September 28, 2017

Betsy Stapleton
Scott River Watershed Council
591-C Collier Way
Etna, CA 96027

Dear Ms. Stapleton:

Subject: Notice of Applicability (NOA) for Coverage under the State Water Resources Control Board General 401 Water Quality Certification Order for Small Habitat Restoration Projects SB12006GN

File: Lower Sugar Creek Beaver Dam Analogue Project
CW-840314; WDID No. 1A171760WNSI

This letter is to certify coverage of the Scott River Watershed Council's (SRWC) Lower Sugar Creek Beaver Dam Analogue Project (project) under the General 401 Water Quality Certification Order for Small Habitat Restoration Projects (SHRP Order); Order No. SB12006GN. The proposed project includes construction of three new beaver dam analogues (BDAs); conducting maintenance work on three existing BDAs; and allows for construction of up to a maximum of 15 additional structures following specified adaptive-management procedures, within Sugar Creek, a tributary to the Scott River watershed.

Project Goals:
The SRWC developed the project to accomplish the following objectives: (1) maintain and expand the critically needed summer and winter slow water juvenile coho rearing habitat created by the existing Sugar Creek BDAs; (2) improve fish passage between the mainstem Scott River and the existing Sugar Creek BDA 0.1 habitat; (3) provide stability for the existing Sugar Creek BDAs; and (4) allow for ongoing adaptive management for current and future site changes.

Background:
On September 27, 2017, the North Coast Regional Water Quality Control Board (Regional Water Board) received a Notice of Intent (NOI) from the Scott River Watershed Council

(applicant) to comply with the terms of, and obtain project coverage under, the SHRP Order.

Project Location:

The project is located in Sugar Creek, a tributary to the Scott River watershed in Siskiyou County (Figure 1). The Scott River watershed is listed as impaired under the Section 303d of the federal Clean Water Act for excess sediment and elevated temperatures. In 2006, the Regional Water Board adopted the Action Plan for the Scott River Watershed Sediment and Temperature Total Maximum Daily Loads (TMDLs). The Scott River TMDLs were developed with the goal of recovering the beneficial uses of the watershed, including the populations of native anadromous salmonids like Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), and steelhead trout (*Oncorhynchus mykiss*).

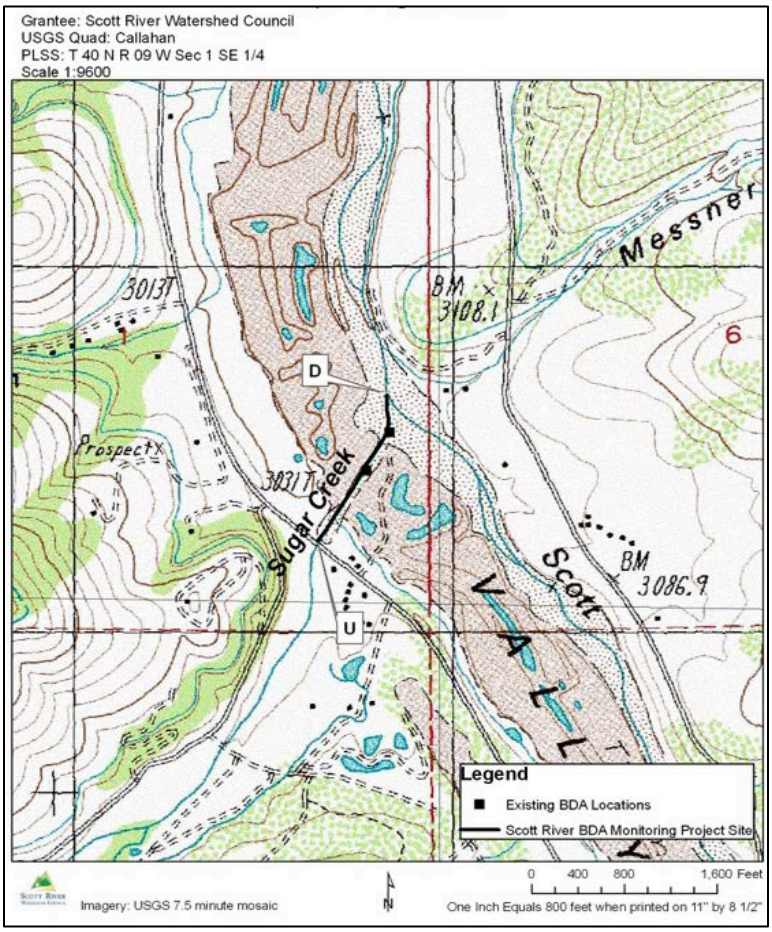


Figure 1. Project location

Project Inspection:

On June 21, 2017, Regional Water Board staff participated in an inspection of the proposed project during a BDA workshop hosted by the SRWC. Present during the inspection were: Jonathan Warmerdam and Jake Shannon of the Regional Water Board; staff from the California Department of Fish and Wildlife (CDFW) and National Marine Fisheries Service (NMFS); environmental consultants; and SRWC staff.

The purpose of the inspection was to exhibit the resulting environmental change that occurred following BDA construction and maturation. Additionally, the SRWC detailed the changes that had occurred following the previous winter period, provided insights into adaptive management considerations, and discussed future opportunities for implementation of additional structures.

Of particular concern to the SRWC was the increasing gradient that had developed below the primary, existing BDA 0.1 on Sugar Creek. A combination of high-winter flows, channel bed scour, and increasing thalweg depths on the Scott River mainstem may be contributing towards a steepening of the channel below the BDA. This steepening poses a threat to the integrity of the upper BDA structure during future winter flows and is also a concern relative to summertime migration ability of juvenile salmonids.

On September 21, 2017, staff from the CDFW, NMFS, U.S. Fish and Wildlife Service, and Scott River Watershed Council conducted an additional inspection of the project area. Regional Water Board staff were not present during the inspection. However, Regional Water Board staff have been working closely with CDFW to evaluate the potential for significant effects from the project, including barriers to fish migration that may be created from any proposed new structures.

On September 26, 2017, CDFW staff notified the Regional Water Board that:
"the Department has evaluated the proposed actions proposed by the SRWC for stabilization of the existing structures at Sugar Creek. Based on recent interactions and discussions the Department feels that fish passage can likely be achieved utilizing side channel flows. In the case of Sugar Creek there are multiple pathways identified that provide passage during certain flows. The Department will work with SRWC on additional protectionary measures and operational measure needed pursuant to 1653 Section (b)(4). These measures will include more specificity on how the channels are operated and when fish passage is required based on site specific conditions."

Project Description:

The project proposes to construct two additional BDAs downstream of an existing, primary structure (shown below in Figure 2 as BDA RKM 0.1) on Sugar Creek and above the mainstem of the Scott River. Changes in the channel topography and slope below the primary BDA has destabilized the structure and may be presenting a partial barrier to migration for juvenile salmonids at certain flow regimes. The primary design principle (see below in Figure 3) for the initial project work is to provide backwater pools leading upstream to BDA 0.1 to "cushion" overtopping flows under high-flow conditions and to decrease scour below BDA 0.1. To achieve these objectives, the SRWC is proposing to install secondary and tertiary BDA structures approximately 15 and 30 feet downstream (respectively) from the primary BDA 0.1.

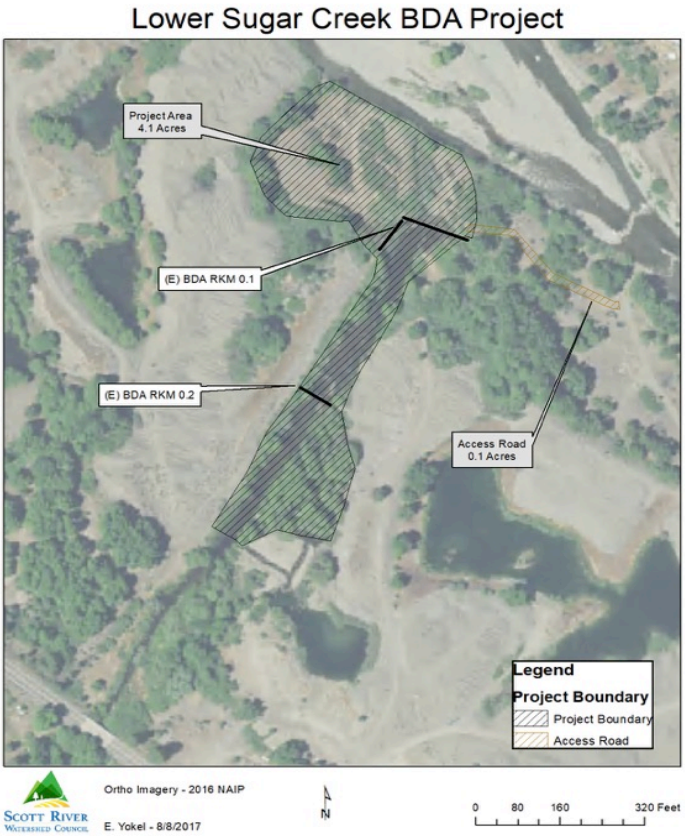
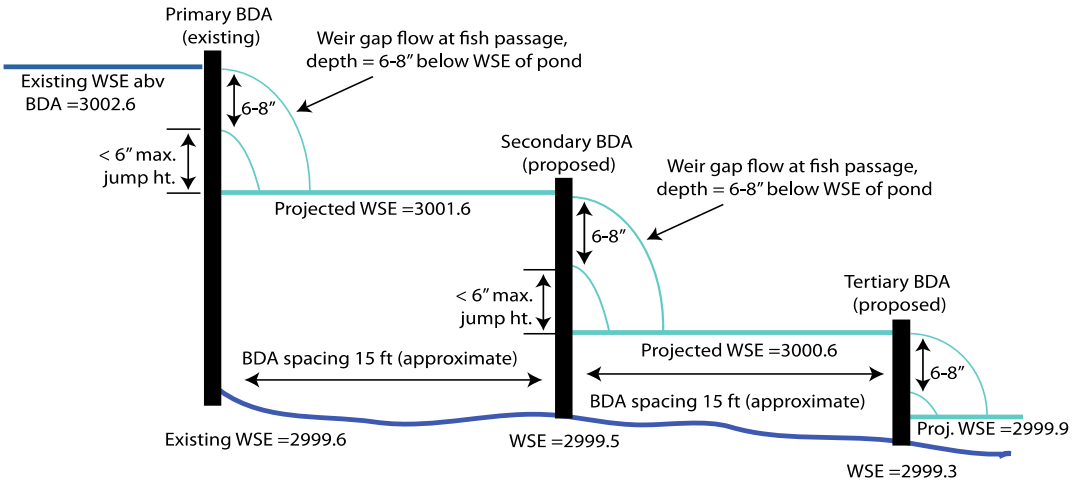


Figure 2. Project area

The construction of the additional BDAs is also intended to create a series of step pools below BDA 0.1 to allow juveniles to migrate up Sugar Creek and around the primary structure. Upstream of BDA 0.1 is a large impoundment pool that provides favorable habitat for juvenile salmon and trout.

Up to a total of 20 cubic yards of rock and/or cobble material will be either obtained onsite or locally sourced from a commercial distributor to be incorporated across the project BDAs in October 2017. Additionally, up 20 cubic yards of smaller sediments may be incorporated into the BDAs to minimize permeability and promote groundwater recharge. Construction of the BDAs will include a matrix of varying sized sediment materials intermixed with straw to reduce permeability. Up to 126 non-treated fir posts will be installed in October 2017.

An additional post-line and wicker-weave BDA will be constructed on a vegetated gravel bar on the northwest side of the primary BDA 0.1. This additional structure will help maintain winter period high-flows in the Sugar Creek main channel and river left side-channel.



Notes:
1. BDAs should have a weir gap flow depth of 6-8" at low flow to ensure max. 6" "jump" height.
2. Use cobble at base of BDAs to minimize scour.
3. Weave BDAs and seal structure using organic material, gravel, sand and silt as described in the USFWS/NOAA/USFS Beaver Restoration Manual.
4. BDA spacing and heights are approximate and will need to be field fitted.
5. WSE below lowest BDA will be elevated approximately 6-8" by local scour and subsequent downstream deposition.

Figure 3. Sugar Creek BDA construction designs

In addition, the project will conduct repairs to the existing primary BDA 0.1 to address post placements lost in the spring high flows of 2017. Handwork repairs were conducted to address some structural damage at the site during the summer 2017, but additional vertical post installation will occur to prevent further high-flow damage to the primary BDA. The applicant will drive 9 to 12 additional vertical posts downstream of the existing structure with a vibratory plate mounted on an excavator. Locally sourced stream cobbles will be placed as an apron below the BDA to reduce the scouring force of overtopping flows.

BDAs will be installed by driving a series of untreated fir or pine posts into the channel bottom perpendicular to flow across the side-channel, and extending laterally up both banks. Posts will be installed at approximately 1-foot spacing, and shall be driven several feet into the substrate.

Locally harvested willow branches will be collected from both within the riparian zone and from off-site at pre-approved harvest locations. All nesting bird protection measures will be followed. Willows are harvested and woven between the posts to form a basket-like structure across the side-channel at each BDA site. Willow will be harvested at a rate of not more than 30% of the vegetative coverage at any site. This may consist of removal of 30% of an individual clump, or entire clumps at not greater than 30% of the number of clumps based on the density, age and vigor of the plants. All willow harvest sites, whether at actual structure site, or at alternative harvest sites, will be identified for review by CDFW staff, or

similarly qualified biologist, prior to the start of willow harvest to determine the presence of potential occupation by Willow Flycatcher.

Additionally, SRWC proposes to construct up to an additional 15 BDAs during future years as the project site evolves. The applicant will submit annual workplans to the Regional Water Board and CDFW for review and approval for all future BDAs. Estimates of materials to be introduced or "discharged" into waters of the state are for all proposed 2017 activities as well as all potential future BDAs at the project site.

The project includes a description of Construction, Adaptive Management Guidelines, and Best Management Practices. As described in the attachment to the Notice Of Intent (NOI, application form), the project will allow for adaptive management of constructed BDAs per the techniques and methods described in the "2015 Beaver Restoration Guidebook" (U.S. Fish and Wildlife Service (Janine Castro), National Oceanic and Atmospheric Administration (Michael Pollock and Chris Jordan), Portland State University (Gregory Lewallen), U.S. Forest Service (Kent Woodruff) and/or under the direction and supervision of Dr. Michael Pollock, beaver guidebook principal author.

As proposed in the project attachment and described in the Beaver Restoration Manual, adaptive management strategy will generally adhere to the following principals: "BDAs are intended to mimic beaver dams, they require ongoing maintenance and repair, similar to beaver dams. The amount and type of maintenance needed depends on project objectives. Typical maintenance includes extending the length of the structure as a result of end cutting, replacing sections that have been damaged (often from under-scour), and raising the height of a structure, typically by constructing a new BDA on top of the sediment wedge that has accumulated upstream of an existing BDA."

