Lower Klamath Sub-Basin Coordination & Planning - FYs 2014-2015

Annual & Final Progress Report: 10/01/15 – 09/30/16

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Agreement Numbers:
F14AP00345 – FY 14 – **Final Progress Report** (Yurok Project 5356)
F15AP00276 – FY 15 – **Interim Progress Report** (Yurok Project 5076)
F16AP00507 – FY 16 – **Interim Progress Report** (Yurok Project 6008)

Project Background & Accomplishments

Historically the Klamath River Basin contained bountiful anadromous fish runs, supporting indigenous peoples throughout the region. Anthropogenic activities over the last 150 years, coupled with natural events, have resulted in widespread degradation of native fish habitats and substantial declines in anadromous fish populations. The declining health and productivity of the Klamath River's anadromous fisheries is of great cultural and economic concern to the Yurok Tribe. To help address this decline, the Yurok Tribal Fisheries Program (YTFP) and Yurok Tribe Watershed Restoration Department (YTWRD) initiated a large-scale, coordinated watershed restoration effort in the Lower Klamath Sub-basin in the late 1990s. Restoration activities conducted have focused on decommissioning roads and removing stream crossings, planting native conifers in riparian habitats, installing constructed wood jams in fluvial habitats, and constructing complex off-channel habitats (e.g. alcoves, wetlands) in priority watersheds.

This report documents watershed assessment, planning, coordination, and restoration efforts conducted by YTFP and YTWRD in the Lower Klamath River Sub-basin during the period October 1, 2015 through September 30, 2016 (Agreements F14AP00345 & F15AP00276).

- **Restoration Planning & Effectiveness Monitoring**

During the project period, YTFP continued working with our restoration specialist Rocco Fiori (Fiori GeoSciences - FGS) to plan, prioritize, implement, and assess restoration effectiveness in the Lower Klamath River Sub-basin. Restoration priorities and treatment plans developed during the report period continued to be guided by fisheries research and effectiveness monitoring currently being conducted by YTFP, other basin partners (i.e. Karuk Tribe & Mid-Klamath Watershed Council), and other Pacific Northwest practitioners.

Klamath River Estuary and Blue Creek Climate Change Adaptation Planning

In 2016, YTFP was funded to conduct climate change adaption planning in the Klamath estuary and Blue Creek. To assist these planning efforts, YTFP went through a competitive bid process to hire Quantum Spatial Inc. (QSI) to acquire LiDAR for the estuary and the Blue Creek watershed. QSI is currently in the process of collecting this data and working in conjunction with our survey crews to establish benchmarks and collect elevation data in the vicinity of these benchmarks to help calibrate the LiDAR. For the estuary study, YTFP went through another competitive bid process and selected the Estuary Technical Group & Wolf Water Resources (ETG) to provide technical assistance and capacity building training opportunities related to climate change assessment and planning (i.e. sea level rise modeling, estuary mapping).

With staff from the Yurok Tribe Environmental Program (YTEP), FGS, and ETG, YTFP formed the Klamath Estuary Assessment Team (KEAT). In May 2016, KEAT held a two day kick off meeting in Klamath, California. The first day was spent on the river and in the off-estuary tributaries discussing habitat conditions and the Tribe's assessment programs (Figure 1). The second day was spent reviewing various data including the Tribe's SLAMM model for the estuary and developing a strategy to meet project goals. Following the Kick Off Meeting, YTFP and ETG held a conference call to discuss the Scope of Work and next steps. ETG is currently developing a DRAFT conceptual model of how the Klamath Estuary is functioning and

characterizing the various driving mechanisms of the system and potential future conditions (i.e. in the face of climate change and potential dam removal).

For the Blue Creek planning component, YTFP and FGS conducted a site visit to lower Blue Creek in winter 2016 to help document current conditions and obtain photographs. Based on this visit and previous studies, FGS developed a plan to conduct water table monitoring and sub-surface geotechnical investigations in the Blue Creek valley (Figure 2). YTFP then worked with the Yurok Cultural Department and the current landowner (Western Rivers Conservancy) to get the necessary approvals to move forward with well installation and sub-surface investigations.

