Rationale for Recommended Rejection of the Vitzhum Gulch Rehabilitation Site as one of the 44 Record of Decision Channel Rehabilitation Sites Implemented by the Trinity River Restoration Program

Berm notching at Vitzhum Gulch. Photo by the Trinity River Restoration Program

Prepared for:

Hoopa Valley Tribal Council

Prepared by:

Hoopa Valley Tribe Fisheries Department

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INTRODUCTION

The Trinity River Restoration Record of Decision (ROD) established specific annual flow releases, a sediment management regime, and channel rehabilitation programs to create and sustain a dynamic alluvial channel to provide the habitat necessary for fishery restoration. In all, the ROD established five major restoration program components. These components are derived from the Trinity River Flow Evaluation Final Report (TRFEFR) (June 1999) required to be developed by the Secretary of the Interior with the concurrence of the Hoopa Valley Tribe pursuant to section 3406(b)(23) of the Central Valley Project Improvement Act. Pub. L. 102-575 (Oct. 30, 1992) (CVPIA). Each component is integral to the other and to the program as a whole. The components are:

1) Fine and Coarse Sediment Management
2) Flow Management for Temperature and Habitat
3) Channel and Watershed Rehabilitation
4) Flow Management for Geomorphic and Riparian Processes
5) Adaptive Management and Monitoring.

Under the Channel and Watershed Rehabilitation component, 44 potential rehabilitation sites were identified in the Trinity River Flow Evaluation Final Report (TRFEFR), and correspondingly incorporated into the Trinity River Restoration Program Record of Decision (ROD). As the purpose of the ROD was to restore the fishery of the Trinity River, and associated fishing opportunities to the Tribe, proper implementation of the channel rehabilitation projects (in combination with the components above) are critical to achieving the benefits anticipated by the Tribe. The Fisheries Department has been conducting many of the channel rehabilitation site designs for the program, and also review channel rehabilitation designs conducted by other entities. In this role, the Fisheries Department has had an important role in ensuring proper implementation of the channel rehabilitation projects as envisioned in the TRFEFR and ROD. However, one site, designed by TRRP staff, significantly deviates from the approach shown in the TRFEFR and ROD, and despite opposition by the Fisheries Department and others, was implemented in summer 2007 in a manner inconsistent with the TRFEFR and ROD. Therefore, the Fisheries Department recommends that the Tribal Council adopt a resolution that rejects this site as counting towards one of the 44 sites contained in the TRFEFR and ROD. The rationale for this recommendation, as well as criteria for acceptance of future site design and implementation, are provided below.

BACKGROUND

The Vitzhum Gulch site was one of the 44 potential channel rehabilitation sites identified in the TRFEFR and ROD (Figure 1). The TRFEFR and ROD selected Vitzhum Gulch as a potential channel rehabilitation site using several prioritization criteria, including:

1) substantial fish habitat improvements could be produced by its rehabilitation,
2) substantial probability for long-term self-maintenance under the ROD flow schedules due to the site's tight radius of curvature, and
3) substantial amount of sand stored in the berms that could be removed from the system.