The proposed project includes a series of environmental impact avoidance and minimization measures with conditions associated with:

1. Wet weather restrictions based on local forecasts.
2. Seasonal work window limitations (June 15 to October 15).
3. Worksite notification and compliance.
4. Visual downstream turbidity monitoring to limit impacts on water quality.
5. Monitoring to avoid disturbance of adult salmonids and redds.
6. Minimization of stream zone impacts and disturbance to riparian vegetation.
7. Willow Flycatcher protections.
8. General habitat protection measures.
9. Petroleum, chemical, and other pollutants storage, use, and measures to prevent accidental spills.
10. Erosion and sediment controls.

The NOI includes a description of the existing Scott River BDA Monitoring Program which applies to other BDA projects in the watershed. The applicant is proposing to incorporate the BDAs under the proposed project into this larger Monitoring Program if additional

funding is obtained. The Scott River BDA Monitoring Program includes several monitoring parameters related to: adult and juvenile fish passage across BDAs, stream temperatures above and below BDAs, dissolved oxygen, beaver naturalization of structures, pre- and post- aerial surveys of vegetative cover, and hydro-geomorphic changes in habitat.

Project Size:
The total temporary impacts associated with all proposed 2017 project activities as well as construction of up to 15 additional BDAs is estimated to be 4.56 acres and 420 linear feet. The applicant has provided the calculations used to determine the total size of the project. The proposed project size does not exceed what is allowed for coverage under the General 401 Water Quality Certification Order for Small Habitat Restoration Projects and associated Categorical Exemption (15333) from the California Environmental Quality Act.

Project Associated Discharge:
Estimates of materials to be introduced or discharged into waters of the state are for all proposed 2017 activities as well as all potential future BDAs at the project site. The discharge of materials into waters of the state resulting from the project includes those associated with the posts, willow, cobble and rock, local sediment, and straw.

Project Time Frame
Proposed project start date: September 2017
Expected date of completion: September 2022
Seasonal work window: June 15 to October 31

Monitoring Plan:
The applicant proposes to collect information regarding project outcomes and measurable performance standards to achieve several specific goals. The project is seeking to create approximately 0.5 acres of slow water habitat, monitor the utilization of the newly created habitat by anadromous salmonids, and identify the effects of BDA installation on groundwater and surface water habitats.

The monitoring plan is adaptive in nature, and depends in part on the acquisition of additional public funding assistance in order to be incorporated into the larger, Scott River BDA Monitoring Program. Absent the additional funding acquisition (and the larger proposed deliverables from the Scott River BDA Monitoring Program), the project must still conduct monitoring and reporting to achieve reasonable performance measures.

At a minimum, the project shall include the following monitoring and reporting elements:

1. Quantitative monitoring of groundwater elevation pre- and post- construction;
2. Qualitative pre- and post-project photos at defined photos points;
3. Beaver utilization monitoring;
4. Geomorphic change analyses, including longitudinal profiles and cross-sections;
5. BDA structural stability reports; and
6. Salmonid fish passage assessment for juveniles.

Seasonal Work Plan:
SRWC will submit a work plan for construction of ancillary structures or major repair activities to NCRWCQB and CDFW at least 30 days prior to the proposed work window. The work plan will provide details on specific construction activities for each project site, including equipment type, materials, access and BMPs. NCRWCQB and CDFW will work with SRWC to provide a notice to proceed (NTP) within 30 business days of receiving the work plan. Construction will not commence until the NTP is received and the BMPs are in place.

Notice of Applicability & Project Determination:
Regional Water Board staff has determined that the proposed activities as described in the NOI are categorically exempt from CEQA review and may proceed under the General 401 Water Quality Certification Order for Small Habitat Restoration Projects.

Receiving Water:	Sugar Creek Scott River Hydrologic Area 105.40
Total Project Size:	4.56 acres
Acreage Temporarily Impacted:	4.56 acres
Length Temporarily Impacted:	420 linear feet
Discharge Volume:	400 wooden posts 180 cubic yards of willow material 60 bales of straw or hay <180 cubic yards of fine grained material <180 cubic yards of washed cobble/gravel
Latitude/Longitude:	41.341791°N / 122.824080°W

SHRP Order Special Conditions:
Section D of the SHRP Order includes special conditions that apply to all authorized projects. In particular, the following special conditions D(1) and D(4)are emphasized relative to the project and must be achieved for authorization to proceed under the SHRP Order:

> 1. Other Permits – This Order does not relieve the project applicant from the responsibility to obtain other necessary local, state, and federal permits, nor does this Order prevent the imposition of additional standards, requirements, or conditions by any other agency.

4. Endangered, Threatened, Candidate, Rare, Sensitive, or Special Status Species – The project will not result in a taking, either directly or through habitat modification, of any plants or animals identified as endangered, threatened, candidate, rare, sensitive or special status species in local or regional plans, policies, or regulations or by CDFW, the U.S. Fish and Wildlife Service, or the National Marine Fisheries Service, unless the take is authorized by those agencies.

Reporting:
As required in Section B, Item 4, of the General 401 Water Quality Certification Order for Small Habitat Restoration Projects, Monitoring Reports shall be submitted at least annually documenting the achievement of performance standards and project goals. In addition, a Notice of Completion (NOC) shall be submitted by the applicant no later than 30 days after the project has been completed. A complete NOC includes at a minimum: photographs with a descriptive title, the date each photograph was taken, the name of the photographic site, the WDID number indicated above, and success criteria for the project. The NOC shall demonstrate that the project has been carried out in accordance with the project description as provided in the applicant's NOI. Please include the project name and WDID number with all future inquiries and document submittals. Document submittals shall be made electronically to: NorthCoast@waterboards.ca.gov

The State Water Resources Control Board General 401 Water Quality Certification Order for Small Habitat Restoration Projects SB09016GN can be found here: http://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/generalorders/shrpcert032713.pdf

Please call Jonathan Warmerdam at (707) 576-2468 or Jake Shannon at (707) 576-2673 if you have any questions.

Sincerely,

Fred Blatt
for Water Boards
Digitally signed by Fred Blatt
Date: 2017.09.28 16:35:12 -07'00'

Matthias St. John
Executive Officer

170928_JWW_er_SRWC_Lower Sugar Creek BDA

Enclosure: NOI for Lower Sugar Creek BDA

cc: Michael R. Harris, California Department of Fish and Wildlife
Michael.R.Harris@wildlife.ca.gov
Curt Babcock, California Department of Fish and Wildlife
Curt.Babcock@wildlife.ca.gov
Clifford Harvey, State Water Resources Control Board
Clifford.Harvey@waterboards.ca.gov
Jennifer Siu, U.S. Environmental Protection Agency
Siu.Jennifer@epa.gov

State Water Resources Control Board

Division of Water Quality, 1001 I Street, 15th floor• Sacramento, California 95814 • (916) 341-5455
Mailing Address: P.O. Box 100 • Sacramento, California • 95812-0100
FAX (916) 341-5463 • Internet Address: http://www.waterboards.ca.gov/

NOTICE OF INTENT
TO COMPLY WITH THE TERMS OF GENERAL 401 WATER QUALITY CERTIFICATION ORDER FOR SMALL HABITAT RESTORATION PROJECTS

ORDER NUMBER: SB12006GN

Regional Water Quality Control Board (Regional Water Board) and State Water Resources Control Board (State Water Board) - *FOR AGENCY TRACKING USE ONLY*			
WDID:	*Regional Board Office:*	*Date NOI Received:*	*Check No:*

I. NOTICE OF INTENT STATUS

MARK ONLY ONE ITEM:	☐New Application ☐Change of Information for WDID#_____ ☐ Coho HELP Act Project

II. PROJECT and APPLICANT INFORMATION

Project Title:	**Lower Sugar Creek BDA**		
Applicant Name:	**Scott River watershed Council**		
Business/Agency:	Click here to enter text.		
Street Address:	**520 Collier Way**		
City, County, State, Zip:	**Etna, Siskiyou, Ca. 96027**		
Telephone:		Fax	Click here to enter text.
E-mail:	Click here to enter text.		

III. PROPERTY OWNER ☐ **Check Box if Same As Above**

Name:			
Street Address:			
City, County, State, Zip:	Click here to enter text.		
Telephone:		Fax	Click here to enter text.
E-mail:			

IV. PROJECT LOCATION

A. Address or description of project location.				
B. Check box to verify that a map of at least 1:24000 (1" = 2000') detail of the proposed project site (e.g., USGS 7.5 minute topo map) is enclosed:			☐ Project Map Enclosed	
C. County:				
D. Assessor's Parcel No.:				
E. Coordinates (*If available, provide at least latitude/longitude or UTM coordinates. Check appropriate boxes)*				
Latitude/Longitude:	*Latitude:*	**Several, see attached project description**	*Longitude:*	Click here to enter text.
	Degrees/Minutes/Seconds ☐ Decimal Degrees ☐ Decimal			
UTM coordinates:	*Easting:*	Click here to enter text.	*Northing:*	Click here to enter text.
Datum or UTM	☐ NAD 27 ☐ NAD 83 or WGS 84			
F. River(s), stream(s), lake(s), or wetland(s) affected by the project:	Sugar Creek			
G. Name the receiving watershed or water body:	**Scott River**			
H. Is the river or stream segment affected by the project listed in the state or federal Wild and Scenic Rivers Acts?	☐ yes ☐ no ☐ Unknown			
I. Is the watershed listed as impaired under Section 303(d) of the Clean Water Act?	☐ yes ☐ no	Pollutant Category(ies): **Temperature, sediment**		
J. Has a Total Maximum Daily Load been established for the impairment?	☐ yes ☐ no ☐ Unknown	TMDL Name: **Action Plan for the Scott River Watershed Temperature and Sediment TMDLs**		

V. PROJECT INFORMATION

A. What is the primary purpose for the project? (*check one or more boxes below)*
☐ Fish Habitat Improvement ☐ Wetland Restoration ☐ Native Plant Restoration ☐ Bioengineering ☐ Barrier Removal ☐ Stream Bank Stabilization ☐ Sediment Control Project ☐ Invasive Plant Control ☐ Large Woody Material Enhancement ☐ Watercourse Crossing Replacement ☐ Other: Click here to enter text.

V. PROJECT INFORMATION (Cont.)

B. Estimated Project Term:	Beginning (Month / Year)	**9/2017**	Ending (Month / Year)	**9/2022**
C. Seasonal Work Period:	**June15-Oct31**			
D. Estimated Total Number of Work Days:	**20**			

E. Describe the project in detail and enclose diagrams, drawings, plans, and/or maps that provide all of the following: site specific construction details; dimensions of each structure; extent of activity in the bed channel, bank or floodplain; where equipment will enter or exit the area, if applicable, project overview showing the location of each structure and calculations at each site of area of disturbance. (*Attach additional sheets as needed*).

See Attached Project Description

F. Specify the equipment and machinery (if any) that will be used to complete the project. Describe in detail the measures that will be taken to prevent discharges and spills of oil, grease, and other petroleum products.

See Attached Project Description

G. Will water be present during the proposed work period:	☐ yes ☐ no ☐ Unknown
H. Will the proposed project require work in the wetted portion of the channel? If yes, please describe the work that will be required, the type of equipment to be used, whether the channel will need to be dewatered, and how long equipment will be in the wetted portion of the channel.	☐ yes ☐ no ☐ Unknown

See Attached Project Description

I. Verify that the project is not part of a compensatory mitigation project (e.g. Cleanup and Abatement Order, Supplemental Environmental Project, etc.).	☐ I verify this to be true.
J. Verify that the primary project purpose is habitat restoration. This project is not proposed as part of a larger project whose primary purpose is not habitat restoration (e.g. land development or flood management).	☐ I verify this to be true.
K. Verify that this project shall not exceed five acres or 500 linear feet of stream bank or coastline.	☐ I verify this to be true.

VI. DISCHARGE INFORMATION

A. Within the box provided below, identify the type(s) of material that are proposed to be introduced, or "discharged" into Waters of the State as a result of the project.

☐ Soil ☐ Rock Rip-Rap ☐ Native Vegetation ☐ Non-native Vegetation ☐ Large woody material
☐ Rootwads ☐ Erosion Control Materials (jute netting, straw wattles, etc.) ☐ Culverts
☐ Anchoring (bolts, cables, rebar, chains, etc.) ☐ Fertilizers ☐ Pesticides[1]
☐ Other: **Posts, willow, herbaceous material, rock, cobble, fine sediment.**

B. For each of the materials identified above, identify the volume or quantity of material that is intended to be introduced or "discharged" into Waters of the State. Declare whether or not the material type is expected to cause a "temporary" or "permanent" effect. Include estimates of incidental material discharges that may occur from project implementation, or as a result of post-project adjustment.

Material Type	Volume or Number	Temporary Effect	Permanent Effect
1. **Posts**	**400**	☐ yes ☐ no	☐ yes ☐ no
2. **Willow or similar**	**180 Cubic Yards**	☐ yes ☐ no	☐ yes ☐ no
3. **Straw or hay**	**60 bales**	☐ yes ☐ no	☐ yes ☐ no
4. **Rock/cobble**	**<180 CY**	☐ yes ☐ no	☐ yes ☐ no
5. **Fine grained material**	**<180 CY**	☐ yes ☐ no	☐ yes ☐ no

C. In the space provided below, describe the intended purpose, or reason for the discharges associated with each of the material type(s) listed above:

Build Beaver Dam Analogues by pounding posts, weaving willow, building berms with rock, cobble, straw and fine grained material.
See Project description for detail.

[1] The point source discharge of aquatic pesticides into Waters of the United States requires a separate National Pollutant Discharge Elimination System (NPDES) permit administered by the State Water Resources Control Board. Information about pesticide permits can be found at the following Web address: http://www.waterboards.ca.gov/water_issues/programs/npdes/aquatic.shtml

VII. PROJECT SIZE

A. For each of the applicable water body type(s) listed below, indicate the area(s) in ACRES and LINEAR FEET that will be affected by the project and identify the impact(s) as permanent or temporary. For project disturbance outside of Waters of the State, estimate the total disturbance in acres (lineal feet does not apply) as "Non-jurisdictional Areas."

☐ *Project Size Calculator is attached.*

Water Body Type	Temporary Impact		Permanent Impact	
	Acres	Lineal Feet	Acres	Lineal feet
Wetland	Click here to enter text.		Click here to enter text.	Click here to enter text.
Riparian	**4.2**	Click here to enter text.	Click here to enter text.	Click here to enter text.
Streambed/Stream bank	Click here to enter text.	**420**	Click here to enter text.	Click here to enter text.
Lake/Reservoir	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Ocean/Estuary/Bay	Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Non-jurisdictional Areas[2]	Click here to enter text.	.36 acres	Click here to enter text.	
TOTAL AREA AFFECTED:	Click here to enter text.	4.56 acres	Click here to enter text.	Click here to enter text.

B. Additional information relative to Project Size can be included in the space provided below:

See Project description.

[2] The categorical exemption for small habitat restoration projects (Title 14, California Code of Regulations, Division 6, Chapter 3, *Guidelines for Implementation for the California Environmental Quality Act* (CEQA), Article 19, section 15333) requires projects to be no more than 5 acres in size. Total project size for the Categorical Exemption for permitting from the Disturbance estimates for "Non-jurisdictional Areas" are included for the purpose of coordinating project size with the California Department of Fish and Wildlife's Lake and Streambed Alteration Agreement (LSAA), or 1600 Permit, which includes areas outside of Waters of the State.

