Stream & Floodplain Enhancement of East Fork Hunter Creek, Lower Klamath River: Phase I

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Introduction

The Yurok People have relied upon Klamath River and coastal resources for their subsistence, cultural, and economic livelihood since time immemorial. Central to Yurok culture is the harvest of anadromous fish. Runs of anadromous fish currently returning to spawn in Lower Klamath tributaries are depressed when compared with historical numbers. Extensive timber removal and road building activities has resulted in chronic sedimentation of streams and floodplains; a significant loss of channel-stored wood and riparian conifers; and a concomitant loss of habitat diversity and production potential in the sub-basin (Payne & Associates 1989; Gale and Randolph 2000; Beesley and Fiori 2007 & 2008; Voight and Gale 1998).

In the Klamath River, all runs of chinook salmon (*Oncorhynchus tshawytscha*), green sturgeon (*Acipenser medirostris*), and Pacific lamprey (*Lampetra tridentata*) are on the decline and coho salmon (*O. kisutch*) are listed as "threatened" under the Endangered Species Act. The Yurok Tribe is dedicated to rehabilitating degraded instream and riparian habitats to levels that support robust, self-sustaining populations of native anadromous fish. To help address this need, the Yurok Tribe's Fisheries (YTFP) and Watershed (YTWRD) programs have been conducting fisheries and watershed assessments, and implementing instream and upslope restoration activities in the Lower Klamath River Sub-basin since the late 1990s.

Initial restoration planning efforts included developing the Lower Klamath Sub-Basin Watershed Restoration Plan that prioritized upslope restoration and identified tributary specific restoration objectives for each Lower Klamath tributary (Gale and Randolph 2000). Sub-basin restoration objectives included: 1) reducing sediment inputs from upslope sources by treating high priority watershed road segments and stream crossings; 2) restoring native, conifer-dominated riparian forests; and 3) enhancing freshwater aquatic habitats. Since 2007, YTFP has been working with Rocco Fiori of Fiori GeoSciences (FGS) to design and implement innovative stream and floodplain enhancement projects in priority Lower Klamath tributaries. Treatments have included installation of constructed wood and engineered log jams to facilitate formation and maintenance of productive fish habitats (e.g. spawning beds, deep pools with cover, slow velocity habitats), and enhancing off-channel habitats to increase salmonid rearing capacity (YTFP 2010; Hiner et al. 2011; YTFP 2013; Beesley and Fiori 2012a, 2012b, 2013a, 2013b).

Project Area

Hunter Creek is a fourth order watershed draining approximately 28.7 square miles of steep, forested terrain (Figure 1). Hunter Creek flows into the north side of the Lower Klamath River 1.2 river miles upstream of the Pacific Ocean (Figure 1). The watershed supports anadromous populations of chinook and coho salmon, steelhead (*O. mykiss*), coastal cutthroat trout (*O. clarkii clarkii*), and multiple species of lamprey. East Fork Hunter Creek is the largest tributary in the watershed and supports populations of coho, steelhead, coastal cutthroat trout, and lamprey (Figure 1). The lower reaches and tributaries of Hunter Creek also provides critically valuable rearing habitat for non-natal juvenile coho salmon and thermal refuge to fish migrating through the river during the low flow period (Silloway 2010; Silloway and Beesley 2011). Hunter Creek is located in the Klamath Glen Hydrologically Significant Area, which was given the highest priority rating in the Recovery Strategy for California Coho Salmon (CDFG 2004).

A majority of the watershed and 100% of the project area is owned by Green Diamond Resource Company (GDRC) and managed for industrial timber harvest. Forests in the watershed are comprised of coastal redwood (*Sequoia sempervirens*), Sitka spruce (*Picea sitchensis*), western red cedar (*Thuja plicata*), Douglas fir (*Pseudotsuga menziesii*), California bay laurel (*Umbellularia californica*), red alder (*Alnus rubra*), and bigleaf maple (*Acer macrophyllum*).

YTFP has been conducting physical and biological monitoring and restoration planning in Hunter Creek since the late 1990s (Hayden and Gale 1999; Gale and Randolph 2000; Beesley 2004, 2007, & 2008; Hiner and Brown 2004; Hiner 2006). These activities have also included assessments of historic information to further characterize changes in fisheries and riparian habitat through time, and identify limiting factors. The watershed has been impacted by historic and current water and land management activities that have resulted in draining and conversion of off-estuary wetlands, removal of old growth conifers from riparian habitats, habitat simplification, increased channel sedimentation, and loss of large wood in fluvial habitats (Beesley and Fiori 2004, 2007, & 2008; Gale and Randolph 2000; Graham Matthews & Associates 2006). Large floods occurring over the last 150 years have exacerbated degraded conditions by increasing rates of riparian loss, channel widening, and valley aggradation.

To address stream and riparian dysfunction, the California Conservation Corps (CCC) and the California Department of Fish and Wildlife (CDFW) began implementing riparian planting and large wood placement projects in Hunter Creek and East Fork Hunter Creek in the late 1990s. Some of the CCC/CDFW habitat structures still influence pool habitat formation and provide limited instream cover for juvenile salmonids. However, most of the structures are disassembling and leaving remnant pieces of rebar and cable in the creek; or are not effective at collecting and storing mobile wood or metering and sorting channel stored sediment.

Excessive channel sedimentation of lower Hunter Creek has also resulted in damage to private property in a residential housing community located in the watershed that prompted an emergency gravel extraction effort in an attempt to provide relief for residents (Beesley and Fiori 2008). Complex wood accumulations consisting of interlinked pieces of large and small wood are required to form and maintain productive stream and floodplain habitats capable of supporting healthy salmonid populations and riparian forests; and to meter channel stored sediment and slow the delivery of coarse sediment to downstream habitats and communities. Increasing the amount of instream wood accumulations throughout the watershed was identified as a priority habitat restoration measure in several local and regional watershed plans and species recovery documents (Gale and Randolph 2000; Beesley and Fiori 2007 & 2008; CDFG 2004).

YTFP and YTWRD are currently coordinating with the landowner (GDRC) to conduct large-scale restoration within the Hunter Creek watershed. YTFP is constructing numerous fish habitat structures and planting native riparian trees throughout the watershed. YTWRD is currently working with GDRC to decommission high priority road segments and stream crossings throughout the watershed. Upslope work continues to generate quality wood materials for our on-going instream restoration projects in the watershed. We work very closely with YTWRD and GDRC to coordinate upslope and instream efforts to ensure that: 1) restoration objectives are compatible with GDRC; 2) wood generated from upslope treatment activities are used to

improve salmonid habitats in the Lower Klamath; and 3) stream reaches are properly addressed prior to road decommissioning efforts inhibit access via heavy equipment.

Project Overview

In 2008, YTFP received funding from the U.S. Bureau of Reclamation (Reclamation - Klamath River Restoration Program & Native American Affairs Program - NAAP) and the U.S. Fish and Wildlife Service (USFWS – Partners for Fish and Wildlife Program) to conduct a phase I restoration effort in 1.0 mile of East Fork Hunter Creek (Figures 1-2). Restoration treatments consisted of installation of several constructed wood jams (CWJs) and planting native trees within riparian habitats. Priority California coho salmon recovery tasks addressed by this project were KR-KG-24, KR-KG-23, KR-KG-17, and KR-KG-15 (CDFG 2004). On-the-ground activities for this project began on 6/18/10 and the project end date was 3/31/13. No fish relocation was necessary to install the CWJs and all other project permit requirements were met.

East Fork Hunter Creek Project objectives included:

- Increasing salmonid spawning and rearing habitat complexity and reducing water quality impacts in the watershed by installing several constructed wood jams;
- Increasing riparian forest complexity and resiliency by planting a variety of native trees;
- Evaluating project effectiveness to facilitate adaptive management of the project area; and
- Creating high quality, resource-based employment opportunities for Yurok tribal members.

Driving Directions & Project Location

The project site is located on property owned by Green Diamond Resource Company (GDRC - Contact: Ryan Bourque - Aquatic Monitoring Supervisor - PO Box 68; Korbel CA, 95550). Heading north from the town of Klamath on U.S. Highway 101, travel approximately 2.7 miles and turn right on Hunter Creek Road. Travel approximately 1.8 miles to a private gate. A GDRC North Klamath key is needed to unlock this gate. Proceed through the gate and travel on this road (H100) for 1.0 mile to the H-120 Road. Turn right onto the H-120 and cross over Hunter Creek. The confluence of Hunter Creek and East Fork Hunter is located just downstream of the H-120 bridge. The project reach included instream and riparian habitats of East Fork Hunter Creek from the confluence with Hunter Creek to 1.0 mile upstream (Figures 1-2). The reach is located in T14N, R1E, Sections 13, 14, 23, and 24 (USGS Requa Quad - Downstream BND: Lat. 41.593; Long. -124.035; Upstream BND: Lat. 41.593; Long. -124.014 (Figure 1).

Physical Monitoring

YTFP conducted baseline 3-D topographic surveys of the channel and established multiple, permanent cross sections in the project reach during June 2010 and 2011 (Figures 3-5; Appendix A). Surveys were conducted using an optical total station and a hand-held data collector and data was collected in meters using the following coordinate systems: projected coordinate system NAD_1983_UTM Zone_10N; geographic coordinate system GCS North American 1983. End points for the longitudinal profile survey and cross sections were marked using rebar with end

caps and georeferenced using the optical total station. YTFP tied all project surveys to YTFP's and GDRC long-term channel monitoring survey located within the watershed to expand and enhance physical monitoring activities in this high priority Lower Klamath tributary. All survey data was analyzed using Trimble Geomatics Office, ESRI GIS, and Excel software to produce maps and monitor changes in channel morphology over time.

