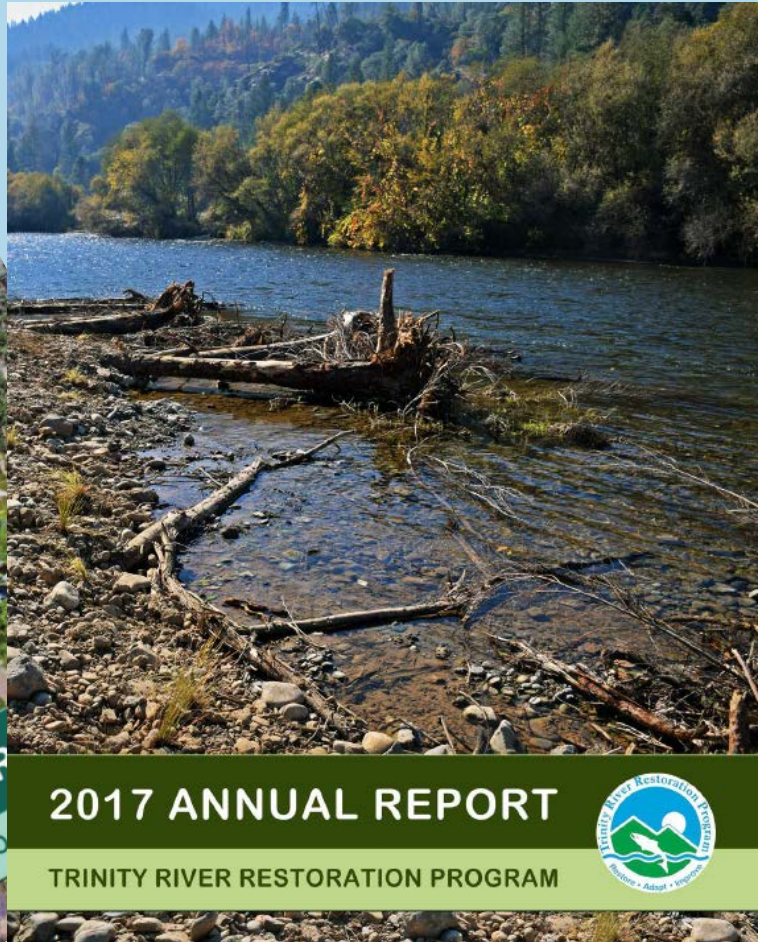


2016 ANNUAL REPORT
TRINITY RIVER RESTORATION PROGRAM

Trinity River
Restoration Program



TRRP Annual Reporting Requirements and Guidance

The ROD states:

"Reclamation and the Service, as the Secretary's representatives on the Trinity Management Council, will be responsible for assuring that the restoration is carried out in a timely manner and that progress reports are submitted to the Department and to the Congress"

The IAP states:

"Particularly important are reports on selected physical, riparian and habitat responses to the previous year's management actions (for assessments that feed back to annual flow and sediment management actions)"

North Coast Regional Water Quality Control Board – Certification for Channel Rehabilitation:

"The [TRRP] shall continue to provide an Annual Report to the Regional Water Board, starting at the end of 2015, that summary TRRP implementation activities to date, monitoring results and findings, and recommendations based on their long-term monitoring and research."



TRRP Annual Report Contents

TRRP Overview (5 pages)

- Mission/Background/Restoration Strategy

Annual Highlights (2 pages)

Funding and Expenditures (1 page)

Activities and Accomplishments

- Flow Management (7 pages)
- Mechanical Channel Rehabilitation (5 pages)
- Coarse Sediment Management (2 pages)

Physical and Biological Responses

- Riparian Monitoring (6 pages)
- Fisheries Monitoring (6-8 pages)
 - Juvenile Salmon Habitat Assessment
 - Salmon Redd Distribution and Abundance
 - Spawning Escapement and Harvest

Data Management and Remote Sensing (4 pages)

Environmental Compliance and Mitigation (6 pages)

Public Outreach (5 pages)

Look Ahead: Program Activities (4 pages)



Funding and Expenditures 2016 - 2017

Fiscal Year 2016

Trinity River Restoration Program Budget Allocations	
TRRP Administration	\$2.7
Restoration Rehabilitation Implementation	\$7.44
Science Program	\$5.0
TOTAL	\$15.14

BUREAU OF RECLAMATION	
Water and Water-related Fund	\$11.911
Central Valley Project Improvement Act Restoration Fund	\$1.5
FISH AND WILDLIFE SERVICE	
FY 2016 Appropriations	\$1.73
TOTAL	\$15.14

Fiscal Year 2017

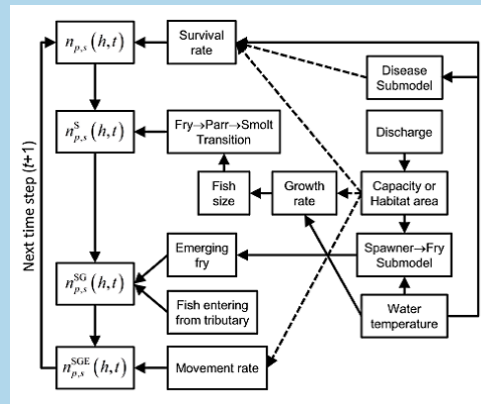
Trinity River Restoration Program Budget Allocations	
TRRP Administration	\$2.5
Restoration Rehabilitation Implementation	\$7.88
Science Program	\$4.85
TOTAL	\$15.119

BUREAU OF RECLAMATION	
Water and Water-related Fund	\$11.911
Central Valley Project Improvement Act Restoration Fund	\$1.5
FISH AND WILDLIFE SERVICE	
FY 2016 Appropriations	\$1.708
TOTAL	\$15.119



TRRP Annual Report Highlights 2016

- Enhanced previous efforts to lower floodplains and construct key habitat features at the Bucktail channel rehabilitation site
- Neared completion of the draft fish production model, the Stream Salmonid Simulator (S3)



- Implemented modified ROD hydrograph for a Wet Water Year with twin peak release of 10,000 cfs
- Added 3,600 cubic yards of gravel to the river planned around the WY16 hydrograph
- Continued fisheries and riparian monitoring