VIII. MONITORING AND REPORTING PLAN

A Monitoring and Reporting Program must be included with the *Notice of Intent* and shall include the following information relative to the proposed project:

MONITORING PLAN ☐ ***Monitoring Plan is attached (check box)***

A. Function(s) of the impacted water resources: Cold water anadromous fishery,

B. Project purpose, goal(s), and performance standards: Improve quantity and quality of habitat

C. Measurable performance standards appropriate to each goal: Acres of habitat, water quality data

D. Monitoring parameters and protocols used to determine whether performance standards have been met:
See monitoring plan in project description and in Attachment A.

E. The timeframe and responsible party for determining attainment of performance standards:
Scott River Watershed Council. The 5 years of the permit term

F. Monitoring schedule:
:See Project description

G. Annual Reporting Schedule for the period stated as required for achievement of performance standards:
4/1/2018, 4/1/2019, 4/1/2020, 4/1/2021, 4/1/2022

REPORTING PLAN ☐ ***Reporting Plan is attached (check box)***

Monitoring Reports shall be submitted by the applicant on an annual basis to the appropriate agencies as provided in the Monitoring Plan, documenting status of achievement of performance standards and project goals. Monitoring Reports shall include:

A. Summary of findings:
See Attachment A

B. Identification and discussion of problems with achieving performance standards:
Each annual report will contain a discussion of problems in achieving standards.

C. Proposed corrective measures (requires Regional Water Board approval): Any proposed corrective measures

will be included in annual reports
D. Monitoring data: Will be included in annual reports

IX. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

All projects utilizing this General 401 Certification form must comply with the terms of the California Environmental Quality Act. The General 401 Certification was designed for use with the Categorical Exemption for Small Habitat Restoration Projects (CEQA Title 14, Chapter 3, Article 19, Section 15333), although other CEQA analyses may also be used. Please review the categorical exemption to ensure conformance with CEQA (http://ceres.ca.gov/ceqa/guidelines/15300-15333_web.pdf).

This project conforms to the requirements of CEQA through the Categorical Exemption for Small Habitat Restoration Projection (Section 15333).	☐ yes ☐ no	☐ Other CEQA Document Click here to enter text.

APPLICATION REQUIREMENTS AND FEES

Permit:	Submit Application to following agencies:	Time Restrictions:
General 401 Certification for Small Habitat Restoration Projects:	Program Manager, Certification and Wetlands Program, Regional Water Quality Control Board (address to appropriate Regional Water Board Board)	Must be submitted at least 30 days prior to proposed discharge.
Fees:	Fees are subject to the most current Dredge & Fee calculator. Refer to the resources for applicants section of the Dredge/Fill (401) and Wetlands program web site for the most current fee information. http://www.waterboards.ca.gov/water_issues/programs/cwa401/#resources	

X. SIGNATURE / CERTIFICATION

State Water Resources Control Board: Notice of Intent to Comply with the Terms of General Water Quality Certification for Small Habitat Restoration Projects

I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to ensure that qualified personnel property gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and/or imprisonment. Additionally, I certify that all provisions of the permit will be complied with, including development and implementation of a monitoring plan.

Applicant Signature _____ Date _____

Printed Name _____

NOI Attachment A
Project Monitoring Lower Sugar Creek BDA Project:

Project Monitoring and Measurable Performance Standards:
The site of this project lies immediately downstream of, and inclusive of, the existing Sugar Creek BDA project, which has an extensive and ongoing monitoring effort. The proposed new for construction in 2017 BDAs are being placed primarily to provide structural stability to the existing BDAs and to assist with the ease of fish passage from the mainstem Scott to the created and historic spawning and rearing habitat in Sugar Creek. Therefore the primary focus for monitoring of these structures is geomorphic change, new and existing BDA 0.1 stability and juvenile salmonid fish passage.

Quantitative monitoring will consist of pre- and post-project monitoring of groundwater levels, photo-documentation from established points, and surveys for geomorphic change detection.

Quantitative monitoring: Pre and Post Project:

1) Groundwater monitoring and subsurface investigations: No new groundwater monitoring wells will be installed; however ongoing monitoring of the existing well network will detect any pre/post installation differences. See well network map below.

Qualitative monitoring: Pre-Project:

1) Take pre-project photos prior to and during construction at defined photo points.

Post–Project:

1) Re-occupy photo point sites and take photos at 1 year and 3 years post installation of any BDA.

Beaver Utilization Monitoring

1) Pre-installation evaluation of evidence of beaver utilization of area
2) Twice annual monitoring for evidence of beaver utilization of BDA/BDA habitat with field notes submitted to California Department of Fish and Wildlife and the North Coast Regional Water Quality Control Board when significant findings are identified.
3) If beavers are identified as utilizing the structures the Department and Waterboard shall be notified

Geomorphic Change:

1. Pre-implementation monitoring consisting of a longitudinal profile of the channel extending to BDA 0.1, and downstream of BDA 0.1 to the confluence of Sugar Creek and Scott River and cross-sectional profile at each BDA. These profiles will be done prior to implementation of any BDA. As additional work plans are developed in future years longitudinal and cross sectional surveys of the relevant areas will be undertaken.

2. Post-Implementation monitoring will consist of repeat surveys as above at two-year intervals until a notice of completion is filed.

BDA Structural Stability

1. All BDAs repaired under this permit will have a standardized repair report completed (See Attachment C) and kept for review by any interested party.

Salmonid Fish Passage, Juvenile

1. SRWC has an established juvenile fish monitoring program for the Sugar Creek site that will be continued as long as funding is obtained (see Attachment D). At this time, funds are secured for the 2017 year, with several funding sources applied to carry monitoring forward for an additional 1-3 years depending on grant source. In addition, SRWC is working closely with CDFW to intensively monitor juvenile fish passage at the Sugar Creek/Scott River confluence and Sugar BDA 0.1 in 2017. This monitoring includes placing a uniquely constructed PIT Tag array, consisting of 2"x2" squares, over various potential fish passage pathways. This is to attempt to determine at a fine scale exactly where fish may be passing through the structure. In addition, a permanently established Biomark array is placed in the pool above BDA 0.1 which will determine if fish marked with a PIT Tag below the BDA 0.1, or below a series of BDAs after installation of those permitted under this request, have passed over/through/around the BDAs in any fashion (coarse scale). Tagging of fish in the Sugar channel and in the mainstem Scott at the confluence is taking place. This monitoring, as well as additional agreed to monitoring schemes, will be undertaken at CDFW request as long as funds are available.

Annual Reporting: 4/1/2018, 4/1/2019, 4/1/2020, 4/1/2021 to NCRWQB and CDFW

The report will include a summary of findings, identification of problems with meeting performance standards, construction and repair reports, any necessary corrective measures, as well as all project data.

Project Area Calculator

Name	Lat and Long RR	Long and Long RL	Height	Width (ft.)[1]	Potential Adaptive Management Extensions (ft.)	Potential Total Width (ft.)	Length (linear ft) Streambank impact	Acreage
BDA 0.1 Secondary	41º20'31.41' N Long: 122º 49' 265.11" W	Lat: 41º 20' 31.75" N Long: 122º 49' 26.44" W	2-2.5'	114'	30'	145'	10[2]	Included in total project acreage of 4.2 acres
BDA 0/1 tertiary	41º 20' 31.63" N 122º 49' 25.34" W	Lat: 41º 20' 31.87" N Long: 122º 49' 26.25 " W	1-1.5'	80'	30'	110'	10[2]	Included in total project acreage of 4.2 acres
BDA 0.1 repair							0[3]	Included in total project acreage of 4.2 acres
BDA Connecting	41º 20' 31.63"N Long: 122º 49' 25.34" W	Lat: 41º 20' 31.41" N Long: 122º 49' 26.84" W	1.5-2'	26-30'	10'	40'	10[2]	Included in total project acreage of 4.2 acres
to Secondary and Tertiary BDAs[4]	From established ranch road to worksite, outside of defined project area- see map		N/A				15[4]	0.1[4]

ne in Sugar creek dary and tertiary BDA				130			Included in above	Included in total project acreage of 4.2 acres
Connecting BDA[5]	Non-hand carry						0[5]	Included in total project acreage of 4.2 acres
d Potential future BDAs	unknown	unknown	unknown	unkno wn	unknown	unknown	10x15=150[6]	Included in total project acreage of 4.2 acres
s to future BDAs[7]							15 BDAs x 15' stream bank impact= 225	Included in total project acreage of 4.2 acres
Beaver Mud- non-dictional, several reas, each ~ 0.04								0.16
rvest areas, non-onal, two areas ~ 0.1								0.2
Totals							420	4.56

Applicant Signature _____ Date _____

Printed Name _____

NOI Attachment A
Project Monitoring Lower Sugar Creek BDA Project:

Project Monitoring and Measurable Performance Standards:
The site of this project lies immediately downstream of, and inclusive of, the existing Sugar Creek BDA project, which has an extensive and ongoing monitoring effort. The proposed new for construction in 2017 BDAs are being placed primarily to provide structural stability to the existing BDAs and to assist with the ease of fish passage from the mainstem Scott to the created and historic spawning and rearing habitat in Sugar Creek. Therefore the primary focus for monitoring of these structures is geomorphic change, new and existing BDA 0.1 stability and juvenile salmonid fish passage.

Quantitative monitoring will consist of pre- and post-project monitoring of groundwater levels, photo-documentation from established points, and surveys for geomorphic change detection.

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2) Twice annual monitoring for evidence of beaver utilization of BDA/BDA habitat with field notes submitted to California Department of Fish and Wildlife and the North Coast Regional Water Quality Control Board when significant findings are identified.
3) If beavers are identified as utilizing the structures the Department and Waterboard shall be notified

Geomorphic Change:

1. Pre-implementation monitoring consisting of a longitudinal profile of the channel extending to BDA 0.1, and downstream of BDA 0.1 to the confluence of Sugar Creek and Scott River and cross-sectional profile at each BDA. These profiles will be done prior to implementation of

Lower BDA Sugar Creek BDA Project 401 Notice of Intent (NOI)

Project Description

Notice of Intent (NOI) for Water Board General 401 Water Quality Certification
Applicant: Scott River Watershed Council
Contact: Betsy Stapleton, Board Chair
Contact Email:
Project Address:

Landowners:

APN:

Date: 8/18/2017

This project, installation of Beaver Dam Analogues (BDAs) below the lower Sugar Creek near the confluence with the Scott River, Siskiyou County California, is proposed to preserve and expand the 2.1 acres of high quality juvenile coho over-summer and over-winter rearing habitat and to adaptively manage the existing BDAs and respond to geofluvial changes at the site. Doing so will further the overall evaluation and monitoring goals of the Scott River BDA project as outlined in California Department of Fish and Wildlife LSAA Agreement # 1600-2014-0094-R1 as revised per National fish and Wildlife Foundation (project funder), California Department of Fish and Wildlife, National Oceanic, Atmospheric Administration and Scott River Watershed Council (SRWC) and North Coast Regional Water Quality Control Board WDID # 1A14055WBSI. The issuance of a North Coast regional Water Quality Control Board (NCRWQCB) 401 and a California Department of Fish and Wildlife (CDFW) Habitat Enhancement and Restoration Act 1653 agreement as a result of this NOI will supercede the terms of California

Department of Fish and Wildlife LSAA Agreement # 1600-2014-0094-R1 and North Coast Regional Water Quality Control Board WDID # 1A14055WBSI for Sugar Creek (only).

The goals of implementing new Sugar Creek BDAs are to: adaptively manage the site in response to the changes occurring naturally at the site, changes occurring as result of the BDAs, and those changes resulting from changes in the mainstem of the Scott; and to further the scientific study of juvenile salmonids, specifically the ability and mechanisms of coho salmon to travel over, around and through constructed BDAs. The Sugar Creek BDA project has created critically needed summer and winter rearing habitat for salmonids with documented over-summer rearing of ~6200 salmonids in the summer of 2016 (Private communication, Dr. Pollock). While more difficult to quantify due to the difficulties of sampling under high flow conditions, the Sugar BDAs also provide substantial over-wintering slow water habitat. Dr. Michael Pollock, of the NOAA Northwest Fisheries Science center and project Principle Investigator, is increasingly convinced that over-wintering habitat is a critical limiting factor for recovering coho salmon in the Scott. This habitat is threatened by the potential loss of the Sugar Creek 0.1 BDA ("Lower Sugar BDA") due to underlying geomorphic features and downstream scour. Recent survey data shows an increase in the depth of the scour pool at the base of BDA 0.1 (not unexpected), and an increase of the depth of the pool at the confluence of Sugar Creek and the Scott River. The increase of depth of the confluence pool may be causing a relaxation of the slope in Sugar Creek, but a downstream hydraulic control (riffle crest) on the Scott is stable, indicating that the overall Scott River has not significantly downcut (Attachment A) in the region of the Sugar Creek/Scott River confluence. The changes in geomorphology of the Sugar Creek channel may have increased the velocity of flows in Sugar Creek at its confluence with the Scott, potentially offering a velocity barrier to juvenile salmonids attempting to enter Sugar Creek. The primary design principle for the project proposed for implementation this year

is to provide backwater pools for BDA 0.1 to "cushion" overtopping flows under high-flow conditions to decrease scour below the BDA. Additionally, reinforcing BDA 0.1 will push water to the RL Sugar channel, which is longer and has a lower gradient, which will reduce the pressure on BDA 0.1 and offer a multiplicity of flow and fish passage pathways. The series of pools below BDA 0.1 will provide a series of step pools, formed by BDAs, allowing juveniles migrating upstream velocity refugia in the their passage up the primary Sugar Creek channel as they approach Sugar Creek BDA 0.1. Side passage flow around will be established around each of the newly installed BDAs to ensure juvenile fish passage around them. A post line and weave will be placed across the vegetated area between BDA 0.1 and the ancillary BDA on Sugar RL channel, to reduce flow pathways through that area. Additional adaptive management actions at the site will be to adjust the weave on the Sugar RL ancillary BDA and Sugar 0.1 BDA as flows change. During low flow periods the weave will be maintained to ensure adequate ponding and fish passage, as flows increase water will be preferentially directed to the Sugar RL channel to reduce hydraulic pressure on BDA 0.1.

The Scott BDA project has proven that ongoing adaptive management of BDAs is an essential component of BDA restoration and the original permit for the Sugar BDAs does not easily allow for this function, hence the need to retire the existing permits and issue new ones that allow for ongoing site adaptive management. Additionally, BDAs function best when built in series to replicate the structural redundancy of natural beaver engineering, decreasing the dependency on the patency of any one BDA. Due to constraints in the original permit for the Sugar Creek BDAs, this was not done, leaving the created Sugar Creek habitat vulnerable to any decrease in BDA patency. This deficiency will be remediated by the terms of this new permit.