West Fork Blue Creek

YTFP worked with the landowner Green Diamond Resource Company (GDRC), CA Department of Fish and Wildlife (CDFW) the State Water Quality Control Board, and the Yurok Cultural Department to conduct the necessary regulatory compliance tasks for the proposed West Fork Blue Creek habitat enhancement project. YTFP and YTWRD were recently funded to conduct a comprehensive road removal and stream enhancement project in this priority tributary. All state permits and requirements for the project are complete and the federal permits are in progress.

McGarvey Creek

In 2016, YTFP was funded to work with FGS to install and intensively monitor beaver dam analogues (BDAs) in two key locations within lower McGarvey Creek. YTFP is currently working with the landowner (GDRC), Yurok Cultural Department, and various state and federal resource agencies to conduct the necessary regulatory compliance tasks for the project. Anticipated benefits of the proposed BDAs include 1) increasing the amount of summer rearing habitat by storing surface waters and recharging ground water tables, 2) improving winter rearing conditions in mainstem McGarvey Creek by increasing the amount of slow velocity refuge areas, and 3) increasing rearing habitat resiliency to environmental perturbations such as seasonal and/or /pro-longed drought and potential future climate change impacts.

Stream Channel Monitoring

YTFP crews continued conducting topographic surveys of fluvial habitats within the Lower Klamath Sub-basin to document baseline conditions and to assess habitat changes following implementation of stream and riparian habitat restoration activities. This channel monitoring data allows us to quantitatively assess channel changes over time, document project performance, and guide future restoration in the Lower Klamath.

During this reporting period, YTFP survey crews completed the following topographic surveys:

Hunter Creek

- As-built survey of the 2015 restoration reach in Hunter Creek (Fall 2015)
- Post-project surveys of the 2015 restoration reach in Hunter Creek (Spring 2016)

Terwer Creek

- As-built survey of the 2015 restoration reach in Terwer Creek (Fall 2015)
- Post-project surveys of the 2015 restoration reach in Terwer Creek (Spring 2016)

Waukell Creek

- As-built survey of the 2015 restoration reach in lower Waukell Creek (Fall 2015)

Hoppaw Creek

- Baseline survey of the Lower Treatment Reach of Hoppaw Creek (Summer 2016)

Lower Klamath River

- YTFP staff used our Real Time Kinematic (RTK) GPS unit and optical total station to establish a highly accurate network of topographic survey benchmarks throughout the lower river and within the estuary and several priority tributaries including Hunter, Hoppaw, Waukell, Terwer, McGarvey, and Blue creeks. This network will be used to help calibrate data collected during the LiDAR flights and will also improve our stream monitoring efforts by providing us the opportunity to tie all our surveys to a single, accurate survey datum.

Off-Channel Habitat Monitoring

YTFP continued assessing habitat conditions, water quality, and fish use in newly constructed off-channel habitats (i.e. alcoves) in Hunter Creek, McGarvey Creek, and Terwer Creek to document post-restoration conditions (Silloway 2010; Silloway and Beesley 2011; Hiner et al. 2011; YTFP 2012 & 2013; Beesley and Fiori 2014). Coordinating habitat, water quality, and fisheries investigations greatly increase our understanding of habitat and fish response to restoration efforts and is invaluable for planning, implementing, and adapting fisheries restoration in the Lower Klamath River Sub-basin. YTFP is in the process of summarizing results and writing detailed case studies for the alcoves constructed in Lower Klamath tributaries. During spring 2016, YTFP monitored water quality in McGarvey Creek alcoves I, II, III, and IV.

YTFP has been working closely with our partners the Karuk Tribe and the Mid-Klamath Watershed Council to inform resource agency staff and other stakeholders of our off-channel habitat enhancement efforts (i.e. design/implementation process, monitoring results). Off-channel habitat enhancement is a fairly "new" restoration practice in California and we are among the only practitioners implementing these projects. Therefore there is a real need to share our approach and the lessons we are learning with the restoration community. Outreach efforts include leading field tours of our projects and presenting our work at various other forums.

