon will likewise be generated by GAM using hatchery marked and unmarked Chinook Salmon carcasses expanded for 25% mark rate at Trinity River Hatchery. The centerline-based redd locality data will be weighted by proportions estimated from the GAM's and used to compare longitudinal distribution of natural origin Chinook Salmon redds between years.

The number of marked carcasses, the number of recaptured carcasses, and the total number of carcasses recovered during the survey will be used for four different mark-recapture estimators to estimate escapement numbers of Chinook. Estimators used to calculate the estimate include a pooled Petersen, a weekly stratified Petersen, the Schaefer and a modified Schaefer.

Reporting metrics:

- Number and distribution of natural and hatchery origin Chinook Salmon carcasses.
- Expect the natural component to increase over time as population responds to creation and improvement of rearing habitat.
- Number and distribution of redds constructed by natural and hatchery origin Chinook Salmon females.
- Expect distribution of hatchery origin spawners to remain highly skewed toward Lewiston Dam, and the distribution of natural origin spawners to become more uniform as the progeny of natural origin spawners experience increase success due to improved rearing conditions.
- Expect spawners to colonize and construct redds in habitat newly created by rehabilitated riverine processes or mechanical construction.

Partnerships and Capacity Building:

This project is accomplished by the willingness of multiple agencies to work together and consult with one another in order to successfully complete the monumental task of surveying over 182km of river on a bi-weekly basis. The United States Forest Service-Weaverville Ranger District of the Shasta-Trinity National Forest (USFS) annually funds its own participation in this effort. Reach 1 of our survey (Lewiston Dam to the Old Lewiston Bridge) largely falls on USFS administered lands and USFS conducts redd surveys within this reach and within portions of several tributaries to the Trinity River that flow through the Shasta-Trinity National Forest. Our budget for FY2012 surveys include GPS/tablet mapping equipment that will amplify the value of already critical USFS participation through ease of equipment sharing logistics and complete GPS coverage (some carcass data are currently collected by low-resolution paper methods due to shortage of equipment during peak spawning periods).

NOTE: The next four summaries relate to “Monitor harvest of naturally produced fall Chinook”

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Title: Yurok Tribal Fisheries Monitoring

Scale: Klamath River from mouth to top of Yurok Reservation

Assessment Type: This project evaluates long-term progress toward achieving TRRP goals and objectives.

Principal Investigators: Desma Williams, Yurok Tribal Fisheries Program

Cost: \$160,000

Issue: This project provides information necessary to address the following assessments identified in the TRRP LAP (V1.0): 12F

Objective: Estimate harvest of fall run chinook, steelhead, coho, and late-running spring chinook and sturgeon.

Methods and Data Analysis:

Monitoring will occur daily in the Estuary and four to five days per week in the upper areas. Effort will be estimated using net counts. Catch per effort will be estimated from interviews with fishers. Biological data, scales, and snouts from ad-clipped salmon will be collected from observed fish.

Reporting Metrics:

Chinook estimates will be reported to CDFG in January for inclusion in the Megatable and the B5 table of the PPMC's Review of Ocean Salmon Fisheries, and subsequent use in the Fall Chinook Age Composition Project and the 2011 fall Chinook stock projection. CWT counts and sampling expansions will be provided to CDFG in January for use in cohort reconstruction. This information will also be used to assess the success of the TRRP by estimating the number of recruits available from each brood. A report of the entire fall fishery will be finalized in April.

Partnerships and Capacity Building:

Klamath: In accordance with 25 USC Section 47, preference will be given to qualified Yurok Tribal members or other Native Americans while hiring personnel to conduct tasks associated with this project. Personnel will be trained to select and mount scales, and press the mounted scales into acetate. Some personnel may be trained to age the scales. Cooperators include, but not limited to (carcass surveys involve numerous volunteers) California Department of Fish and Game, U.S. Fish and Wildlife Service, U.S. Forest Service, Salmon River Restoration Council, Karuk Tribe, and the Mid-Klamath Watershed Council.

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Title: Lower Klamath River Creel Census

Scale: Klamath River mainstem from the Confluence with the Trinity River down stream to the Pacific Ocean.

Assessment Type: Evaluate progress toward achieving Program goals and objectives.