The Sugar Creek mainstem confluence site has been identified as a low risk location to implement additional BDAs in the Scott River Basin after discussion with project Principle Investigator, Dr. Michael Pollock, Dr. Brian Cluer, Project Engineer Joey Howard, California Fish and Wildlife engineering and permitting staff (field discussions with Mark Smelser and Janae Scruggs 7/12/2017), and North Coast Regional Water Board staff. The specific goals for BDAs at this location are:

1. Maintain and expand the critically needed summer and winter slow water juvenile coho rearing habitat created by the existing Sugar Creek BDAs.
2. Maintain fish passage between the mainstem Scott and the existing Sugar Creek BDA 0.1 habitat;
3. Provide stability for the existing Sugar Creek BDAs.
4. Allow for ongoing adaptive management for current and future site changes.

Need for Project:

The California Department of Fish and Wildlife (CDFW) Recovery Strategy for California Coho Salmon (2004) Coho Recovery Tasks states: "Current information shows a positive relationship between coho salmon presence and beaver ponds. The (Scott River) valley was historically heavily populated with beaver until mid-1800s. Today small populations exist. The rather stable ponds created by these animals, especially on valley tributaries, likely created year round fish rearing habitat, including the period of low stream flow. Changes in stream channel form and function may have limited riparian restoration potential. Changes in hydrologic conditions, such as changes in

groundwater and water use may also limit riparian restoration potential. The loss of off-channel habitat results in a loss of productive rearing and overwintering areas, often favored by species such as the coho salmon."[1]

The CDFW Southern Oregon Northern California Coast Coho Salmon (SONCC) Recovery plan task number: Scott HM-1-1e suggests, "Evaluate the use of beaver ponds and other efforts that contain similar benefits to increase habitat complexity. Short-term: Review literature (studies done in Washington and Oregon). Hold workshops and publish newsletters as appropriate. Investigate projects in prioritized areas to support beaver activity if appropriate. Coordinate with related projects to improve stream complexity and habitat. If projects are planned, ensure that riparian growth is adequate or provide materials for beaver needs, so that appropriate riparian cover is maintained. Long-term: Include implementation monitoring. If beaver reintroduction fails or is found to be inappropriate, consider analogous habitat attribute efforts." [2]

The NOAA Final SONCC Recovery Plan, NOAA Fisheries states: "The Scott River Watershed Lack of Floodplain and Channel Structure. The ongoing alteration of floodplain and channel structure from mining and other anthropogenic activities has reduced complex channel margin and pool habitat availability, disconnected the floodplain from the adjacent channel, and simplified instream habitat throughout the Scott River basin, creating a high stress for all life stages except for the egg stage (medium) and the juvenile stage (very high)." It goes on to say (p. 36-25) "Since the construction of the first levees in the 1930s, much of the remaining mainstem Scott River has also been channelized in a continuing effort to control flood impacts and

[1] California Department of Fish and Game. Recovery Strategy for California Coho Salmon. Sacramento Ca. 2004. Section 10.14
[2] California Department of Fish and Game. Recovery Strategy for California Coho Salmon. Sacramento Ca. 2004. Section 10.16

maximize acreage of agricultural lands adjacent to the river. This has destroyed low velocity margin and side channel habitat, making winter rearing habitat a significant limiting factor to juvenile coho salmon survival."[3]

Recovery Action SONCC-ScoR.2.2.75: Reconnect the channel to the Constructed off channel habitats, alcoves, backwater habitat, Population wide 2d Channel Structure floodplain and old stream oxbows.
Recovery Action SONCC-ScoR.2.2.75.1: Identify potential sites to create refugia habitats. Prioritize sites and determine best means to create rearing habitat.
Recovery Action SONCC-ScoR.2.2.75.2: Implement restoration projects that improve off channel habitats to create refugia habitat, as guided by assessment results

This project addresses limiting factors identified in both the NOAA and CDFW Recovery Plans and implements the tasks identified above.

The existing Sugar Creek BDA's were installed in 2014 and have created significant over-summering and over-wintering habitat in the important Sugar Creek watershed. 7% of coho redds and 5% of spawner carcasses found during

SRCD 2016 surveys were found on Sugar Creek[4]. Based on production observed from previous restoration efforts, the habitat created by the existing Sugar Creek BDA 0.1 and 0.2 is sufficient to increase coho smolt production potential by approximately 6500 fish, which based on historic smolt-to-adult return ratios, could increase adult returns on average by about 300 fish if the

[3] National Oceanic and Atmospheric Administration. Final SONCC Recovery Plan. Arcata, Ca. NOAA Fisheries 2014 p. 36-14
[4] Yokel and Magranet. 2016. Preliminary SRCD 2016-2017 Spawner Survey Report. Private distribution.

smolt production potential is fully realized (other factors such as high ocean mortality and redd scour, may preclude full seeding of rearing habitat and/or large adult returns)[5]. This conveys the need to support stability of Sugar BDA 0.1 to preserve the created habitat and the fish populations utilizing it.

Use of Beaver Dam Analogues:

The creation of off-channel or side channel habitats is not included in the CDFW Restoration Manual, however their use is becoming standard practice in California with the appropriate guidelines and minimization measures. Similarly, the use of BDAs for restoration is new to California, but is well established elsewhere. In addition to being mentioned in the CDFW Recovery Strategy for California Coho Salmon (2004) as noted above. The theory and practice of using BDAs is explicated in the 2015 Beaver Restoration Guidebook (Chapter 6: Beaver Dam Analogues) from the U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, Portland State University and U.S. Forest Service (Castro et al. 2015) [6].

The 2016 restoration Biological Opinion recently signed by the National Marine Fisheries Service for the North-Central California Coast region (Santa Rosa office jurisdiction), section 1.3.2.2 (p. 6) states: "Creation of Off-channel/Side-channel Habitat Features: Floodplain habitats such as wetlands, sloughs, and off-channel features are important habitat areas for salmonids, particularly during winter months, providing velocity refugia during high winter flow events and improving growth and survival of rearing juveniles

[5] Pollock Private, 2017. Communication.

[6] Castro et al. Beaver Restoration Guidebook. U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration, Portland State University and U.S. Forest Service (2015). pp 82-97

(Tschaplinski 1988, Aitkin 1998, Martens and Connolly 2014)[7]. Although projects to increase off-channel and side-channel habitats are relatively new to California, many such projects have been built in western Washington and Canada. Estuarine restoration projects may include off-channel and side-channel habitat components that can provide rearing habitat for salmonids."

The Biological Opinion specifically mentions BDAs (p.7) "Projects that enhance or create off-channel/side-channel areas will provide important rearing areas and velocity refugia for salmonids. These restoration projects may include: removal or breaching of levees and dikes, channel and pond excavation, constructing wood or rock tailwater control structures, beaver dam analogues and construction of large woody material and rock boulder habitat features. Implementation of these types of projects may require the use of heavy equipment and construction of temporary access roads."

Over the past three years, the Scott River Watershed Council (SRWC) has implemented eleven BDAs in the Scott basin, with nine functional at this time. SRWC has been working under the direct supervision of the project Scientific Lead, Dr. Michael Pollock of NOAA Northwest Fisheries Science Center. In addition to developing a considerable body of knowledge regarding the building and management of BDAs, SRWC has developed strong collaborative relationships with multiple regulatory, scientific and technical advisors. These project collaborators will ensure that, in addition to the management and minimization measures contained in this document, the BDAs identified for construction in this NOI will not cause significant harm to environmental resources.

Site selection and design:

[7] Shapovalov, L., and A. C. Taft. 1954. The life histories of the steelhead rainbow trout (Salmon gairdneri gairdneri) and silver salmon (Oncorhynchus kisutch)

Survey data of the Sugar Creek-Scott River confluence delta has been obtained. Many site reviews have been undertaken with technical and regulatory experts. On 7/12/2017 a site review was undertaken with CDFW engineering and regulatory personnel occurred. Site characterization, and design considerations were discussed. BDA placement is based on property boundary, inundation levels, habitat volumes, fish passage considerations, regulatory issues, and landowner and stakeholder input. Project technical team, Dr. Michael Pollock, Rocco Fiori PG, Dr. Brian Cluer, Joey Howard PE, Erich Yokel have reviewed site data. Consultations have taken place with CDFW Geologist.

Risk Considerations (Note: all references throughout this project proposal referencing River Right (RR) or River Left (RL) are those stream aspects in relationship to facing downstream):

The site is inclusive of the reach of Sugar Creek with the existing Sugar Creek BDAs, and extends to and the Scott River. The site is at the confluence of Sugar Creek and the Scott, and as such, is subject to significant natural geofluvial forces, and is subject to change with or without BDA implementation. The site has also been subject to extreme historic degradation due to the Yuba dredge mining and subsequent channelization of both Sugar Creek and the Scott. The proposed new BDAs will stabilize the existing BDAs, and the significant high quality juvenile salmonid habitat they have created. Over-wintering and over-summer slow water rearing habitat has been identified as limiting factors for coho production in the Scott Watershed. The habitat created by the Sugar BDAs is a significant contribution to meeting this need; therefore maintaining the habitat through all seasons serves an important function in contributing to the species recovery. There is no human infrastructure such as electric lines, septic systems, roads, irrigation

infrastructure or agricultural lands that will be impacted by the project. There are no water rights that will be influenced by the construction of the BDAs. SRWC Board Chair spoke with Jeff Fowle, President of the Farmer's Ditch Company, landowner of the project site, about their support for new BDAs in the Sugar Creek Channel on 7/31/2017. Jeff expressed support for the project as long as Dr. Pollock is involved in design. He specifically expressed that changing the proportion of water moving through the current primary Sugar Creek channel and the River Left Sugar Creek channel is not an issue for him.

All provisions of the attached SRWC Construction and Adaptive Management Guidelines (Attachment B) will apply to the project, and offer habitat and species protection.

General Site Description:

The project site is inclusive of the existing Sugar BDAs 0.1 and 0.2, as well as the slow water habitat they have provided, and it expands the project area to include Sugar Creek to the confluence of Sugar Creek with Scott River, the Sugar RL side channel, and the land lying between the two channels, in Scott Valley, Siskiyou County California. Sugar Creek is a coldwater, westside tributary of the Scott River and has historically offered significant spawning and rearing habitat for Steelhead and coho salmon. The project boundaries encompass the existing primary Sugar Creek channel from the existing Sugar Creek BDA 0.1, following a line 190-100 ft. east of the channel (RR), to the confluence of the Scott River. From the confluence along the Scott River top of bank, to the Sugar RL high flow channel. Following the Sugar RL channel on a line 50 ft. lateral to the top of bank southwest, and southeast of the channel to the Sugar RL side channel ancillary BDA. Then following the top

of bank of Sugar Creek along the RL southwest upstream of BDA 0.2 330 ft, then crossing the channel of Sugar Creek to RR traveling along the top of bank Northeast to Sugar Creek BDA 0.1. Both existing BDAs are included in the project area.

Lower Sugar Creek BDA Fish Passage Considerations:

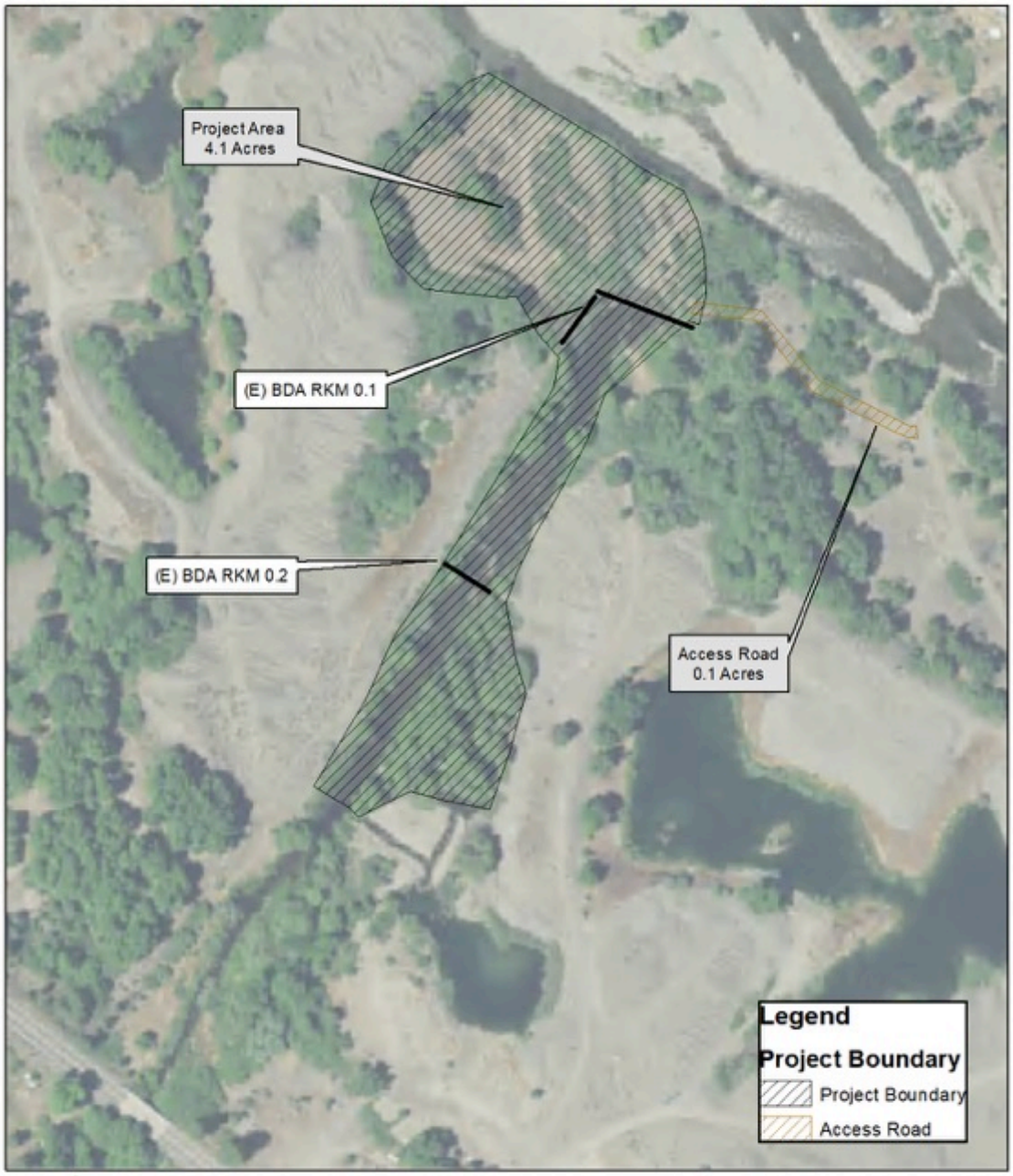
The Sugar Creek BDA project has been an ongoing effort to monitor and identify the effects of BDAs on juvenile salmonids, specifically the upstream migration of juveniles after spring redistribution and as streams reach base flow. Various mechanisms for juvenile passage at the BDAs have been discussed and speculated on which include jumping up and over barriers, passing through interstitial/orifice flow through a BDA, and, as has become agreed is the most likely mechanism, swimming around BDAs after the structure retains sufficient pool volume that water is pushed around the margin of the BDAs- "side passage flow". After several seasons of cooperative monitoring, SRWC NOAA and CDFW have expressed a preference for side passage flow, as most likely providing the gradients and velocities that allow fish passage. These sort of complex flow pathways, with small resting pools in a cascade around a BDA most resemble natural beaver dam conditions, and also a roughed channel engineered approach to fish passage as found in the CDFW restoration manual.

