

Evaluating Habitat Restoration Success at the River Reach Scale

Rutherford Reach Restoration Monitoring, Napa River

Abstract

The Rutherford Reach Restoration project provides a unique opportunity for long-term monitoring of a 4.5 mile reach of the Napa River in response to a comprehensive treatment aimed at enhancing habitat value and reducing rates of fine sediment production on an incised North Coast alluvial channel draining to the San Francisco Bay estuary. The monitoring design provides for an annual rapid assessment of major changes along the thalweg and less frequent comprehensive geomorphic and habitat assessments at selected cross-section transects and longitudinal profile sub-reaches. The physical habitat assessment aims to capture potential increases in complexity due to the installation of instream structures, riparian revegetation, and potentially as a result of agricultural levee and land use setbacks. These results are integrated with ongoing fish surveys that document functional redds relative to pool-riffle distributions. With Phases 1 and 2 of the project completed in summer 2009 and 2010 and likely several years of implementation ahead, this monitoring framework promises adaptive management benefits in refining future phase designs and guiding long-term project maintenance.

Restoration Objectives

- Reduce fine sediment loads due to accelerated rates of channel bed and bank erosion.
- Minimize ongoing channel stabilization and maintenance work.
- Increase and enhance riverine, riparian, and floodplain habitat value and complexity, particularly to support increased quality and quantity of habitat for special status species including Chinook salmon and steelhead trout.
- Re-establish geomorphic and hydrologic processes to support a continuous and diverse native riparian corridor.
- Protect existing high value riparian corridor habitat patches wherever possible.
- Remove invasive non-native vegetation and replanting with native vegetation that will not promote Pierce's disease in vineyards.
- Work closely with landowners to address their interests with regard to adjacent agricultural land and property.
- Rehabilitate the river in a way that facilitates permitting agency approval.

Monitoring Objectives

Capture critical environmental parameters to assess long term riverine and riparian

- Habitat and channel change in control subreaches.
- Habitat and channel response to restoration treatments.

Assess and address channel maintenance needs including

- Restoration element repair
- Channel bank erosion hazard abatement
- Trash removal
- Invasive plant removal

Monitoring Program

Annual River Survey of the Entire 4.5 Mile Rutherford Reach to Map

- Restoration element repair needs
- Bank erosion hazards
- Eroding banks
- large woody debris (LWD) and attributes
- Invasive plant species
- Trash

Channel Cross Section Surveys Control and Restoration Treatment Locations

- Pre-restoration baseline
- Post-treatment baseline
- Following significant flow events or at least once every 5 years

Longitudinal Profile in Treated Subreaches

- Pre-restoration baseline
- Post-treatment baseline
- Following significant flow events or at least once every 5 years

Substrate Monitoring

- Conduct pebble counts at cross sections
- Map changes in surface substrate along cross sections
- Map changes in surface substrate along thalweg

Vegetation Monitoring

- Map communities and document succession along control cross sections
- Establishment success at re-vegetated sites, and treatment cross sections