- **Fisheries Restoration Field Tours, Presentations & Trainings**

In April 2016, our restoration consultant Rocco Fiori (FGS) gave two oral presentations at the 34th Annual Salmonid Restoration Federation Conference in Fortuna, California. The first presentation focused on the merits of beaver dam analogues (BDAs) as a restoration tool as well as discussed salmonid passage at natural beaver dams and constructed BDAs. The second presentation focused on YTFP and FGS wood loading techniques (i.e. CWJs) in Lower Klamath River tributaries. Rocco Fiori (FGS) also led over 20 participants on a field tour of our fisheries restoration work in Hunter Creek. Feedback from the participants was extremely positive.

In April 2016, Sarah Beesley (YTFP) and Rocco Fiori (FGS) attended a meeting in the Scott River with the Scott River Watershed Council (SRWC) and staff from both National Oceanic and Atmospheric Administration (NOAA) and California Department of Fish and Wildlife

CDFW. The purpose of this meeting was to tour the SRWC BDAs and discuss the benefits/potential concerns of these structures, the permitting process, and pathways forward. YTFP currently has funding to install a series of BDAs in the McGarvey Creek watershed and therefore this tour and the discussions with the various resource agency staff was invaluable.

In April 2016, Sarah Beesley (YTFP) attended a Klamath Basin Monitoring Program (KBMP) meeting in Klamath Falls. Sarah was asked to sit on a panel to discuss restoration in the basin. The session was titled: Restoration in the Big Picture: Achieving Watershed Scale Objectives and focused on how to define restoration goals and success at various scales, climate change and how that may influence restoration strategies/approaches, and restoration effectiveness monitoring. Other panelists included staff from the Natural Resources Conservation Service (NRCS), The Nature Conservancy, the Klamath Tribes, and U.S. Bureau of Reclamation (BOR).

Sarah Beesley (YTFP) attended a BDA workshop hosted by NOAA at Humboldt State University. Presenters included staff from SRWC, the Mattole River, and our restoration consultant Rocco Fiori (FGS). SRWC recently installed a number of BDAs in the Scott River watershed to promote improved conditions for native fish and wildlife and promote increased ground water recharge. Rocco Fiori has been working closely with this group to provide technical expertise on design and performance which was the focus of his presentation.

YTFP staff attended a GIS Workshop led by Yurok GIS staff. The workshop provided an overview of the Tribe's GIS data and instructions on how to access and use the Tribe's GIS data. In spring 2016, Yurok GIS staff also provided RTK training to YTFP survey crew staff.

In June 2016, Sarah Beesley (YTFP) and our restoration consultant Rocco Fiori (FGS) led a field tour of fisheries restoration and monitoring in the McGarvey Creek watershed to a group of Tribal students currently participating in the Klamath Basin Tribal Youth Program.

Sarah Beesley (YTFP) and our restoration consultant Rocco Fiori (FGS) led a field tour of fisheries restoration work in Terwer Creek to staff from the SRWC. We have been working closely with this group to support the transfer of information and learning with respect to habitat restoration within the Klamath Basin. SRWC is the first group in California to install BDAs to help increase habitat complexity, watershed/community resiliency, and ground water recharge.

In July 2016, Andrew Antonetti (YTFP) and Sarah Beesly (YTFP) participated in webinar training for the Pacific Coastal Salmon Recovery Fund (PCSRF) Database presented by Robert Markle and Brenden Sylvander from NOAA. The training covered creating records, revising entries, downloading reports, common errors, as well as an overview of the PCSRF Database.

Sarah Beesly (YTFP) lead staff from the California Department of Water Resources (DWR) and Humboldt County (HumCo) on a site visit of restoration work in Hunter Creek. YTFP and FGS are currently working on a comprehensive restoration project installing numerous CWJs and planting riparian trees in Hunter and Terwer creeks with funding via California Proposition 84. DWR and HumCo administer those funds and wanted to visit the site to review progress.