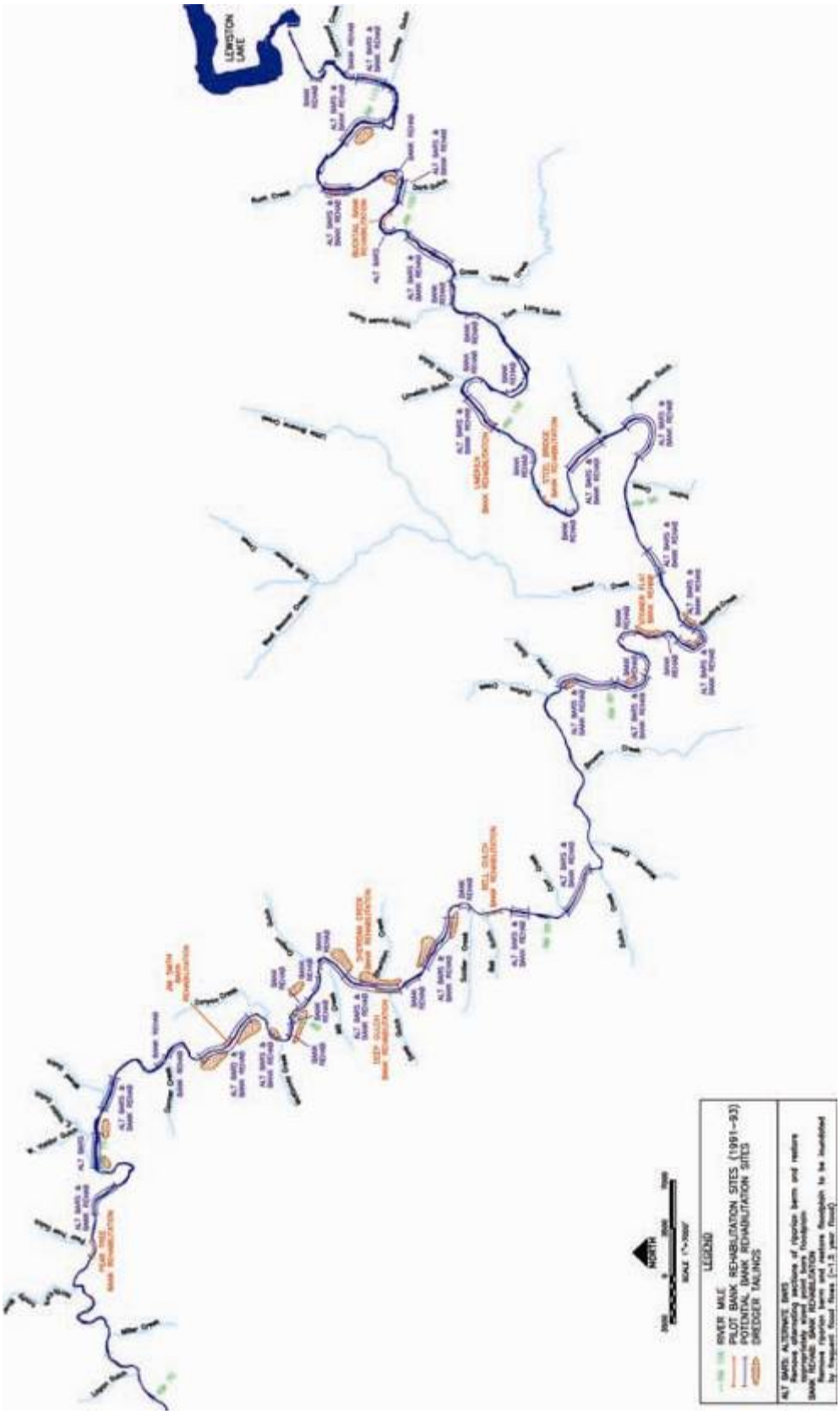

Figure 1. Map of 44 potential bank rehabilitation sites in the TRFEFR.

The Vitzhum Gulch site was the first channel rehabilitation site to be designed by TRRP staff. The TRRP designed and implemented Vitzhum Gulch using a highly experimental "berm notching" approach, where rather than removing the riparian berm and restoring productive fish habitat for the whole site, small lanes were cut through the berm, leaving most of the berm in place. Despite opposition from the Fisheries Department, other Program Partners, and a Bureau of Reclamation review team, the TRRP implemented this berm notching design. The Fisheries Department is concerned that the Bureau of Reclamation is internally conducting a precise accounting of the number of channel rehabilitations sites constructed in order to claim completion of the channel rehabilitation phase of the ROD as soon as possible. Thus the Fisheries Department has been closely overseeing design and implementation of the projects to ensure that they are constructed in a way consistent with the ROD and achieve the greatest potential fish habitat benefits in order to achieve fish production goals. As part of the Fisheries Department's responsibility to ensure proper implementation of the TRFEFR and ROD restoration actions, we provide a brief summary of technical evidence to support our conclusion that the berm notching implemented at the Vitzhum Gulch site will not significantly contribute to improving fish production, thus does not significantly contribute to achieving Tribal fishery restoration goals.

REASONS TO REJECT THE VITZHUM GULCH SITE DESIGN AND IMPLEMENTATION

The design and implementation is inconsistent with the Trinity River Flow Evaluation Study