Principal Investigator: Sara Borok CDFG

Cost: \$65,000

Issue: This project assesses harvest of salmonids in the lower Klamath River and directly relates to a major goal of the Program "Provide increased harvest opportunity for dependent tribal, sport and commercial fisheries" Additional information (age analysis, hatchery contributions) generated from this project will be used in cohort reconstructions to determine the contribution of natural produced Trinity River salmonids to Klamath basin runs.

Objectives:

- 1) Sport fishing catch and effort surveys.
- 2) Data entry and analysis to estimate harvest of hatchery and natural stocks.
- 3) Report generation.

Methods and Data Analysis: Stationary and Access Point Creel Census

Reporting Metrics: Catch/effort of target species, harvest of target species, contribution of hatchery and naturally produced fish, harvest timing.

Partnerships/Capacity Building:

Public outreach and education are part of the surveys. Anglers have access to speak with representatives of the Department of Fish and Game throughout the survey period. Coordination and public meetings with the Yurok and Hoopa Tribes.

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Title: Lower Trinity River sport harvest survey

Scale: Trinity River system

Assessment Type: Evaluates long-term progress toward achieving Program goals and objectives.

Principal Investigator: George Kautsky, Hoopa Valley Tribal Fisheries Department

Cost: \$64,393

Issue: This project provides information necessary to address the following assessments identified in the TRRP IAP (V1.0):

FY12 Identifier	Assessment	Description	Objective
12F9	17A	Monitor harvest (tribal, sport and commercial) of naturally produced fall Chinook	4.2.2
12F13	22A	Develop cohort reconstructions for Chinook and coho and evaluate cohort performance or year class strength, and population growth rate	4.1.1, 4.2.1, 4.3.1
12F25	19A	Monitor harvest (tribal, sport and commercial) of naturally produced steelhead	4.4.2

Objective: The objective is to implement a monitoring program to sample harvest by sport anglers in the lower Trinity River below WCW.

Methods and Data Analysis:

This project estimates total angler harvest of Chinook and steelhead between WCW downstream to the confluence of Trinity River with Klamath River.

A roving creel census from WCW (Trinity River Farms) to the Klamath/Trinity River confluence is implemented on three randomly selected days per Julian week wherein anglers are interviewed and total effort and catch are estimated. Additional information on hatchery contributions is obtained by recovery of the snouts of adipose (Ad) fin clipped fall Chinook. Catch/release information on steelhead informs about the relative contributions of hatchery and natural origin fish encountered in this fishery.

Reporting Metrics:

Provide real-time catch data to DFG for quota management. Data summaries to DFG for assembly of total run sizes of fall Chinook and steelhead. Annual report to Restoration Program describing methods and results of the creel census. Final report due date is six months after completion of field and laboratory work.

Partnerships and Capacity Building:

Tribal Fisheries employment requirements mandate Tribal Preference hiring. Most field technicians employed with agency are Tribal members.

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Title: Hoopa Tribal harvest survey of Trinity River of fall and spring Chinook, coho salmon, and steelhead.

Scale: Trinity River system

Assessment Type: Evaluates long-term progress toward achieving Program goals and objectives.

Principal Investigator: George Kautsky, Hoopa Valley Tribal Fisheries Department

Cost: \$122,777

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

FY12 Indicator	Assessment	Description	Objective
12F9	17A	Monitor harvest (tribal, sport and commercial) of naturally produced fall Chinook	4.2.2
12F13	22A	Develop cohort reconstructions for Chinook and coho and evaluate cohort performance or year class strength, and population growth rate	4.1.1, 4.2.1, 4.3.1
12F18	16A	Monitor harvest (tribal, sport and commercial) of naturally produced spring Chinook	4.1.2
12F24	18A	Monitor harvest (tribal, sport and commercial) of naturally produced coho	4.3.2
12F25	19A	Monitor harvest (tribal, sport and commercial) of naturally produced steelhead	4.4.2

Objective: Implement a monitoring program to sample harvest by Hoopa Tribal members.

Methods and Data Analysis:

Monitor Tribal harvest to contribute to the total run-size estimation for the Trinity River fall/spring Chinook, coho, and steelhead. Subsample the fishery on four randomly selected days per statistical week. Collect data on catch by individual fishers including total caught, species composition in sampled day. Estimate total weekly and season harvest by expansion of observed catch within sampled day, and sampled days within statistical week. Report total fall Chinook harvest estimate to co-managers for publication in "Mega-Table thus contributing to Klamath Basin Chinook management. Also, collect biological data from sampled fish in the fishery (CWT, lengths). CWT recovery and analyses will contribute to the age structure modeling and determining hatchery contribution to the fishery. These data aid in validation of run-size estimates, a measurement of the success of the program at producing adult fall Chinook. Additionally, prudent harvest management relies on accurate assessment of run-size and age-composition. The age-composition of fall-run Chinook salmon sampled from Tribal fisheries are essential to determining year-class success for Chinook originating from Klamath Basin.