Sarah Beesley and Rocco Fiori (FGS) led staff from U.S. Fish & Wildlife Service (USFWS) and NOAA on a tour of the Hunter and Terwer restoration reaches. Both USFWS and NOAA have contributed grant funds for the habitat enhancement efforts currently underway in these streams.

- **Fisheries Restoration Implementation**

Stream and Floodplain Enhancement

During summer-fall 2016, YTFP and FGS conducted the following restoration activities in priority Lower Klamath tributaries: 1) installed nine additional constructed wood jams (CWJs) in Hunter Creek (East Fork to SubDivision CWJ Reach – Figures 3-5); 2) installed 16 additional CWJs and 22 large wood/willow post baffles in Terwer Creek (Terwer Gage CWJ Reach – Figure 6); and 3) constructed an off-channel wetland (i.e. Hoppaw Alcove I) and installed 10 CWJs in lower Hoppaw Creek (Lower Hoppaw Creek Reach – Figure 7).

Riparian Forest Restoration

YTFP continued operation of the Yurok Tribal Native Plant Nursery (YTNPN) at the Yurok Fisheries office in Klamath. The nursery and greenhouse provides quality employment opportunities with staff receiving training in native seed collection, germination and propagation, and other related nursery skills (e.g. installing water lines, operating greenhouse systems, maintaining stock, conducting inventories). The YTNPN currently provides native conifer and deciduous saplings and shrubs each year for Lower Klamath watershed restoration projects.

In winter 2016, YTFP planted 278 native trees in riparian habitats of lower Waukell Creek, 252 native trees in Terwer Creek, and 254 native trees in Hunter Creek. All of these trees were obtained from the YTNPN. In summer 2016, YTFP installed and watered numerous willow baffles in the 2016 Terwer Creek project reach. All the willow planted was selectively harvested from baffles planted in lower Terwer Creek by YTFP during the mid-2000s. The Terwer baffles are doing extremely well and can easily support selective thinning for restoration purposes.

Restoration Wood Timber Harvest

A critical limitation to implementing instream habitat restoration projects in the Lower Klamath is the difficulty obtaining high quality, whole tree materials, especially long stems with rootwads attached. We continued working with GDRC, YTWRD, and other organizations to obtain whole tree materials from local projects. In summer 2016, YTFP hired an American Indian (Yurok Tribe) owned company (JR's Wood Salvage) to harvest and deliver whole tree materials to Lower Klamath restoration sites. They delivered a total of 170 logs with rootwads (35-25 ft length) attached and an additional 327 manufactured logs (35-15 ft length). The trees were harvested from a GDRC timber harvest unit located in the Lower Klamath.

- **Watershed Restoration Implementation**

During winter 2015-2016, YTWRD road crews conducted storm inspections and cleaned inboard ditches and culverts to prevent sedimentation of tributaries on the Yurok Tribe's Phase I property and on other roads within the Yurok Reservation. Maintaining Yurok roads during storm events is a critically important land stewardship and resource and community protection measure.

During summer-fall 2016, YTWRD continued road decommissioning work in high priority locations in the Hunter Creek watershed. During the 2016 season, YTWRD decommissioned 2.50 miles of road, removed 20 stream crossings, and treated six mass wasting sites for a total of 31,736 cubic yards of sediment saved.

YTWRD also worked closely with the Trinity River Division of YTFP, BOR, and several other partners to implement the Bucktail Restoration Project on the Trinity River in Lewiston, California. YTWRD also helped supply the whole tree materials for this project as well as implemented the annual Salmonid Spawning Gravel Augmentation Project in the Trinity River.

