

Monitoring Result and Project Update

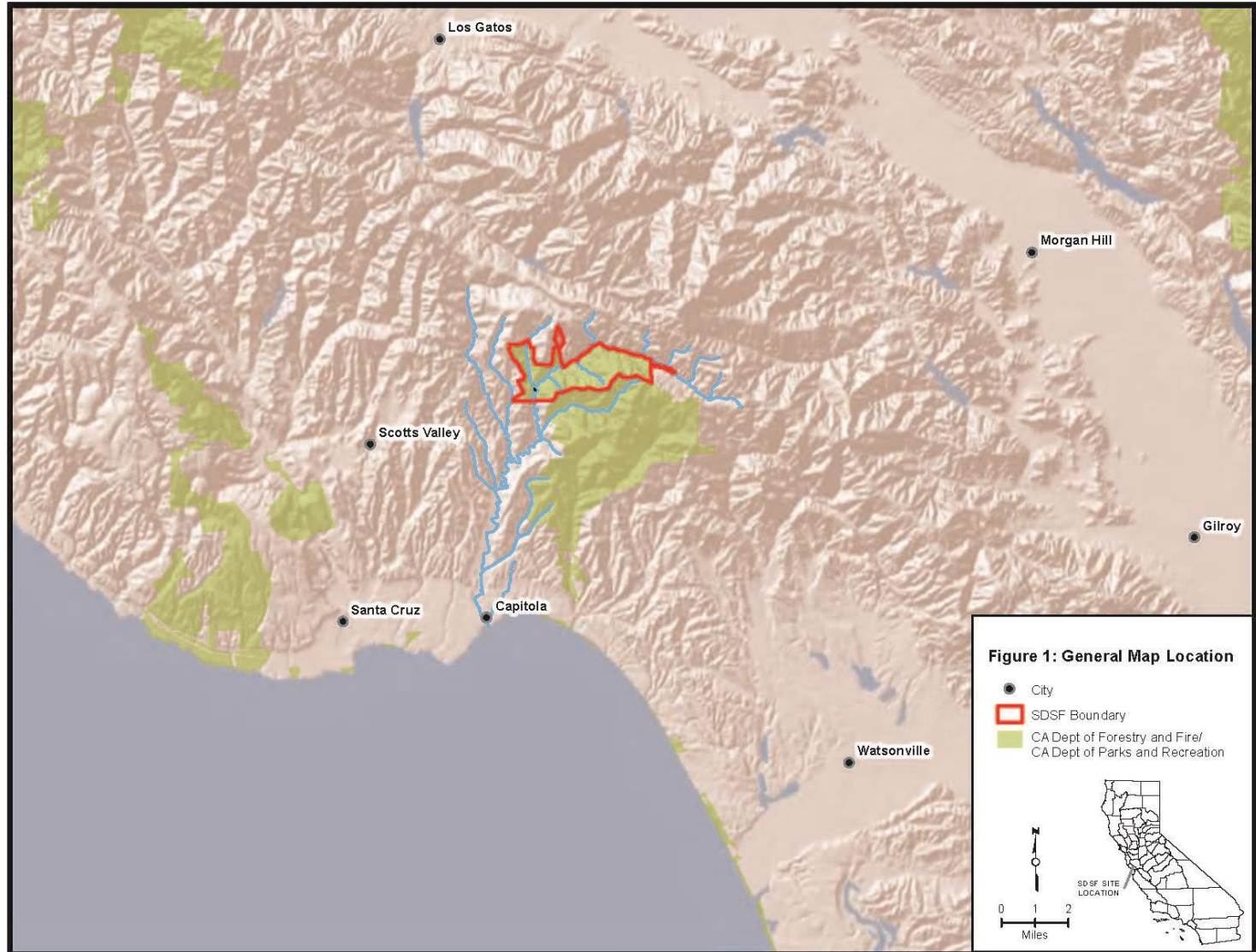
Large Wood Habitat Enhancement and
Stream Bank Stabilization Sites
Soquel Demonstration State Forest

Cheryl Hayhurst, P.G.
California Geological Survey

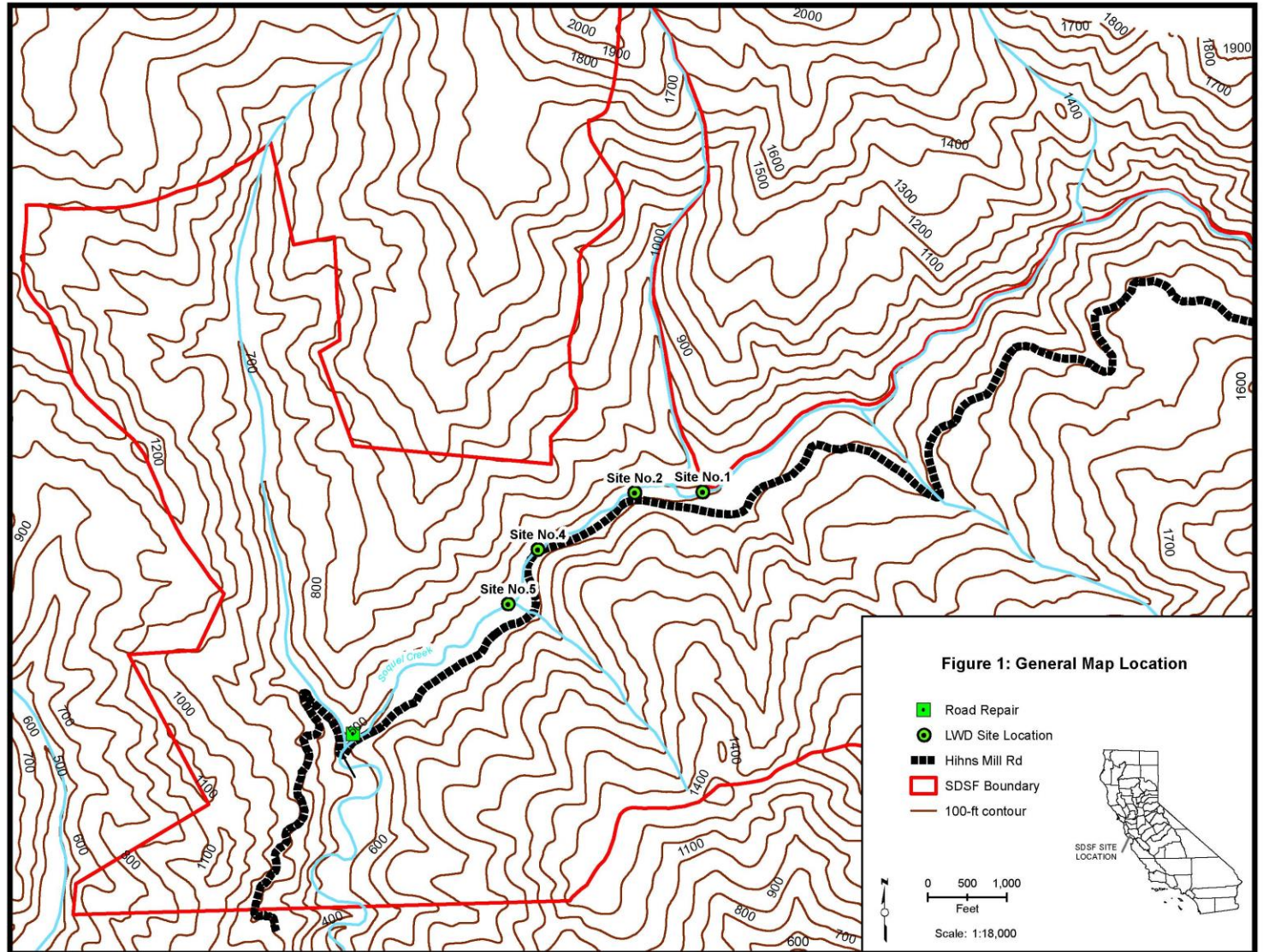


East Branch Soquel Creek

Soquel Demonstration State Forest



East Branch Soquel Creek Soquel Demonstration State Forest



Background

Soquel Creek

- Within the Central Coast Coho Salmon Evolutionarily Significant Unit (CCC ESU)
- In the southernmost part of the range of Coho Salmon
- Identified as a focus watershed in the NOAA Fisheries Recovery Plan for the CCC ESU