Reporting Metrics:

Data will be inputted and processed in programs created in D-Base. Total harvest numbers and CWT data structures for fall Chinook will be provided to co-managers from which models may be updated to link performance of successive year classes of Chinook production by recovery area. Electronic submission of raw data and the final report will be submitted by May 2013.

Partnerships and Capacity Building:

Tribal Fisheries employment requirements mandate Tribal Preference hiring. Most field technicians employed with agency are Tribal members.

Title: Geomorphic Assessment

Scale: River system

Assessment Type: evaluate long term progress; provide short term feedback

Principal Investigator: Jenny Curtis, US Geological Survey

Co-Investigator(s): Lorraine Flint and Scott Wright, US Geological Survey

Issue: The geomorphic change (extent and rate) in response to restoration management actions needs to be quantified.

Objectives: This study is designed to quantify geomorphic changes and determine the impacts of both natural and artificial drivers responsible for creating documented changes. Analyses of the cumulative effect of ROD actions on eliciting geomorphic change and the physical processes governing channel changes will help with targeting future restoration actions and will guide implementation of channel rehabilitation projects.

Methods and Data Analysis:

This geomorphic assessment will include planimetric changes and volumetric changes. This study will quantify the type, extent, frequency, and rate of change for two separate time periods: 1) post dam/pre-ROD circa 1980 to 1999; and 2) post-ROD 2000 to 2011. The cumulative influence of ROD actions on the river geomorphology will be assessed by comparing channel changes for pre- and post-ROD time periods. The local conditions promoting active geomorphic features and/or channel change will be identified. The evolution of specific construction features (e.g. constructed bars, wood structures, side channels) at channel rehabilitation sites implemented since 2005 will be documented and compared to what was predicted in the original design documents. A study plan is under development that will describe in detail the data and analysis methods.

Reporting Metrics: To be developed in the study plan.

Partnerships/Capacity Building: None.

Title: Map and Quantify Riparian Vegetation.

Scale: System (GRTS-based)

Assessment Type: IAP Assessments 12P, 1R, 3R, and 4R

Principle Investigator: John Bair, McBain & Trush

Co-Investigator(s): Andrea Hilton, HVT

Cost: \$150,546

Issue: Monitoring for achievement of fundamental (core) management objectives described in the Trinity River Flow Evaluation Final Report ([TRFE] USFWS and HVT 1999) and provide information about riparian vegetation response to management actions (e.g., streamflows, gravel augmentation and channel rehabilitation) to support adaptive management.

Objectives:

- (1) Evaluate whether TRFE riparian seedling scour mortality objectives are being achieved during natural tributary-induced flood events and ROD high flow releases (IAP Objective 5.2.1).
- (2) Evaluate whether ROD high flow releases are preventing detrimental riparian encroachment, riparian berm development, and channel simplification (IAP Objective 5.2.1). Detrimental riparian encroachment is defined as re-establishment of dense continuous bands of perennial vegetation near the low flow channel margin that reduce flow velocity, induce fine sediment deposition, and form berms that lead to channel simplification over time.
- (3) Evaluate whether TRFE riparian initiation and establishment objectives on upper bar and floodplain surfaces are being achieved during ROD high flow releases for Wet and Extremely Wet water years (IAP Objective 5.1.1 and 5.1.3).
- (4) Evaluate whether large wood storage within the active channel is increasing and being maintained (IAP Objective 5.1.2).
- (5) Use various channel complexity parameters (topography, wetted channel length, radius of curvature, large wood storage and density, area of exposed active bars, riparian vegetation, geomorphic features, spawning gravels, and water surface elevations associated with a range of discharges) to characterize changes in the physical state of the channel to relate to anticipated changes in fish habitat. Evaluate variable relationships using a univariate and multivariate analytical approaches.

Methods and Data Analysis:

Monitoring activities include: (1) riparian vegetation monitoring at GRTS, (2) riparian vegetation monitoring at channel rehabilitation sites, and (3) large wood monitoring at GRTS sites.