- **Proposals Submitted**

YTFP Lower Klamath Division (LKD) submitted the following proposals:

U.S. Bureau of Reclamation Native American Affairs Funding (NAAP) **(Secured August 2016)**:
- Restoration and Planning for the Lower Klamath River Sub-basin - $80,000

National Fish & Wildlife Foundation (NFWF) (BOR Klamath Coho Fund) **(Secured June 2016)**:
- Increasing Rearing Capacity & Habitat Quality for Coho in McGarvey Creek - $108,910

Pacific Coastal Salmon Recovery Fund FY 2016 **(Secured Spring 2016)**:
- Lower Klamath Tributary Outmigrant Monitoring & Non-natal Stream Rearing - $80,000
- Increasing Salmonid Rearing Capacity & Habitat Quality in McGarvey Creek - $25,000

U.S. Fish & Wildlife Service (USFWS) Partners for Fish & Wildlife Program **(Secured Fall 2016)**:
- McGarvey Creek Habitat Enhancement Using Beaver Dam Analogues: Phase I - $47,834
- West Fork Blue Creek Instream & Riparian Restoration Project: Phase I - $55,491

U.S. Fish and Wildlife CFDA Program Funds **(Secured Summer 2016)**:
- Lower Klamath Sub-basin Coordination and Planning - $15,000

California Department of Fish and Wildlife Fisheries restoration Grant Program:
- Adult Coho Redd Surveys and Abundance Estimates in the Lower Klamath - $385,275
- McGarvey Creek Coho Salmon Life Cycle Monitoring Station - $460,913

U.S. Fish & Wildlife Service (USFWS) Yreka Area Office **(Secured Summer 2016)**:
- Watershed Restoration of Priority Lower Klamath Tributaries - $150,000

Department of Water Resources – California Proposition 84 Grant Fund: **(Secured Fall 2016)**
- Yurok Watershed Restoration and Drinking Water Security - $702,463

- **Meetings Attended**

YTFP and YTWRD held regular meetings throughout the project period to coordinate ongoing and future sub-basin assessment, monitoring, and restoration activities.

YTFP and YTWRD held regular meetings with GDRC during the project period. These meetings were held to discuss ongoing and future watershed assessment, monitoring, and restoration activities within the Lower Klamath River Sub-basin.

YTFP and YTWRD met on a regular basis with the Yurok Tribe Council during the project period to hold fisheries and watershed restoration related planning sessions; and to discuss and seek approval from the Council for proposed watershed restoration, assessment, and monitoring projects within the Lower Klamath River Sub-basin.

YTFP and YTWRD worked regularly with Rocco Fiori (FGS) during the project period to plan ongoing and future restoration, assessment, and monitoring projects in the Lower Klamath River.

YTFP and YTWRD staff met regularly with staff from the CDFW, BOR, NOAA, NFWF, and USFWS during the project period to discuss ongoing and future restoration projects/proposals, discuss project performance/techniques, and to conduct pre- and post-project reviews.

YTWRD attended an Aquatic Habitat Conservation Plan (AHCP) training put on by GDRC. The training focused on a review of AHCP requirements to help ensure compliance.

YTWRD coordinated with the NRCS regarding management and enhancement of Phase I lands.

YTFP and YTWRD staff worked with various Yurok departments to revise the Yurok Tribe Prevailing Wage Ordinance (YTPWO). Several sub-committees were formed to address issues related with the Yurok Tribe's current PWO. The YTPWO working group also met with Yurok heavy equipment operators to review the new ordinance and solicit feedback prior to Council approval. The new YTPWO was completed in late spring 2016 and included detailed job descriptions, evaluation criteria, and a new wage scale with three grades and multiple steps.

In late November 2015, California Department of Transportation (CALTrans) reported a contaminant (cement/grout) spill into Waukell Creek resulting from an "emergency" culvert replacement project. Immediately following the spill, YTFP and YTEP staff began monitoring the impacts. The spill resulted in numerous fish and amphibian mortalities; however, the number and extent of the mortalities remains unknown. Yurok staff met with CalTrans several times following the spill to discuss the issue and potential remediation measures. Yurok staff also met several times with staff from CDFW, State Water Quality Control Board, and NOAA to discuss the spill and next steps. CDFW enforcement staff filed criminal charges regarding the spill but the outcome of these efforts are pending. Water quality monitoring indicated the impacts were immediate (i.e. ~48-72 hours); however, there was no clear way to determine the severity and long-term impacts. We are currently awaiting the outcome of CDFW's criminal charges but plan to press CalTrans to provide some form of meaningful remediation (i.e. habitat mitigation). YTFP coordinated with CalTrans regarding their proposal to replace the U.S. Highway 101 bridges over Panther Creek and Hunter Creek. CalTrans is required to replace the existing