As described in Section 8.1 of the TRFEFR and illustrated in Figures 8.16 and 8.17 in the TRFEFR (Figures 2 and 3), channel rehabilitation at the Vitzhum Gulch site would have removed the sand berm and vegetation, restored point bars, added coarse sediment, restored a functional floodplain on the inside of the bend, and revegetated constructed floodplains with native riparian vegetation; the result expected from these actions would be substantial, long-term improvements to fish production. As shown in Figure 4, the TRRP implemented a berm notching design at the Vitzhum Gulch site, despite strong objection from the Fisheries Department, USFWS, and the Bureau of Reclamation Value Engineering Study, that deviates from the design approach dictated in the TRFEFR and ROD. The berm notching design does not remove most of the riparian berm, nor enable the river to resize itself and create complex channel morphology, thus represents a "pin prick" in restoring habitat rather than the overhaul intended in the TRFEFR and ROD. If the entire berm would have been removed, the underlying floodplain would have also been restored as envisioned in the TRFEFR. Instead, large swaths of the riparian berm were left in place and the floodplain was not restored. This will likely prevent a complex channel morphology to form in this reach. Berm notching also precluded any riparian replanting that would have occurred on the upland areas of a restored floodplain, should one have been built, as outlined in the TRFEFR.. The TRRP does not have discretion to deviate from the channel rehabilitation approach developed in the TRFEFR and adopted by the ROD.

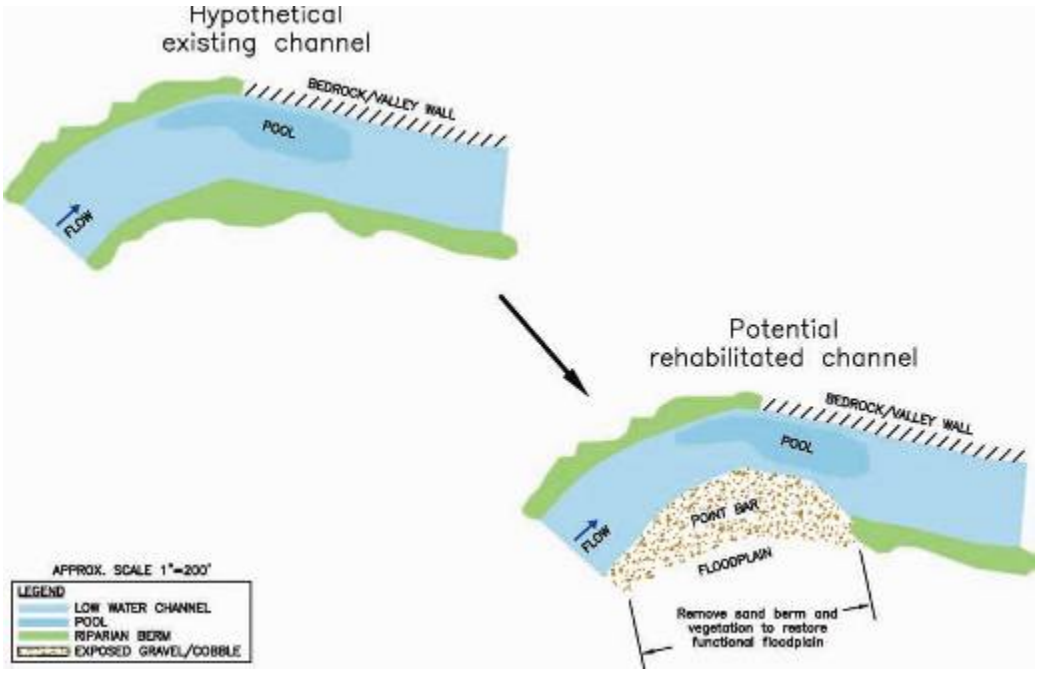

Figure 2. Intended treatment approach in the TRFEFR for "forced meander channel rehabilitations" as recommended at Vitzhum Gulch (Figure 8.16 in TRFEFR)