Large Wood Habitat Enhancement

- Past wood removal occurred due to flooding
- Large wood frequency identified as poor
- Habitat complexity, including scour pool habitat, identified as poor



Site 1

Plate 1 GEOMORPHIC SKETCH MAP SOQUEL DEMONSTRATION STATE FOREST SITE 1 LARGE WOODY DEBRIS ENHANCEMENT PROJECT

Stephen D. Reynolds, CHG and Cheryl A. Hayhurst, PG

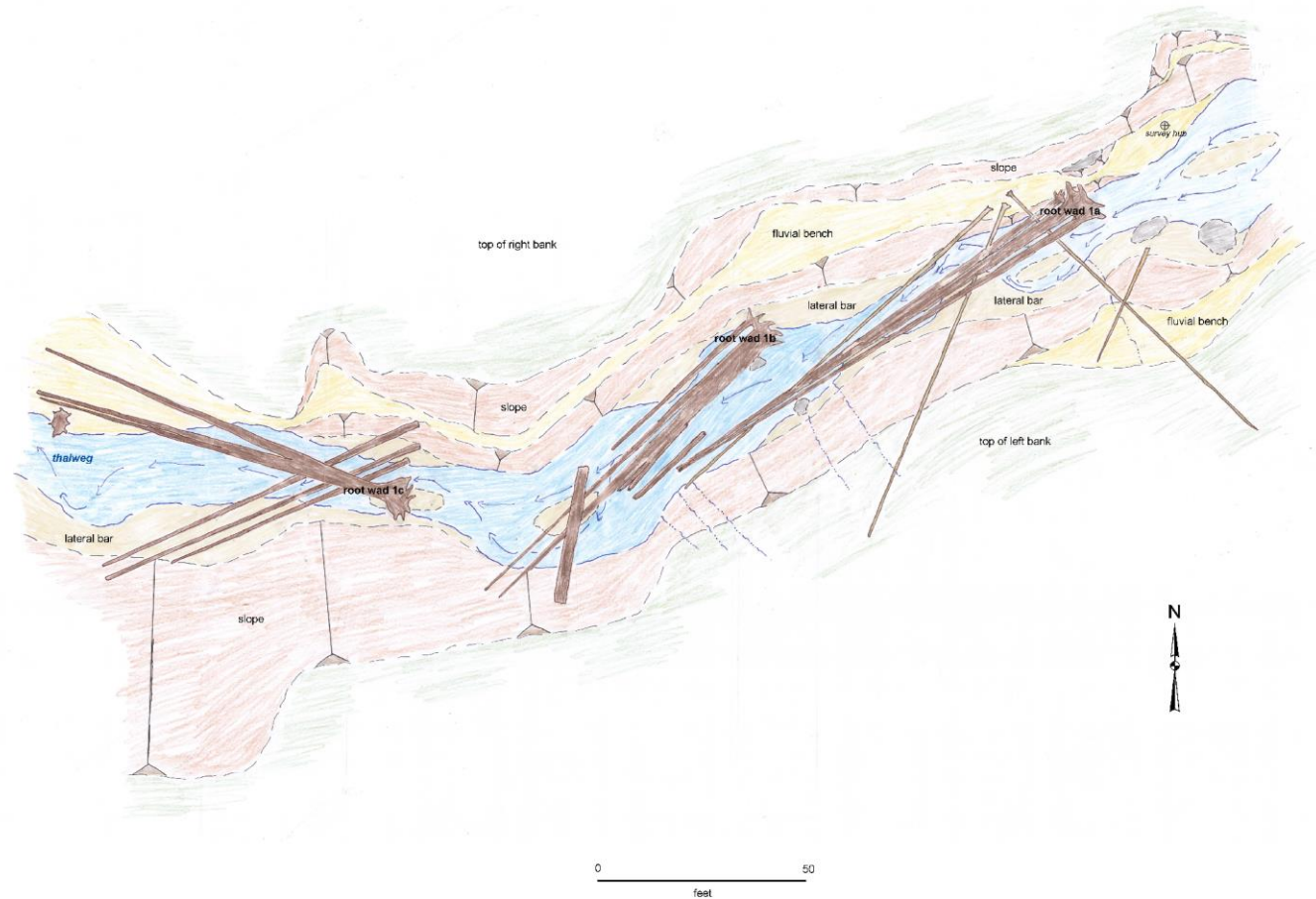
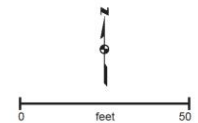
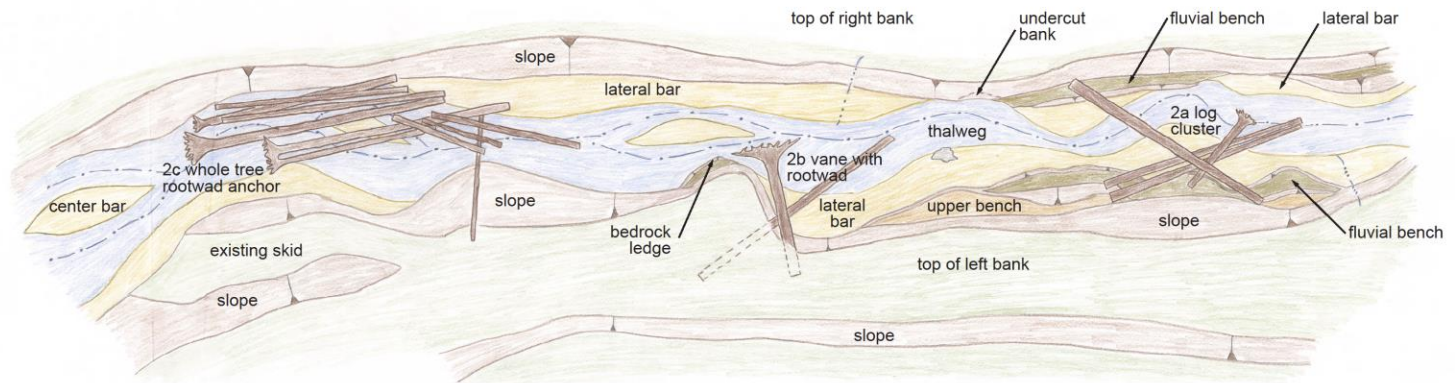