structures to meet earthquake safety standards. YTFP provided fisheries and habitat information for the area, reviewed and provided comments regarding the designs and environmental documents associated with the project, and closely coordinated with CalTrans to help ensure resource impacts are avoided or minimized and adequately mitigated if deemed necessary.

YTFP continued participating in the Pacific Marine and Estuarine Fish Habitat Partnership (PMEP). PMEP is one of 19 nationally recognized partnerships whose mission is to work with partners to protect, enhance, and restore ecological processes and habitats within California, Oregon, and Washington estuaries and nearshore marine environments to sustain healthy native fish communities and support sustainable human uses that depend on healthy fish populations. Sarah Beesley (YTFP) has served on the PMEP steering committee since 2010. During this reporting period, Sarah participated in a PMEP webinar that focused on steering committee composition and the need for more Tribal representation, PMEP's estuary mapping project, updates on projects that PMEP has provided funding, and scheduling of the next meeting.

Sarah Beesley (YTFP) participated in the annual Peer Review Committee (PRC) proposal ranking meeting in Chico, California. The role of the PRC is to review and score proposal applications for CDFW's Fisheries Restoration Grant Program (FRGP).

YTFP continued participating in CDFW's Coho Recovery Team (CRT) which is comprised of numerous California stakeholder groups focused on species recovery.

YTFP restoration staff met with various Yurok departments (YTWRD, YTEP, Forestry, and Wildlife) and Western Rivers Conservation staff to coordinate development of the Phase II Land Acquisition Management Plan. A DRAFT plan was completed in December 2015.

YTFP worked closely with staff from the BOR, Karuk Tribe, Larry Lestelle, Mid-Klamath Watershed Council to plan and implement the Klamath River Coho Salmon Ecology Study.

YTFP continued coordinating with YTEP as part of their Lower Klamath Wetland Program.

- **YTFP Lower Klamath Division Project Reports Completed**

Beesley, S. 2015. Lower Klamath Sub-basin Coordination & Planning – FYs 2013-2014. Yurok Tribal Fisheries Program, Klamath, California.

Beesley, S. and R. Fiori. 2015. Salmonid Habitat Restoration in the Lower Klamath Sub-basin. Yurok Tribal Fisheries Program, Klamath, California.

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Beesley, S. and R. Fiori. 2014. Enhancement of Rearing Habitat for Natal and Non-Natal Salmonids in McGarvey Creek - Lower Klamath River. Yurok Tribal Fisheries Program, Klamath, California.

Hiner, M., S. Silloway, A. Antonetti, and S. Beesley. 2011. Lower Klamath Tributaries Riparian Restoration Projects and Yurok Tribal Native Plant Nursery. Yurok Tribal Fisheries Program, Klamath, California.

Silloway, S. 2010. Fish Surveys Related to the Proposed Del Norte Highway 101 Klamath Grade Raise Project. Yurok Tribal Fisheries Program, Klamath, California.

Silloway, S. and S. Beesley. 2011. Fish Surveys Related to the Proposed Del Norte Highway 101 Klamath Grade Raise Project: Addendum Report 2010-2011. Yurok Tribal Fisheries Program, Klamath, California.

Yurok Tribal Fisheries Program. 2012. Juvenile coho salmon use of constructed off-channel habitats in two Lower Klamath River tributaries: McGarvey Creek & Terwer Creek. Yurok Tribal Fisheries Program, Klamath, California.

Yurok Tribal Fisheries Program. 2013. Juvenile coho salmon use of constructed off-channel habitats in two Lower Klamath River tributaries: McGarvey Creek & Terwer Creek. Yurok Tribal Fisheries Program, Klamath, California.