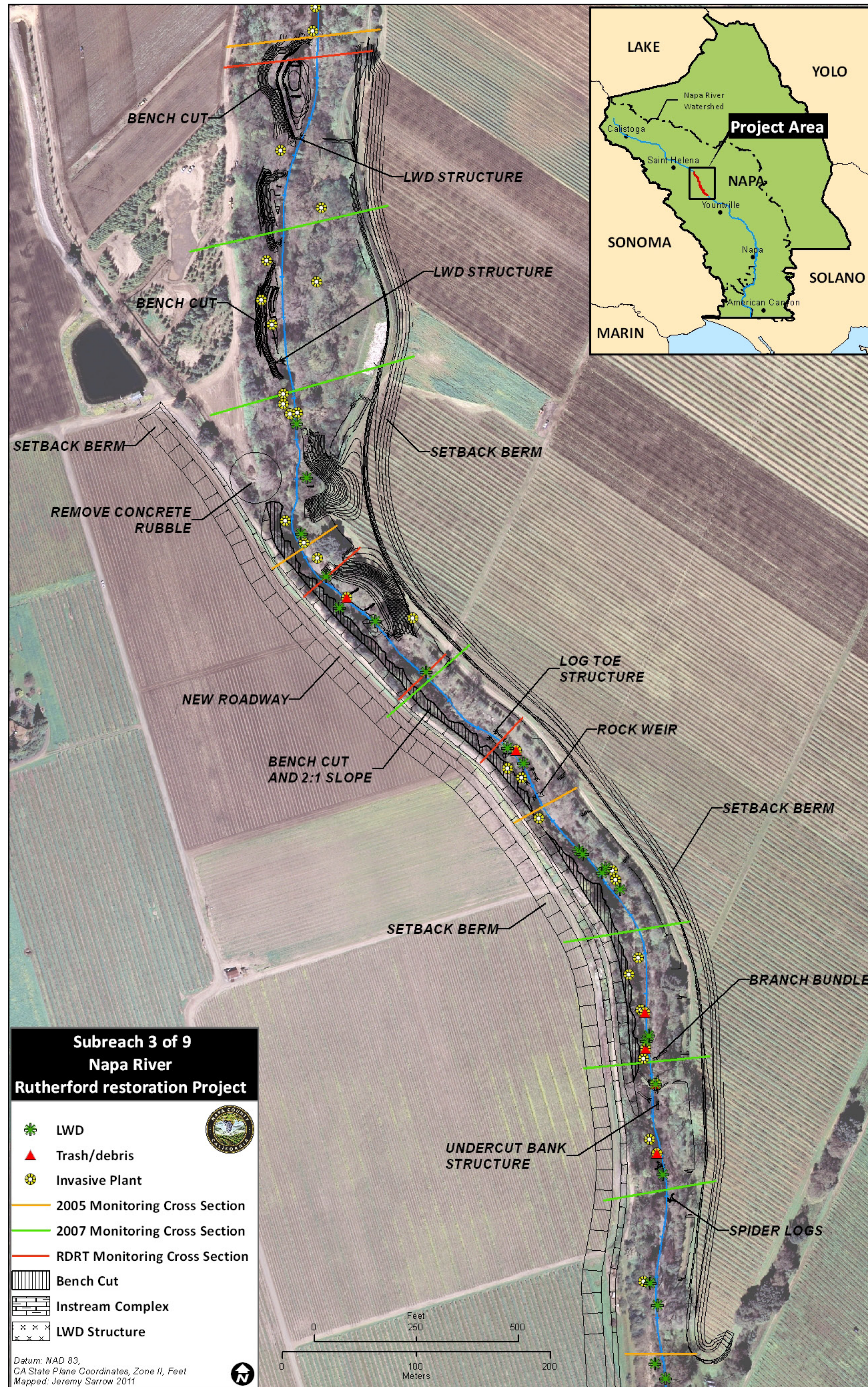
Photo-monitoring

- Annually along the entire reach
- Along cross sections at monumented points
- Pre-and post-construction at monumented points in treated locations