Plate 2
GEOMORPHIC SKETCH MAP
SOQUEL DEMONSTRATION STATE FOREST
SITE 2 LARGE WOODY DEBRIS ENHANCEMENT PROJECT

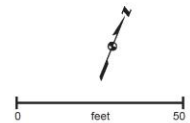
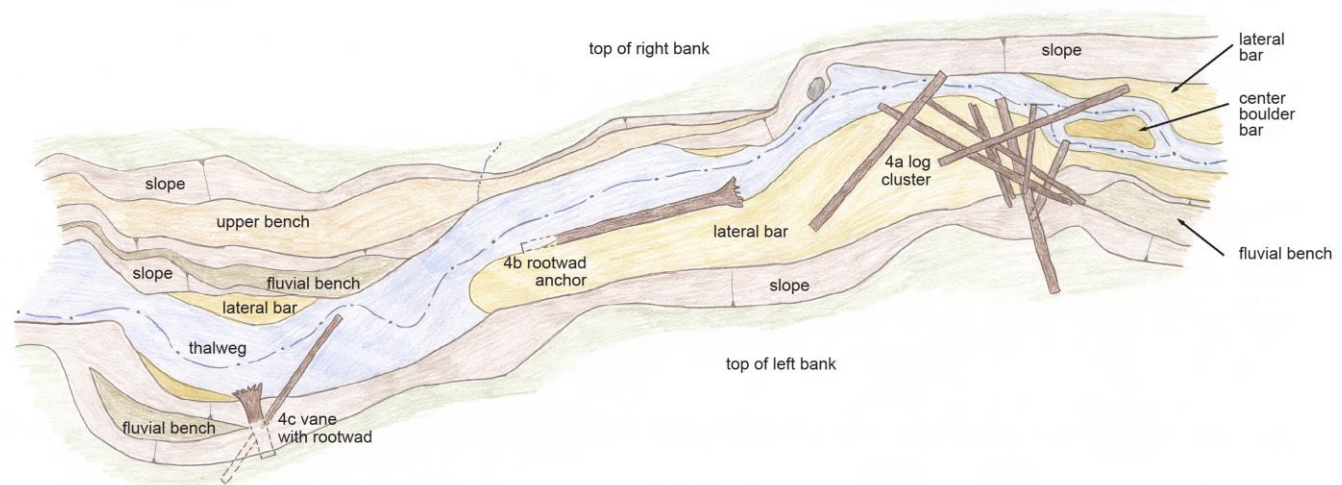
Stephen D. Reynolds, CHG and Cheryl A. Hayhurst, PG



Site 2

Plate 3
GEOMORPHIC SKETCH MAP
SOQUEL DEMONSTRATION STATE FOREST
SITE 4 LARGE WOODY DEBRIS ENHANCEMENT PROJECT

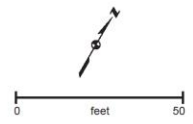
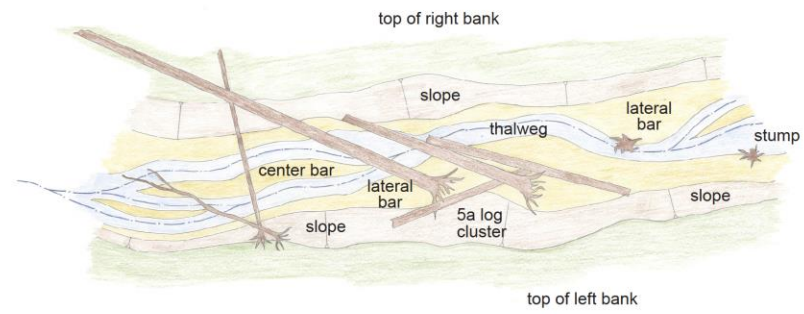
Stephen D. Reynolds, CHG and Cheryl A. Hayhurst, PG



Site 4

Plate 4
GEOMORPHIC SKETCH MAP
SOQUEL DEMONSTRATION STATE FOREST
SITE 5 LARGE WOODY DEBRIS ENHANCEMENT PROJECT

Stephen D. Reynolds, CHG and Cheryl A. Hayhurst, PG



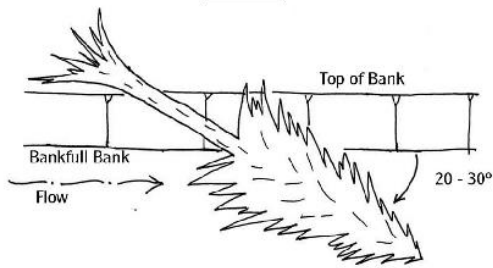
Site 5

Sites 1 and 5: Whole Tree Fall

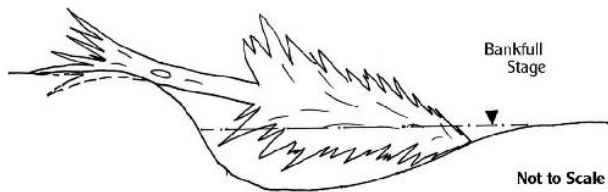
Figure 4: Typical -

LWD introduction via tree-fall from bank, downstream fall

PLAN

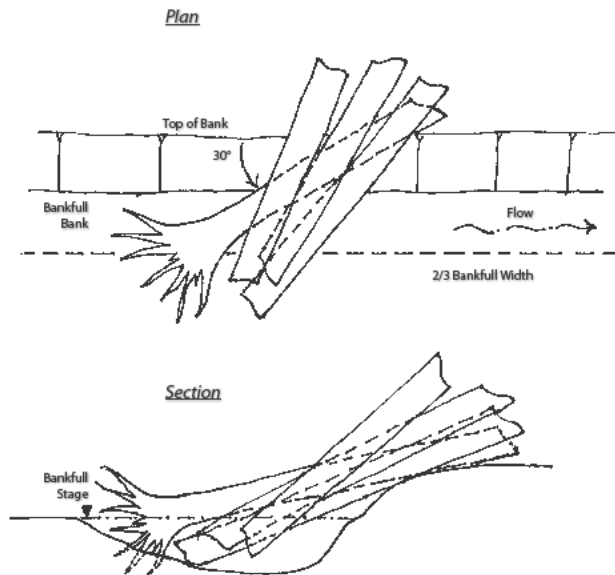


SECTION



Sites 2a and 4a: Log Cluster

FIGURE __: TYPICAL
Rootwad - Log Cluster



Note: logs will either be brought in or felled on-site.
In all cases will retain as many limbs as possible