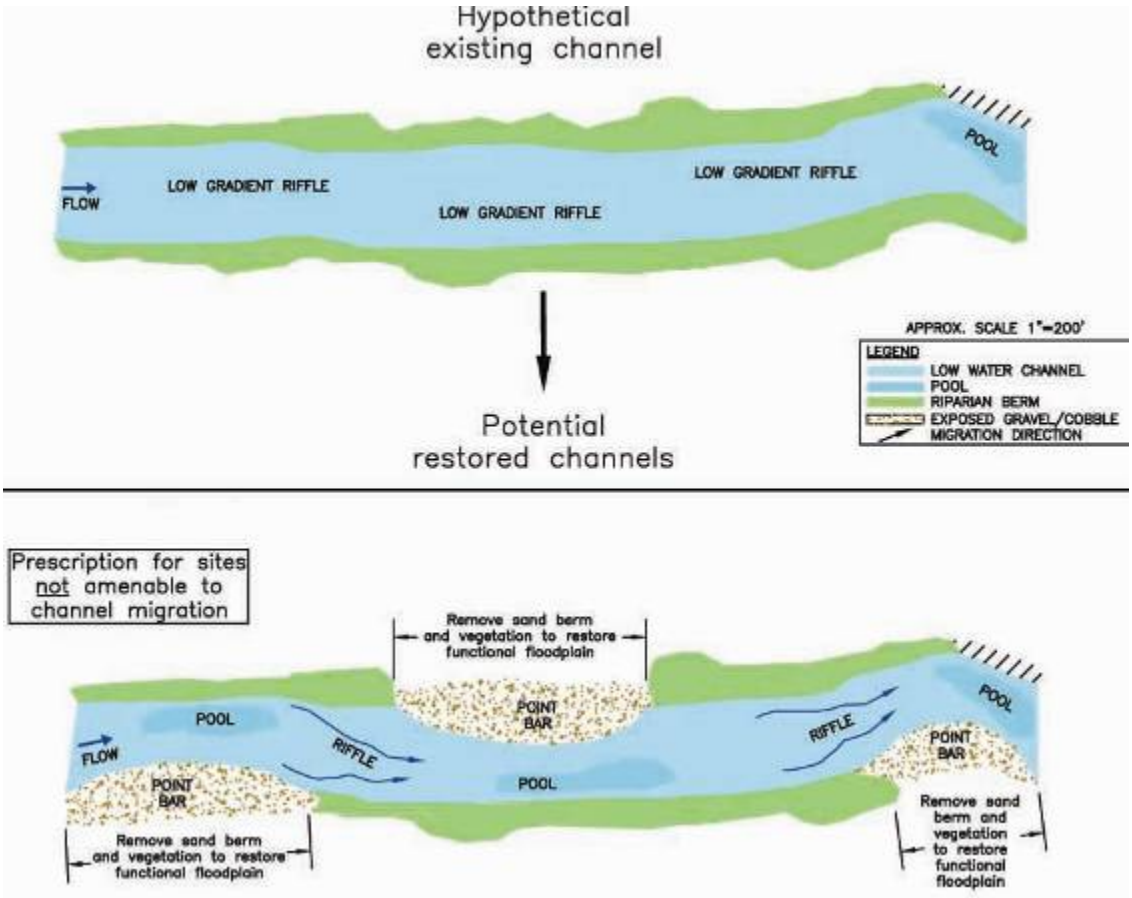

Figure 3. Intended treatment approach in the TRFEFR for "alternate bar channel rehabilitations" as recommended at Vitzhum Gulch (Figure 8.17 in TRFEFR). Given the large size of the Vitzhum Gulch site, both