Figure 1. Photographs of the Klamath Estuary Assessment Team during the Kick Off Meeting in Klamath, California (Left: Micah Gibson (YTEP) describing the stream gage station located in the Lower Klamath River, Right: Staff from the Estuary Technical Group exploring the South Slough).

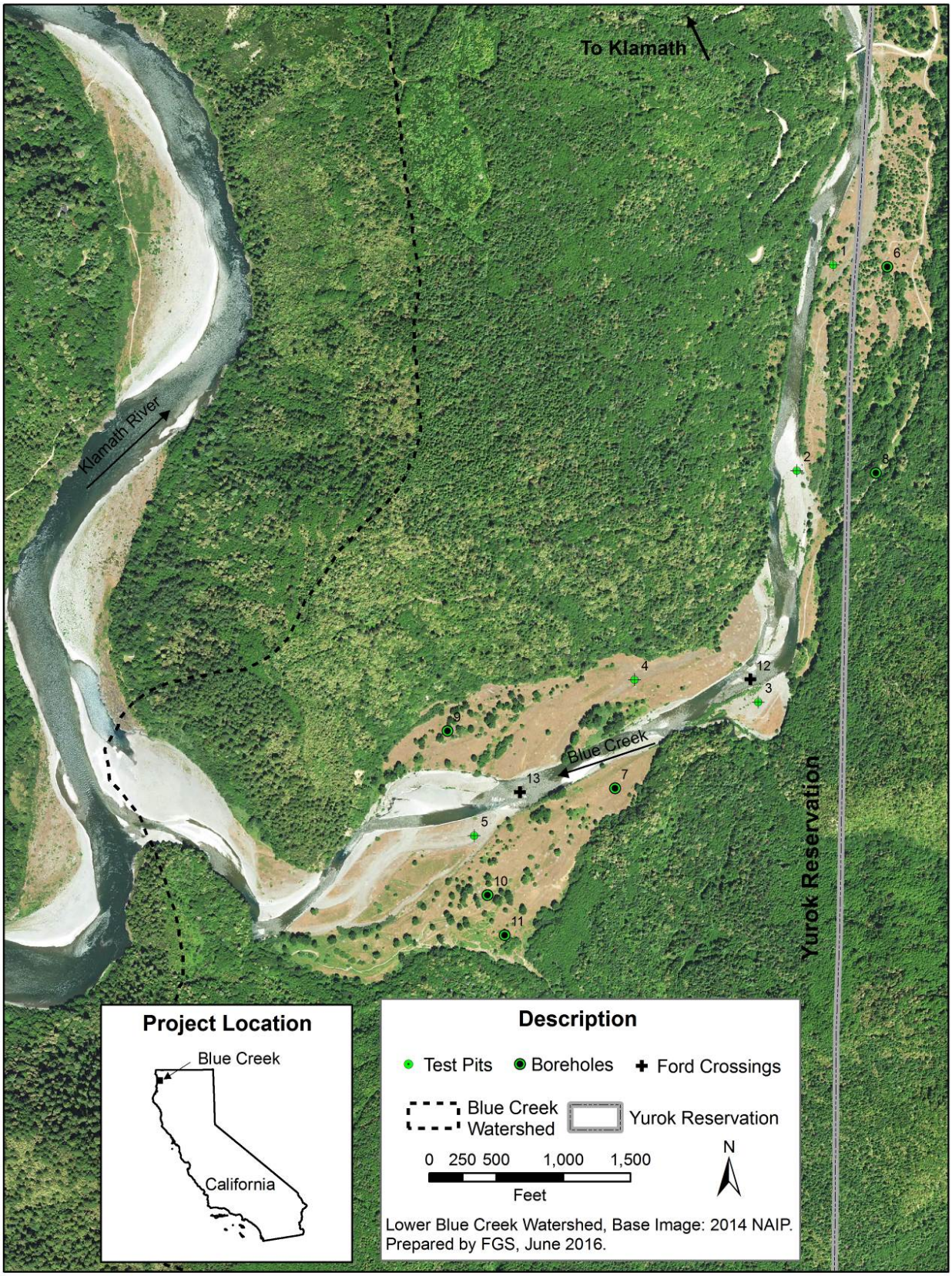

Figure 2. Lower Blue Creek geotechnical investigation project location map.