Prior to CWJ installation in summer 2011, YTFP conducted repeat surveys through the project reach to further document pre-project conditions (Appendix A). Following the first phase of CWJ installation, YTFP marked all the key logs with individual identification tags and surveyed the position of these logs and CWJs using the total station and data collector. YTFP conducted a year 1 post-project survey in summer 2012 prior to additional wood loading efforts in the reach. Following CWJ installation in summer 2012, YTFP marked all the key logs with individual identification tags and surveyed the position of these logs. Preliminary assessment of the topographic data indicates the channel has been incising through the project reach over the last few years (Figure 5). Cross section data collected in the project reach supports this assessment with many sites showing deepening and narrowing of the channel following wood placement (XS7-9, 11, 14-15, 20-21; Appendix A). Formation of a deeper and more narrow channel is a positive habitat response to wood placement especially since the lower portion of the project reach experiences subsurface flow conditions during periods of low flow and precipitation.

In summer 2012, YTFP established a network of photographic monitoring sites within the project reach to help characterize habitat conditions and document changes over time (Table 1; Figure 6). Photo-monitoring location information was collected using a hand-held Garmin GPS Map 78s unit (Latitude, Longitude -decimal degrees, geographic coordinate system, WGS 84). Photographs were obtained throughout the project's duration in an effort to document pre-project and post-project conditions including CWJ site conditions under various flows (Appendix B).

Riparian Tree Planting

YTFP obtained trees from several local nurseries including the Yurok Tribal Native Plant Nursery located in Klamath, California. All trees were planted using hoedads and/or tree planting spades according to methods outlined in Flosi and others (1998). Crews took precaution to properly stabilize the trees when burying root systems to prevent "J-rooting". Trees were planted at a spacing of ~ 8 - 10 feet, with crewmembers selecting the most favorable microsites for planting. Ideal planting sites included areas where soil conditions appeared favorable for holding water and areas shaded by other vegetation or landscape features. YTFP crew leaders recorded daily tree planting information on datasheets and field maps.

Planting efforts were first initiated in East Fork Hunter Creek during spring 2011. During the 2011 season, crews planted 635 Douglas fir and 2,075 coastal redwoods in the upper portion of the project reach (Table 2; Figure 2). In 2011-2012, crews focused riparian planting efforts in the wood loading reach of East Fork (Figure 2). During this period, crews planted one Douglas fir, 351 coastal redwoods, 231 Sitka spruce, 120 California bay laurel, and seven red alder (Table 2). In December 2012, crews planted 158 coastal redwood, 120 western red cedar, and 96 bigleaf maple in the wood loading reach of East Fork Hunter Creek (Table 2; Figure 2).

Constructed Wood Jams

In summer 2011, YTFP restoration crews and FGS used heavy equipment and whole tree materials to install 18 CWJs within the East Fork Hunter Creek project reach (Figure 5; Table 3). In summer 2012, YTFP restoration crews and FGS installed two additional CWJs in the project reach (Figure 5; Table 3). CWJs installed for this project were a variation of Engineered Log Jams (ELJs) described by Abbe et al. (2003a, 2003b, 2005). These structures were constructed to mimic naturally occurring features such as bar apex jams (BAJs), abutment jams (staggered and non-staggered), and toppled riparian trees (Figures 7-10; Appendices B - C). CWJs were constructed using the same principles as ELJs; where mechanically driven logs, riparian trees, old growth stumps, and other landforms were used to create the resisting elements necessary for maintaining CWJ stability and function under a variety of flows. None of the CWJs installed relied on cable and/or threaded rebar anchoring systems and no imported quarry rock was used.

The CWJs installed in East Fork Hunter Creek were designed to facilitate formation and maintenance of productive fish habitats (e.g. spawning beds, deep pools with cover, slow velocity habitats), increase floodplain connectivity to increase salmonid rearing capacity, and to meter channel stored sediment and slow the delivery of coarse sediment to downstream habitats. YTFP and FGS are currently still assessing CWJ function and performance in the project reach; however, initial surveys indicate positive habitat responses resulting from CWJ installation.

Performance Measures

1) Overall stream length affected: 1.0 Mile
2) Stream length planted or protected (with fence): 1.0 Mile Planted
3) Riparian zone planted or protected (length x width): 4.8 Acres
4) Total feet of fencing: NA
5) Trees planted (number, by species):
   636 Douglas Fir, 2,584 Coastal Redwood, 231 Sitka Spruce,
   120 Western Red Cedar, 120 CA Bay Laurel, 96 Bigleaf Maple, and 7 Red Alder
6) Non-native vegetation removed (length x width): NA
7) Stream bank restoration sites (number, length of stream, and technique): NA
8) In-stream habitat structures installed (number, type): 20 CWJs
9) Road stream crossings removed/upgraded: NA
10) Number fish barriers removed: NA
    a. Length of upstream habitat made accessible: NA

Summary & Next Steps

As mentioned, the East Fork Hunter Creek project was part of a larger-scale effort to restore habitats within the Hunter Creek watershed. In summer 2012, YTFP and FGS installed numerous CWJs in mainstem Hunter Creek using funding from CDFW (Fisheries Restoration Grant Program), USFWS (Partners for Fish and Wildlife), and Reclamation (NAAP Funds)

(Figure 11). We will continue these efforts during summer 2013. In addition, we are currently seeking funding to continue CWJ installation and riparian forest enhancement efforts downstream of East Fork Hunter Creek. The proposed project would consist of installing 48 CWJs and 1,000 feet of willow baffles as well as planting riparian habitats with native trees.

Once we have built all of the key CWJs within the watershed we can begin putting additional whole tree materials within the various project reaches and in locations upstream. Supplying instream habitats with whole tree materials is a necessary restorative measure until riparian habitats are capable of continuously providing high quality woody materials through natural recruitment mechanisms. YTFP will also continue to rehabilitate riparian habitats throughout the watershed by planting native conifers and other species capable of providing large diameter wood to instream habitats. At this time, we are unsure when we may begin resupplying the East Fork Hunter Creek wood loading reach with additional whole tree materials. Over the next several years, we will continue monitoring habitat conditions in the reach as funding allows.

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Tables

Table 1. Photographic monitoring site information for the "Stream & Floodplain Enhancement of East Fork Hunter Creek Project", Lower Klamath River.

Watershed	Stream	Site_Name	Latitude	Longitude	Orientation
Hunter Creek	East Fork Hunter Creek	EF Hunter 2011-1	-124.0106	41.5885	260 W
Hunter Creek	East Fork Hunter Creek	EF Hunter 2011-2	-124.0128	41.5913	270 W
Hunter Creek	East Fork Hunter Creek	EF Hunter 2011-3	-124.0141	41.5924	250 W
Hunter Creek	East Fork Hunter Creek	EF Hunter A-0	-124.0345	41.5933	251 W
Hunter Creek	East Fork Hunter Creek	EF Hunter A-1	-124.0344	41.5933	80 E
Hunter Creek	East Fork Hunter Creek	EF Hunter D	-124.0324	41.5940	31 NE
Hunter Creek	East Fork Hunter Creek	EF Hunter M-1	-124.0259	41.5965	257 W
Hunter Creek	East Fork Hunter Creek	EF Hunter M-2	-124.0259	41.5965	58 NE
Hunter Creek	East Fork Hunter Creek	EF Hunter N-1	-124.0244	41.5968	261 W
Hunter Creek	East Fork Hunter Creek	EF Hunter N-3	-124.0244	41.5968	50 NE
Hunter Creek	East Fork Hunter Creek	EF Hunter O-1	-124.0244	41.5968	250 W
Hunter Creek	East Fork Hunter Creek	EF Hunter O-2	-124.0229	41.5976	60 NE
Hunter Creek	East Fork Hunter Creek	EF Hunter P-1	-124.0210	41.5980	280 W
Hunter Creek	East Fork Hunter Creek	EF Hunter P-2	-124.0210	41.5980	60 NE

Table 2. Trees planted in riparian habitats of East Fork Hunter Creek during spring 2011.

Date	Redwood	Douglas Fir	Spruce	WR Cedar	BL Maple	Ca. Bay	Alder	Daily Total
3/7/2011	480	435	0	0	0	0	0	915
3/8/2011	350	200	0	0	0	0	0	550
3/9/2011	450	0	0	0	0	0	0	450
3/10/2011	450	0	0	0	0	0	0	450
3/14/2011	345	0	0	0	0	0	0	345
12/27/2011	0	0	133	0	0	0	0	133
12/28/2011	63	0	98	0	0	0	0	161
12/29/2011	0	0	0	0	0	0	0	0
12/30/2011	63	0	0	0	0	0	0	63
01/03/12	126	0	0	0	0	0	0	126
01/04/12	99	0	0	0	0	0	0	99
01/05/12	0	1	0	0	0	120	7	128
12/12/2012	41	0	0	48	96	0	0	185
12/13/2012	117	0	0	72	0	0	0	189
Grand Total	**2,584**	**636**	**231**	**120**	**96**	**120**	**7**	**3,794**

Table 3. As built descriptions for the constructed wood jams installed in the East Fork Hunter Creek wood loading reach during summers 2011-2012.

