



Trinity River Restoration Program

The long-term goals of this Program are to restore the form and function of the Trinity River; restore and sustain natural production of anadromous fish populations in the Trinity River to pre-dam levels; and to facilitate full participation by dependent tribal, commercial, and sport fisheries through enhanced harvest opportunities.



Trinity River Restoration Program

Science Funding Recommendation

James Lee

30 March 2022

Trinity Management Council Quarterly Meeting

Science Funding Recommendation Process

- FY 22 TMC-approved budget reserved \$250k for short-term modeling and scientific research outside of normal status and trend monitoring
- ED proposed that TRRP Interdisciplinary Team would solicit and rank proposals, and Science Advisory Board would review them, and projects would be funded in the order ranked.
- IDT met and defined process (30 August 2021 Memo to IDT from Science Coordinator)
- Received and ranked 8 pre-proposals
- Solicited feedback from SAB on pre-proposals
- Requested full proposals from top 5 IDT-ranked pre-proposals
- Solicited feedback from SAB on full proposals
- Recommended 4 projects be funded in FY 22; prioritized one for funding in FY 23

Trinity River Turbidity Monitoring (1)

- Developed by Hoopa Valley Tribal Fisheries Department
 - Potentially, Yurok and/or TRRP staff would have collaborated
- Emphasis on short-term impacts of 2021 Monument Fire (216k acres)
Purchase and install two turbidity meters- one at Douglas City, the other at Burnt Ranch
- \$40,000 estimated cost
- Was ranked 7 of 8 by IDT; no full proposal was requested
- Comments- impacts would likely be underway by the time project was funded; seemed more suitable for long-term monitoring; not clear how information would be used

Development of a Bed Surface Grain Map (2)

- Developed by USFWS, Yurok Tribe, and Hoopa Valley Tribe
- Essentially a facies map of the Trinity River along the 40-mile restoration reach. Based on ocular estimates of d50 and d84.
- Would be a roughness layer for updated hydraulic model with a wide range of applications in both science and implementation
- Could be used to predict bed entrainment and redd scour
- \$174,938 firm cost in FY 2022 dollars based on latest full proposal
- Ranked 5 of 8 by IDT- full proposal developed, but did not rank high enough to recommend funding in FY 22
- Proposal was highly regarded by SAB, but with many caveats

Development of a Bed Surface Grain Map (2) (continued)

- The map is an update to a 2014 map. The changes to channelbed substrate is anticipated due to flows and sediment augmentation; therefore this product could be planned for as part of a multi-year monitoring program
- After SAB review of pre-proposal, SAB review of full proposal, and subsequent SAB review of revised full proposal, “...quite supportive of the work, but the revisions and rebuttals do not fully address the previous concerns, and aspects of the methods and prior work are unclear, as detailed below. I recommend that the proposal be sent back to the PIs for further revision”
- ED Recommendation: develop proposal and prioritize for FY 23 science planning

Mainstem Trinity River Bar Area Mapping (3)

- Developed by Hoopa Valley Tribe Fisheries Department
- Maps gravel bars that are exposed at late-summer base flow of 450 cfs
- Follow-up to 2014 project
 - search McBain Associates 2015 on TRRP document portal
- \$38,000 estimated cost
- Was ranked 6 of 8 by IDT
- Full proposal not requested
- Should consider working into a long-term monitoring plan
 - Science Plan- ongoing

Effects of scour and inundation on aquatic communities (4)

- Developed by Yurok Tribe, Hoopa Valley Tribe, and Cal Poly Humboldt
- Evaluates hypothesis, “scour and variable inundation periods of marginal areas can increase abundance of benthic macroinvertebrates and thus make food more available/abundant for juvenile salmonids”, which is a major assumption that underlies the winter flow variability proposal.
- \$152,228 firm cost (FY 22)
- Was ranked 3 of 8 by IDT and ranked above funding line
- No “red flags” on SAB reviews

Updates and improvements to RBM-10 (5)

- Developed by USBR personnel at TRRP office, in collaboration with Riverbend Sciences and USGS
- Model is perhaps the most widely used in TRRP. Primarily used for hydrograph planning in the following ways:
 - Directly for temperature compliance
 - Model output is input for:
 - Stream Salmonid Simulator to generate salmonid smolt production/biomass estimates
 - FYFAM for foothill yellow-legged frog production
 - Targets for riparian trees
 - Empirical bedload transport functions for geomorphic work predictions
 - Shields analyses for bed mobility and scour
- Current version (1.7.5) can't model below 300 cfs; doesn't include record low water year in the period of flow records; existing GUI doesn't allow user to access the full functionality of the model

Updates and improvements to RBM-10 (5) (continued)

- Updates and improvements would be a desktop exercise and cost \$106,860
- Was ranked 2 of 8 by IDT, but preproposal was ranked 7 of 8 by SAB
- This discrepancy was reconciled by communication with SAB- it was not made clear enough the extent that this model was used in the program. As a standalone model for temperature compliance, it's probably good enough as-is. As a basis for nearly every other model used in TRRP, and a tool for modeling scenarios in which we are dealing with unprecedented water shortages, updates and improvement are very important.

Comparing physical and bioenergetic metrics of juvenile salmonid habitat at channel rehabilitation sites in the Trinity River (6)

- Developed by Yurok Tribe, Hoopa Valley Tribe, and US Fish and Wildlife Service
- Explores a new method of evaluating salmonid rearing habitat- one which incorporates food and temperature- and compares it to conventional univariate habitat classification systems, with an eye towards refining our current methods of assessing and creating rearing habitat.
- Cost is \$27,400
- Ranked top project by both IDT and SAB

Development of SRH-2D as a tool used to inform project site design and performance (7)

- Developed by Yurok Tribe
- Water temperature is gaining recognition as an attribute that we can manage for a variety of species/life stages simultaneously
- SRH-2D has a new temperature model that predicts water temperature at a fine spatial scale; this project validates that module by comparing predictions with logged temperatures.
- Cost is \$26,346
- Ranked 4 of 8 by both IDT and SAB

Wildfires and Stream Temperatures (8)

- Developed by Yurok Tribe, USFS, Watershed Center, Riverbend Sciences
- Wildfires affect streams in a wide variety of ways- smoke cover from some recent wildfires have actually cooled water temperatures in the Trinity River during late summer
- Desktop analysis using existing datasets to explore the historic relationship between wildfire history/burn severity and water temperatures within the Trinity River Basin- cost \$40-50,000
- Ranked 8 of 8 by both IDT and SAB. No full proposal requested. Interesting project, but link to management actions was unclear

Recommendation:

Recommendation: I recommend that the program fund the following proposals (Table 4) for a total of \$312,839. Proposal 2, which was well received by both SAB and IDT, should not be funded through this one-off research and modeling effort because it supports what should be a recurring long-term monitoring strategy. I recommend that Proposal 2, or a version of it, be incorporated into the Science and Monitoring Plan and prioritized for funding in FY23.

Table 4. Executive Director's recommendation

Proposal	Budget	Running Total
6 - Comparing physical and bioenergetic metrics of juvenile salmonid habitat at channel rehabilitation sites	\$27,405	\$27,405
5 - Update and improvements to the RBM10 Model for predicting water temperatures in the Trinity River	\$106,860	\$134,265
4 - Effects of Scour and Inundation on Trinity River Aquatic Communities	\$152,228	\$286,493
7 - Development of SRH-2D as a tool used to inform project site design and performance	\$26,346	\$312,839
2 - Development of a bed surface grain map	\$174,938	Incorporate into Science Plan