The Sugar Creek BDA site, as sufficient sealing of the BDA 0.1 structure has occurred, has achieved a multiplicity of fish passage mechanisms over, around and through the 0.1 BDA and the RL Ancillary BDA. (See Attachment C for 2017 fish passage pictorial and monitoring effort description). During much

of the year, fish passage exists out the Sugar RL side channel, which has low gradient and low velocity. Under the current water year conditions, and due to the water storage in the BDA habitat, this RL channel is remaining connected to the Scott River and provides excellent fish passage. In all but severe drought years this channel is now expected to remain connected through much of the year and is the preferential mechanism for fish passage between the Scott and the Sugar Creek habitat complex. An additional flow pathway exits the BDA 0.1 pool, bypassing the BDAs and entering the Sugar Creek main channel approx. 70 feet below the BDA. At the BDA 0.1 itself there is, to the RL of the BDA 0.1, side passage flow around the end of the BDA, which enters the Sugar Creek channel below the BDA. In 2016, Dr. Pollock performed a small-scale experiment that documented the ability of salmonids to utilize this pathway to pass the BDA in an upstream direction. Adding additional BDAs below the BDA 0.1 will improve fish passage options by breaking the side passage between BDA 0.1, BDA 0.1 secondary, and BDA 0.1 tertiary into segments, allowing fish to rest in the pools between each BDA before proceeding up the next segment of side passage.

Which of these many fish passages mechanisms will be primary and most effective at any one time will be dependent on flow, evolving site conditions at the BDA, in the main-stem and other factors. SRWC will continue its commitment to monitor fish passage at the site and ensure that at least one functional fish passage mechanism is in place at any one time, until such time as all parties are satisfied that juvenile salmonids can freely pass. One-to three fish passage pathways will be maintained by adaptive management of BDA weave height and BDA weave seal. SRWC will be on-site at least twice weekly as flows approach baseflow until fall rains start and flows increase. SRWC will maintain close communication with CDFW staff Mike Harris, and if fish passage becomes questionable will consult with CDFW as to how to proceed.

Lower Sugar Creek BDA Project



Scott River Watershed Council

Ortho Imagery - 2016 NAIP

E. Yokel - 8/8/2017

N

0 80 160 320 Feet

General Site Characteristics:

The project area lies within the Scott River Dredger tailings. The area was mined with a Yuba Dredge from the late 1800's until as recently as 1950. Dredging consisted of excavating all river valley material to depths of 30+ feet and running it through a series of screens to remove placer gold and then casting the residual material into piles across the valley floor. All fine materials were washed away, leaving astounding piles of cobble and rock. All natural stratigraphy was destroyed. Sugar Creek, one of the Scott Watershed's cold water, perennial westside tributaries, enters the Scott through an excavated straight channel extending over a distance of approx. 1,345 ft. from the Highway 3 crossing of Sugar Creek to the Sugar Creek/Scott River confluence.
Mercury was not used on the dredges, only in the off-channel processing sheds, and the reach has been previously evaluated for the presence of mercury.

Under winter flow conditions, there are a multiplicity of flow pathways including the main Sugar Creek channel, the RL channel, and additional pathways extending across the delta and re-entering either the main channel or the RL channel at multiple points. As flows approach base flow, only the Sugar Creek main channel as historically maintained flow, however with the improved groundwater storage resulting from the BDAs, Sugar RL channel is remaining connected through much of the year. The Sugar Creek main channel consists of rock and cobble and has a gradient ranging from 1-3%

from BDA 0.1 downstream until the last 30 ft which has an 8-14% grade. The Sugar Creek RL channel has a longer pathway (600 ft), and therefore a lesser gradient to achieve the same change in elevation as the main channel. The substrate in the side channel consists of mostly sand. Across the floodplain of the delta there is a veneer of sand/sandy loam with vegetation overlying a rock/cobble base similar to that found in the Sugar Creek main channel.

The project technical team (Joey Howard, Michael Pollock, Brian Cluer, Erich Yokel, Rocco Fiori) has surveyed and reviewed a longitudinal water surface and of the primary channel, qualitatively assessed hydraulic and sediment transport characteristics of the existing site conditions. Based on our investigations, we believe the BDA provides multiple benefits both up and downstream of the project location and augmenting the existing BDA with secondary and tertiary BDAs downstream will help to maintain the upstream BDA in place and improve fish passage opportunities.

Drone Photo Joey Howard 2/11/2017

Sugar Creek Channel within the Dredger Tailings looking downstream towards the Scott River. The pools from Sugar Creek 0.1 and 0.2 BDAs are in the middle of the photo. Project area at the middle of the top of the photo.

Drone Photo Joey Howard 2/11/2017. Project area at center of photo. Sugar Creek transects the photo. Scott River at top of photo. Farmers Ditch boulder weirs evident at top right of photo.

Drone Photo Joey Howard 2/11/2017. Blue lines represent the multiple flow pathways at high flows.

More Detailed Site Characteristics of Sugar Creek Main Channel in Project Area,

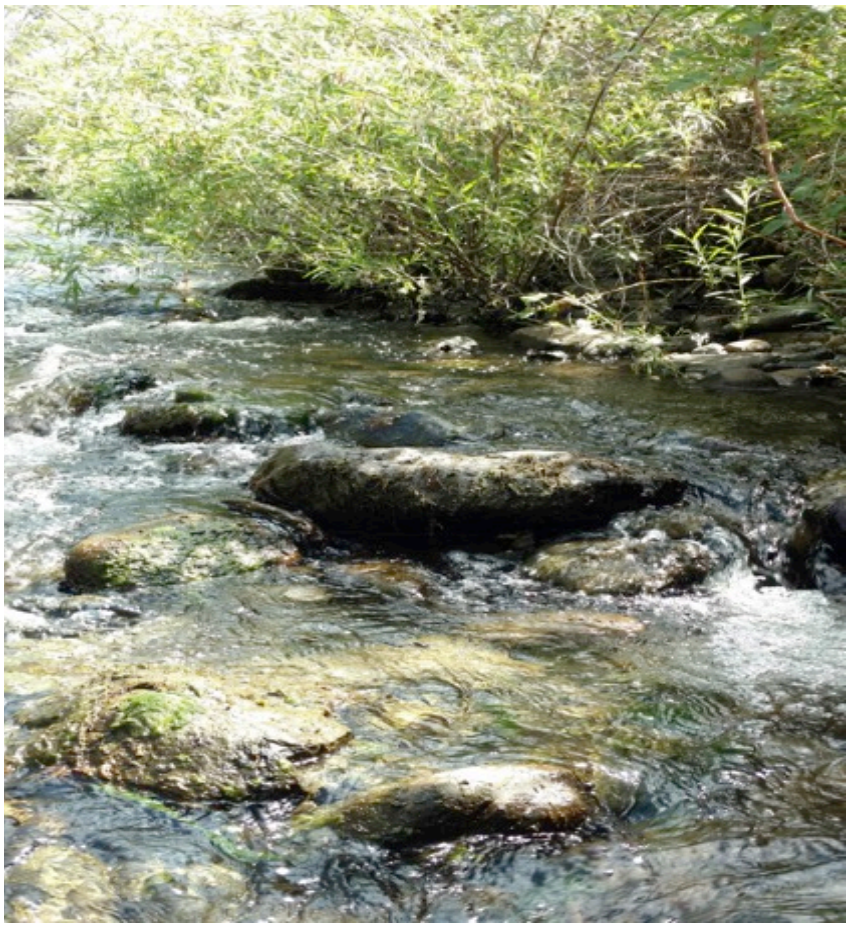
The Sugar Creek main channel substrate consists of rock and cobble ranging in size from 1"-30".

Sugar Creek Channel immediately below Sugar Creek BDA 0.1 July 2017

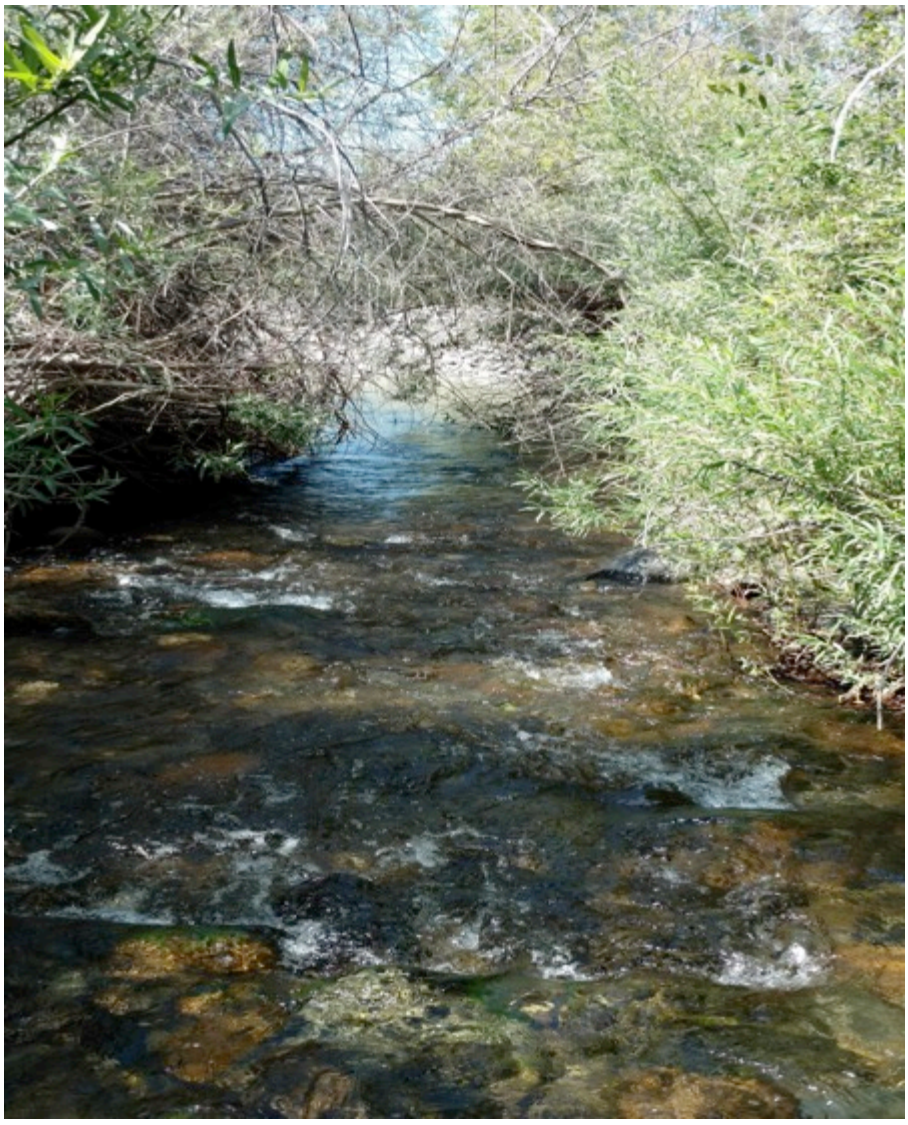
Immediately below the existing Sugar Creek BDA 0.1 the channel is approximately 120 ft. wide and with a gradient of < 1%. Approx. 30ft downstream of the BDA the channel constricts to about 15ft wide and the gradient steepens to ~3%. Very little fine sediment is present below the BDA.

Panoramic view of area immediately below Sugar Creek BDA 0.1 from RR photo point, showing area of wide channel before constriction of channel width occurs. Dry plateau visible in foreground. August 2017

The channel length from BDA 0.1 to the Scott River confluence is ~200 feet.



As the channel constricts and the gradient steepens, a series of small 6-12” cascades over and around boulders of ~23” occurs. August 2017



Looking downstream in constricted portion of channel, approx. 20 meters above the Scott confluence. Confluence visible. August 2017

As the channel narrows, the banks become heavily vegetated with a narrow band of riparian vegetation, 1-2 plants thick. Outside of the riparian ribbon is dry plateau, with sparse vegetation. The soil of the plateau is fine, sandy loam, but underlying this 1-5″ topsoil there are 4-18″ cobble and boulder equivalent to that found in the Sugar Main channel.

Dry plateau found between Sugar Main Channel and Sugar RL Channel. August 2017

Thin layer of sandy loam overlying rock and cobble

Plans for 2017-2018 Adaptive Management:

The intention of ongoing adaptive management activities for the 2017-2018 season is to preferentially move water into the Sugar RL channel to remove hydraulic pressure on Sugar BDA 0.1, and to ensure flow through the lower gradient channel for ease of fish passage between the Sugar Creek habitat complex and the Scott. If flows drop to the point where insufficient water is present to keep this channel connect, weave height and permeability will be adjusted to ensure water to pass around each BDA in identified side passage pathways. One to three fish approved fish passage pathways will be maintained throughout the season. If flows are insufficient to maintain at least one pathway, consultation with CDFW staff Mike Harris will take place and joint decision making will occur as how to maximize habitat benefit and meet regulatory obligations.

Sugar RL Channel August 2017

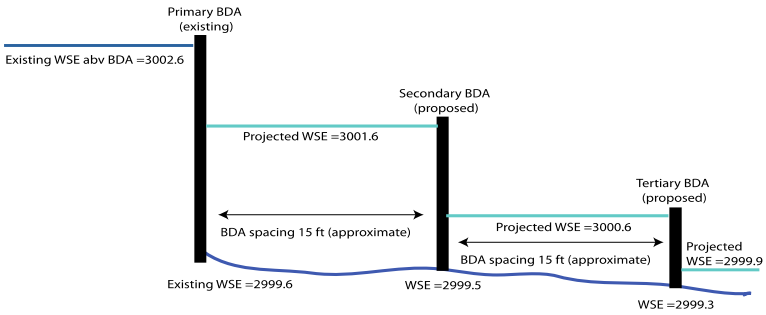
Fish and Wildlife Habitat Risk Considerations: Minimal (due to the project design and monitoring, and implementation of extensive protection measures)

Water Quality Risk Considerations: Minimal (due to the project design and monitoring, and implementation of extensive protection measures)

Work-plan for 2017

Three BDAs are proposed for construction in 2017 as noted on diagram above. Two to be placed below the existing BDA 0.1 as secondary and tertiary structures, and a third to connect BDA 0.1 and the existing RL Ancillary BDA. In addition 8-10 posts will be placed immediately downstream of BDA 0.1 to reinforce a section that lost posts in the winter 2016-17.