Feature Number	Feature Type	Key Pieces RTW	Key Pieces Pole	Other LWD Added	Total Pieces Added	Channel Position	Foundation	Northing*	Easting*
1	Abutment Jam	7	6	12	25	Right Bank	Riparian Trees, Old Growth Redwood Stump	4605608.0417	414981.0725
2	Cover/Spider	1	2	0	3	Right Bank	Riparian Trees	4605631.7332	414943.5609
3	Cover/Spider	3	2	3	8	Right Bank	Riparian Trees	4605637.6561	414900.1264
4	Cover/Spider	3	3	0	6	Right Bank	Riparian Trees	4605635.6818	414866.5634
5	Cover/Spider	1	2	2	5	Right Bank	Riparian Trees	4605611.9902	414821.1546
6	Cover/Spider	4	2	2	8	Right Bank	Riparian Trees	4605604.0931	414797.4631
7	Cover/Spider	3	2	1	6	Right Bank	Riparian Trees	4605594.2216	414767.8486
8	Cover/Spider	3	2	2	7	Right Bank	Riparian Trees	4605554.7357	414702.6969
9	Cover/Spider	3	2	3	8	Right Bank	Riparian Trees	4605542.8899	414684.9283
10	Cover/Spider	2	6	3	11	Right Bank	Riparian Trees, Old Growth Redwood Stump	4605501.4297	414673.0825
11	Cover/Spider	4	2	4	10	Left Bank	Riparian Trees	4605489.5840	414669.1339
12	Cover/Spider	4	6	5	15	Left Bank	Riparian Trees, Piles	4605489.5840	414605.9565
13	Cover/Spider	6	8	5	19	Right Bank	Riparian Trees, Piles	4605467.4811	414550.6762
14	Cover/Spider	3	3	3	9	Left Bank	Riparian Trees, Old Growth Redwood Stump	4605467.8667	414519.0875
15	Cover/Spider	5	2	5	12	Right Bank	Riparian Trees, Old Growth Redwood Stump	4605465.892	414499.3445
16	Cover/Spider	6	6	3	15	Left Bank	Riparian Trees, Piles, Old Growth Redwood Stump	4605442.2009	414493.4217
17	Stagered Abutment Jam	8	7	5	20	Right Bank	Riparian Trees	4605396.7921	414337.4524
18	Cover/Spider	4	5	3	12	Right Bank	Riparian Trees	4605345.4604	414217.0204
19	Bar Apex Jam	4	5	3	12	Mid Channel	Piles	4605211.2084	413997.8736
20	Channel Span	6	4	0	10	Channel Span	Riparian Trees, Existing LWD	4605128.2880	413847.8272

*GIS Coordinates - coordinate systems: projected coordinate system NAD_1983_UTM Zone_10N

Figures

Figure 1. East Fork Hunter Creek project location map, Lower Klamath River.

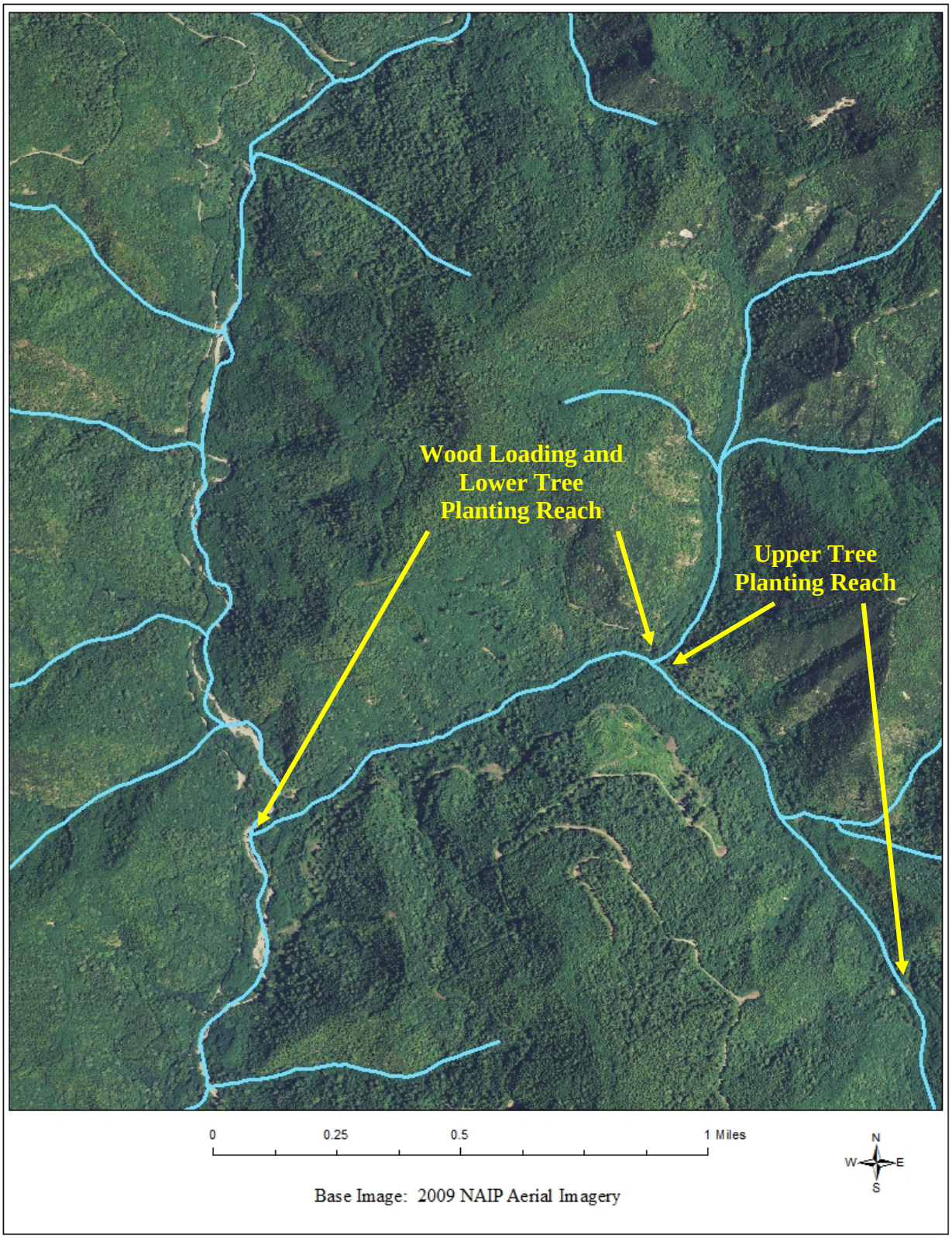


Figure 2. Map depicting restoration treatment reaches implemented in East Fork Hunter Creek.

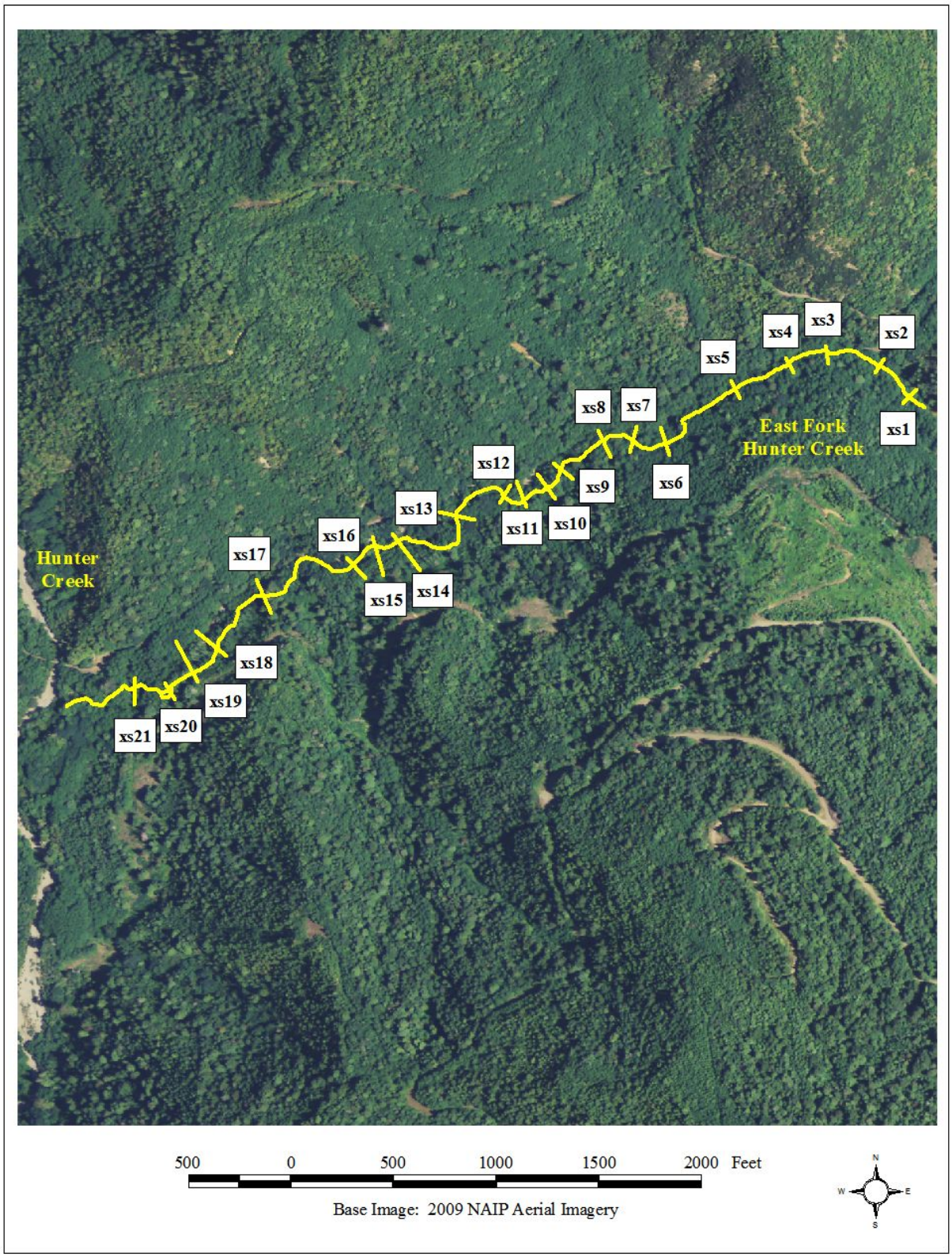


Figure 3. Map depicting the channel profile and cross section locations, East Fork Hunter Creek.