TRRP Annual Report Highlights 2017

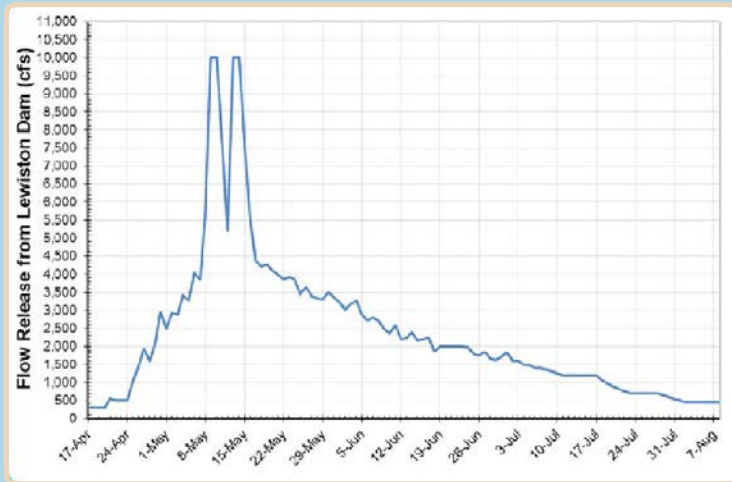
- Conducted channel rehabilitation at 34 of the 47 sites within the TRRP focal reach as described in the *Trinity River Flow Evaluation Study*
- Constructed the 177-acre channel rehabilitation project at the Deep Gulch and Sheridan Creek site
- Implemented the ROD peak release of 11,000 cfs in the Extremely Wet Water Year
- Added 3,550 cubic yards of gravel to the river planned around the WY17 hydrograph



- Overhauled the TRRP website and DataPort (previously Online Data Portal) for better management and usability



Restoration Flow Management 2016



Wet Water Year 2016

Two peak release about 8,700 were released to increase geomorphic work

A modified ROD hydrograph known as the Wet-Biophysical- Riparian (WBR 2p) was implemented to meet programmatic objectives for a Wet year, increase geomorphic work, and meet riparian objectives

Releases from Lewiston Dam attained two separate peaks with daily mean discharges of 8,870 cfs on May 10 and 8,710 cfs on May 14

Reclamation released flows higher than 450 cfs in August and September 2016 to supplement flows in the lower Klamath River

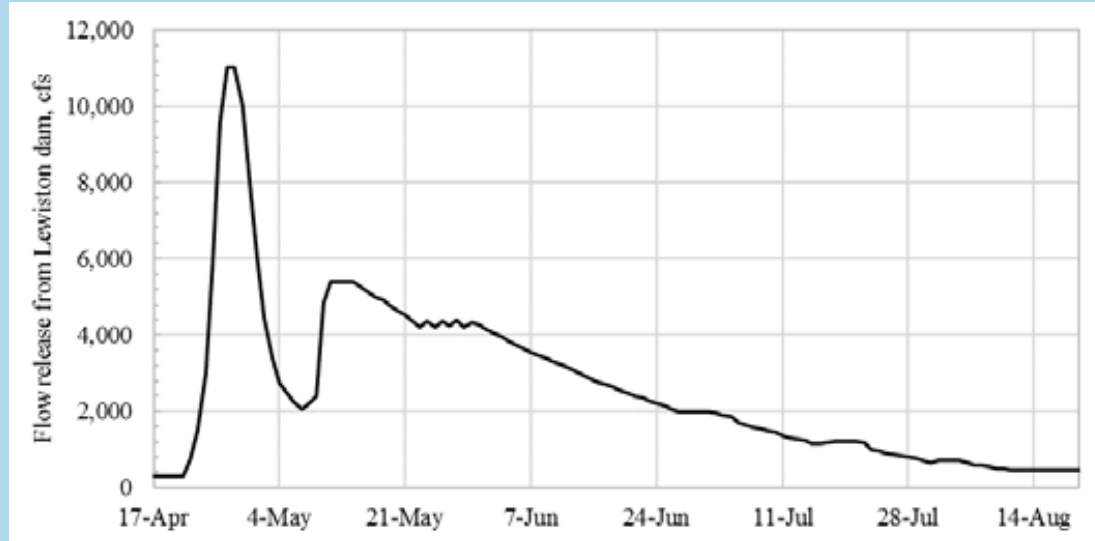
Actual restoration release volume to Trinity River in 2016 was 708,800 af; Total release volume was 748,000 af



Restoration Flow Management 2017

Extremely Wet Water Year 2017

The implemented hydrograph was designed to meet ROD objectives for an extremely wet water year as well as provide benches for monitoring.



Coordinated and scheduled the peak release of 11,000 cubic feet per second (cfs) from Lewiston Dam allowed under the ROD in an Extremely Wet water year

The April 27 timing of the peak release was scheduled earlier than in previous years to better match the historic timing of spring snowmelt

Reclamation implemented late summer releases for the HVT Boat Dance Ceremony

Actual restoration release volume to the Trinity River in 2017 was 821,226 af (ROD: 809,000)

Total release volume to the Trinity River was 865,954 af

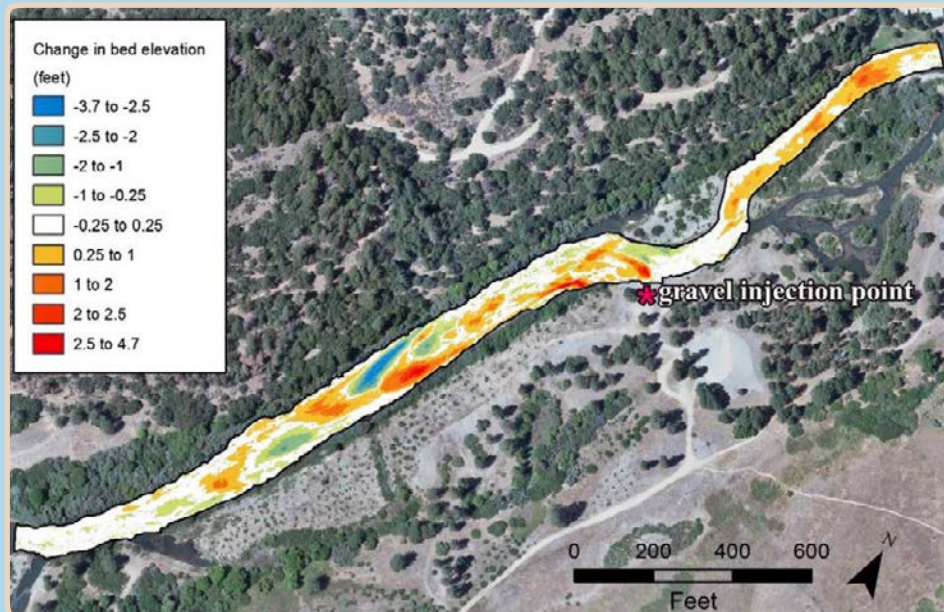


Gravel Augmentation and Sediment Transport Monitoring 2016

Peak flow events (~8,700 cfs) made it possible to introduce a total of 3,600 cubic yards of coarse sediment into the river channel in 2016