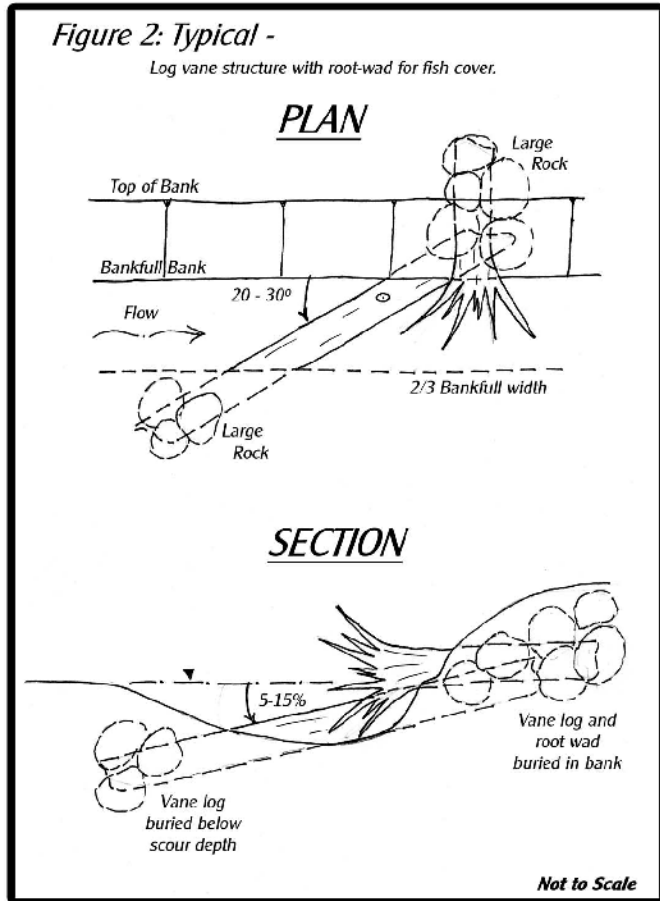
Not to Scale



September 2013



Sites 2b and 4c: Log Vane with Rootwad Cover

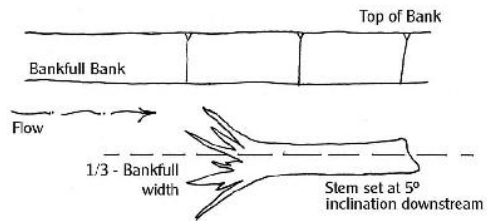


October 2013

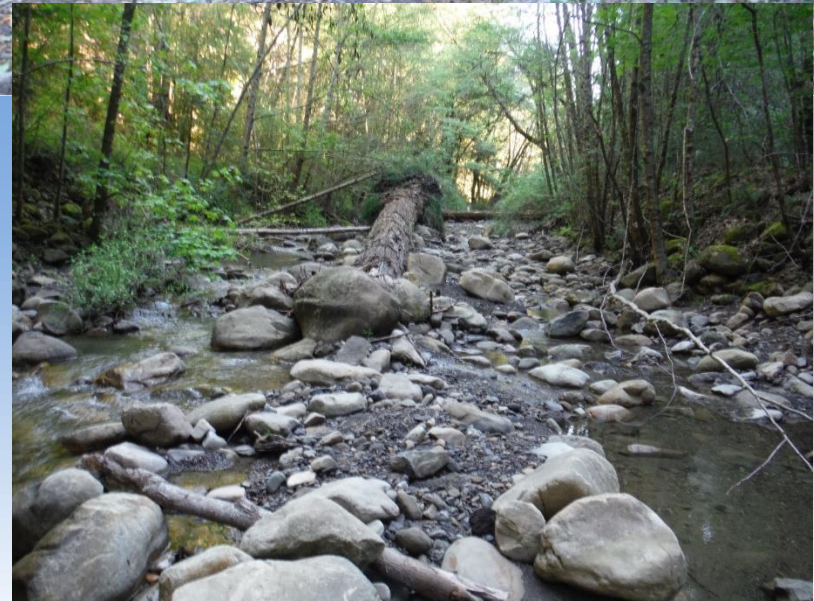
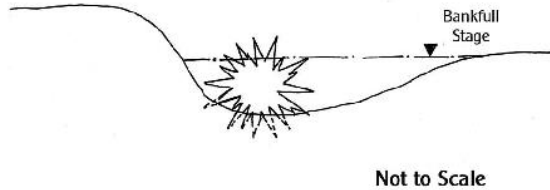
Sites 2c and 4b: Rootwad Anchor