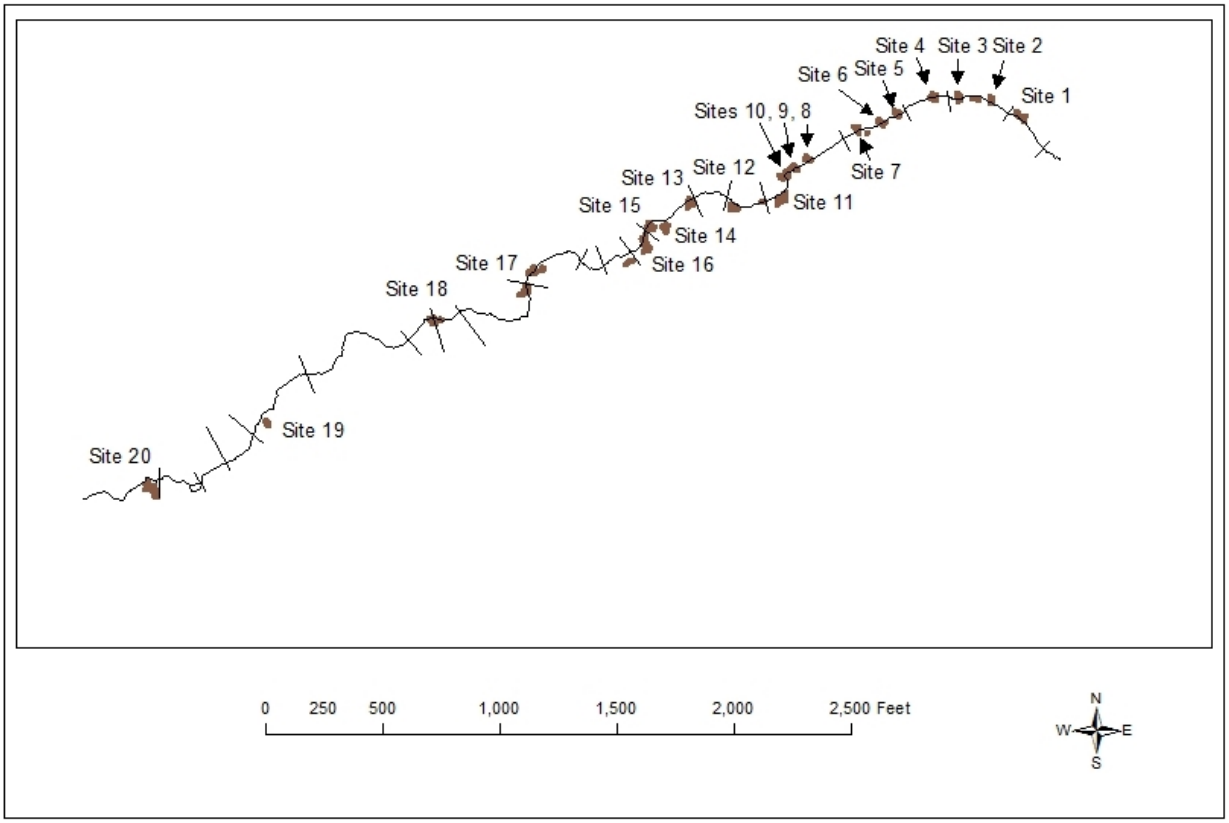


Figure 4. Map depicting locations of constructed wood jams in East Fork Hunter Creek.

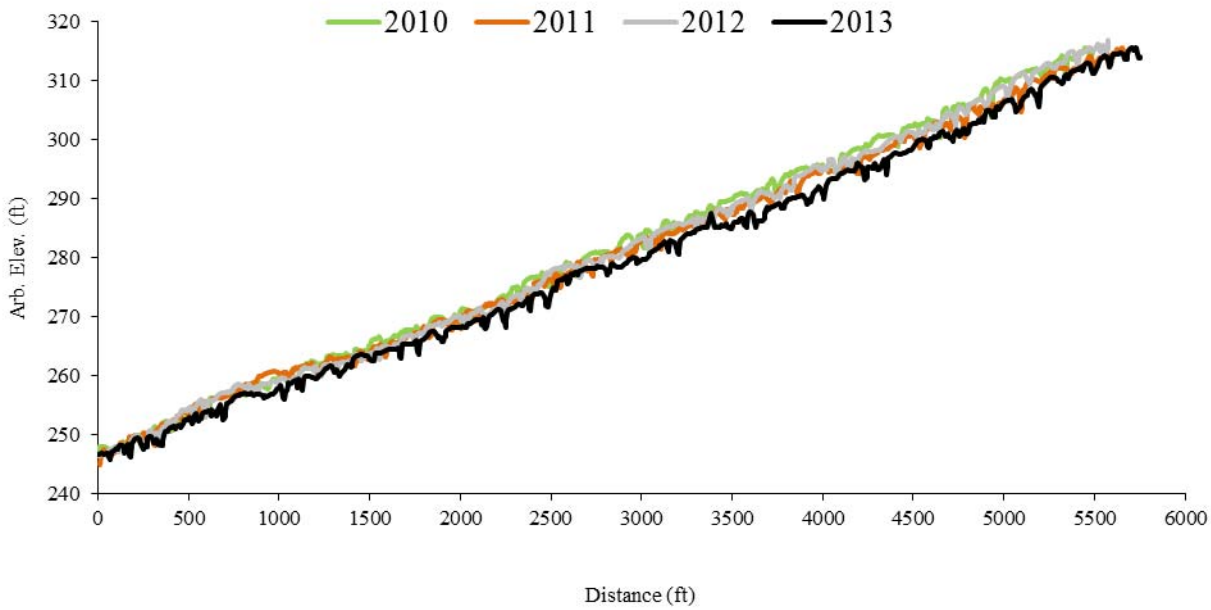


Figure 5. Channel profile survey data collected in the East Fork Hunter Creek project reach.

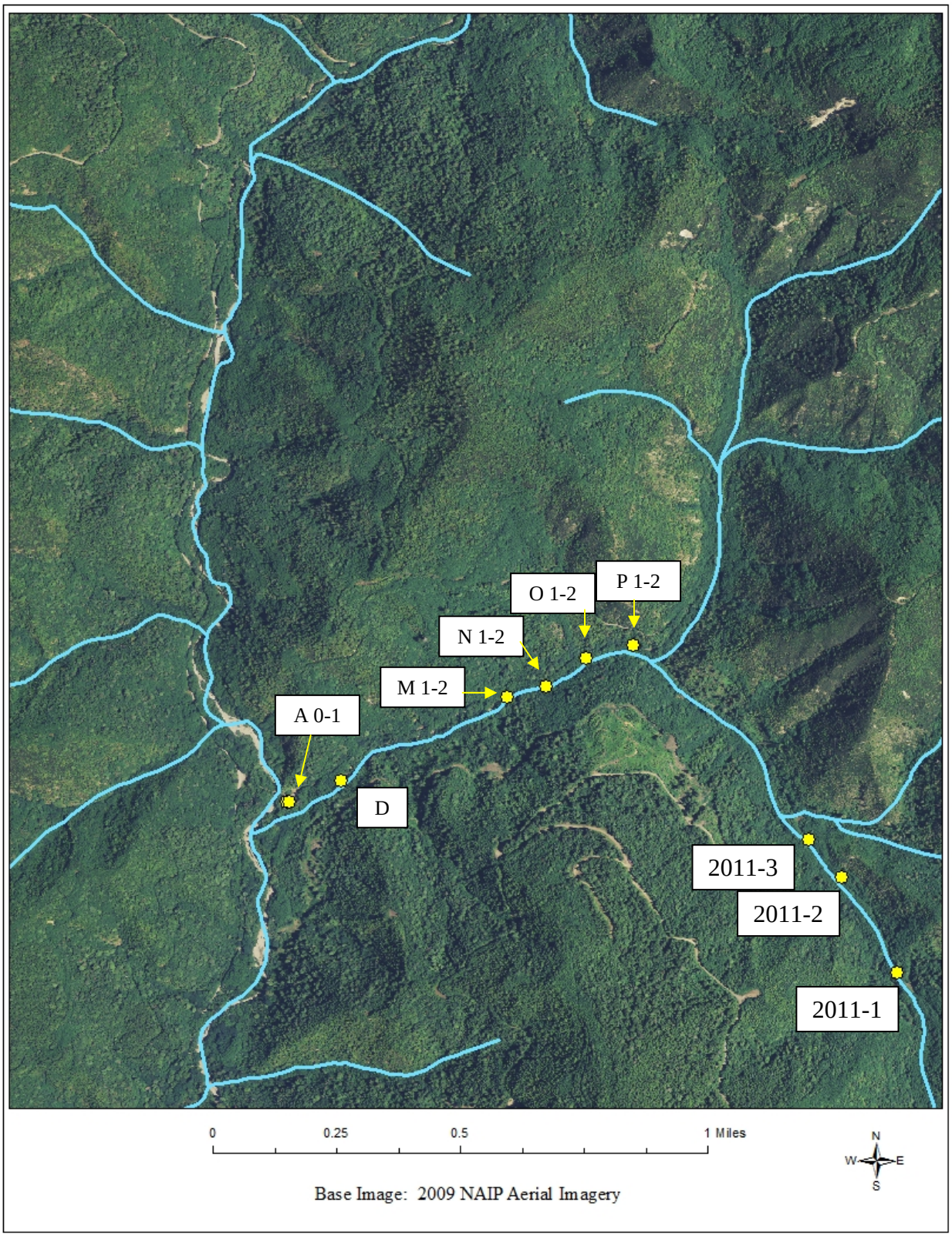


Figure 6. Map depicting photo-monitoring sites located in East Fork Hunter Creek.