For riparian mapping, the baseline location, composition, and structure of riparian vegetation will be characterized in the field at a portion of eight channel rehabilitation sites and 16 GRTS sample sites (GRTS sample), and at channel rehabilitation sites constructed in 2007 (Table 1). Site vegetation characterization consists of field-mapping riparian vegetation, exotic hardwoods, and substrate on the most recent ortho-rectified aerial photographs (scaled to 1:1,800) at the same scale, but in greater detail, as that used in the riparian vegetation inventory (McBain and Trush 2005). Riparian vegetation mapping at Vitzthum Gulch, Indian Creek Delta and Lower Indian Creek channel rehabilitation sites will quantify riparian vegetation recovery 5 years after construction and provide the necessary information needed to assess regulatory compliance.

For riparian band transects at GRTS sites where construction has not occurred, less intensive measures will be taken along band transects to document riparian vegetation patch boundaries, vertical structure associated with patch types, and species distribution along a cross section. The band transects will be integrated with geomorphic

and hydrologic monitoring at each site to relate riparian vegetation patterns and structure to channel morphology, annual flow regimes, and bed mobility and scour. Specific objectives of the less intensive band transect sampling are:

- (1) Document riparian vegetation structure (species, age and height class) at non constructed sites.
- (2) Document bank position of riparian hardwood initiation, establishment, and mortality.
- (3) Relate riparian vegetation patterns to flow recurrence, channel morphology and inter-annual flow variation.

Reporting Metrics:

Key system-scale performance measures should include: *patch type frequency, abundance, and spatial and size distribution* within a consistently defined riparian corridor; and *unvegetated cover type frequency, abundance, distribution, and area* within a consistent definition of riparian corridor.

The key site-scale performance measures should include: *patch type frequency, abundance, and spatial and size distribution* at GRTS selected sites within a consistently defined riparian corridor; *area, frequency, and abundance* of colonizing and established riparian patches between 450 cfs and 2,000 cfs; *plants species frequency, abundance, and distribution* at bank rehabilitation sites within inundation zones; *age class distribution; region of river bank above summer baseflows where woody riparian plant species are initiating and establishing; and zones and abundance of frequently sampled riparian plant species.*

Partnerships and Capacity Building: Since its inception, the IHAP has been a collaborative effort among multiple TRRP partners, including the USFWS, Yurok Tribe, and Hoopa Valley Tribe. The project has provided job-related training and experience for many field technicians, oftentimes tribal members, from both tribes.

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Wildlife Monitoring and Assessment

TRRP Draft Fiscal Year 2012 Work Plan

Title: Trinity River juvenile salmonid spatial and temporal density monitoring

Scale: Restoration Reach, Lewiston Dam to North Fork Trinity River

Assessment Type: Monitoring status and trends; long term progress toward achieving program goals and objectives

Principal Investigators: William Pinnix and Joe Polos – U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office (AFWO); Nina Hemphill – Trinity River Restoration Program (TRRP); Wade Sinnen (CDFG); Andrea Hilton and Paul Petros-- Hoopa Valley Tribal Fisheries Department (HVT); Tim Hayden and Aaron Martin-- Yurok Tribal Fisheries Program (YTF).

Cost: \$326,683

Issue: The goal of this project is to assess the spatial and temporal distribution and density of juvenile salmonids in the mainstem Trinity River restoration reach, Lewiston Dam to confluence with North Fork Trinity River.

Objectives:

- Assess the spatial distribution and density of juvenile salmonids in the mainstem Trinity River at 32 Integrated Habitat Assessment monitoring sites (GRTS sites) over time, and inter-annual density trends with a particular focus on Chinook salmon (*Oncorhynchus tshawytscha*) through a spatially balanced dive survey between February and June 2012.
- Provide data for the intermediate step between habitat and juvenile outmigrants.
- Assess changes in juvenile salmonid density to inform the assessment of response to management actions and the number and distribution of spawners at 32 GRTS sites over time.
- Assess the variance of juvenile salmonid density, both spatially and temporally, to determine if the proposed sampling regime will provide adequate resolution to assess Objective #1 stated above.
- Provide information to support a fish production model.