FIGURE ____: TYPICAL
Rootwad Anchor

PLAN

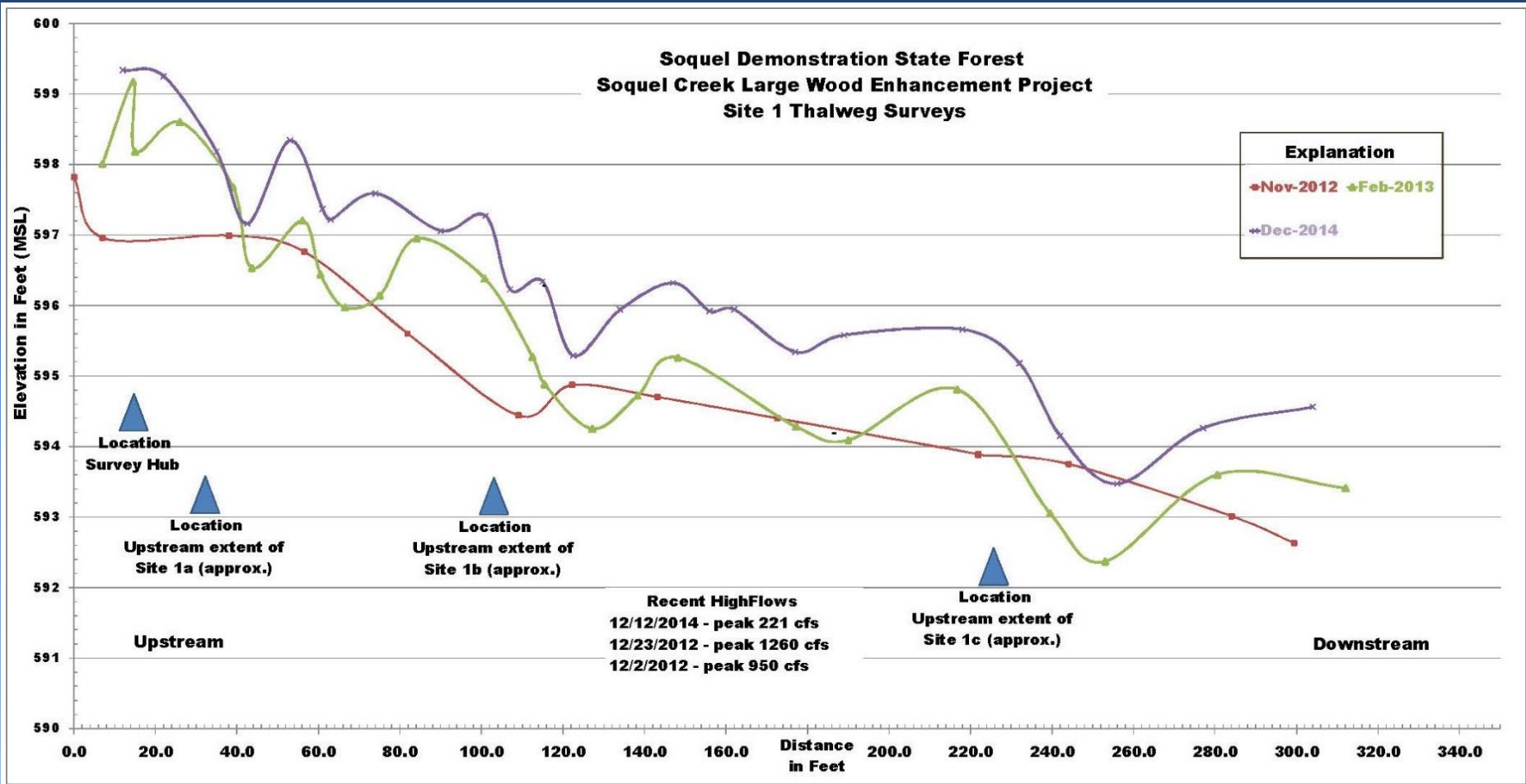


SECTION



March 2015

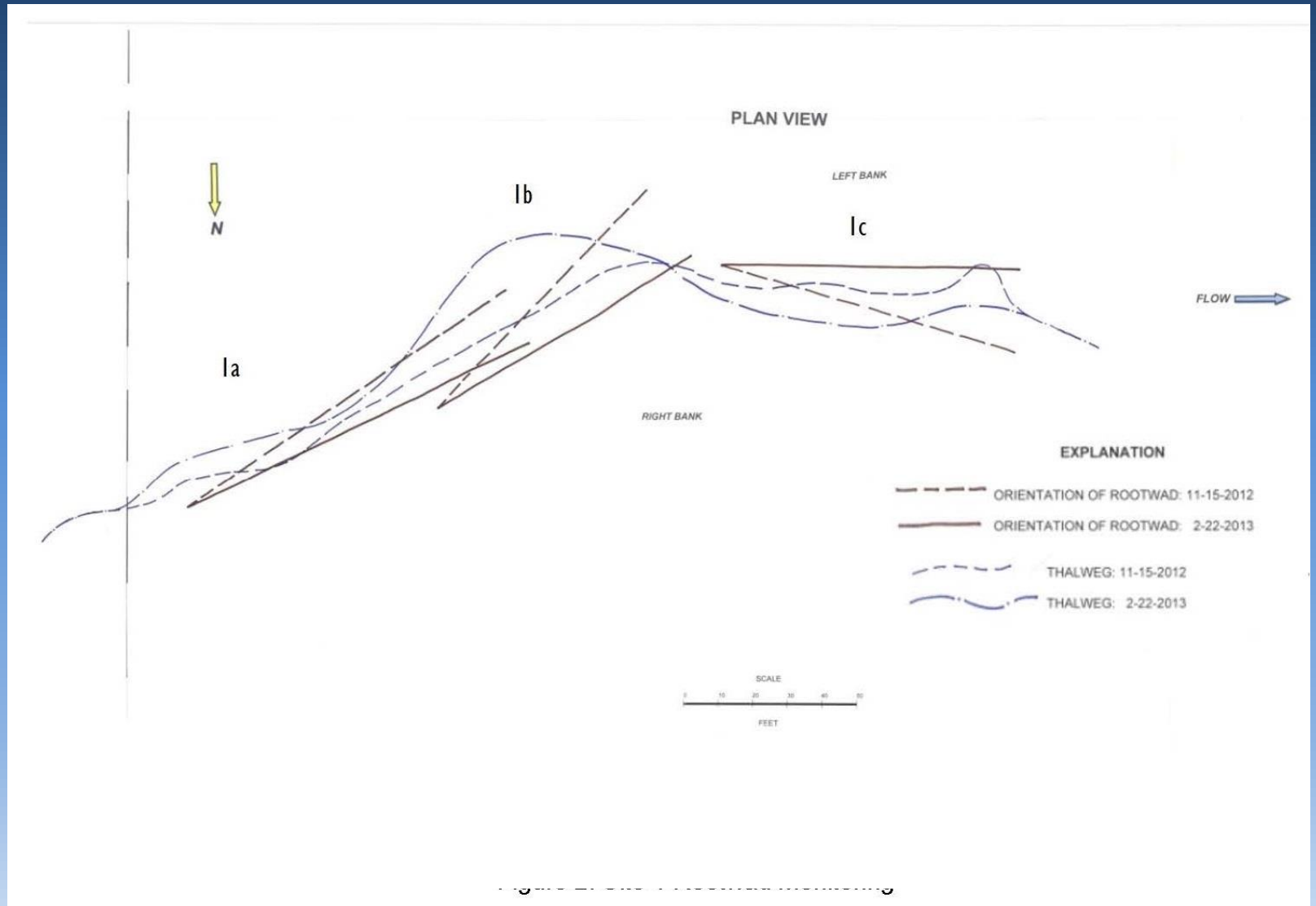
Site 1: Thalweg Surveys



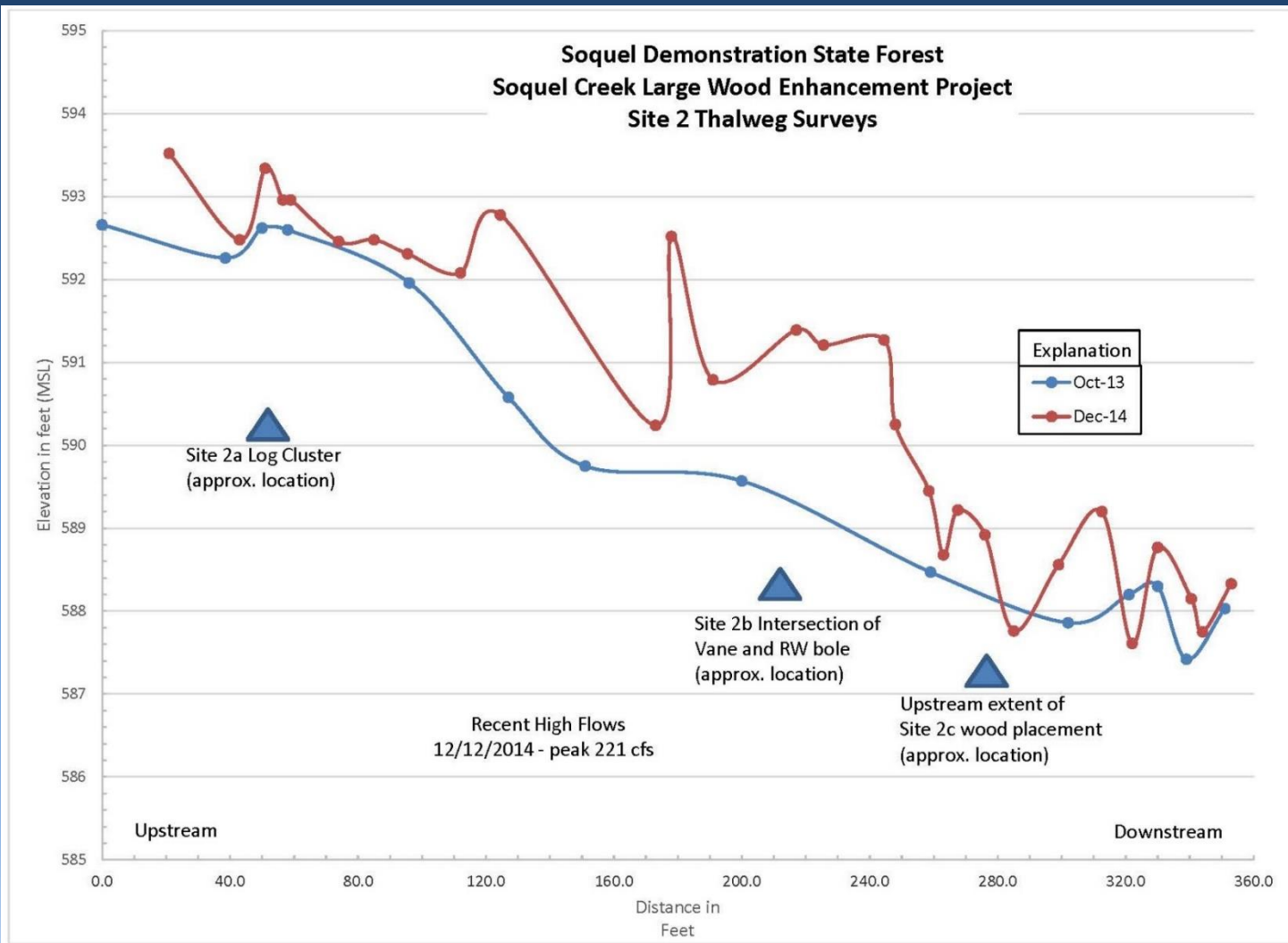
- Incipient pools (depth < 1 foot) increased from 1 to 5
- Pools (depth > 1 foot) increased from 0 to 2
- Channel appears to have locally aggraded approximately 1 ½ feet through project reach