Figure 7. Installing the first constructed wood jams in East Fork Hunter Creek (9/13/11).

Figure 8. Constructed wood jam (Site 13) in East Fork Hunter Creek during the first spring post-construction (Top 3/8/12; Bottom 3/17/12).

Figure 9. Looking upstream at constructed wood jams (Site 15 – upper left of photo; Site 16 - right side of photo) in East Fork Hunter Creek during the first spring post-construction (3/17/12).

Figure 10. Installing a constructed wood jam (Site 19) in East Fork Hunter Creek (07/24/12).

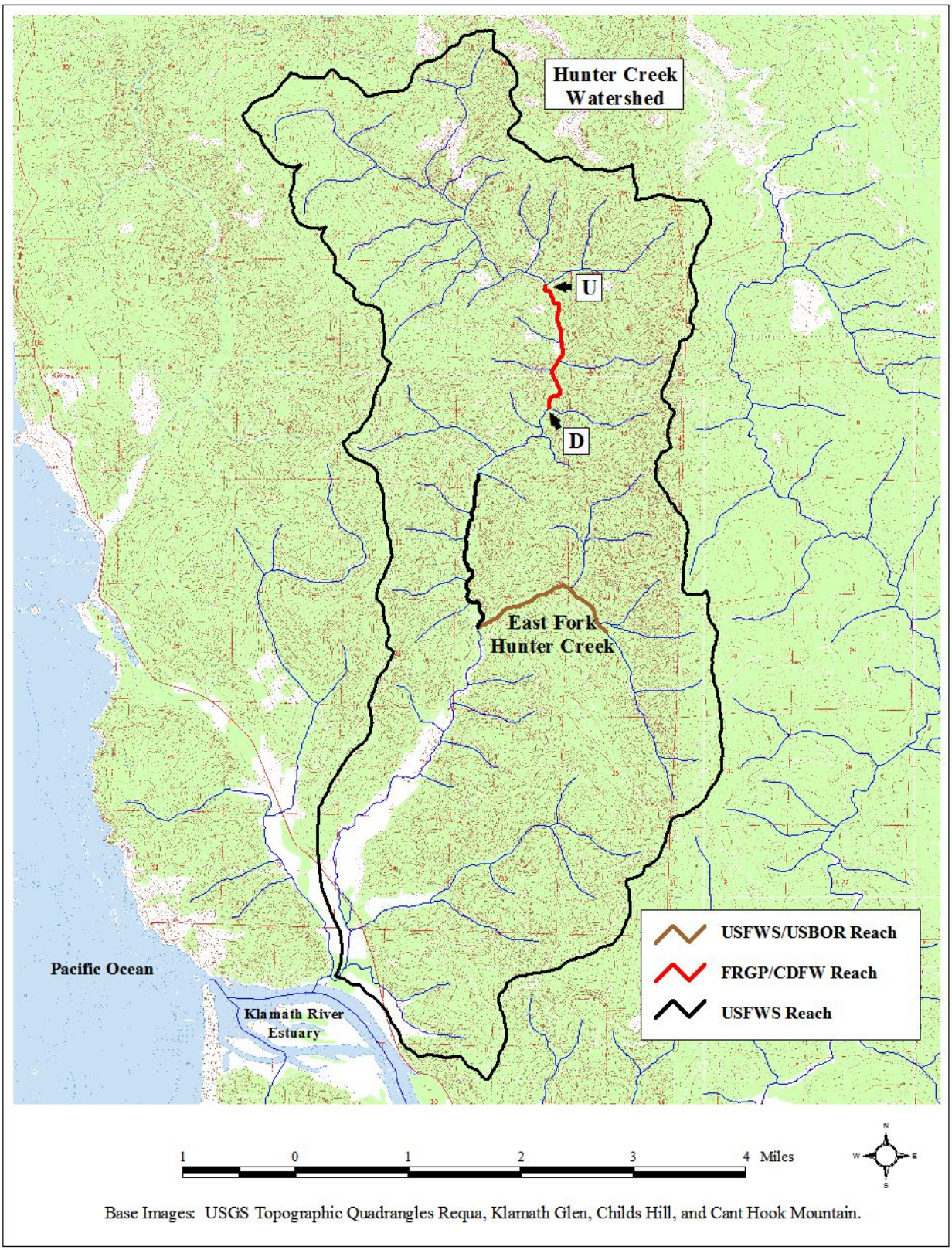
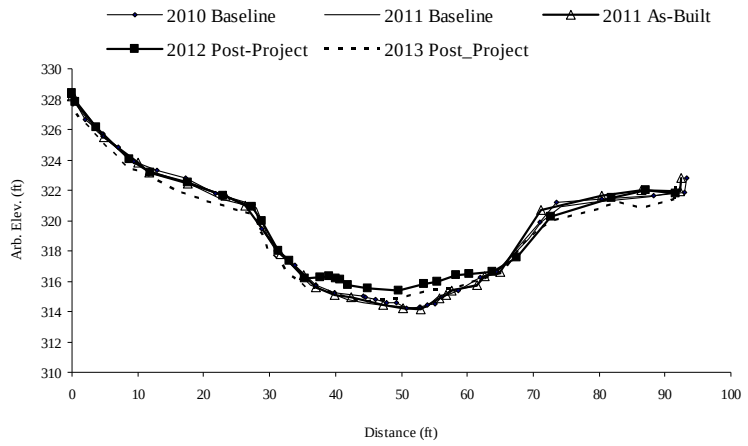


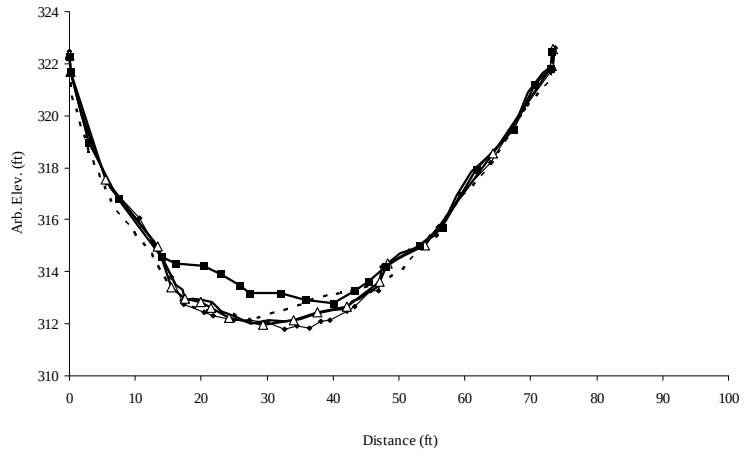
Figure 11. Map depicting wood loading reaches in the Hunter Creek watershed, California.

Appendix A. Cross Section Data Collected in the Upper Hunter Creek Wood Loading Reach – CDFW Project Reach (Grant Agreement # P1010527)