55% was introduced a mile from Lewiston Dam, the remainder was introduced at Lowden Ranch

2016 sediment monitoring showed that the augmentation provided about 2/3 as much coarse sediment as was transported in more downstream reaches of the river



Observed changes in bed elevations at the Lowden Ranch injection site after gravel injection and the flow releases

Gravel Augmentation and Sediment Transport Monitoring 2017

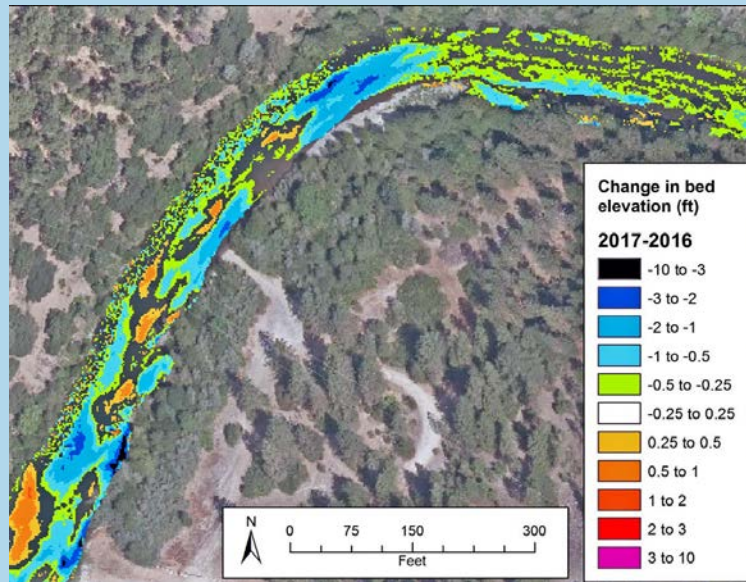
3,550 cubic yards of coarse sediment was introduced into the river channel before the peak release in late April

60% of the total sediment was placed in the river at the Lowden Ranch gravel injection site on April 18-19 with flows between 1,250 - 1,500 cfs.

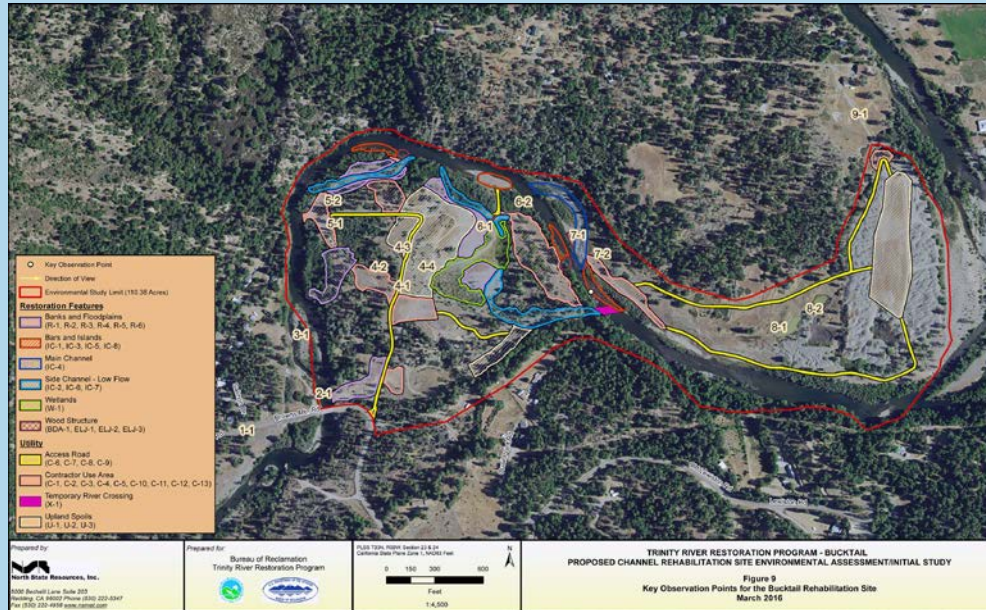
40% was pushed into the channel one mile downstream from the dam on April 25, when flow releases reached 6,000 cfs

Sediment monitoring 13 miles downstream from Lewiston Dam indicated that the augmentations increased coarse sediment storage in the river upstream from the location by about 1,400 cubic yards

Observed changes in bed elevations downstream from Lowden Ranch injection site during the 2017 flow release. Most changes were less than 1.5 feet.



Channel Rehabilitation 2016: Bucktail



Further improved habitat conditions at the largest restoration site upstream of Grass Valley Creek as covered in the Master EIR (USFWS and HVT 1999).

60% of the site consisted of private ownership



The design by the Hoopa Valley Tribe Design Team included:

- Low flow side channels and split flow structures to provide juvenile salmon rearing habitat
- Connected an existing seasonal wetland to surface and subsurface flows to provide juvenile salmon rearing and foraging habitat
- Shifted the main channel into a new meander to decrease slope and increase spawning area
- Lowered floodplains to increase connection to the river at a greater range of flows
- Installed engineered logjams and the first beaver dam analog to provide cover for fish, and to increase channel complexity and groundwater retention