Site 1: Rootwad Monitoring



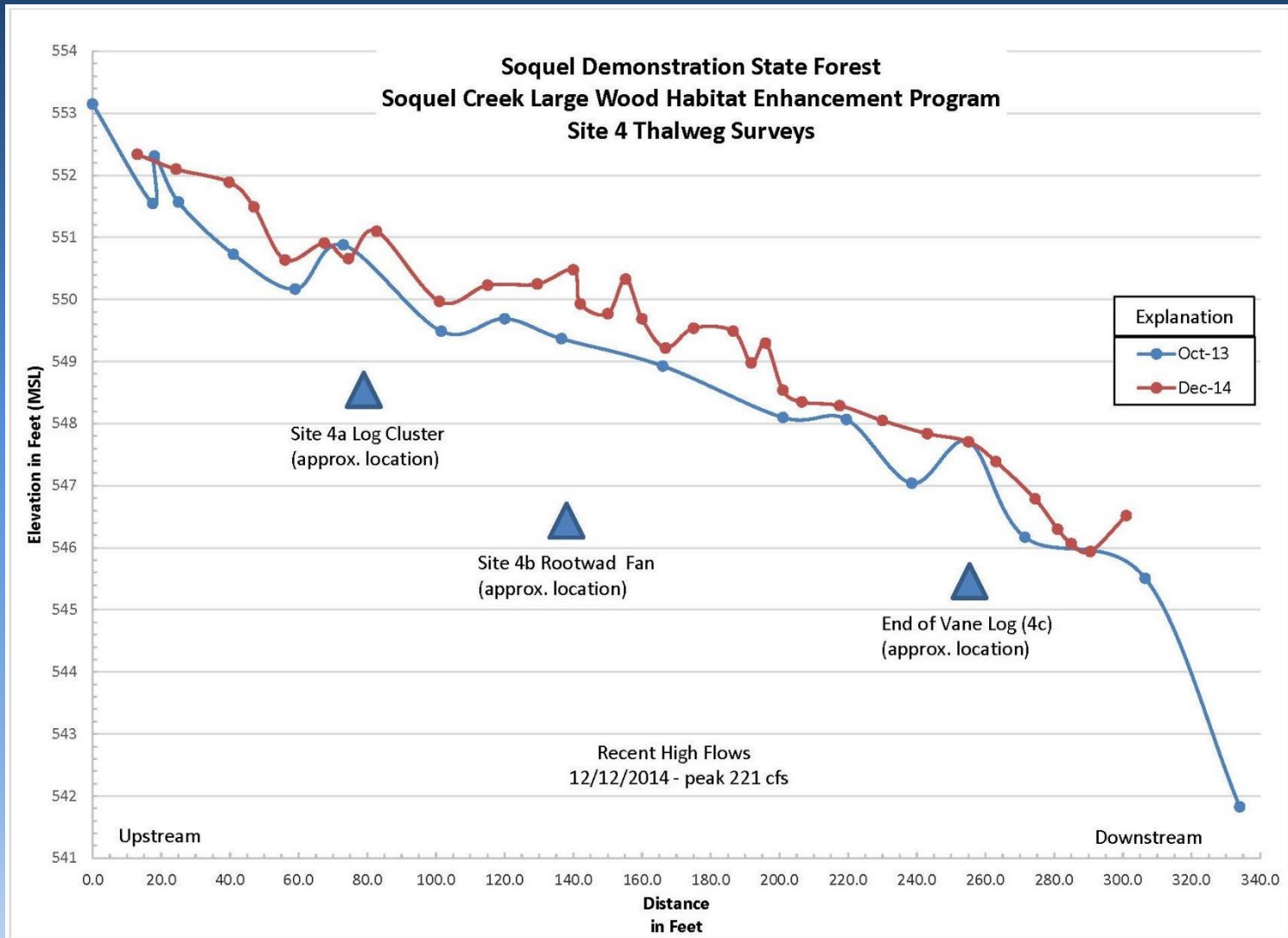
Site 2: Thalweg Surveys



- Incipient pools (depth < 1 foot) increased from 3 to 5
- Pools (depth > 1 foot) increased from 0 to 3
- Channel locally aggraded from 2c and extending approximately 200 feet upstream
- Scour pool (2+ feet deep) created at 2b log vane



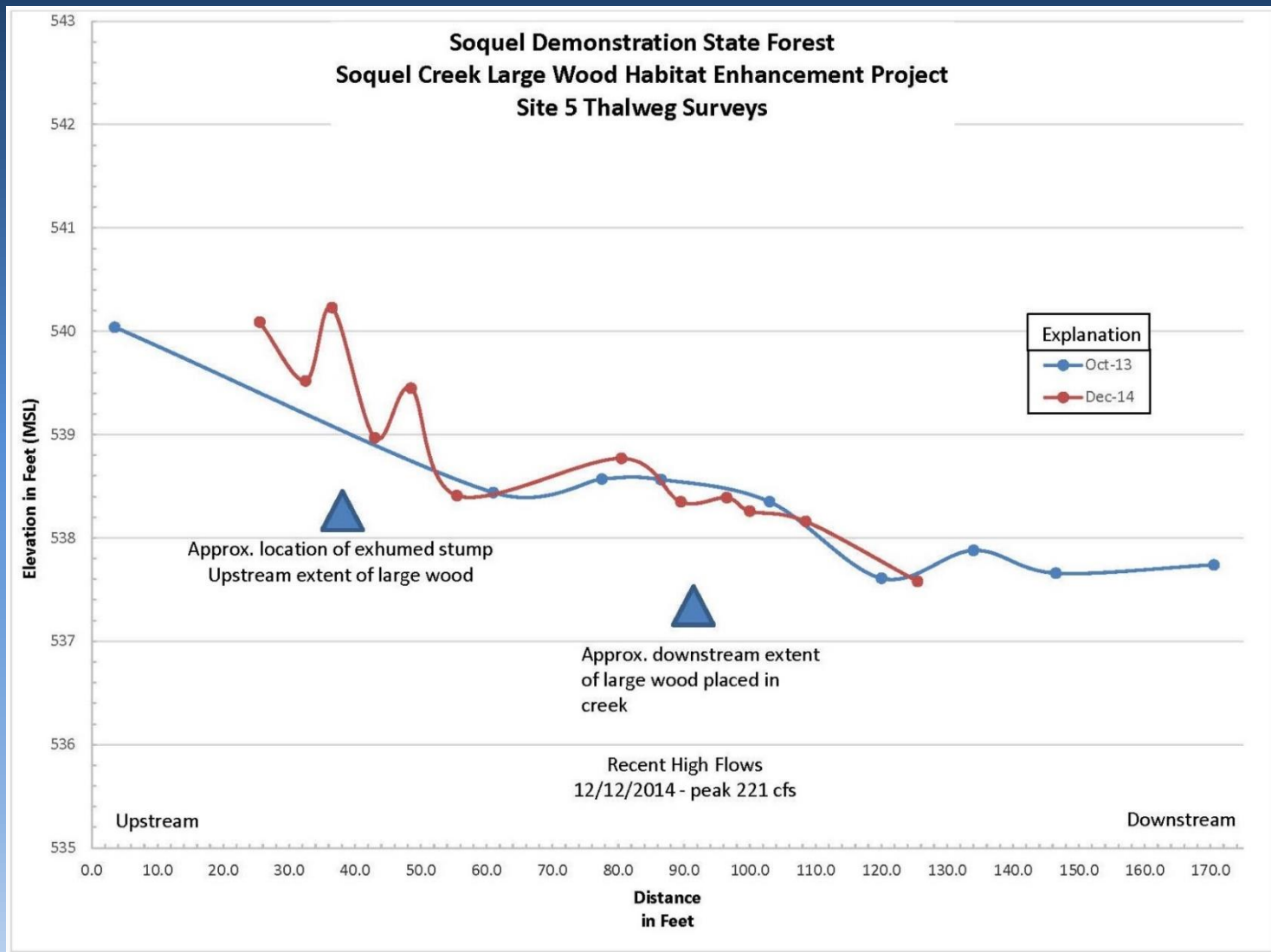
Site 4: Thalweg Surveys



- Incipient pools (depth < 1 foot) increased from 4 to 6
- Channel locally aggraded approximately ½ to 1 foot through most of reach



Site 5: Thalweg Surveys



- Incipient pools (depth < 1 foot) increased from 2 to 3
- Local channel aggradation of approximately ½ to 1 foot extending 25 upstream of log cluster