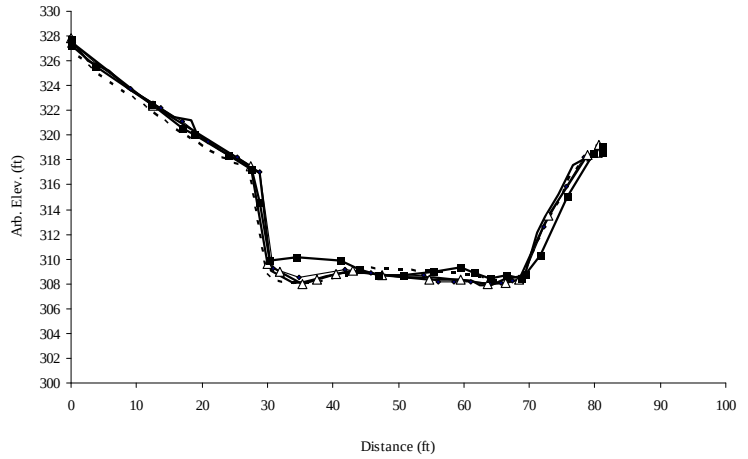
Cross Section – XS1



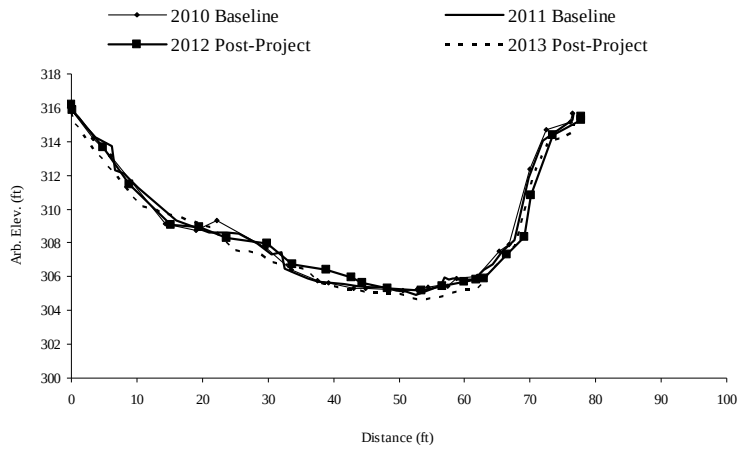
Cross Section – XS2



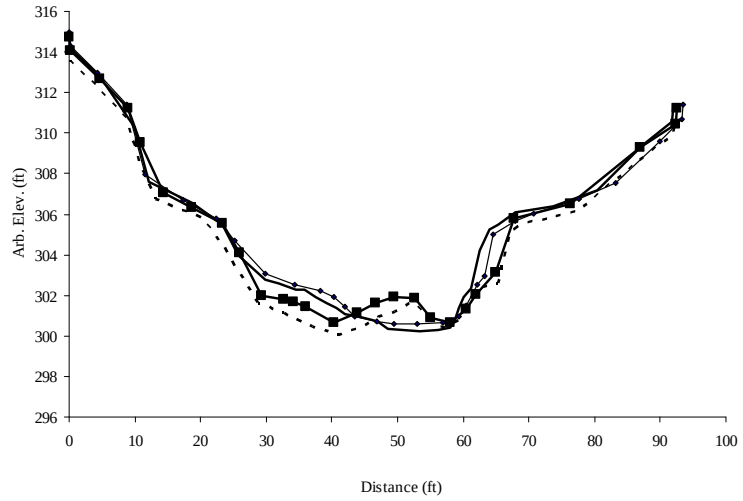
Cross Section – XS3



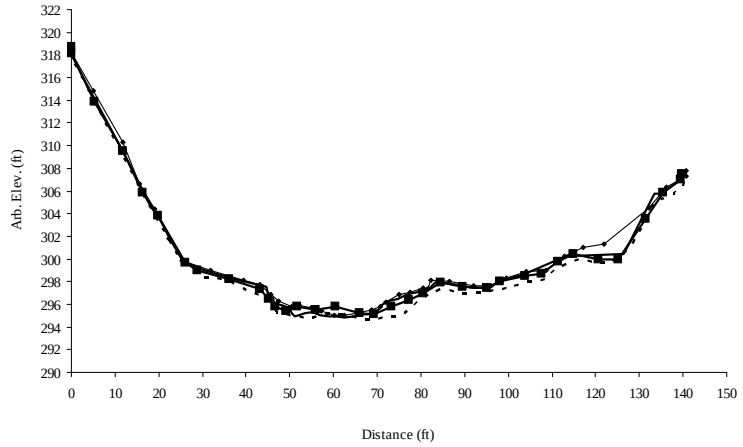
Cross Section – XS4



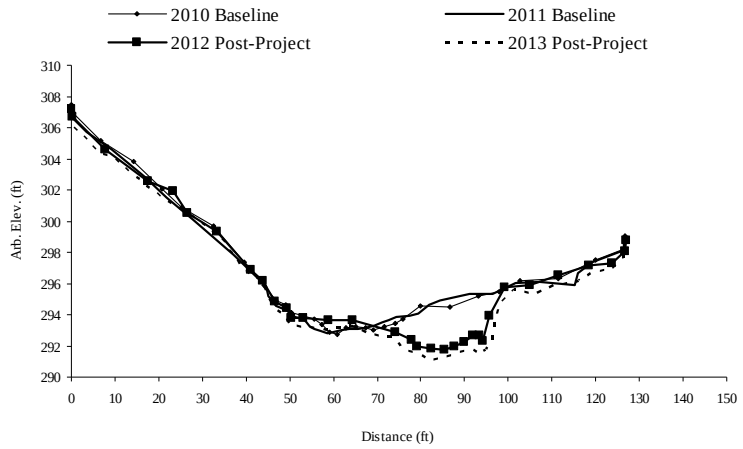
Cross Section – XS5



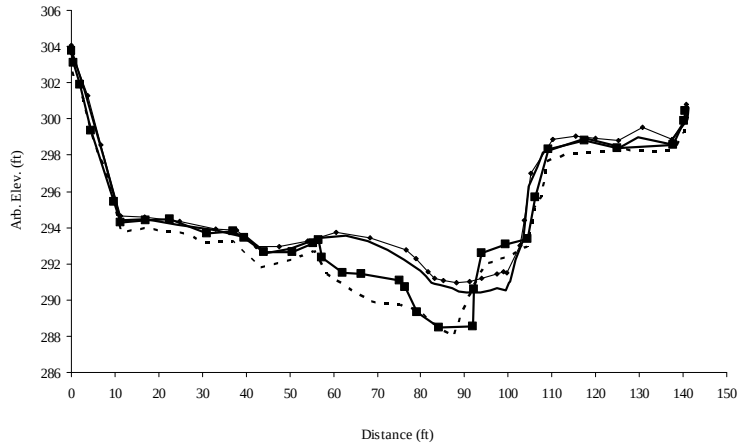
Cross Section – XS6



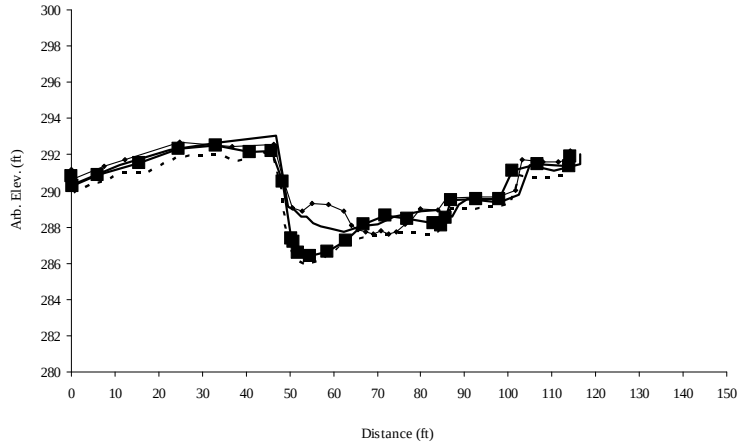
Cross Section – XS7



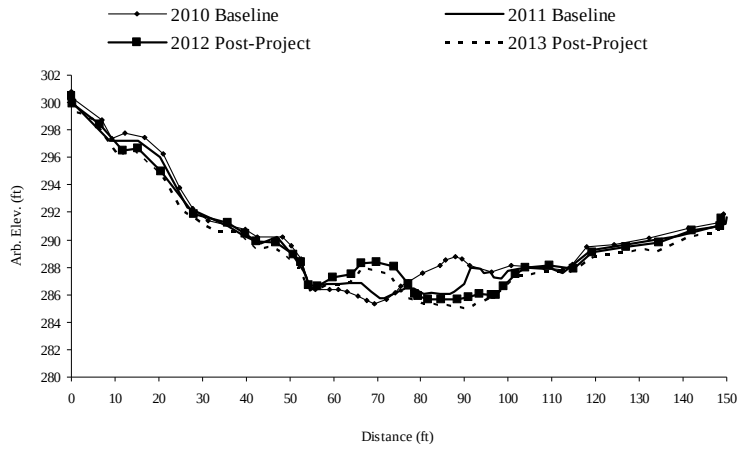
Cross Section – XS8



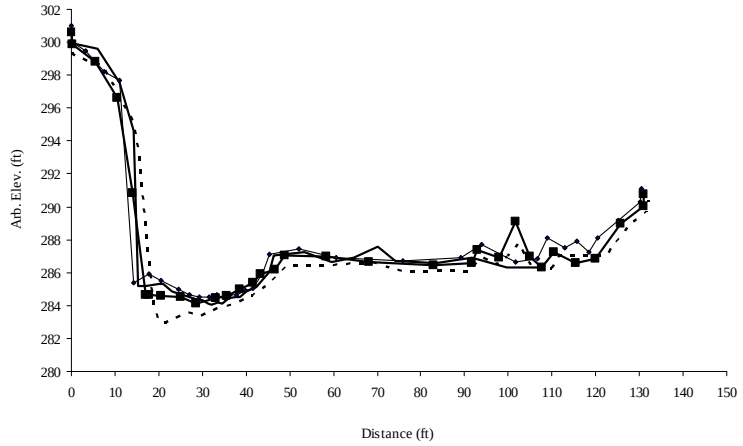
Cross Section – XS9



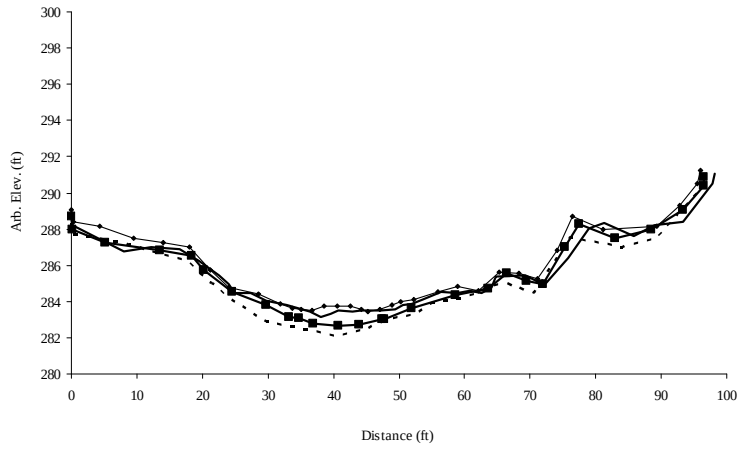
Cross Section – XS10



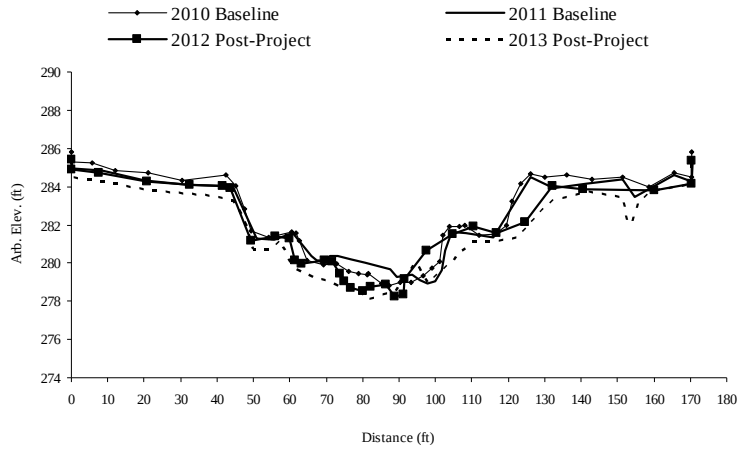
Cross Section – XS11



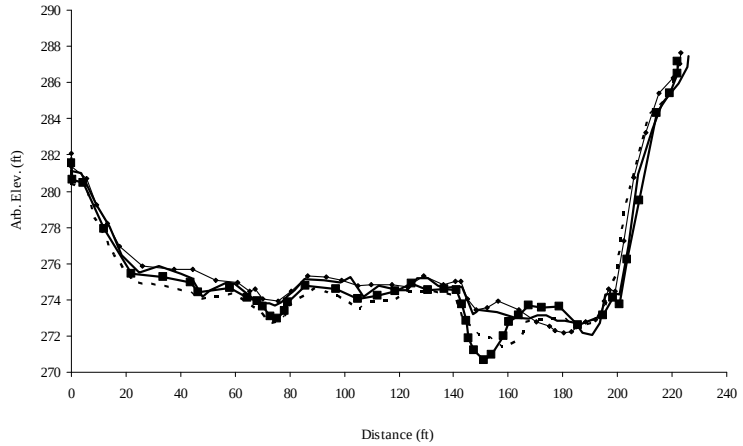
Cross Section – XS12