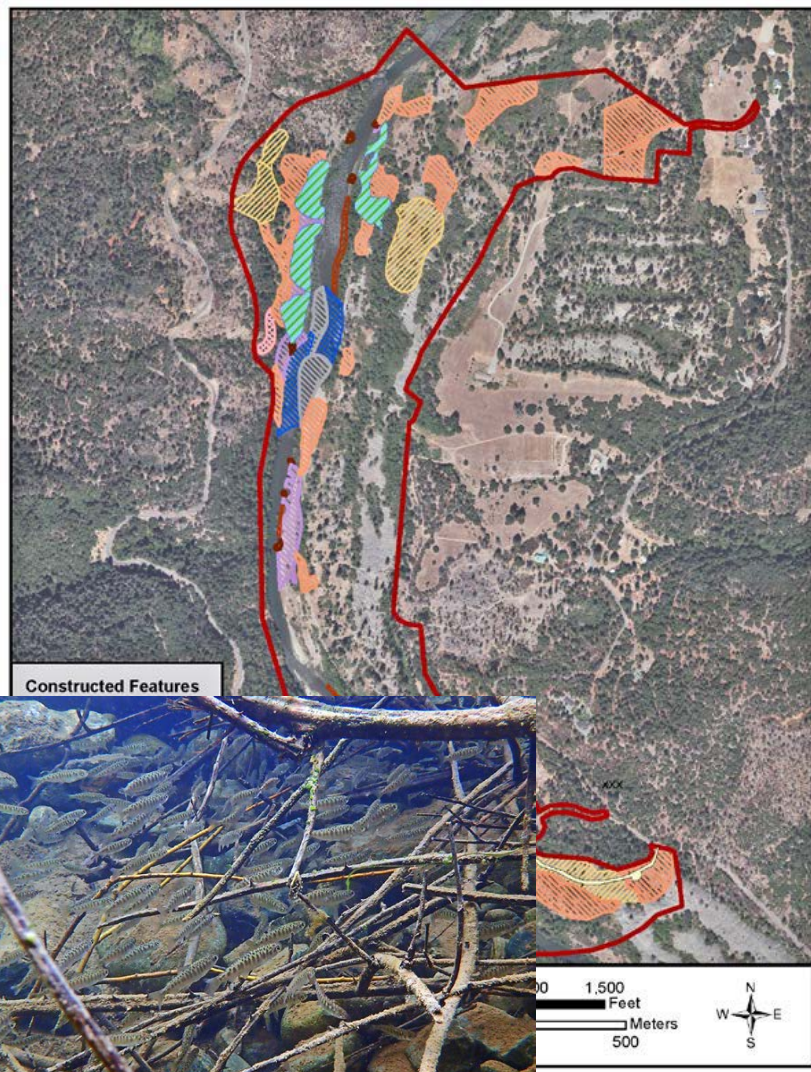


Channel Rehabilitation 2017: Deep Gulch and Sheridan Creek

Designs by the Yurok Design Team and the Federal Design Team preserved existing features

Design elements at the 177-acre site included:

- Reduced the encroachment of riparian vegetation
- Placed large wood material
- Physically altered alluvial features (i.e., placing or excavating alluvial material to construct floodplains and side channels)
- Constructed large wood hydraulic and habitat structures
- Removed or replaced riparian and upland vegetation at strategic locations
- Constructed several off-channel wetland features that were inset into lowered floodplains. These wetlands were loaded with large wood and their edges revegetated to provide cover and shade, which will maintain cool water temperatures for juvenile salmon rearing
- A major riffle feature that was already there and that supports salmonids in the Sheridan Creek site was incorporated into the design features



Aaron Martin – Yurok Tribe



Fisheries Monitoring: 2016 - 2017

Juvenile Salmon Habitat
Assessment:

*Restoration Reach Systematic
Habitat Estimate*

Rehabilitation Site Assessments

Synthesis Reporting



Juvenile Chinook Salmon Abundance
(2017)

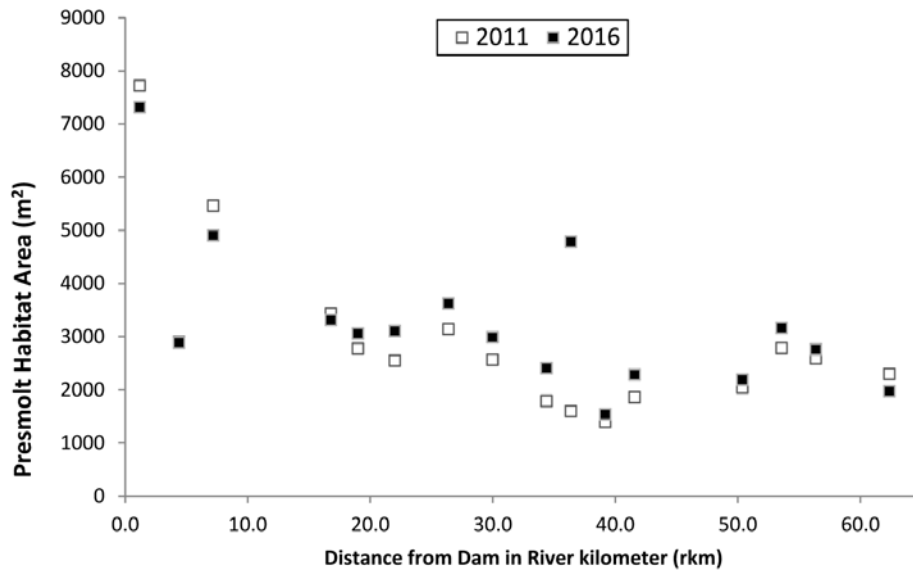
Salmon Redd Distribution and Abundance

Salmonid Spawning Escapement and
Harvest (2017)