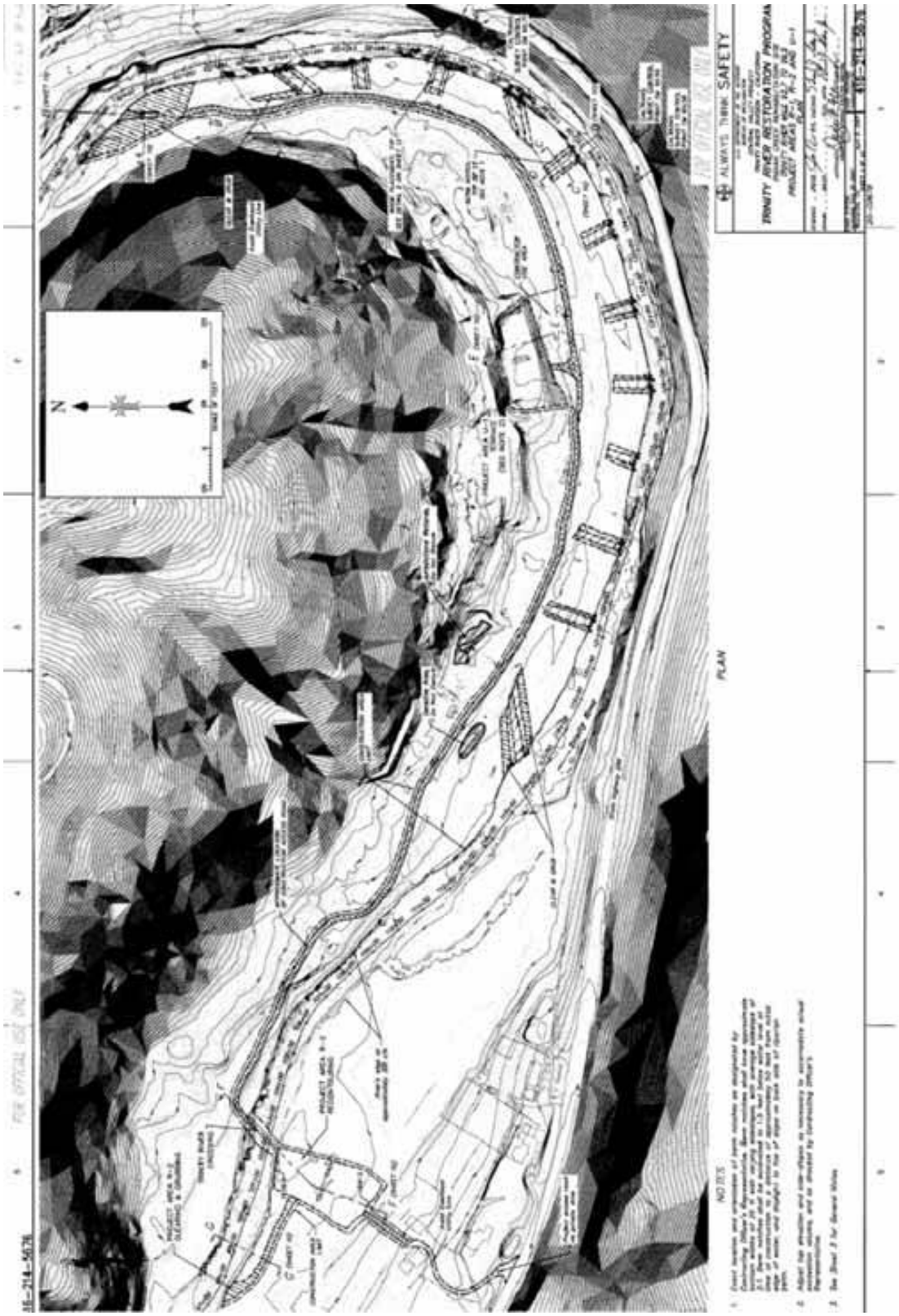

Figure 4. Rehabilitation design that was implemented at the Vitzhum Gulch bank rehabilitation site in fall 2007. Note "berm notching" approach rather than the complete berm removal dictated by the TRFEFR and ROD

There is been no evidence supplied to indicate berm notching at Vitzhum Gulch is a superior and more productive alternative to what was adopted in the ROD, let alone evidence that the experiment would even work at all. The TRRP should have the burden of proof responsibility to provide strong evidence on why the berm notching experiment at Vitzhum Gulch was likely to succeed, but did not do so.

The restoration approach developed in the TRFEFR was based on the best available science and was intended to provide large scale fish habitat improvements as a cumulatively significant mechanism to increase fish production from the Trinity River. As described below, there are a number of reasons that the berm notching design will not achieve habitat restoration objectives, thus failing to contribute to increasing fish production from the Trinity River.

The design process provided insufficient consultation with Program Partners

The berm notching design at the Vitzhum Gulch site was developed internally by TRRP's Technical Modeling and Analysis Group (TMAG) staff, which is the science arm of the TRRP. As mentioned above, TMAG staff designed the Vitzhum Gulch site using an approach contradicting that directed by the TRFEFR and ROD, despite clear input provided by Program Partners with expertise in this area, including the Fisheries Department. Opportunities for Program Partners to provide technical information were extremely limited. This stands in high contrast to design processes conducted by either the Fisheries Department or the California Department of Water Resources. Pivotal technical input provided by Program Partners during the field tour and single Interdisciplinary Design Team meeting was rejected without further consultation.

The design and implementation disregarded significant recommendations in the USBR Value Engineering Report and USFWS comments

The Bureau of Reclamation convened a Value Engineering (VE) Study Group on October 23-27, 2006 to review the Indian Creek design components for their design cost effectiveness. The objectives presented to the group were to look beyond direct cost savings and consider opportunities to increase the value of each dollar spent. This is a standard internal process for all TRRP designs over $1 million. A team of engineers representing a wide range of expertise participated, including: Denise Wiltse (Civil Engineer, Bureau of Reclamation), Andreas Krause (Hydraulic Engineer, Bureau of Reclamation), and Norm Hyndman (General Engineer, Team Leader, Bureau of Reclamation), Fred Meyer (Engineering Technician, McBain & Trush, Inc) and Rick Jones (Civil Field Engineer, Private Civil Consultant).