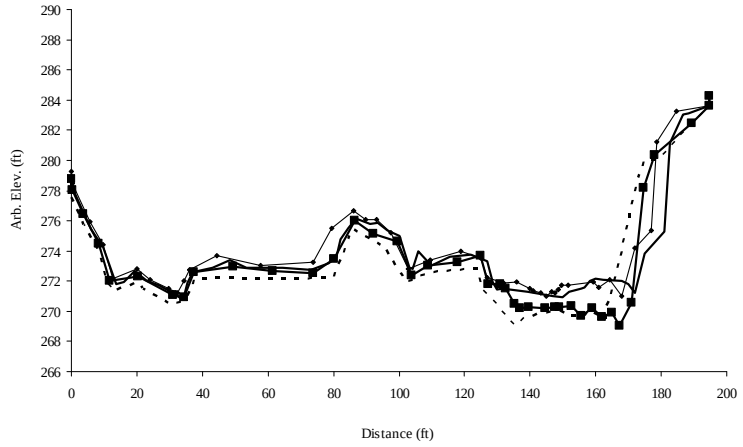
Cross Section – XS13



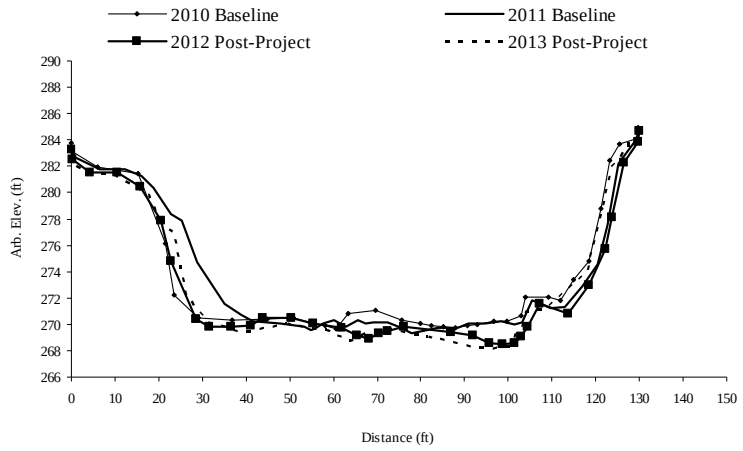
Cross Section – XS14



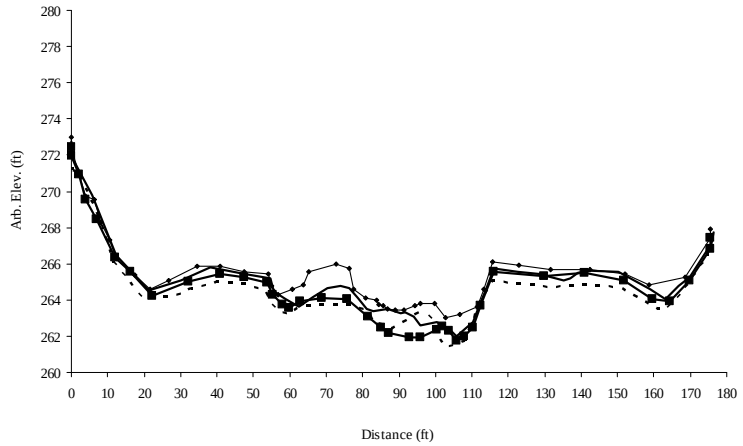
Cross Section – XS15



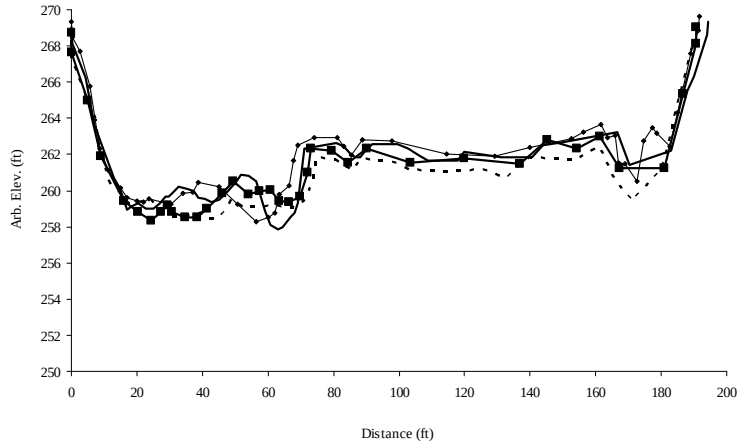
Cross Section – XS16



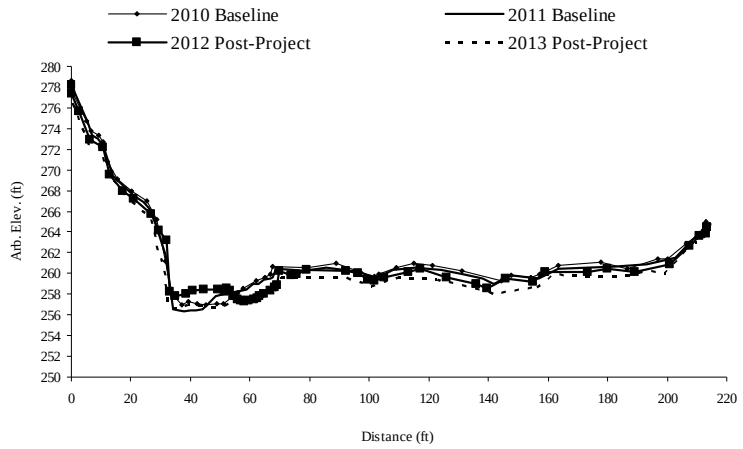
Cross Section – XS17



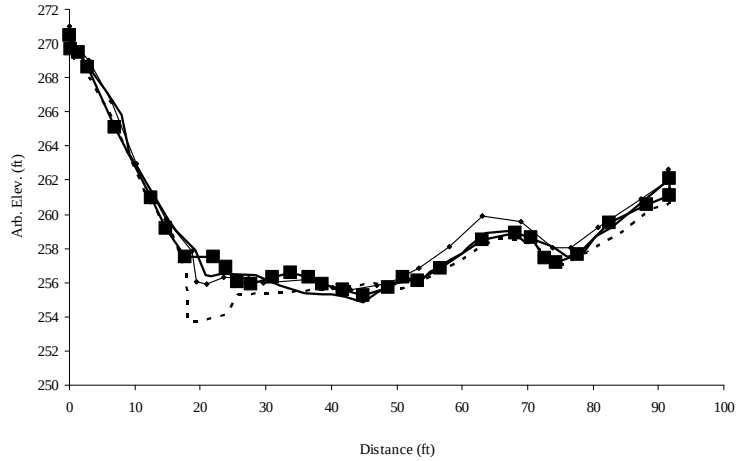
Cross Section – XS18



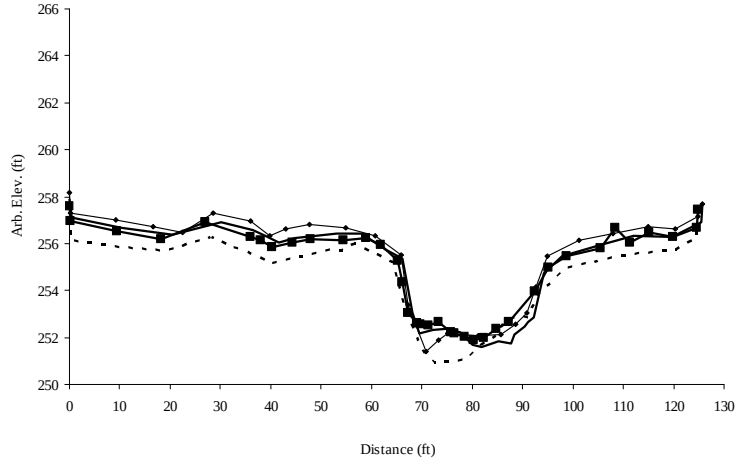
Cross Section – XS19



Cross Section – XS20



Cross Section – XS21



Appendix B. Photo-Monitoring Sites for the East Fork Hunter Creek Phase I Project

- **Upper Riparian Photo-Monitoring Sites.**

Site EF Hunter 2011-1 – 3/14/11 (Left and Center) and 8/4/11 (Right).

Site EF Hunter 2011-2 – 3/14/11 (Left) and 8/4/11 (Right).