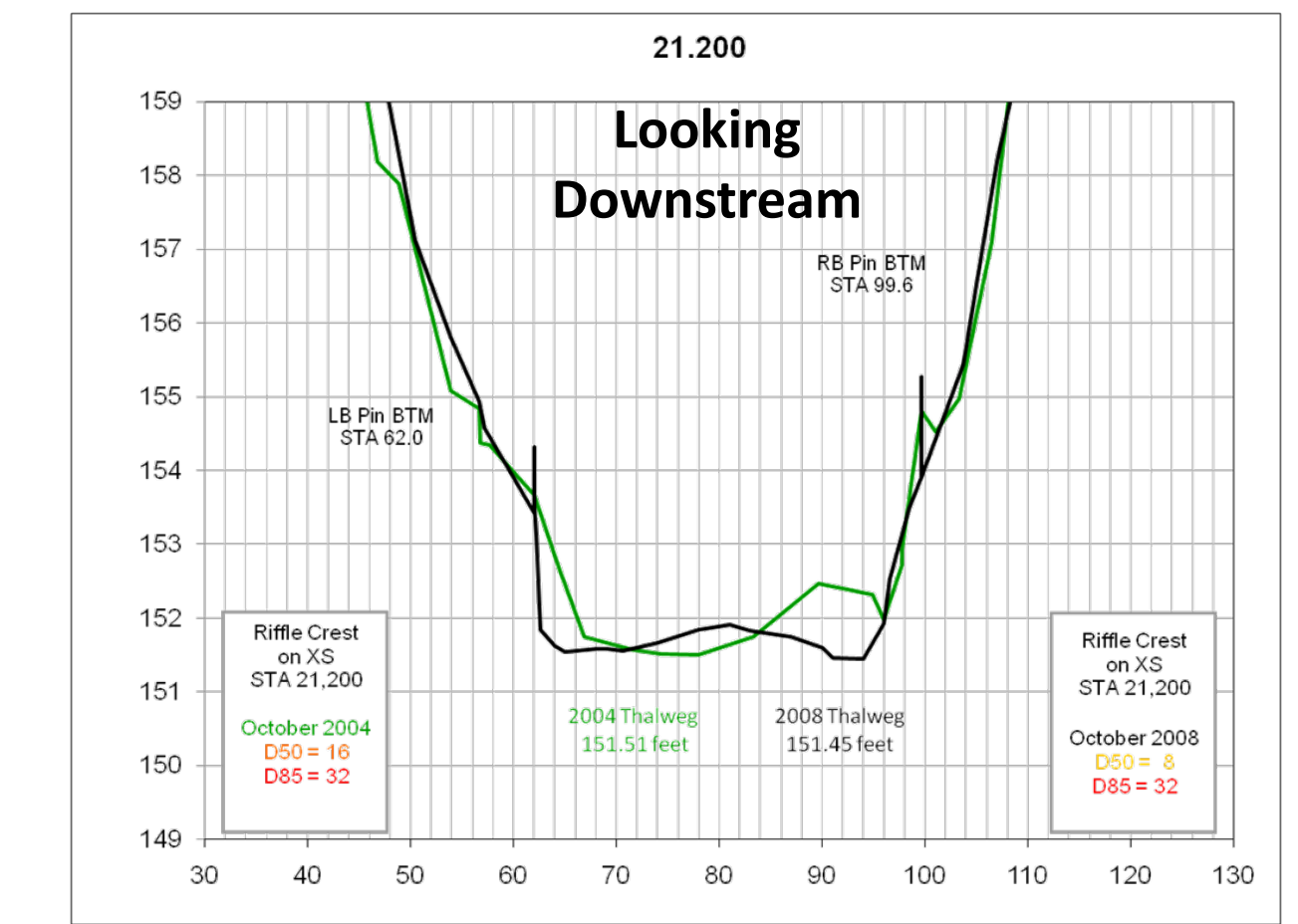
Fish Surveys

- Annually map and document functional redds along the entire reach

Stakeholder Participation Surveys



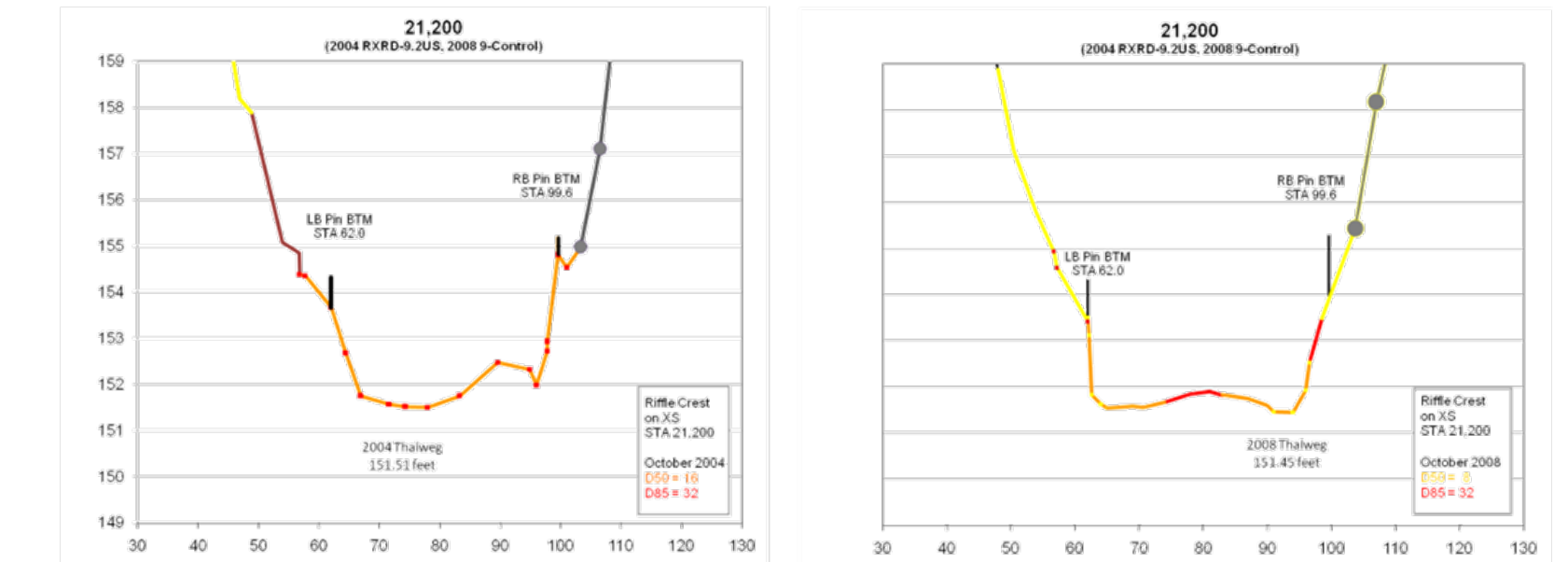
Monitoring Cross Section Example Pre- and Post- 2005 Flood Event