This diagram represents the existing Sugar Creek BDA 0.1 with secondary and tertiary "step down" BDAs placed below it:



Notes:
1. BDAs should have a weir gap flow depth of 6-8" at low flow to ensure "jump" height of approximately 6".
2. Use cobble at base of BDAs to minimize scour.
3. Weave BDAs and seal structure using organic material, gravel, sand and silt as described in the USFWS/NOAA/USFS Beaver Restoration Manual.
4. BDA spacing and heights are approximate and will need to be field fitted.
5. WSE below lowest BDA will be elevated approximately 6-8" by local scour and subsequent downstream deposition.

Fish Passage Considerations at BDA 0.1: (see section above for discussion of overall fish passage considerations between the Lower Sugar Creek Habitat complex and the Scott River).

BDA 0.1 Oct 2016 showing side passage flow at RL of BDA.

Side passage flow has been expressed as the preferential mechanism for fish passage around BDAs by CDFW Fisheries and Habitat Conservation staff (field conversations and email correspondence). Therefore, with the addition of secondary and tertiary BDAs, the goal is to establish side passage flow around each structure.

Overall Access to Site:

Established Ranch Road: Green Line
New Access Road: Blue line
Proposed BDAs: Red lines

Between the established ranch road and the worksite an access road through thick vegetation will need to be cut. The vegetation consists of willow, wild rose, blackberry and other shrubs. No stem larger than 6" will need to be cut, and any native species that does not regrow from cut stems (ie Alder, Pine etc) will not be cut. Willow and other vegetation cut for access will either be laid down on equipment tracks or utilized for BDA weaving. All access roads will be cut after 9/1/2017 so no nesting bird precautions will be required. For access to the "Connecting BDA", weave will be lowered on the Ancillary RL BDA to prepare for winter flows, this will dry flow pathways through the area for construction of the connecting BDA.

Vegetation east of the main channel through which an access road will need to be cut.

Sugar Creek main channel will need to be crossed. At approx. 10 ft. downstream of BDA 0.1 the bank has less vegetation and relatively gentle bank slopes. Willow and other material will be placed across the bank and stream for equipment to drive on. A single pass back and forth will be sufficient with the excavator arm reaching upstream and downstream to pound the two post-lines.

BDA Effects on Riparian Vegetation

The robust response of riparian vegetation to BDA implementation has been striking, with the extent unexpected at the onset of the project. Many of SRWC photo points established with the thought that they could record BDA changes over time have been completely overwhelmed by vegetation.

Miners Creek BDA 0.2 at installation in fall 2015. Note dry, desiccated vegetation.

Sane reach of Miners Creek (immediately below BDA 0.2) in late summer 2017 with extremely robust and dense riparian vegetation. .

The speculated mechanisms for this vigorous riparian growth seen at all SRWC BDA sites are several: 1) prolonged surface inundation allowing germination of willow and other species requiring prolonged wetting for germination. 2) Improved groundwater elevations allowing riparian vegetation access to groundwater, and 3) increased retention of fine grained soils and organic material which contribute to soil water retention and nutritional composition. BDAs themselves are acting as new vegetation islands. The willow used in BDA construction has often sprouted, starting new colonies with root sprouts and seeds spreading the new vegetation. An additional mechanism for improved riparian vegetation with BDA restoration is the distribution of beaver “chew sticks”. Once beavers inhabit a restorations site. These sticks float downstream, become lodged in shallow margins and start growing.

Deposition behind Miners Creek BDA 0.3 showing sand (yellow) and organic material (dark material).

Most riparian zones in the Scott Valley have substrate consisting of sand, rock, and cobble making establishment of vegetation challenging. The changes occurring at BDA sites directly address the Scott's limiting factors controlling the establishment of robust riparian vegetation.

Many riparian vegetation species, specifically all willow and cottonwood, show a healthy response to coppicing- ie: cutting from chewing or other cutting or crushing actions. Coppicing creates vigorous fresh growth. After repeated cutting such as prolonged grazing, plants can loose vigor and decline in their ability to grow, but intermittent disturbance actually enhances plant health. Patchy disturbance creates different age class plants, increasing ecological diversity in the riparian corridor. SRWC considers BDA restoration as "self mitigating" for any riparian disturbance occurring as a result of construction or access needs. SRWC is careful to design access and construction activities to avoid the cutting larger diameter trees, especially those that do not re-sprout naturally.

Therefore SRWC does not propose specific re-vegetation activities as mitigation for construction. That being said, SRWC is committed to whole site restoration, and in locations where natural re-vegetation will be slow, such as in tailings piles, SRWC is committed, as funding and resources allow, to planting by placing willow sprigs and other enhancement activities.

Scott Valley Riparian willow showing response to coppicing with vigorous new shoots.

Proposed Construction for 2017 work season consists of:

- **Adding Secondary and Tertiary BDAs to Existing Sugar Creek BDA 0.1**
- **Connecting Sugar Creek BDA 0.1 with Side Channel Ancillary BDA.**
- **Reinforcing BDA 0.1**

<u>Sugar Creek BDA Secondary BDA</u>

Design Considerations: This BDA will placed 16' (+/- 4') downstream of BDA 0.1. This BDA will placed so that there will be an approx. 8-12" WSE differential to the BDA 0.1 pool WSE. It is before the grade break in the existing channel, and will wrap into the bank on both RL and RR. The RR elevation crest will be 6-12" higher than the elevation on the mid and RL BDA, in order to control flow and protect the RL bank.

Fish passage considerations: The primary fish passage mechanism from the BDA 0.1 habitat to and from the Scott River is through the Sugar Creek RL channel (see pages 8, 17 and 19 above). Placing the secondary and tertiary BDAs below the existing Sugar Creek BDA 0.1 will make a series of step pools

RR Lat: 41º20'31.41' N Long: 122º 49' 265.11" W
RL Lat: 41º 20' 31.75" N Long: 122º 49' 26.44" W
Lats and Longs as built may vary based on field fit adjustments.

Structure dimensions: 114 ft. wide (perpendicular to streamflow RL to RR) and 5-ft linear feet along stream. BDA 0.1 is 135 ft. long. The secondary structure length was sized to fit into the stream channel as it has evolved below the BDA 0.1. Structure posts will be placed across stream channel and into existing stream bank to provide anchoring and stability. This secondary structure is being placed at the point where the stream channel is narrowing and the length of the BDA will effectively provide a stream bank "wrap" on RR. The RR BDA crest elevation will be at 6'12' higher than the rest of BDA to protect the RR bank and decrease the likelihood of end-cut around the margin on RR. Current channel is approximately 61ft. wide, however the greater length will be installed to wrap around the existing stream bank margin at first construction to diminish the need for repeat entry for post pounding for adaptive management. Maximum anticipated future lateral expansion is an additional 15 feet at each margin. Only the existing channel will have willow weaving and berming at this time. Berming and weaving is necessary to prevent structure underscour, and sealing the structure sufficiently to allow side passage flow to develop is necessary. The "tightness" of seal can be adjusted in an adaptive management process, as fish passage mechanisms become better understood.

BDA Crest: 2-2.5 ft high from existing WSE, however WSE elevation upstream to down stream will be 1' after construction.

Construction:

Time Estimate for constructing:

2-4.5 days total consisting of:

1 days post pounding
1.5 day harvesting and weaving willow
2 days berming and sealing (stuffing, stacking, layering cobble, straw, gravel, and woody matrix).

Material and techniques: See attached construction and adaptive management guidelines.

- Posts: 38-45 locally harvested, untreated fir/pine posts. Post-line will be extended into the banks to have in place for anticipated future scour and channel widening events.
- Willow: To be harvested from pre-approved harvest locations, both on-site and off site. All nesting bird protection measures will be followed. Willow will likely be harvested after 9/1/2017, obviating the need for pre-harvest surveys.
- Cobble/rock: Cobble is available nearby at the tailings pile. Cobble will removed from the piles and transported by truck or excavator to the BDA on established access routes at site. <10 cubic yards rock material per

adaptive management parameters, varying from 3-18". A single 10-yard dump truck will bring material to a minimum of 10 feet laterally from the stream bank to prevent deformation of the stream bank morphology. Materials will be hand carried from there to the BDA.

- Weed free straw or pasture grasses: 1-3 bales
- Mud: Reduction of permeability of BDA with fine grained silt/clay material. See attached construction and adaptive management guidelines. Fine grained material to be layered on length of BDA and /or placed into specific orifice flow points to reduce structure porosity. <10 cubic yards of imported fines. Landowner has stockpiled "beaver mud" excavated from areas where beavers have built undesired dams. If insufficient material on site, clay from Moore's gravel will be obtained. SRWC will notify the NCRWQCB and CDFW in advance of importing material from Moore's gravel. A single 10-yard dump truck will bring material to a minimum of 10 feet laterally from the stream bank to prevent deformation of the stream bank morphology. Materials will be hand carried from there to the BDA.

Equipment: See attached construction and adaptive management guidelines.

Access: Established ranch access roads across the tailings will be used to access the worksite (see attached map), along with established or created footpaths. Temporary vehicular access will be established by cutting brush from ranch road to BDA site. Willow, and other shrubby vegetation will be cut flat to allow equipment movement across it, but will regrow. No permanent tree removal anticipated. The equipment will cross Sugar Creek downstream of the Secondary Structure and travel in a lane running parallel to the Secondary BDA.

Sugar Creek BDA 0.1 Tertiary Structure:

Design Considerations: This BDA will placed 31' (+/- 4') downstream of BDA 0.1, and 16' downstream of the Secondary BDA. This BDA will be placed so that there will be an approx.. 12-16" WSE differential to the Secondary 0.1 BDA pool WSE. RR elevation crest will be 6-12" higher than the elevation on the mid and RL BDA, in order to control flow and protect the RL bank.
Fish passage considerations: The primary fish passage mechanism from the BDA 0.1 habitat to and from the Scott River is through the Sugar RL channel. Placing the secondary and and tertiary BDAs below the existing Sugar Creek BDA 0.1 will make a series of step pools.

RR Lat: 41º 20' 31.63" N Long: 122º 49' 25.34" W
RL Lat: 41º 20' 31.87" N Long: 122º 49' 26.25 " W
Lats and Longs as built may vary based on field fit adjustments.

Structure dimensions: 80 ft. wide (perpendicular to streamflow RL to RR) and 5-ft linear feet along stream. BDA 0.1 is 135 ft. wide (bank to bank), the BDA 0.1 secondary is 114. The tertiary structure is proposed to be 50' wide (bank to bank). It is designed to fit into the channel morphology, and extending BDA posts into the adjacent banks to provide anchoring and stability. Structure posts will be placed across stream channel and into existing stream bank. Current channel is approximately 50ft. wide, however the greater length will be installed at first construction to diminish the need for repeat entry for post pounding for adaptive management. Maximum anticipated future lateral expansion is an additional 15 feet at each margin. Only the existing channel will have willow weaving and berming at this time. The RR BDA crest elevation will be at 6'12' higher than the rest of BDA to protect the RR bank and decrease the likelihood of endcut around the margin on RR. Berming and weaving is necessary to prevent structure underscour, and sealing the structure sufficiently to allow side passage flow to develop is necessary

Material and techniques: See attached construction and adaptive management guidelines.

- Posts: 38-45 locally harvested, untreated fir/pine posts. Post-line will be extended into the banks to have in place for anticipated future scour and channel widening events.
- Willow: To be harvested from pre-approved harvest locations, both on-site and off site. All nesting bird protection measures will be followed. Willow will likely be harvested after 9/1/2017, obviating the need for pre-harvest surveys.
- Cobble/rock: Cobble is available nearby at the tailings pile. Cobble will removed from the piles and transported by truck or excavator to the BDA on established access routes at site. <10 cubic yards rock material per adaptive management parameters, varying from 3-18". A single 10-yard dump truck will bring material to a minimum of 10 feet laterally from the stream bank to prevent deformation of the stream bank morphology. Materials will be hand carried from there to the BDA.
- Weed free straw or pasture grasses: 1-3 bales

- Mud: Reduction of permeability of BDA with fine grained silt/clay material. See attached construction and adaptive management guidelines. Fine grained material to be layered on length of BDA and /or placed into specific orifice flow points to reduce structure porosity. <10 cubic yards of imported fines. Landowner has stockpiled "beaver mud" excavated from areas where beavers have built undesired dams. If insufficient material on site, clay from Moore's gravel will be obtained. SRWC will notify the NCRWQCB and CDFW in advance of importing material from Moore's Gravel. A single 10-yard dump truck will bring material to a minimum of 10 feet laterally from the stream bank to prevent deformation of the stream bank morphology. Materials will be hand carried from there to the BDA.

Equipment: See attached construction and adaptive management guidelines.

Access: Established ranch access roads across the tailings will be used to access the worksite (see attached map), along with established or created footpaths. Temporary vehicular access will be established by cutting brush from ranch road to BDA site. Willow, and other shurby vegetation will be cut flat to allow equipment movement across it, but will regrow. No permanent tree removal anticipated. The equipment will cross Sugar Creek downstream of the Secondary Structure and travel in a lane running parallel to the Secondary BDA.

Sugar Creek Main Channel BDA 0.1

Design Considerations:

Repairs are needed for the existing Sugar Creek BDA 0.1. An ~15' section of the BDA, lying ~10 from the left lateral margin suffered from a loss of post placement in the spring high flows of 2017. Handwork repairs were

undertaken with 2-3" vertical posts placed with a non-mechanical fence post pounder, then weave and berm material placed. This section will be prone to loss in the coming winter high flows. We propose to pound 9-12 vertical posts just downstream of the existing structure with a vibratory plate on an excavator (see adaptive management guidelines) to provide structural stability. We will also place cobble of 12-18" size as an apron below the BDA to reduce scour force of overtopping high flows.

Material and techniques: See attached construction and adaptive management guidelines.

- 9-12 untreated fir/pine posts will be placed into or immediately downstream of the existing postline.

Equipment: See attached construction and adaptive management guidelines.
Access: While the equipment is pounding posts for the Secondary BDA it will be able reach and pound posts on BDA 0.1 without additional stream bank impacts.

Photo Don Flickinger 6/2017. Sugar Creek BDA 0.1. Section of BDA that lost posts and was repaired with handtools evident by slightly lower profile and water spilling over the top.

Placement of Connecting BDA Between BDA 0.1 and Sugar Creek RL Ancillary BDA

Site Design Considerations: Between Sugar Creek 0.1 BDA and RL Ancillary BDA there is 30 ft. of thickly vegetated plateau. In the past two years beavers have been creating canals through the reach, allowing water to move more freely through the vegetation. At highflows 2016-2017 significant flow pathways developed through this area with water returning to Sugar Primary Channel, Sugar RL Channel and across the plateau between the two channels and connecting directly to the Scott. We will place a postline and weave through this area, to reduce ease of flow and allow for berming in the event of future undesirable site changes. The use of the hand held hydraulic postpounder for post placement, and achievement of access by hand carrying of equipment will ensure that minimal disturbance occurs.

RR Lat: 41º 20′ 31.63″N Long: 122º 49′ 25.34″ W

RL Lat: 41º 20′ 31.41″ N Long: 122º 49′ 26.84″ W

Lats and Longs as built may vary slightly based on field fit adjustments.