Methods and Data Analyses:

- Conduct a data modeling exercise in October 2011 to ensure that proposed sampling protocol is sufficient.
- Conduct mark-recapture study to determine best method for estimating detection probability.
- Estimate density of juvenile salmonids at 32 predetermined GRTS sites spanning the upper 41 miles of the Trinity River as conditions permit between February and June 2012, anticipated to be bi-monthly estimates.
- Characterize the spatial structure of juvenile salmonid density by species, size class, and habitat type at the 32 GRTS sites.
- Assess temporal and spatial effects on variance in order to inform additional surveys; includes day vs. night, diver variability, reach effects, visibility, flow, and habitat effects.

Reporting Metrics: Quarterly reports and Annual report

Partnerships/Capacity Building: This project is a collaborative project between the Hoopa Valley Tribe,

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Yurok Tribe, California Department of Fish and Game, Bureau of Reclamation and US Fish and Wildlife Service. All staff involved with project are local residents. A variety of technical and safety trainings are conducted throughout the course of the project.

Title: Implementation monitoring and analysis

Principle Investigator: David Gaeuman, Reclamation

Cost: The work is proposed as an ongoing effort with an annual budget of \$85,000.

Issue: This proposal integrates monitoring activities needed to inform a range of implementation actions, including rehabilitation site design and gravel augmentation. Bathymetric and terrestrial surveys are proposed to quantify topographic changes in areas impacted by gravel additions and other construction activities to guide future activities. Coarse sediment management requires this information to determine when augmentation locations are ready for replenishment, how much coarse sediment is needed in the long term, and whether augmentation activities are having adverse consequence, such as filling of holding pools or increasing flood risk.

Title: Geomorphic monitoring and assessment of bed scour and mobility

Scale: System (GRTS-based)

Assessment Type: IAP Assessment 6P

Principle Investigator: Andrea Hilton, HVT; Geoff Hales, John Bair, and Scott McBain, McBain & Trush

Cost: \$226,016

Issue: Monitoring for achievement of fundamental (core) geomorphic management objectives described in the TRFE.

Objectives:

- Evaluate if TRFE bed mobility and scour thresholds are being achieved by WY 2012 ROD high flow release.
- Evaluate topographic changes (including potential riparian berm) on cross sections due to WY 2012 ROD high Flow release.
- Compare predictions of bed mobility and scour with measured bed mobility and scour at and between monitoring sites.
- Correlate WY 2012 results of riparian scour evaluation with bed mobility and scour results to evaluate cause-and-effect relationships.
- Use various channel complexity parameters (topography, wetted channel length, radius of curvature, large wood storage and density, area of exposed active bars, riparian vegetation, geomorphic features, spawning gravels, and water surface elevations associated with a range of discharges) to characterize changes in the physical state of the channel to relate to anticipated changes in fish habitat. Evaluate variable relationships using a univariate and multivariate analytical approaches.

Methods and Data Analysis:

In 2012, we propose to conduct this assessment at 8 sample sites in Panel 4 and eight sample sites in Panel 5. (Sampling all 16 sites on a panel is cost-prohibitive.) These 16 sample sites will be the same as those identified in the riparian vegetation and fish habitat investigation plans, which will facilitate integration by enabling comparison of bed mobility and scour processes to other disciplines.

To facilitate multi-disciplinary integration, we will collect data to develop variables topography, radius of curvature, large wood storage and density, area of exposed active bars and geomorphic features at GRTS sites to facilitate an investigation linkages among riparian, geomorphology vs. fish habitat and wildlife disciplines (Appendix A: 2010 IHAP Proposal and Appendix B: 2011 IHAP Proposal).

A Before After study design is proposed for the site-specific monitoring strategy at a portion of eight channel rehabilitation sites. As part of the post-construction assessment, we plan to revisit a subset of the channel rehabilitation sites in the future to assess the evolution of these sites. Typically, channel rehabilitation site revisitation has been determined by water year specific objectives and hypothesis. Channel rehabilitation site monitoring has documented into the physical response of the channel to streamflows and channel rehabilitation site design, which has facilitated evaluation of whether annual TRFE management objectives are being achieved by the ROD flow releases, and provide information for adaptive management.

Geomorphic data collection at GRTS sites and at Channel Rehabilitation sites will consist of the following components: (1) Establishing and surveying cross sections, (2) installing and monitoring bed mobility and bed scour experiments, (3) linking bed mobility and bed scour results via a Shields parameter analysis.