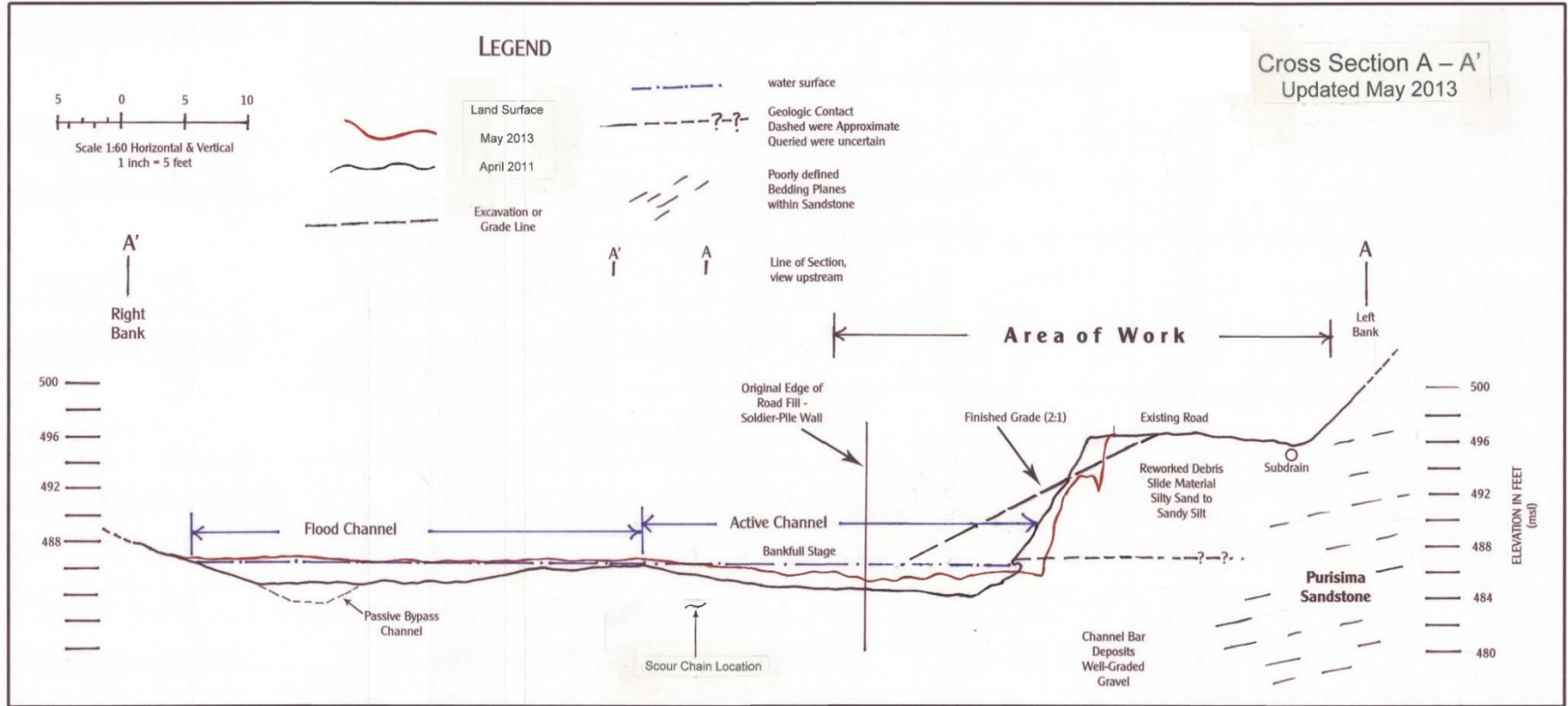
Stream Bank Stabilization Site (prior to repair)