Photomonitoring

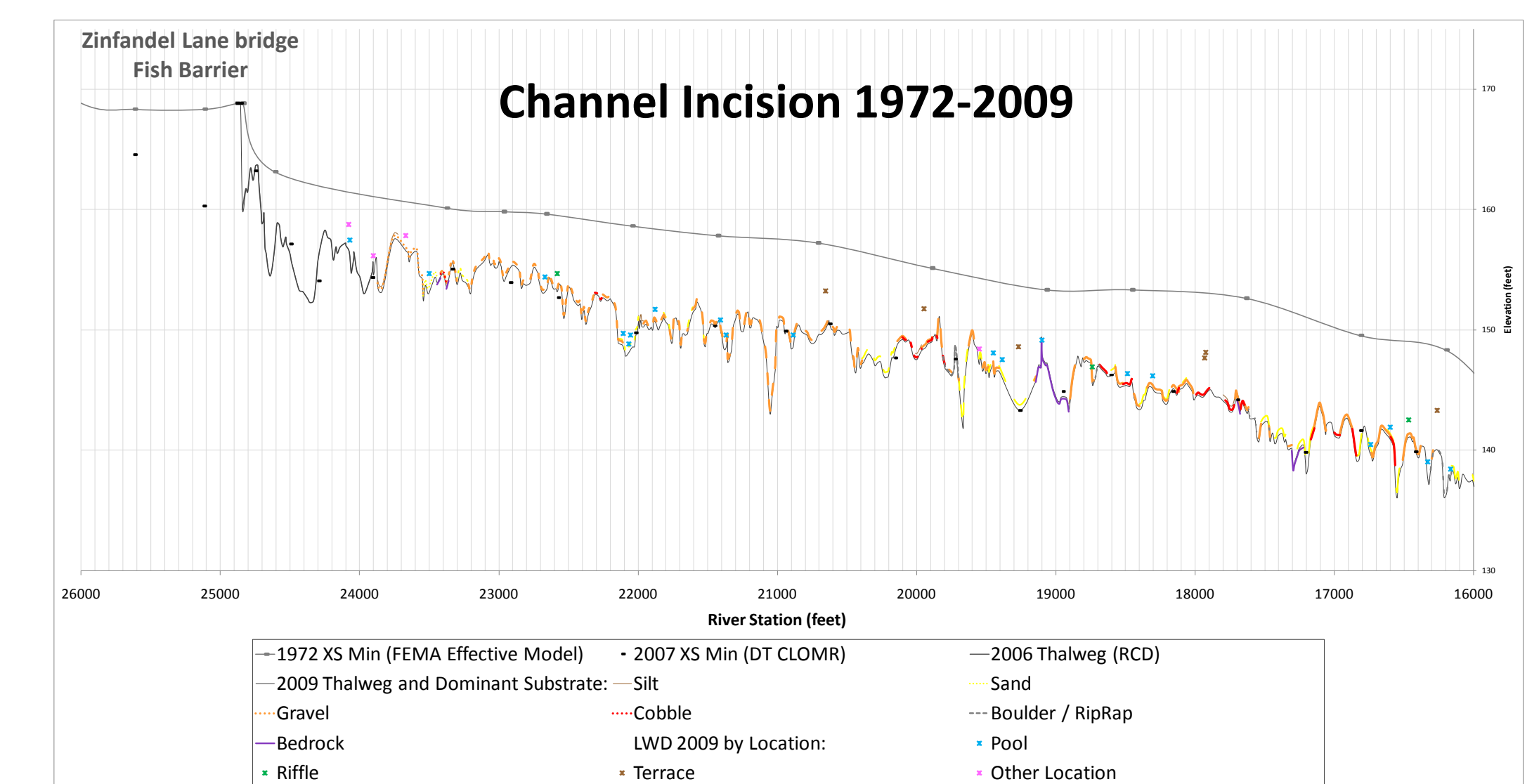


Substrate Mapping and Analysis

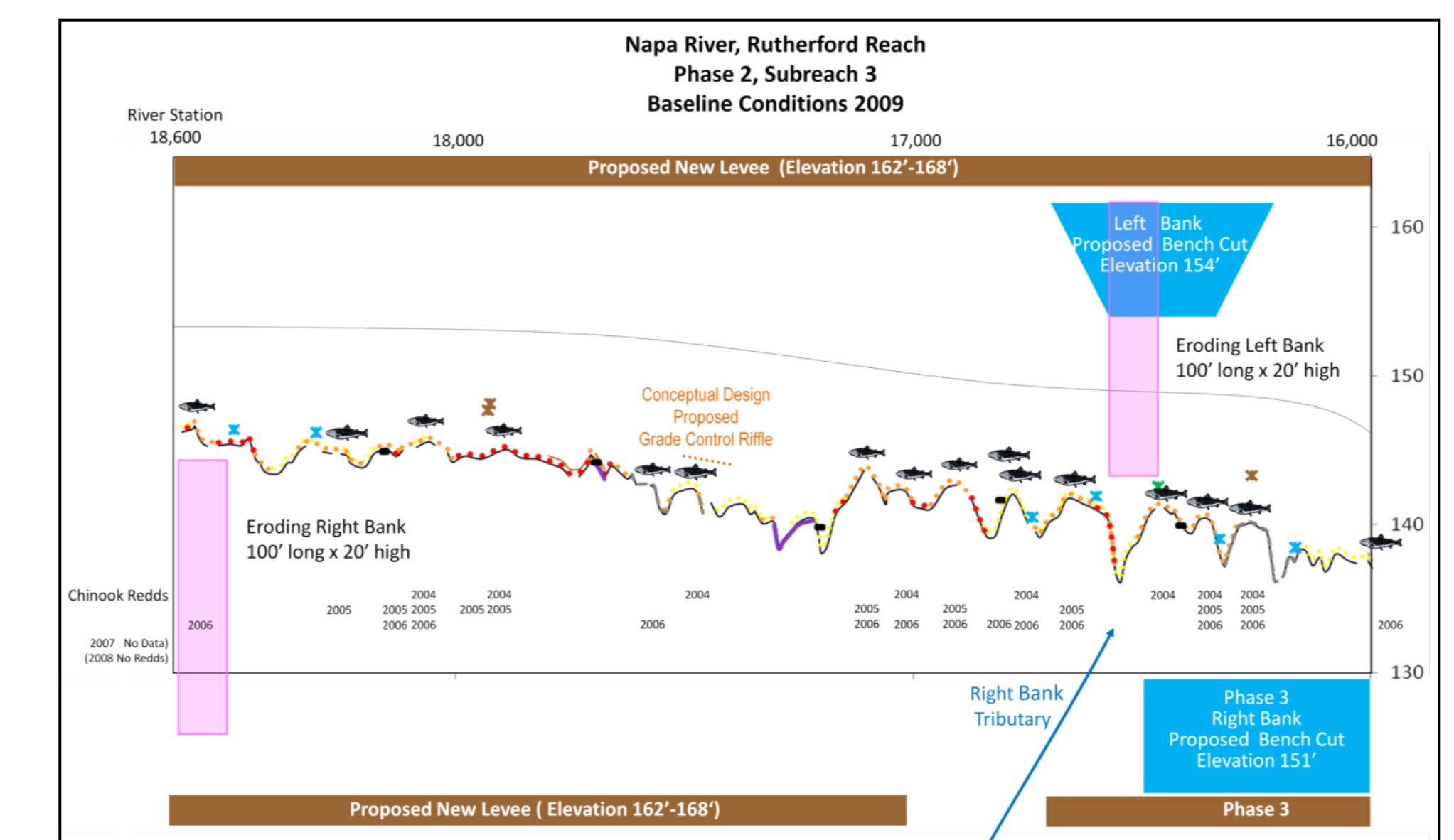


Re-survey of monumented cross sections throughout the Rutherford Reach before and after the 2005 New Year's Flood (Recurrence Interval of approximately 30 years) showed no appreciable incision or increase in river width, necessitating a re-evaluation of the assumption that the Napa River is continuing to actively incise downstream of the Zinfandel Lane Bridge fish barrier. Continued monitoring of cross sections and the thalweg will provide a more solid empirical basis for restoration design.

Thalweg Profile with Channel Surface Substrate and LWD



Thalweg, Substrate, Fish Survey Data and Proposed Treatments



Gretchen Hayes, Tessera Sciences
Rick Thomasser, Napa County Flood Control & Water Conservation District
Jeremy Sarrow, Napa County Flood Control & Water Conservation District
Jonathon Koehler, Napa County Resource Conservation District