Adult Fall Run Chinook Salmon Harvest

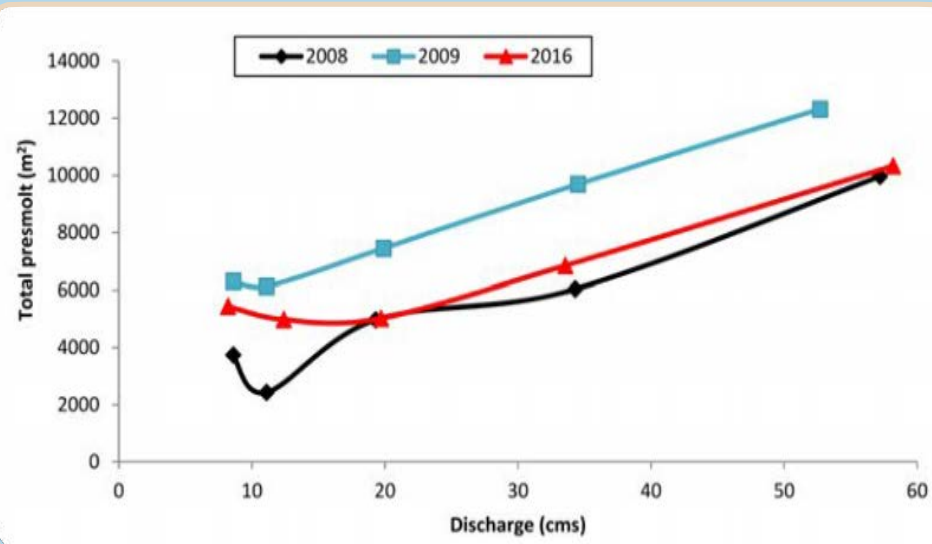


Fisheries Monitoring – Juvenile Salmon Habitat Assessment 2016



11 of the 16 surveyed segments were in sections without rehabilitation construction portions of the restoration reach, 8 of which showed higher habitat values in the 2016 survey than the 2011 survey

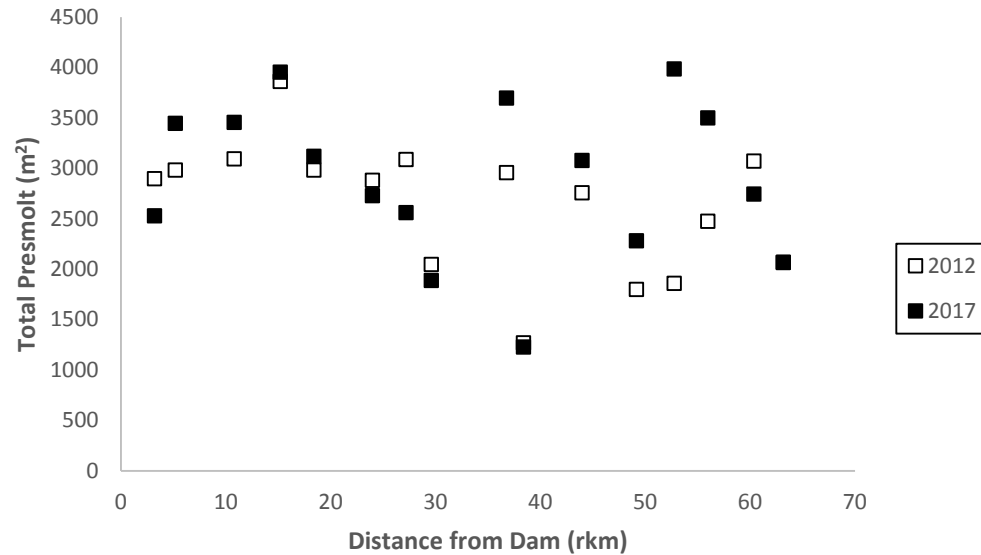
Overall, the median total pre-smolt habitat area increased from 2,576 m² to 3,020 m²



Total pre-smolt habitat area at Lewiston Cableway by survey year. Symbols indicate habitat measurement.

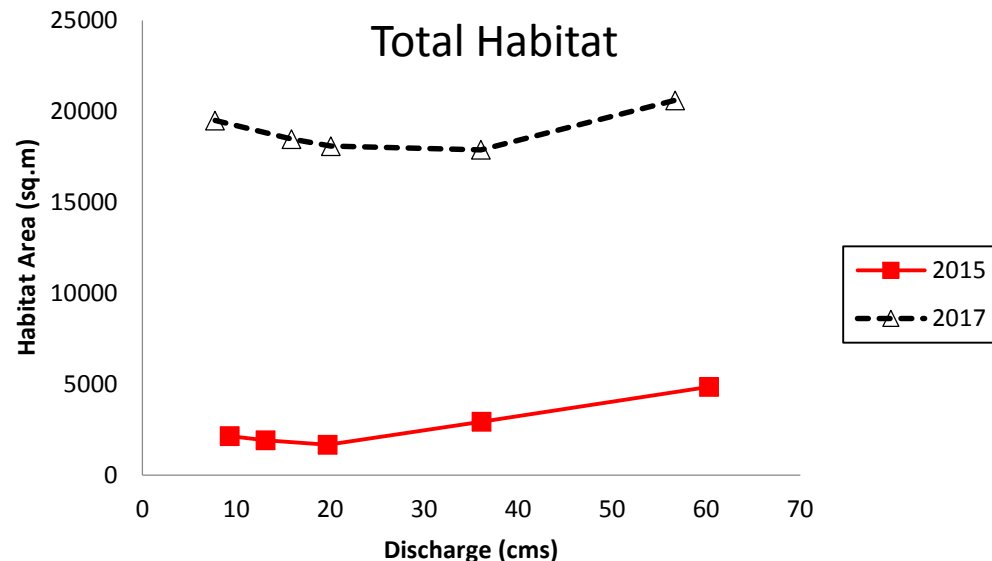


Fisheries Monitoring – *Juvenile Salmon Habitat Assessment 2017*



Ten of the 16 segments had more total pre-smolt habitat areas in 2017 than in 2012

Overall, the median total pre-smolt habitat area increased from 2,890 square meters (m²) to 2,912 m²