Reporting Metrics:

Percent mobility of D_{84} and D_{50} substrate

Scour depth in in/ft

Partnerships and Capacity Building: Since its inception, the IHAP has been a collaborative effort among multiple TRRP partners, including the USFWS, Yurok Tribe, and Hoopa Valley Tribe. The project has provided job-related training and experience for many field technicians, oftentimes tribal members, from both tribes.

Title: Sediment Monitoring

Scale: River system

Assessment Type: Evaluate long term progress; provide short term feedback

Principal Investigator: Dave Gaeuman, Reclamation

Co-Investigator(s): Andreas Krause, Reclamation; Graham Matthews, Graham Matthews and Associates

Issue: Sediment transport data provides the basis to quantify the track the sediment budget for the Trinity River. Sediment transport and sediment budget information is used to assess whether we are meeting stated sediment management objectives and to guide high flow releases and gravel augmentation management actions.

Objectives: In dry and wetter water years, compute sediment transport rates by size fraction at 4 mainstem locations: Trinity River at old Lewiston bridge, Trinity River at Lowden Meadows, Trinity River at Limekiln Gulch, and Trinity River at Douglas City.

Methods and Data Analysis:

Sediment transport monitoring and analyses following standard protocols set forth by the US Geological Survey is used to determine suspended sediment and bedload transport rates, develop sediment transport curves, and determine total sediment loads by size fraction that represent the entire flood hydrograph.

Reporting Metrics: dry weight by size fraction, total bedload and suspended sediment transport by size fraction, bedload rating curves.

Partnerships/Capacity Building: None.

Title: Water Year Specific Activities

Scale: River system

Assessment Type: Evaluate long term progress; provide short term feedback

Principal Investigator: Andreas Krause, Reclamation

Co-Investigator(s): To be determined

Issue: Budget development for the restoration program occurs 1.5 years in advance of the spring high flow releases. This largely precludes any flexibility to respond during the annual flow scheduling process to current river conditions or new insights that may warrant additional monitoring, assessment, and/or adaptive management experiments.

Objectives: Objectives will be identified by proposals submitted to the Flow Workgroup during the annual flow scheduling process. It is reasonable to expect that in wetter years the funds would go for more physical process related items and in drier years to temperature or fish health / disease items.

Methods and Data Analysis:

To be identified in proposals submitted to the Flow Workgroup during the annual flow scheduling process.

Reporting Metrics:

To be identified in proposals submitted to the Flow Workgroup during the annual flow scheduling process.

Partnerships/Capacity Building: None.

Title: Klamath-Trinity River fall/spring run Chinook scale age analysis

Scale: Klamath River from mouth to Iron Gate Dam, Trinity River to Trinity River Dam, with tributaries to both rivers.

Assessment Type: This project evaluates long-term progress toward achieving TRRP goals and objectives.

Principal Investigators:

George Kautsky, Hoopa Valley Tribal Fisheries Department
Desma Williams, Yurok Tribal Fisheries Program

Cost: \$130,529.34

Issue: This project provides information necessary to address the following assessments identified in the TRRP IAP (V1.0): 13A, 17A, 22A, 16A, 23A

Objective:

Trinity: Estimate brood-year contributions of hatchery and naturally produced returns of spring and fall Chinook salmon.

Klamath: The project is used to determine the age of fall Chinook salmon sampled from the Yurok Fishery and the Lower Klamath Recreational fishery. Additional funds are obtained by the Tribe to determine the age composition of fish from the rest of the Klamath Basin (excluding the Trinity). The estimation of brood-year abundance allows for an assessment (via cohort reconstruction) of recruitment prior to harvest impacts, which allows for an assessment of the success of restoration activities, such as implementation Trinity River Restoration Program. The age composition of the fall Chinook run also enables forecasts of ocean population size and projected river returns of adult fall Chinook; essential information for the management of fisheries. The performance of particular broods can then be partitioned into hatchery and natural components (via analysis of coded wire tag recoveries in the fisheries and other locations of the Basin).

Methods and Data Analysis:

Trinity: Ages are assigned to recovery sectors through visual examination of scale patterns for samples gathered in fisheries and spawner escapement. Read-scale age is then corroborated and adjusted for reader bias using coded-wire tag (CWT) data. This information is used in conjunction with estimates of total harvest and escapement in sectors of interest to estimate the age-specific run size of Chinook originating from hatcheries as well as natural spawning areas.