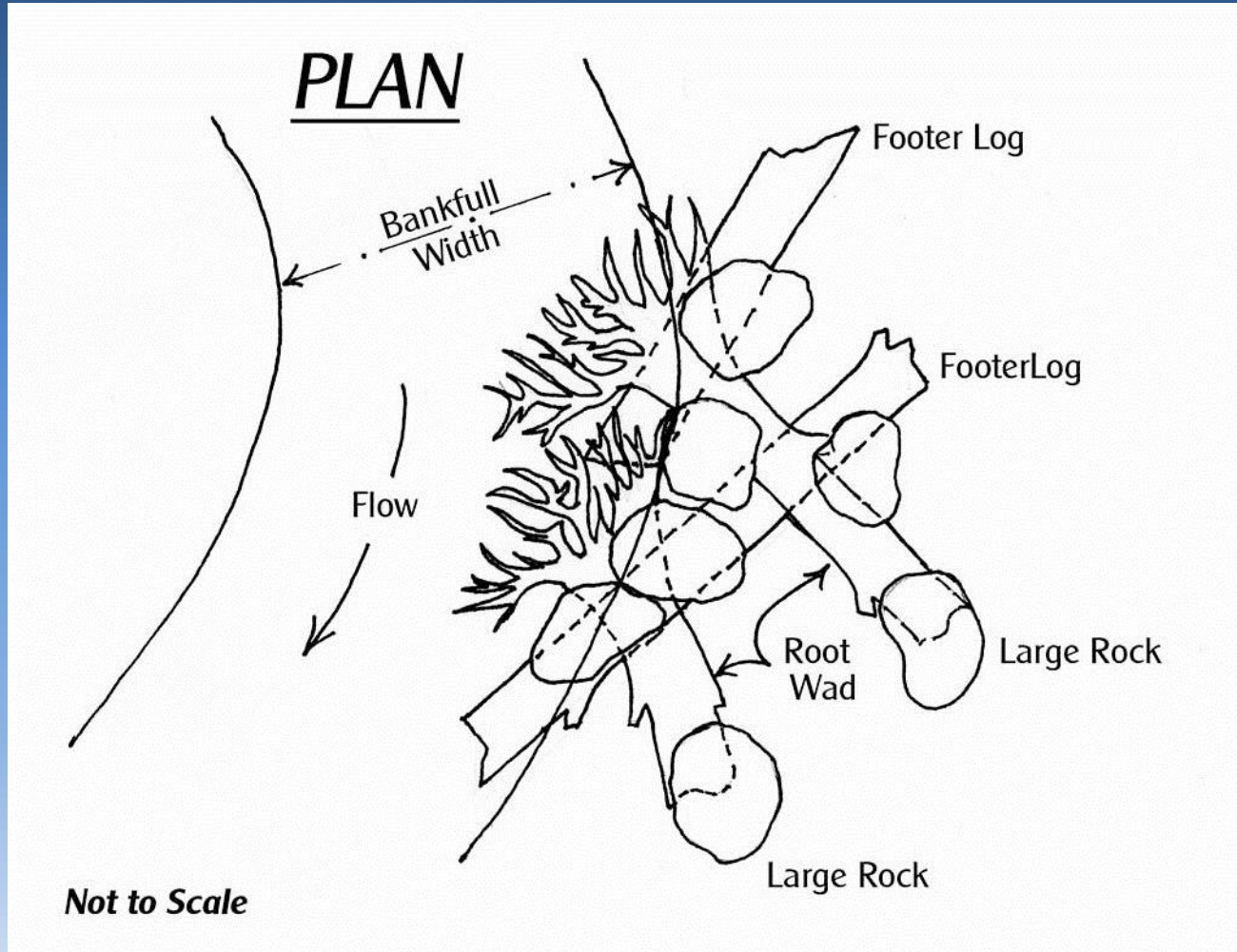
May 2013



Stream Bank Stabilization Site Cross Section



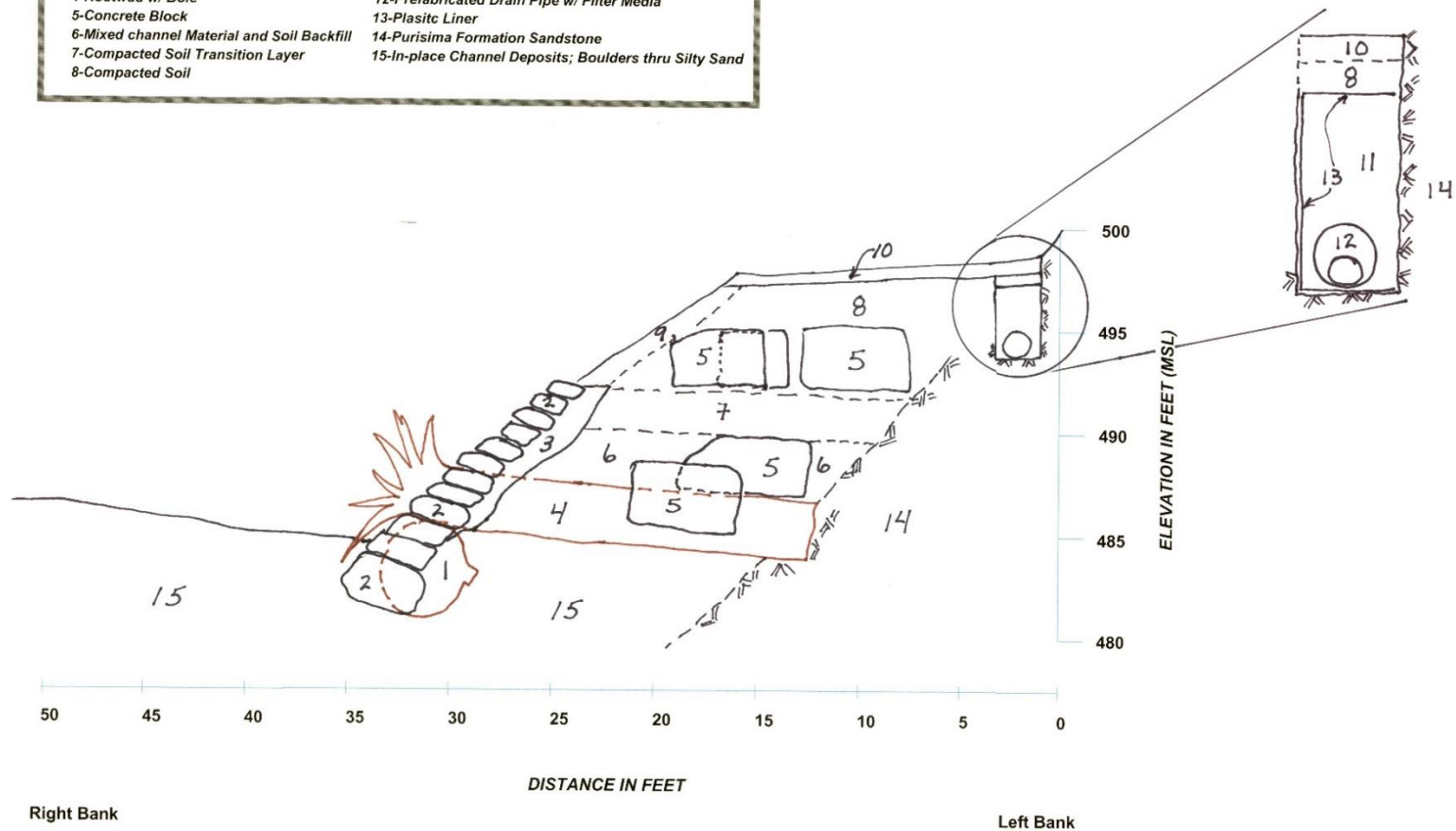
Stream Bank Stabilization Site General Repair Design



Stream Bank Repair

EXPLANATION	
1-Footer Log	9-Loosely Compacted Rooting Layer
2-Rock Revetment	10-Road Base, ¾-inch Crushed Rock
3-Drain Blanket	11-Washed ¾-inch Crushed Drain Rock
4-Rootwad w/ Bole	12-Prefabricated Drain Pipe w/ Filter Media
5-Concrete Block	13-Plastic Liner
6-Mixed channel Material and Soil Backfill	14-Purisima Formation Sandstone
7-Compacted Soil Transition Layer	15-In-place Channel Deposits; Boulders thru Silty Sand
8-Compacted Soil	

Typical As-Built Section (A-A')
Soquel Demonstration State Forest, Hihns Mill Road Repair,
Section Prepared by California Geological Survey
2014







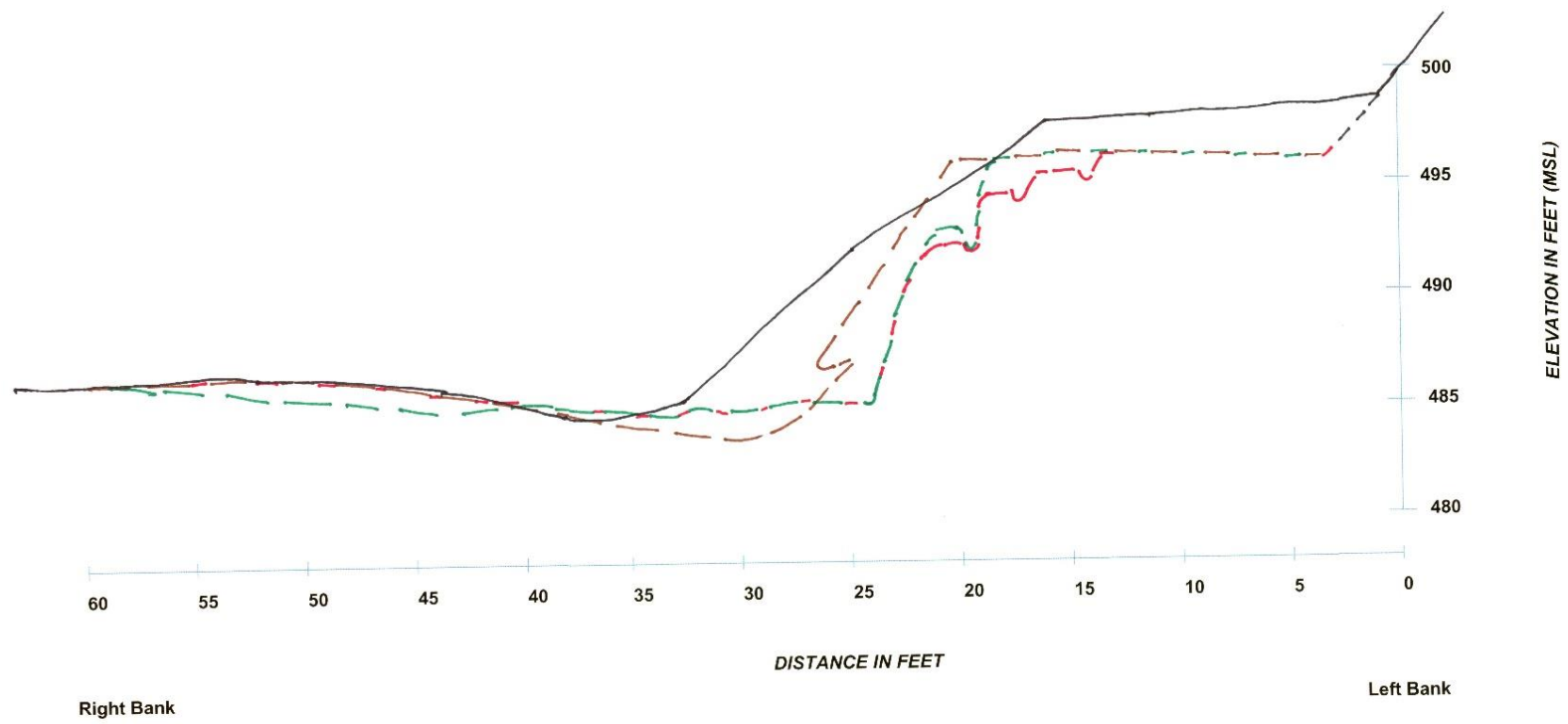
- 9 pairs of footer logs and rootwads w/boles installed
- Concrete or rock ballast placed
- Drain placed along inboard edge of road to drain hillslope seepage



Stream Bank Repair Cross Section: As built vs previous

Comparative Cross Sections
Soquel Demonstration State Forest, Hihns Mill Road Repair,
Sections Prepared by California Geological Survey
2014

EXPLANATION	
	April 2011
	May 2013
	January 2014
	As-Built 2014



Right Bank

Left Bank



Stream Bank Repair: Post construction



August 2014



Stream Bank Repair: December 2014



Stream Bank Repair: April 2015



Changes....



Site 2b October 2013 – View looking downstream



Site 2b December 2014
View looking downstream