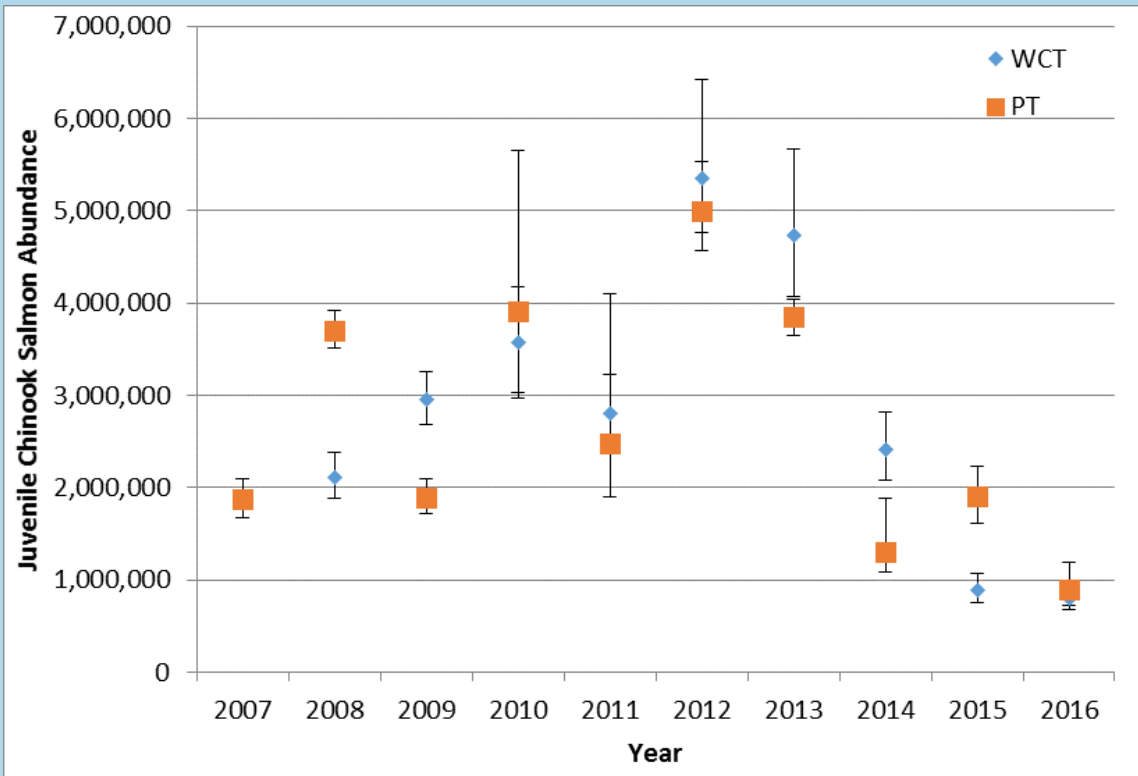


Total pre-smolt habitat area at the Lower Bucktail Dark Gulch rehabilitation site before construction (2015) and after construction (2017)



Fisheries Monitoring – Juvenile Chinook Salmon Abundance 2017

Willow Creek Trap (WCT) sampling captures juvenile salmon that originate from the entire basin above the WCT site. Pear Tree (PT) sampling captures juvenile salmon that originate from the restoration reach of the Trinity River.



Annual population estimates of naturally produced juvenile Chinook salmon (spring- and fall-run combined) in 2016 were 0.8 million fish at WCT and 0.9 million fish at PT

Analyses to determine cause and effect are planned for 2018, including analyses relating the size of the spawning population to the number of juveniles produced, as well as habitat availability and temperature regimes to assess factors that influence juvenile population sizes

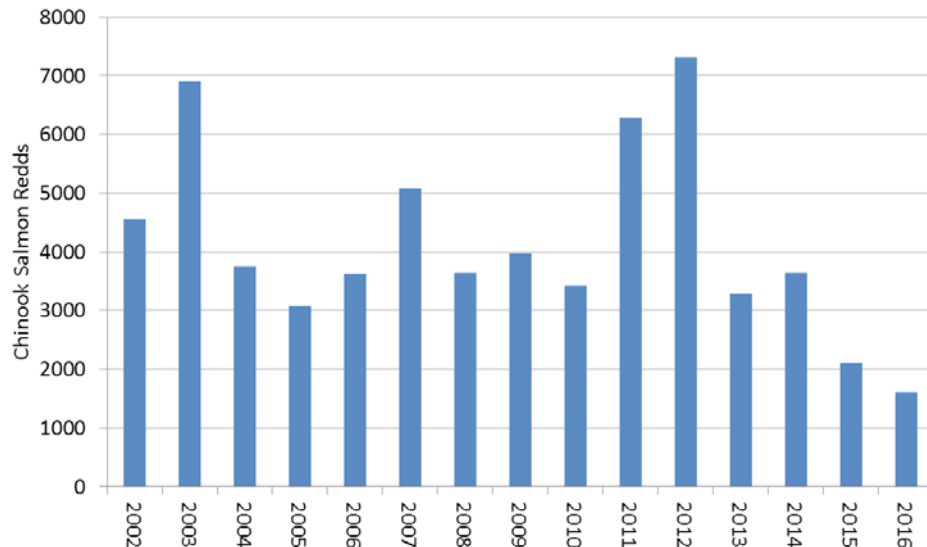
Abundance of naturally produced juvenile Chinook salmon at Willow Creek (WCT) and Pear Tree (PT) trap sites, 2007 - 2016. Error bars represent 95% credible limits of the annual estimates



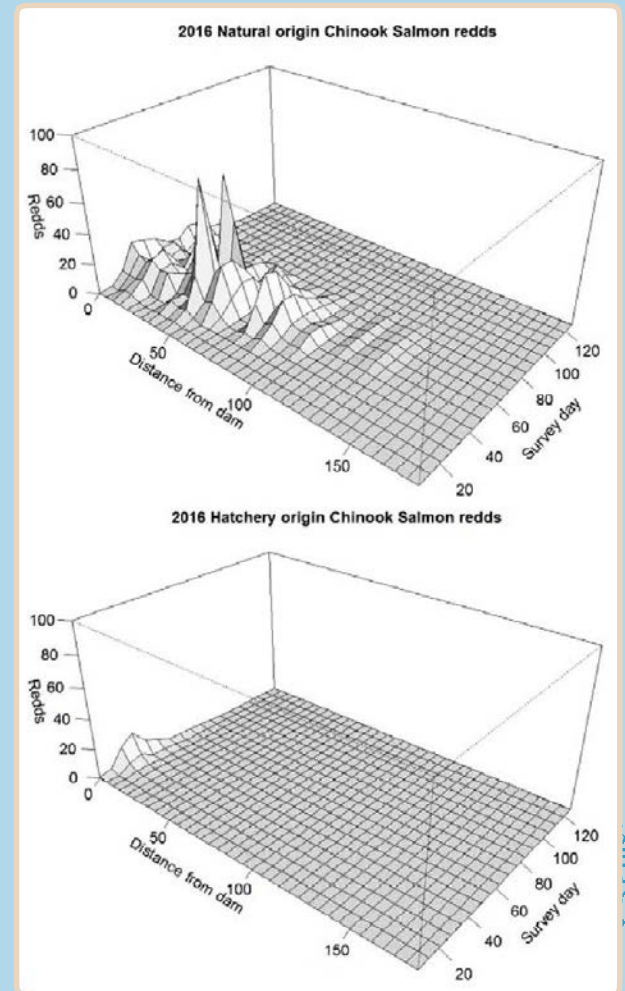
Fisheries Monitoring – *Salmon Redd Distribution and Abundance 2016*