The Value Engineering Report strongly urged against berm notching at Vitzhum Gulch site, stating, "The Value Engineering (VE) group agrees that testing the hypothesis through berm notching is important. However, it would be appropriate to evaluate the effectiveness of berm destabilization techniques like berm notching at a smaller scale before such a large and expensive implementation is attempted." Testing the berm notching experiment at Vitzhum Gulch made little sense due to the large expense of mobilizing equipment to the opposite side of the river and the low likelihood the experiment would be successful in this location.

The Arcata Field Office of the U.S. Fish and Wildlife (USFWS) shared this sentiment, writing to the program on February 27, 2007, "…Specifically, we are concerned about the appropriateness and cost effectiveness of using the Indian Creek site as an "experiment" to test the effectiveness of riparian berm breaching. This view is supported by the Value Engineering Final Report for the Indian Creek Project, commissioned by BOR." The USFWS recommended that the TMAG "…refocus the objective of the project on fish habitat restoration rather than being an experiment to test the effectiveness of the riparian berm breeching construction method."

The design disregards the best available science

Considerable empirical evidence was available to the TMAG to predict failure of the design in providing necessary long-term fish habitat improvements. All of the following were available for use by TRRP in designing Vitzhum Gulch.

Observations from Hocker Flat site

Implemented in September and October 2005, the Hocker Flat channel rehabilitation site was subjected to a 17,000 cfs peak flow on December 31, 2005. Photographic evidence of the upstream portion of the Hocker Flat shows that the riparian encroachment left standing after the mechanical restoration effort withstood the flood. The riparian berm and its community of trees and brush remained intact. As compared to Vitzhum Gulch, Hocker Flat has 1) larger peak flows (17,000 cfs versus 11,000 cfs), 2) a much larger supply of coarse sediment, and 3) a greater transport of large wood during peak flows, all of which should make Hocker Flat riparian vegetation more prone to removal by high water than at Vitzhum Gulch. Therefore, data from Hocker Flat predicts failure of the Vitzhum Gulch design (Figures 5 and 6).

1995 Riparian Experiments

Experiments conducted in 1995 with Bureau of Reclamation staff to compute force needed to push over individual mature riparian trees suggested that flows in excess of 16,000 to 20,000 cfs are required. Because maximum flows provided for under the ROD release at the Vitzhum Gulch site would be approximately 11,000 cfs, the data predict failure of the Vitzhum Gulch design.

Observations during 1997 Flood

The 1997 flood occurred shortly after HVT consultants computed the discharge required to remove mature riparian vegetation (a minimum threshold to begin removing the riparian berm and restoring fish habitat). Discharge during the flood ranged from 6,000 cfs at Lewiston to over 30,000 cfs below Canyon Creek. These flows allowed HVT consultants to evaluate calculations by comparing predicted versus actual flows to remove the riparian berm based on post-flood field observations. Observations of riparian berm disturbance during the 1997 flood showed *damage* to the berm began to occur at flows exceeding 24,000 cfs, and intermittent berm *removal* began to occur at flows exceeding 30,000 cfs. Maximum ROD releases expected at the Vitzhum Gulch site would be less than 11,000 cfs, plus a small amount of tributary accretion. These data predict failure of the Vitzhum Gulch design.

Figure 5. Trinity River at Hocker Flat, pre-construction riparian encroachment.

Figure 6. Trinity River at Hocker Flat, post-construction, and post 17,000 cfs flow. Note that riparian encroachment remains in place despite being fully exposed to high flows that are greater magnitude than maximum ROD releases (11,000 cfs).

Recommendations

Based on the improper implementation of the Vitzhum Gulch channel rehabilitation with respect to the approach that the Tribe agreed to when it signed the Record of Decision, and combined with the TRRP's decision to proceed with a faulty design contrary to the strong opposition from the Fisheries Department, USFWS, and the Bureau of Reclamation VE Study, the Fisheries Department recommends that the Tribal Council adopt a resolution *rejecting the Vitzhum Gulch channel rehabilitation site* in the accounting for progress towards channel rehabilitation goals identified in the TRFEFR and ROD.

Furthermore, the Fisheries Department recommends that the Tribal Council adopt a resolution that specifies that the TRRP adopt the following criteria for acceptance of site designs and on-the-ground implementation:

- Site designs adhere to channel rehabilitation approach described in the TRFEFR and ROD.
- Site designs have been developed using the best available science.
- Site designs provide for maximum long-term increases in aquatic habitat, as feasible.
- The TRRP has conducted thorough consultations with Program Partners, and provided written responses to all substantive comments. Significant disagreements have been resolved prior to implementation of site designs.
- The Fisheries Department concurs with the design and implementation.