Site EF Hunter 2011-3 – 3/14/11 (Left and Center) and 8/4/11 (Right).

- **Wood Loading Photo-Monitoring Sites.**

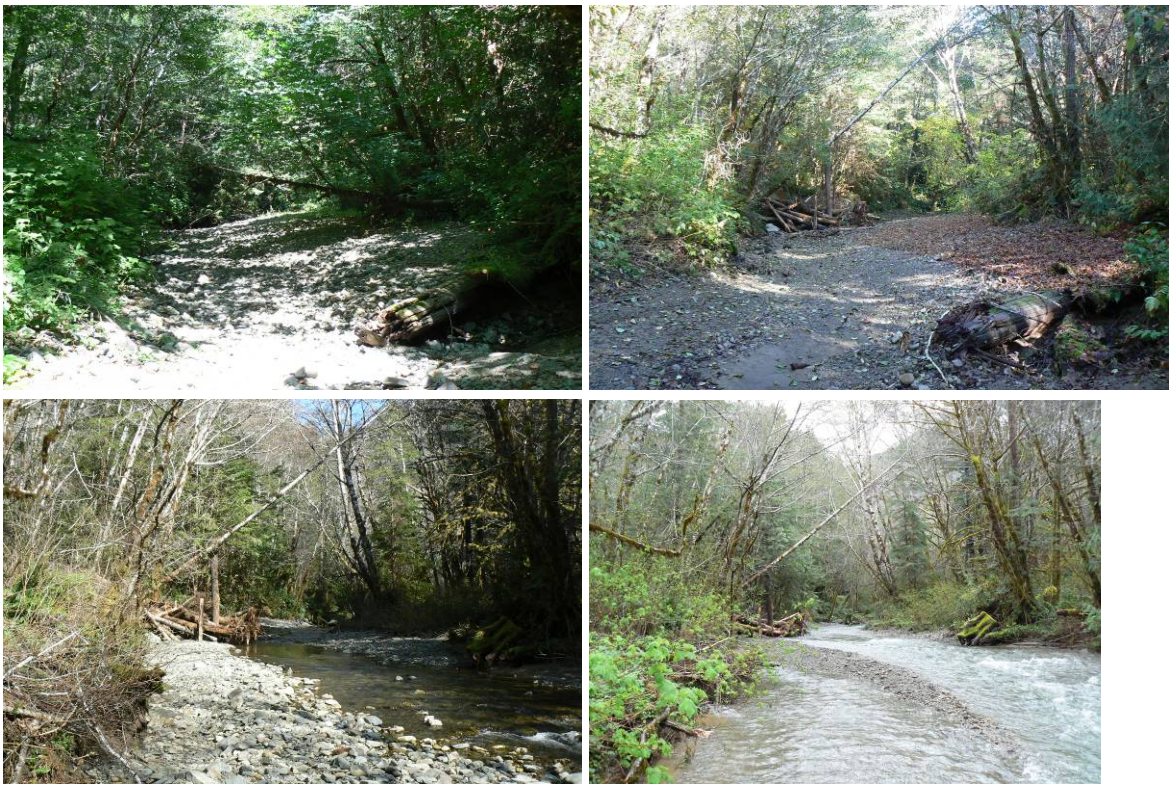
Site EF Hunter A-0 (Left 8/4/11; Right 4/3/12).

Site EF Hunter A-1 (Top Lt. 8/4/11; Top Rt. 11/14/11; Bottom Lt. 3/8/12; Bottom Rt. 4/3/12).

Site EF Hunter D (Top 8/4/11; Upper Middle 11/14/11; Lower Middle 3/8/12; Bottom 4/3/12).

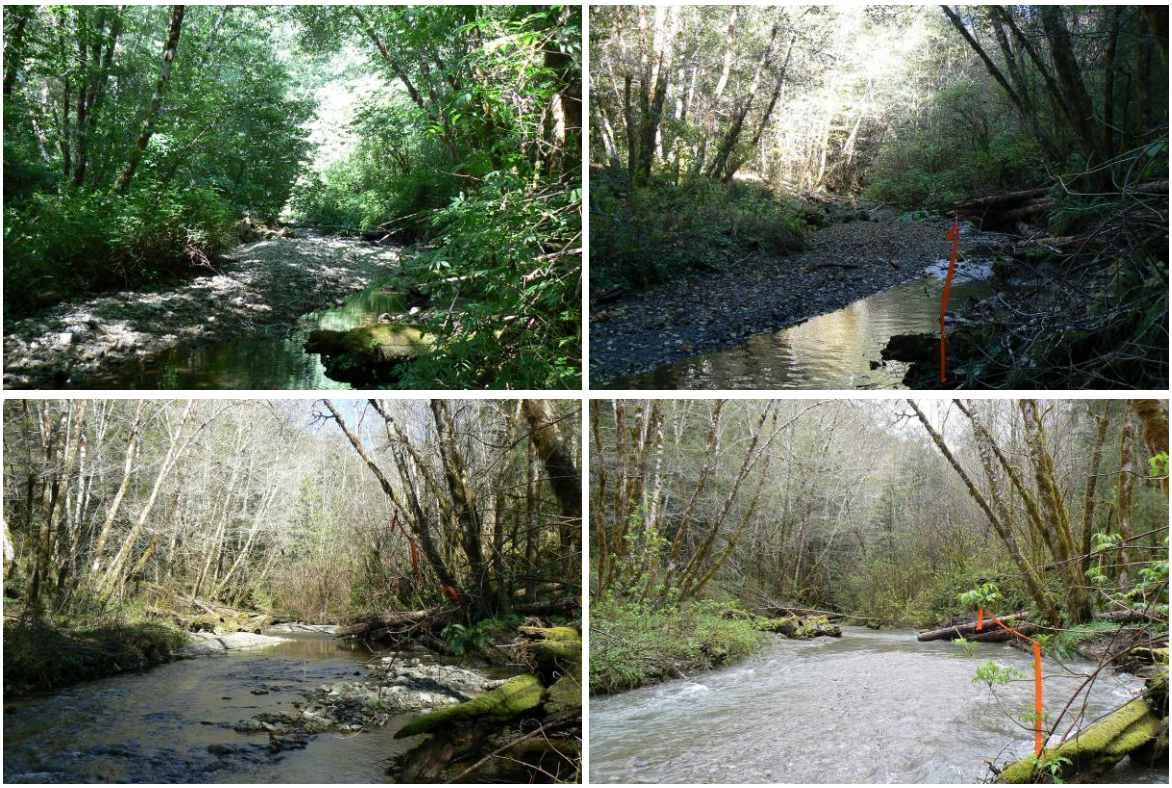
Site EF Hunter D (Top 7/24/12; Middle 8/19/12; Middle 8/19/12; Bottom 11/12/12).

Site EF Hunter M-1 (Top Lt. 8/4/11; Top Rt. 11/14/11; Bottom Lt. 3/8/12; Bottom Rt. 4/3/12).



Site EF Hunter M-2 (Top Lt. 8/4/11; Top Rt. 11/14/11; Bottom Lt. 3/8/12; Bottom Rt. 4/3/12).

Site EF Hunter N-1 (Top Lt. 8/4/11; Top Rt. 11/14/11; Bottom Lt. 3/8/12; Bottom Rt. 4/3/12).



Site EF Hunter N-3 (Top Lt. 8/4/11; Top Rt. 11/14/11; Bottom Lt. 3/8/12; Bottom Rt. 4/3/12).

Site EF Hunter O-1 (Top Lt. 8/4/11; Top Rt. 11/14/11; Bottom Lt. 3/8/12; Bottom Rt. 4/3/12).

Site EF Hunter O-2 (Top Lt. 8/4/11; Top Rt. 11/14/11; Bottom Lt. 3/8/12; Bottom Rt. 4/3/12).

Site EF Hunter P-1 (Top Lt. 8/4/11; Top Rt. 11/14/11; Bottom Lt. 3/8/12; Bottom Rt. 4/3/12).

Site EF Hunter P-2 (Top Lt. 8/4/11; Top Rt. 11/14/11; Bottom Lt. 3/8/12; Bottom Rt. 4/3/12).

Appendix C. East Fork Hunter Creek - Constructed Wood Jams: Spring 2013

Site 1 – Facing right bank

Site 2 – Facing right bank

Site 3 – Facing downstream

Site 4 – Facing downstream

Site 5 – Facing upstream towards right bank

Site 6 – Facing right bank

Site 7 – Facing right bank

Site 8 – Facing right bank

Site 9 – Facing right bank

Site 10 – Facing downstream towards right bank

Site 11 – Facing left bank

Site 12 – Facing left bank

Site 13 – Facing right bank

Site 14 – Facing left bank

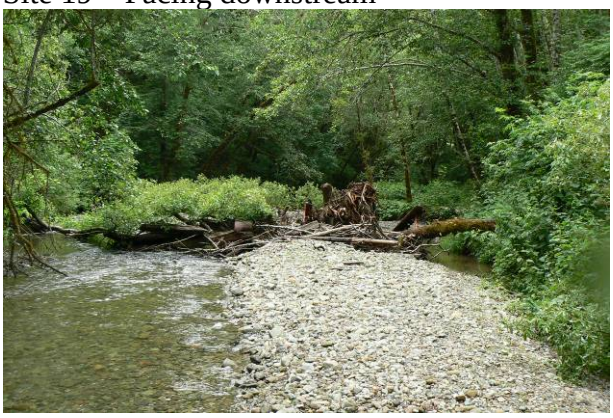
Site 15 – Facing downstream towards right bank

Site 16 – Facing left bank

Site 17 – Facing right bank

Site 18 – Facing right bank

Site 19 – Facing downstream



Site 20 – Facing upstream