Klamath: Scales are organized by date and collection area, mounted, and pressed into acetate. Pressings are read by two independent readers, and disagreements resolved with a third read. Readings of known-age (CWT) fish scattered throughout the samples are used to adjust readings of unknown-age fish for reader bias. The resulting corrected age proportions from each scale collection area are applied to the total count of unknown-age fish in each area to estimate the number of fish at age.

Reporting Metrics:

Trinity: Age structures for Chinook will be provided to co-managers from which models may be updated to link performance of successive year classes of Chinook production by recovery sector. Past age structure data (up to 10 years) for spring Chinook and current year data will simultaneously be transmitted to the Program contact.

Klamath: The corrected age structures will be provided to CDFG for use in management models. The process and results of the Fall Chinook Age Composition project will be summarized into a report prepared by the Klamath River Technical Advisory Team.

Partnerships and Capacity Building:

Trinity: Tribal Fisheries employment requirements mandate Tribal Preference hiring. Most field technicians employed with agency are Tribal members.

Klamath: In accordance with 25 USC Section 47, preference will be given to qualified Yurok Tribal members or other Native Americans while hiring personnel to conduct tasks associated with this project. Personnel will be trained to select and mount scales, and press the mounted scales into acetate. Some personnel may be trained to age the scales. Cooperators include, but not limited to (carcass surveys involve numerous volunteers) California Department of Fish and Game, U.S. Fish and Wildlife Service, U.S. Forest Service, Salmon River Restoration Council, Karuk Tribe, and the Mid-Klamath Watershed Council.

TRRP Draft Fiscal Year 2012 Work Plan

Title: Trinity River Hatchery Chinook Coded Wire Tagging

Scale: System

Assessment Type: This project evaluates long-term progress toward achieving Program goals and objectives as well as providing short-term feedback to improve Program management.

Principal Investigator: George Kautsky, Hoopa Valley Tribal Fisheries Department

Cost: \$119,996

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

FY12 Identifier	Assessment	Description	Objective
12F3	13A	Monitor adult escapement of hatchery and naturally produced spring and fall Chinook, coho and fall steelhead	4.2.1,4.2.2,4.2.3,4.2.4
12F9	17A	Monitor harvest (tribal, sport and commercial) of naturally produced fall Chinook	4.2.2
12F13	22A	Develop cohort reconstructions for Chinook and coho and evaluate cohort performance or year class strength, and population growth rate	4.1.1, 4.2.1, 4.3.1
12F18	16A	Monitor harvest (tribal, sport and commercial) of naturally produced spring Chinook	4.1.2
12F20	9J	Monitor the proportion of hatchery reared to natural smolt outmigrants (best undertaken in conjunction with assessment4J)	3.3.1

Objective: The project objective is to apply a 25% constant fractional mark (CFM) of all Chinook production at Trinity River Hatchery (TRH) using Coded Wire Tags (CWT).

Methods and Data Analysis:

This project applies CWTs and Ad fin clips to spring- and fall-run Chinook salmon reared at TRH. Twenty-five percent of each race (spring/fall) and each release strategy within race (smolt or yearling) are to be marked. A complete inventory of each raceway is necessary. Representative marking will be ensured by the automated tagging trailer as well as to ensure that 25 percent Ad CWT is assigned to each rearing pond sub-population. An automated tagging trailer constructed by Northwest Marine Technology will be used in 2012. The marks subsequently recovered in juvenile and adult monitoring projects in river are used to estimate contributions of hatchery and natural populations in mixed stock marine and river fisheries and adult spawning escapements. Population estimates are used to assess juvenile and adult production by brood year, run, and rearing type. Brood tables constructed for hatchery and wild fish, based on Ad CWT results, may be used to model performance of hatchery and naturally spawned fish.

Reporting Metrics: CWT release reports prepared for CDFG tagging coordinator, published results in PSMFC publication. Point of Contact will be notified when data are sent to CDFG tagging coordinator.

Partnerships and Capacity Building:

Tribal Fisheries employment requirements mandate Tribal Preference hiring. Most field technicians employed with agency are Tribal members.

TRRP Draft Fiscal Year 2012 Work Plan

Title: Develop cohort reconstructions for Chinook and coho evaluate cohort performance or year class strength, and population growth rate.

Scale: System

Assessment Type: Evaluates long-term progress toward achieving TRRP goals and objectives.