To evaluate the distribution and abundance of Chinook salmon spawning activity, the USFWS, USFS, CDFW, the Hoopa Valley Tribe, and the Yurok Tribal Fisheries Program conduct salmon spawning surveys annually on the mainstem Trinity River

Species	Origin	2016
Chinook Salmon	All Natural	1,607 1,516 (1,453–1,580)
	Hatchery	91 (27–154)
Coho Salmon	All Natural	64
	Hatchery	NA NA

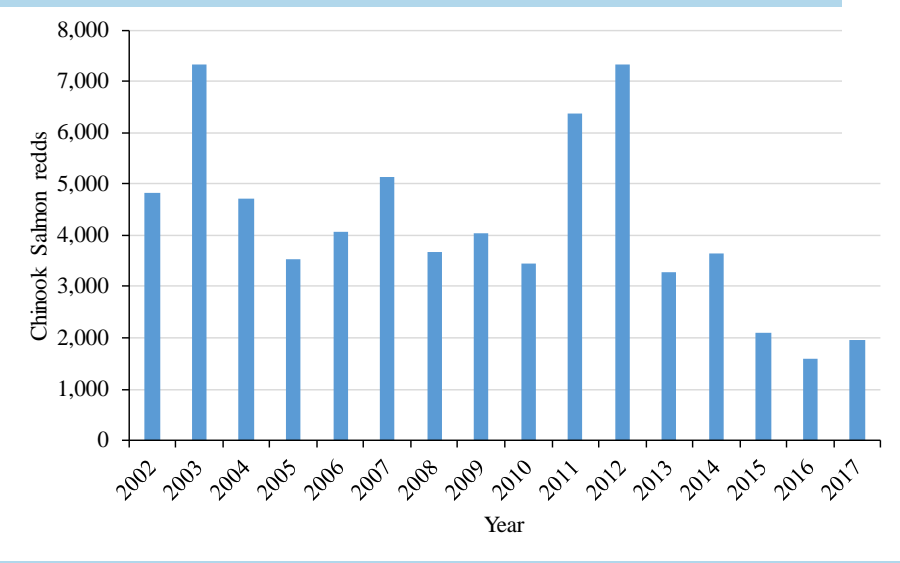
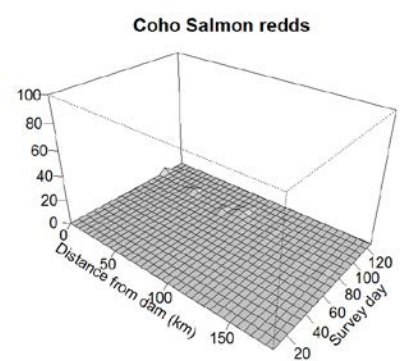
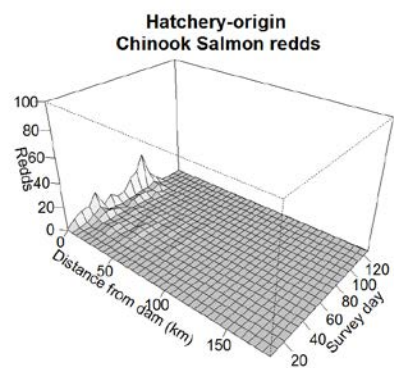
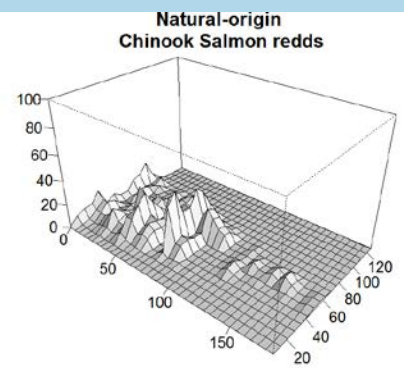
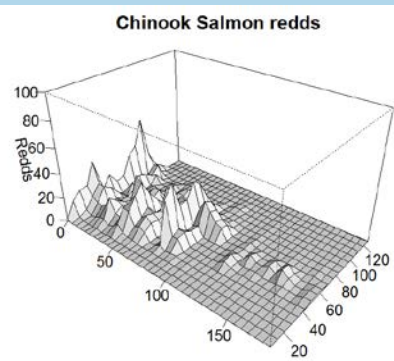


Spatiotemporal distribution of mainstem Trinity River salmon redds observed in 2016.



Fisheries Monitoring – Salmon Redd Distribution and Abundance 2017

Species	Origin	2017
Chinook salmon	All	1,607 ^b
	Natural	1,516 (1,453–1,580)
	Hatchery	91 (27–154)
Coho salmon ^a	All	64 ^b
	Natural	NA
	Hatchery	NA



Spatiotemporal distribution of mainstem Trinity River salmon redds observed in 2017.



Riparian Monitoring: 2016 - 2017

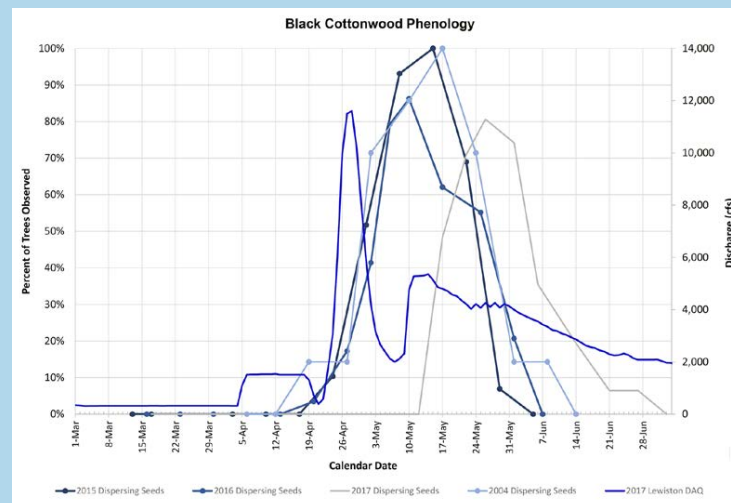
Black Cottonwood Seed Dispersal Monitoring is done to synchronize flow releases with seed dispersal periods