- Posts: 18-24 locally harvested, untreated fir/pine posts will be placed through the vegetation connecting the two existing BDAs.
- Willow: To be harvested from pre-approved harvest locations, both on-site and off site. All nesting bird protection measures will be followed. Willow will likely be harvested after 9/1/2017, obviating the need for pre-harvest surveys. The posts will be woven
- No Rock, cobble, straw or fine grained material will be placed at this time.

- Equipment: We propose to use the handheld postpounder, in an appropriate containment system, to limit heavy equipment access to the site,
- Access: The handheld post pounder will be brought to the site on the established landowner road running along the Northwest side of Sugar Creek to the RL Ancillary BDA. The pounder will be place in a small rowboat, in an appropriate containment system, and transported across the BDA pool to the north bank and will be used to pound the posts between BDA 0.1 and RL ancillary BDA.

Access for Handheld post pounder to "Connector" BDA on established landowner road.

Work Plans for Future Years:

As Scott River BDA project has shown, on going adaptive maintenance is an essential component of BDA restoration. BDA restoration is the deliberate practice of working with dynamic geo-fluvial forces. Therefore it is fully anticipated that repair of installed BDAs, as well as deployment of future new BDAs will be needed. As per the adaptive management provisions below (Attachment B), a workplan for

moderate or major repairs will be sent to CDFW and the Waterboard staff for review prior to commencement of work. It is not anticipated that more 15 additional BDAs will be constructed in the Lower Sugar Creek Project area, as shown on project area map contained in this document, over the course of this permit.

Project Monitoring:

Project Monitoring and Measurable Performance Standards:
The site of this project lies immediately downstream of, and inclusive of, the existing Sugar Creek BDA project, which has an extensive and ongoing monitoring effort. The proposed new for construction in 2017 BDAs are being placed primarily to provide structural stability to the existing BDAs and to assist with the ease of fish passage from the mainstem Scott to the created and historic spawning and rearing habitat in Sugar Creek. Therefore the primary focus for monitoring of these structures is geomorphic change, new and existing BDA 0.1 stability and juvenile salmonid fish passage.

Quantitative monitoring will consist of pre- and post-project monitoring of groundwater levels, photo-documentation from established points, and surveys for geomorphic change detection.

Quantitative monitoring: Pre and Post Project:

1) Groundwater monitoring and subsurface investigations: No new groundwater monitoring wells will be installed; however ongoing monitoring of the existing well network will detect any pre/post installation differences. See well network map below.

Qualitative monitoring: Pre-Project:

1) Take pre-project photos prior to and during construction at defined photo points.

Post–Project:

1) Re-occupy photo point sites and take photos at 1 year and 3 years post installation of any BDA.

Beaver Utilization Monitoring

1) Pre-installation evaluation of evidence of beaver utilization of area
2) Twice annual monitoring for evidence of beaver utilization of BDA/BDA habitat with field notes submitted to California Department of Fish and Wildlife and the North Coast Regional Water Quality Control Board when significant findings are identified.
3) If beavers are identified as utilizing the structures the Department and Waterboard shall be notified

Geomorphic Change:

1. Pre-implementation monitoring consisting of a longitudinal profile of the channel extending to BDA 0.1, and downstream of BDA 0.1 to the confluence of Sugar Creek and Scott River and cross-sectional profile at each BDA. These profiles will be done prior to implementation of any BDA. As additional work plans are developed in future years longitudinal and cross sectional surveys of the relevant areas will be undertaken.
2. Post-Implementation monitoring will consist of repeat surveys as above at two-year intervals until a notice of completion is filed.

BDA Structural Stability

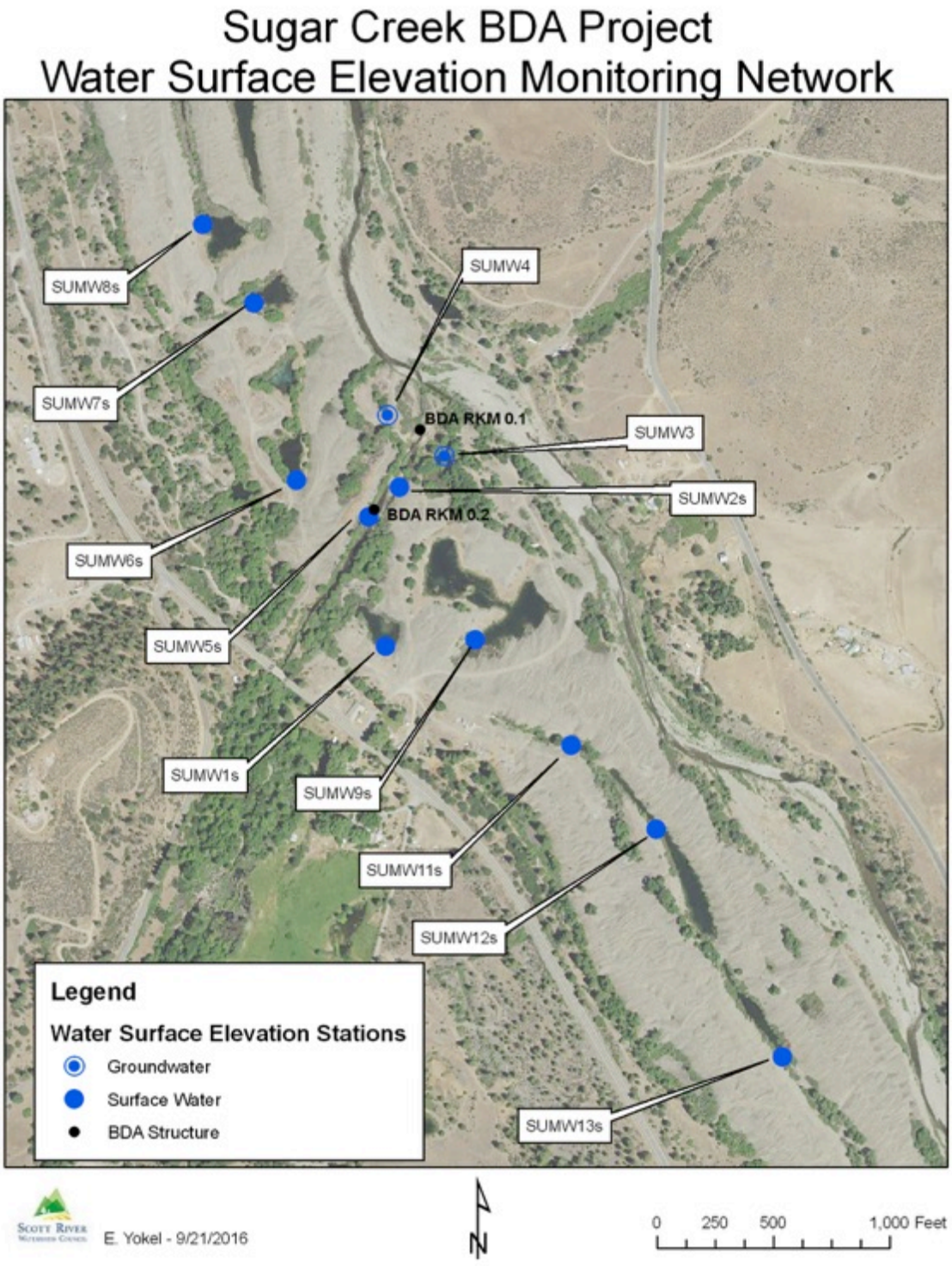
1. All BDAs repaired under this permit will have a standardized repair report completed (See Attachment C) and kept for review by any interested party.

Salmonid Fish Passage, Juvenile

1. SRWC has an established juvenile fish monitoring program for the Sugar Creek site that will be continued as long as funding is obtained (see Attachment D). At this time, funds are secured for the 2017 year, with several funding sources applied to carry monitoring forward for an additional 1-3 years depending on grant source. In addition, SRWC is working closely with CDFW to intensively monitor juvenile fish passage at the Sugar Creek/Scott River confluence and Sugar BDA 0.1 in 2017. This monitoring includes placing a uniquely constructed PIT Tag array, consisting of 2"x2" squares, over various potential fish passage pathways. This is to attempt to determine at a fine scale exactly where fish may be passing through the structure. In addition, a permanently established Biomark array is placed in the pool above BDA 0.1 which will determine if fish marked with a PIT Tag below the BDA 0.1, or below a series of BDAs after installation of those permitted under this request, have passed over/through/around the BDAs in any fashion (coarse scale). Tagging of fish in the Sugar channel and in the mainstem Scott at the confluence is taking place. This monitoring, as well as additional agreed to monitoring schemes, will be undertaken at CDFW request as long as funds are available.

Annual Reporting: 4/1/2018, 4/1/2019, 4/1/2020, 4/1/2021 to NCRWQB and CDFW

The report will include a summary of findings, identification of problems with meeting performance standards, construction and repair reports, any necessary corrective measures, as well as all project data.



Small Habitat Impact Calculations:

The total stream bank/bed and project area calculations are shown below. The adjacent flood plain does not have material appropriate for BDA construction (see discussion below under adaptive management), so no additional impact is anticipated from these activities. Staging will occur on Ranch Roads or other established ranch work areas and will not require ground or vegetation disturbance.

Willow harvesting is anticipated to occur off-site in non-riparian areas, so acreages are indicated as non-jurisdictional in the project size calculator. The landowners would be removing vegetation from irrigation ditches, pastures, sewage treatment ponds or locations for landowner initiated purposes and their use of SRWC is incidental.

Project Area Calculator

The anticipated construction activities will commence in 2017 and the SRWC is initially proposing to install 2 supporting BDAs to Sugar Creek BDA 0.1, repairing existing BDA 0.1 and connecting BDA 0.1 to the Side Channel Ancillary BDA. The SRWC estimates that the linear ft. of streambank impact from each of the BDAs will be 10 linear feet. Access for construction of this 2017 workplan adds an additional 15 lineal ft. of streambank impact. Making a total of 45 lineal feet of impact for this construction season.
The SRWC has also estimated 150 additional linear feet of streambank impact for construction of fifteen future BDAs that may be constructed as project area conditions evolve. These additional BDAs will be proposed and justified to the agencies under annual work-plans during subsequent years based on site-specific conditions and monitoring results, all additional work-plans will be submitted to the Waterboard and CDFW for review and approval prior to construction activities, and subject to lineal feet of streambank impact limitations. Access to the future BDAs is anticipated to be 225 lineal ft. for a project total of 420 project total. The project area is delineated in the map below and is encompassed within 4.20 acres, an additional 0.36 non-jurisdictional acres for a total project 4.56 total acres. All future management activities are accommodated within the 500 linear feet and 5 acre limitations allowed for small habitat restoration projects under the SWRCB General Order for 401 Water Quality Certification.

Impact totals for the 2017 workplan are;

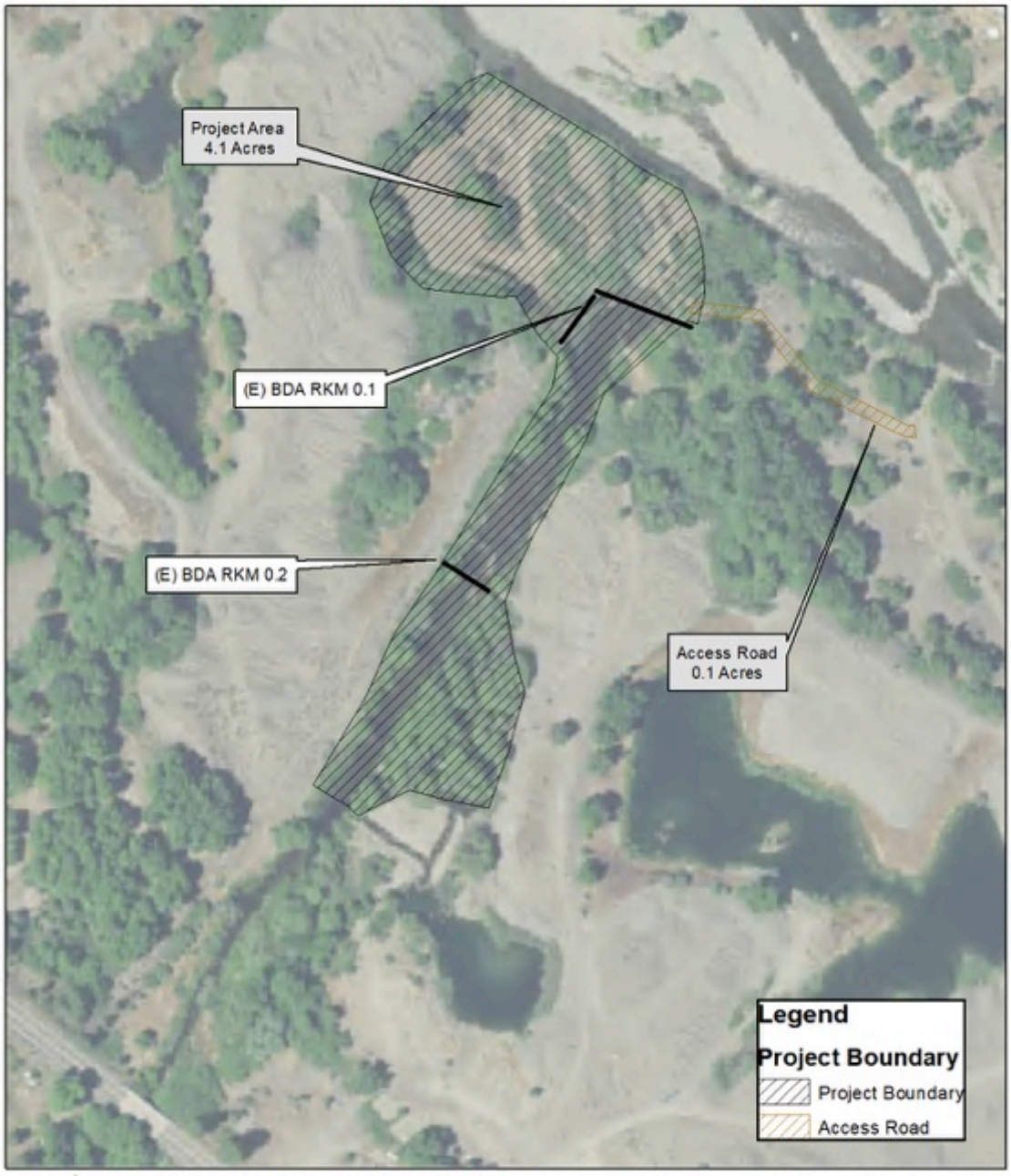
- Total acreage= 4.20 acres (plus .36 non-jurisdictional)
- Total Lineal ft. of streambank impact 2017= 45’

Name	Lat and Long RR	Long and Long RL	Height	Width (ft.)[1]	Potential Adaptive Management Extensions (ft.)	Potential Total Width (ft.)	Length (linear ft) Streambank impact	Acreage
BDA 0.1 Secondary	41º20'31.41' N Long: 122º 49' 265.11" W	Lat: 41º 20' 31.75" N Long: 122º 49' 26.44" W	2-2.5'	114'	30'	145'	10[2]	Included in total project acreage of 4.2 acres
BDA 0/1 tertiary	41º 20' 31.63" N 122º 49' 25.34" W	Lat: 41º 20' 31.87" N Long: 122º 49' 26.25 " W	1-1.5'	80'	30'	110'	10[2]	Included in total project acreage of 4.2 acres
BDA 0.1 repair							0[3]	Included in total project acreage of 4.2 acres
BDA Connecting	41° 20′ 31.63″N Long: 122° 49′ 25.34″ W	Lat: 41° 20′ 31.41″ N Long: 122° 49′ 26.84″ W	1.5-2'	26-30'	10'	40'	10[2]	Included in total project acreage of 4.2 acres
Access to Secondary and Tertiary BDAs[4]	From established ranch road to worksite, outside of defined project area- see map		N/A				15[4]	0.1[4]
Work lane in Sugar creek to Secondary and tertiary BDA				130			Included in above	Included in total project acreage of 4.2 acres
Access to Connecting BDA[5]	None-hand carry						0[5]	Included in total project acreage of 4.2 acres
Estimated Potential future BDAs	unknown	unknown	unknown	unknown	unknown	unknown	10x15=150[6]	Included in total project acreage of 4.2 acres
Access to future BDAs[7]							15 BDAs x 15' stream bank impact= 225'	Included in total project acreage of 4.2 acres
Beaver Mud- non-jurisdictional, several areas, each ~ 0.04								0.16
Willow harvest areas, non-jurisdictional, two areas ~ 0.1								0.2

Totals							420	4.56

1) Width is defined as the footage perpendicular to stream flow
2) For the BDAs to be constructed in 2017 each BDA is considered to 10" of lineal impact
3) No additional impact for placing of posts into existing BDA
4) The single work lane across creek is 15'
5) Access to the connecting BDA will be without stream bank impacts because of use and hand carrying of handheld post-pounder.
6) Estimated 15 BDAs x 10' each(This number may vary depending on adaptive management needs) additional BDAs over life of permit.
7) Access road lineal feet is anticipated to be a 15 ft. work lane for each BDA
8) Project Area defined in map + non-jurisdictional willow harvest and mud harvest areas.
9) All numbers in blue are those of lineal ft. of stream bank impact.