Principal Investigator: George Kautsky, Hoopa Valley Tribal Fisheries Department

Cost: \$10,000

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

FY12 Identifier	Assessment	Description	Objective
12F13	22A	Develop cohort reconstructions for Chinook and coho and evaluate cohort performance or year class strength, and population growth rate	4.1.1, 4.2.1, 4.3.1

Objective: The objective is to provide insight on the performance of individual cohorts as a first step toward analyzing the variability around adult recruitment and parental stock size.

Methods and Data Analysis:

The Hoopa Valley Tribal Fisheries intends to continue its work with the assistance of other sub-group members. Primary efforts in 2012 will be to update the model and make refinements utilizing all-Klamath basin CWT recovery data base recently obtained from CDFG Santa Rosa. We believe the accuracy of our effort will be enhanced by utilizing not only inland recoveries of Trinity origin fish, but the same data for the balance of Klamath basin. We also intend to develop output formats best suited for TRRP purposes as inspired by participation of sub-group members.

Concerns have been raised by some sub-group members that the cohort model being tailored for TRRP purposes not supplant the model used for Klamath fall Chinook harvest management. This proposal is not intended for any such purpose. Presently, the PFMC manages for an aggregate of Klamath Basin fall Chinook natural area spawners. Many are aware of the PFMC's conservation objective for escapement of no less than 35,000 adults to natural spawning areas in Klamath Basin in every year. TRRP partners are also familiar with the expectation that 62,000 natural origin fall Chinook adults would contribute to the annual spawning escapement within Trinity River under a "restored" scenario. However, neither the cohort modeling sub-group nor HVT Fisheries have been tasked with the coordinating these two objectives.

Reporting Metrics: Cohort model will allow assessment of contribution of Trinity naturally produced fall run Chinook to each fishery, escapement, and ocean recruitment.

Partnerships and Capacity Building: N/A



HOME WHO WE ARE WHAT WE DO CHANGES ON THE RIVER REPORTS AND DATA

Developmental Site!!!

This is a DRAFT developmental site.
The official TRRP website is at
TRRP.NET

Search

To search, type and hit enter

Site Structure:

HOME

Background
Restoration
Science and Adaptive Management
Data and Reports
Administration
Glossary



Trinity River Real Time Flows cubic feet per second (cfs)	
Lewiston	3,770
Lime Kiln	3,460
Douglas City	3,960
Junction City	5,220
Above H Fork	5,230
Cedar Flat	5,230
Hooda	8,730

The table above contains provisional data provided by the USGS. All data are provisional and have not received final approval. This table may take several seconds to load.

Home > Now Heading > Notes to Reviewers of the TRRP.NET Overhaul

Notes to Reviewers of the TRRP.NET Overhaul

Published: APRIL 26, 2011

To Reviewers:

Why overhaul the TRRP website?

- Old site was
 - out of date.
 - Old site had become disorganized.
 - Old site was primarily managed by a contractor.
- New site is being built on a content management system that is
 - quick to update (a few spots could still use updating)
 - easy to reorganize without breaking links
 - and will be primarily managed in-house.

What sources of information were used in the overhaul?

- Text was copied or adapted from a variety of sources:
 - 2009 Annual Report
 - TRRP Rehab Site Design Guide
 - IAP
 - old website
 - original writing

What is the overall intent of the website?

1. Provide comprehensible information to the public about TRRP and its activities
 - Header menu system provides an easy route for people with little knowledge of TRRP to quickly get an idea of who we are and what we do. Includes links to all Partner agencies.
 - Site structure follows a drill-down concept with brief pages oriented toward the public at higher levels and increasing details/complexity as one moves deeper into a topic.
 - Heavier emphasis on explaining the need for restoration actions as well as what we are doing about it
2. Provide reference information for TRRP participants (Partner staff, contractors, etc.)
 - Sidebar menu follows the site structure, enabling quick access to deeper, more complex topic pages
 - Several pages for TRRP activities remain, including the new meeting materials pages
 - A better calendar system is added
 - Links to the data portal are improved
 - A data cataloging page is being introduced.

Is there any reasoning behind the overall page layout?

- Retains the color scheme of the old site for continuity
- General style modeled after the DOI website
- Top menu for the general public

Draft website
location

<http://wordpress.trrp.net/?p=1664>

5/26/2011

- Side menu for people more experienced with TRRP

« *Wheel Gulch Environmental Assessment / Initial Study
(EA/IS), Public Meeting, and Review Period*

2011 peak flow release photo gallery »