Floodplain Seedling Scour is monitored to evaluate the effects of restoration flow releases on riparian encroachment

Native Riparian Vegetation Mapping in the Restoration Reach shows that overall abundance has stayed consistent, but at various locations

Large Wood Abundance mapping showed that the restoration reach has roughly one-tenth the amount of large wood that was recommended by Cardno ENTRIX/CH2M Hill in 2011

Monitored black cottonwood seed dispersal (2014 – 2017) shown with the 2017 hydrograph



Environmental Compliance 2016 - 2017

Channel Rehabilitation Compliance and Mitigation

Gravel Augmentation Permitting

Cultural Resource Compliance

Biological Assessments and Programmatic Agreements

FEMA Floodplain Mapping and County Floodplain Development Compliance



Public Outreach and Landowner Interactions

Brochures and Informational Resources



Public Meetings & Landowner Interactions



Watershed Education and Stewardship



Community Event Participation



Annual Report Partner Contributors

Restoration Flow Management: **Reclamation** – Todd Buxton; **Yurok Tribe** – Andreas Kraus; **Flow Work Group Members**

Channel Rehabilitation: **Design Team Members**

Gravel Augmentation: **Reclamation** – Dave Gaeuman

Fisheries Monitoring: **USFWS, CDFW, Yurok, & HVT**

Juvenile Salmon Habitat Assessment:

USFWS – Josh Boyce, Damon Goodman, Nick Som; Yurok – Justin Alvarez, Aaron Martin

Juvenile Chinook Salmon Abundance (2017):

USFWS – Bill Pinnix; Yurok – Paul Petros; HVT – Nathan Harris

Salmon Redd Distribution and Abundance: **USFWS** – Steve Cough; **HVT; USFS; CDFW**

Salmonid Spawning Escapement and Harvest & Adult Fall Run Chinook Salmon Harvest (2017): **CDFW** – Mary Claire Kier, Ken Lindke

Riparian Monitoring: **HVT** – James Lee

Data Management: **Reclamation** – Eric Peterson

Environmental Compliance: **Reclamation** – Brandt Gutermuth



Trinity River Restoration Program



TRRP Partner Staff Bios and Contributions



*Bill Brock, Fisheries Program Manager,
Forest Service
Shasta-Trinity National Forest*



*Ken Lindke, Environmental Scientist,
California Department of Fish and Wildlife*

*Seth Lawrence, Senior Engineer,
California Department of Water Resources*



*Robert Franklin,
Hydrologist,
Hoopa Valley Tribe
Fisheries Department*



*Eric Peterson, Ph.D., Natural Resource Specialist
Data Steward, Bureau of Reclamation*

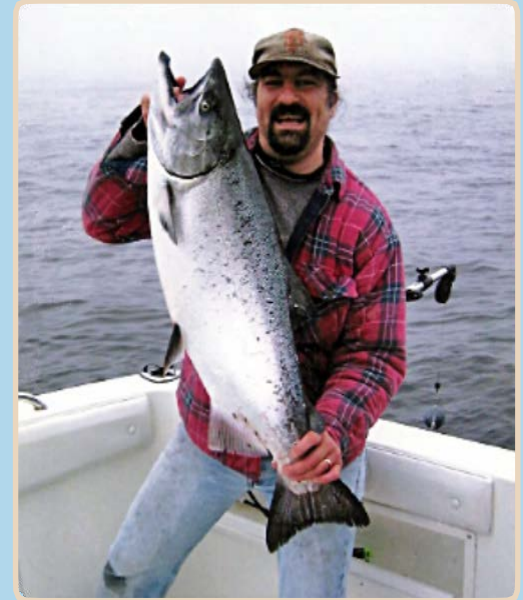


TRRP Partner Staff Bios and Contributions



Kyle De Juilio, Senior Fisheries Biologist,
Yurok Tribe, Fisheries Department

Joe Polos, Fisheries Biologist,
U.S. Fish and Wildlife Service



Seth Naman, Fisheries Biologist,
NOAA Fisheries



Victor Haro, Indian Self-
Determination Specialist,
Bureau of Reclamation



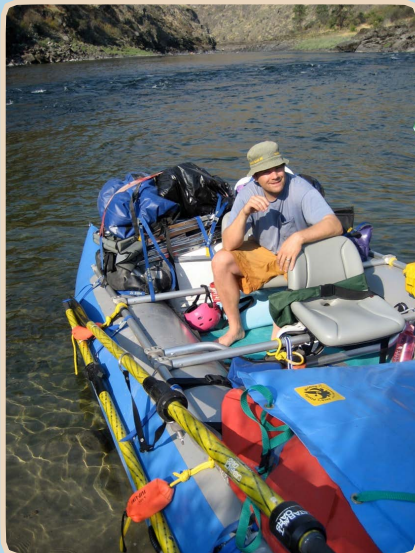
TRRP Partner Staff Bios and Contributions



*Donna Rupp, Project Coordinator,
Trinity County Resource Conservation District*



*Mike Dixon, Ph.D., Implementation
Branch Chief,
Bureau of Reclamation*



*Josh Boyce, Ph.D., Fish Biologist,
US Fish and Wildlife Service*



*James Lee, Riparian Ecologist,
Hoopa Valley Tribe Fisheries Department*



TRRP Partner Staff Bios and Contributions



*Andreas Krause, Geomorphologist,
Yurok Tribal Fisheries*



*Nancy Snodgrass, Engineer,
California Department of Water Resources*



*Galen Anderson, Hydrologist,
Forest Service, Hayfork Ranger District -
Shasta-Trinity National Forest*



*Wade Sinnen, Senior Environmental
Scientist,
California Department of Fish and Wildlife*



Looking Ahead: Suggested changes for future reports / Comparisons w/ other restoration Programs

Make TRRP Overview more concise and include brief Executive Summary

Include additional information on Watershed Tributary Restoration activities

Continue reporting on the following, but condense:

Restoration Flow Management

Channel Rehabilitation

Science and Adaptive Management

Fisheries and Riparian Monitoring

Environmental Compliance and Public Involvement

Yearly Look Ahead

Electronic Distribution

Technical or public audience?