Figure 3. Constructed wood jams in Hunter Creek during a high flow event (03/20/16).

Figure 4. A constructed wood jam (Chaos Jam) in Hunter Creek (04/04/16).

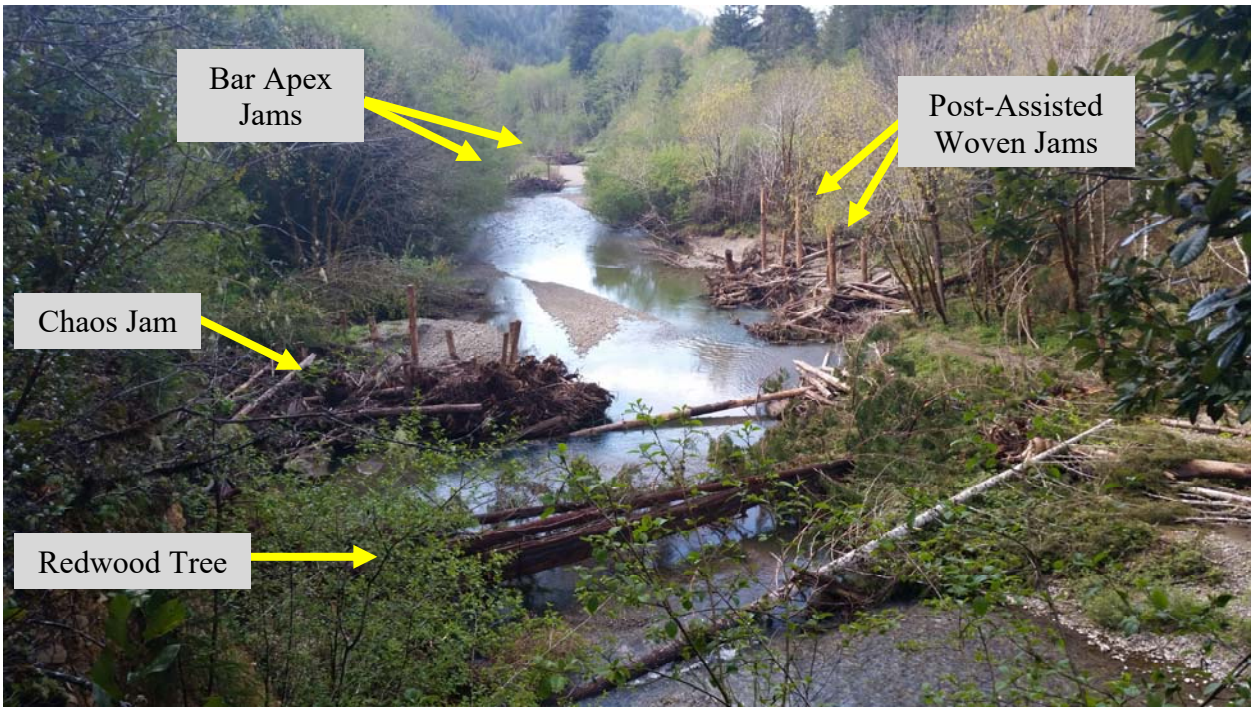

Figure 5. Constructed wood jams and newly recruited redwood tree in Hunter Creek (04/04/16).

Figure 6. A bar apex jam in Terwer Creek prior to construction (Top – March 2016), during installation (Middle – October 2016), and post-construction (Bottom – December 2016).

Figure 7. Hoppaw Creek Alcove I at the start of construction (Top – 10/11/16) and during a high flow event post-construction (Bottom – 12/15/16) (Note: red box demarks the same alder tree).