Lower Sugar Creek BDA Project



Scott River Watershed Council

Ortho Imagery - 2016 NAIP

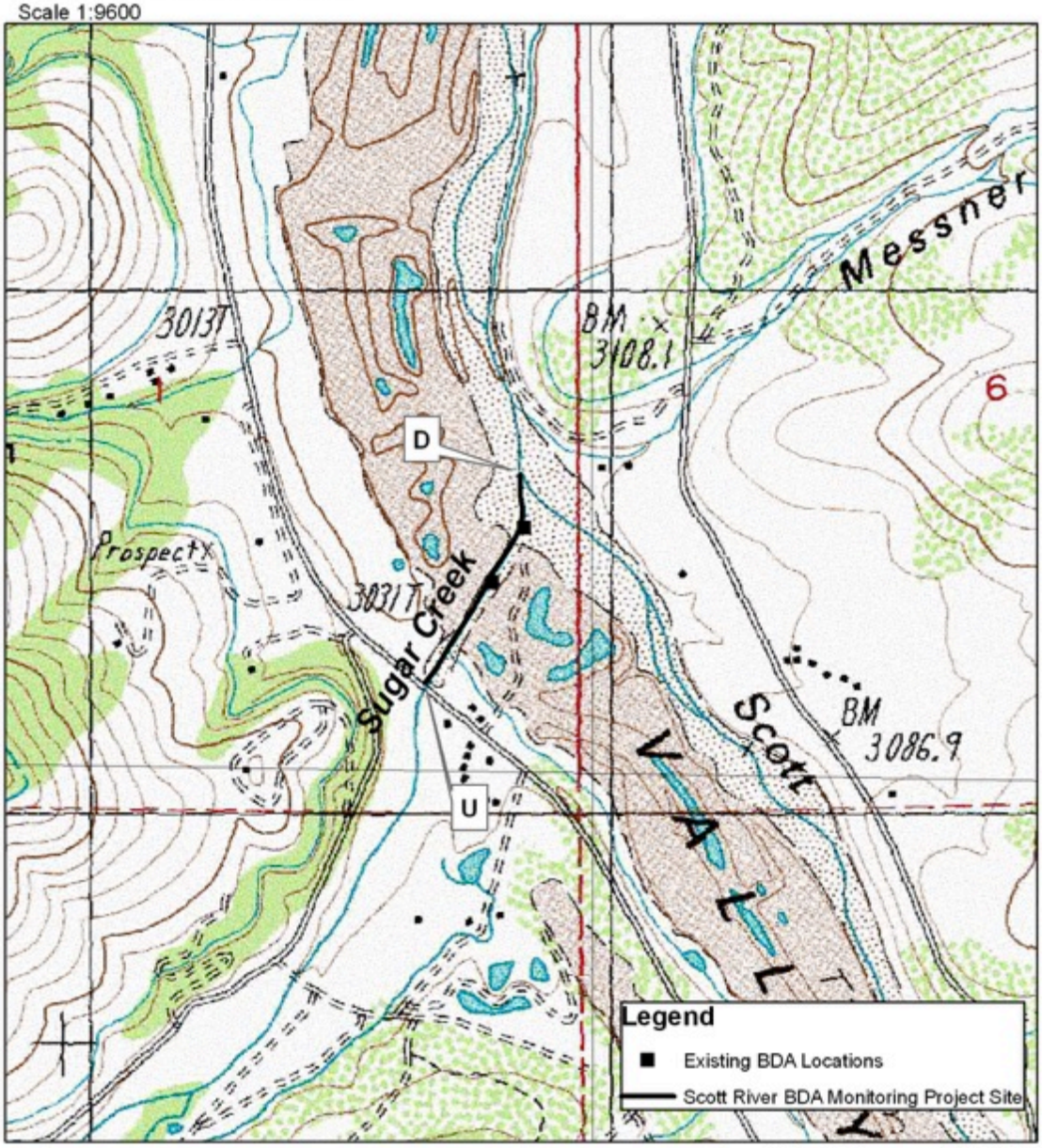
E. Yokel - 8/8/2017

N

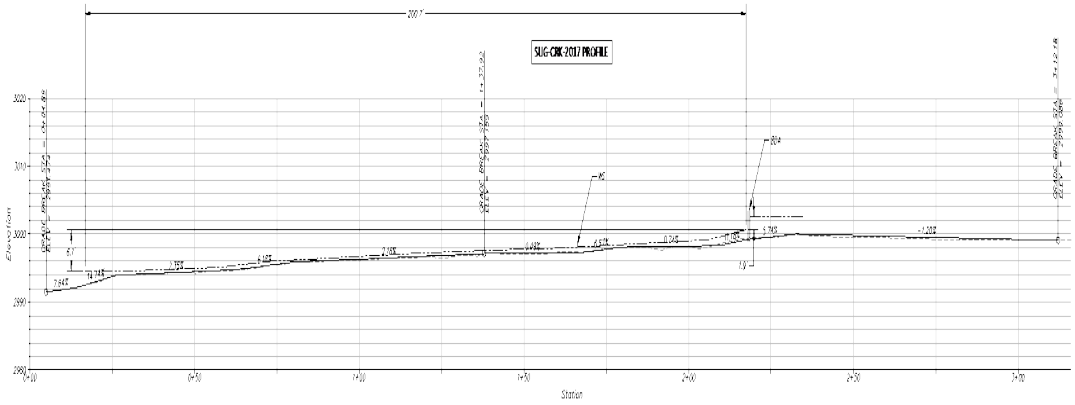
0 80 160 320 Feet

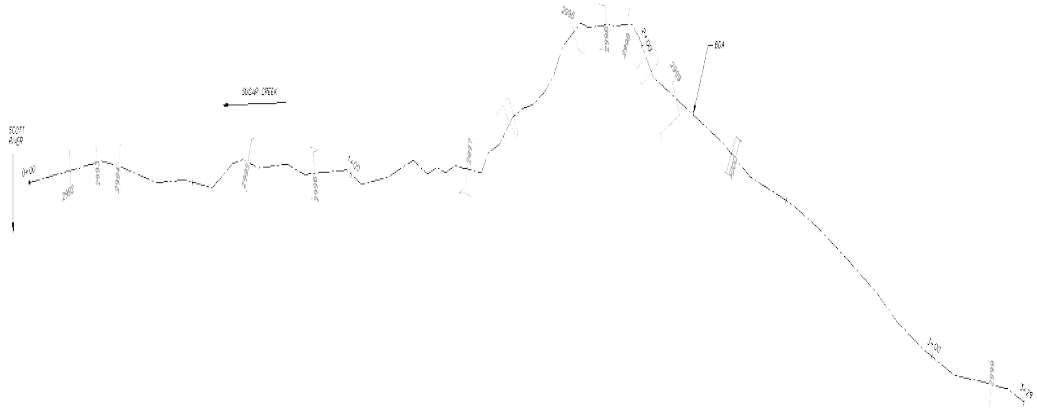
Effectiveness and Validation Monitoring of Scott Beaver Dam Analogues
Map 2 - Sugar Creek

Grantee: Scott River Watershed Council
USGS Quad: Callahan
PLSS: T 40 N R 09 W Sec 1 SE 1/4
Scale 1:9600



Attachment A





Attachment B

Construction and Adaptive Management Guidelines and Best Management Practices
Project Title: Lower Sugar Creek BDA Project

Construction, Maintenance, and Repair details are provided in Section 1, below. Best Management practices (BMPs) for Construction and Repairs of structures are provided in Section 2.

The techniques and methods for construction, maintenance and adaptive management are to found within the "2015 Beaver Restoration Guidebook" (U.S. Fish and Wildlife Service (Janine Castro), National Oceanic and Atmospheric Administration (Michael Pollock and Chris Jordan), Portland State University (Gregory Lewallen), US Forest Service (Kent Woodruf)).
https://www.fws.gov/oregonfwo/toolsforlandowners/RiverScience/Documents/BRG%20v.1.0%20final%20reduced.pdf
and/or under the direction and supervision of Dr. Michael Pollock, beaver guidebook principal author.

Generally, as described in the Beaver Restoration Manual, "BDAs are intended to mimic beaver dams, they require ongoing maintenance and repair, similar to beaver dams. The amount and type of maintenance needed depends on project objectives. Typical maintenance includes extending the length of the structure as a result of end cutting, replacing sections that have been damaged (often from underscour), and raising the height of a structure, typically by constructing a new BDA on top of the sediment wedge that has accumulated upstream of an existing BDA."

The period of adaptive management will extend 5 years from the date of first construction, anticipated to be fall of 2017.

The project boundaries encompass the existing primary Sugar Creek channel from the existing Sugar Creek BDA 0.1, following a line 190-100 ft. east of the channel (RR), to the confluence of the Scott River. From the confluence along the Scott top of bank, to the Sugar RL high flow channel. Following the Sugar RL channel on a line 50 ft. lateral to the top of bank northwest, west, and southwest of the channel to the Sugar RL side channel ancillary BDA. Then following the top of bank of Sugar Creek along the RL southwest upstream of BDA 0.2 330 ft. crossing the channel of Sugar Creek to RR traveling along the top of bank Northeast to Sugar Creek BDA 0.1. Both existing BDAs are included in the project area.

Location Name	Lat.	Long.
East margin of BDA 0.1	41°20'31.41"N	122°49'25.67"W
100' East of Confluence of Sugar Main-channel and Scott	41°20'33.05"N	122°49'24.79"W
Top of Bank west of Sugar RL confluence w/ Scott	41°20'34.63"N	122°49'28.92"W
Top of Bank along Sugar Creek RL at point where channel turns from SW to SE orientation	41°20'33.12"N	122°49'30.64"W
Point where Sugar RL ancillary BDA joins with Sugar Creek BDA 0.1	41°20'31.03"N	122°49'27.92"W
Top of Bank west of Sugar Creek at BDA0.2	41°20'28.24"N	122°49'29.18"W
Top of Bank 330 ft upstream of BDA 0.2 RL	41°20'25.34"N	122°49'31.35"W
Top of Bank RR at BDA 0.2	41°20'27.69"N	122°49'28.32"W

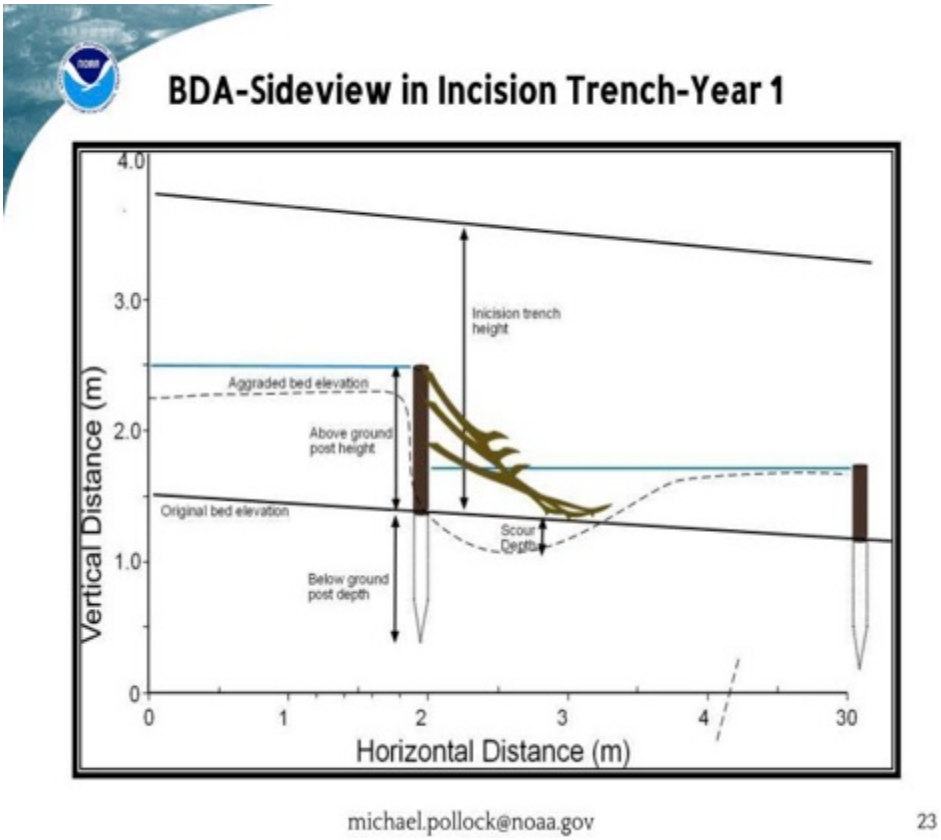
The maximum height of each individual BDA from thalweg to BDA crest will be three feet. As is appropriate, "step down" BDAs will be incorporated to support ease of salmonid passage upstream and downstream through the Sugar Creek channel. As BDAs fill with sediment additional BDAs may be placed upstream or downstream to maintain pool habitat, and/or to facilitate fish passage. No BDA crest, either those in the original construction cycle, or those built over the course of the project as adaptive management responses, will exceed the height of banks.

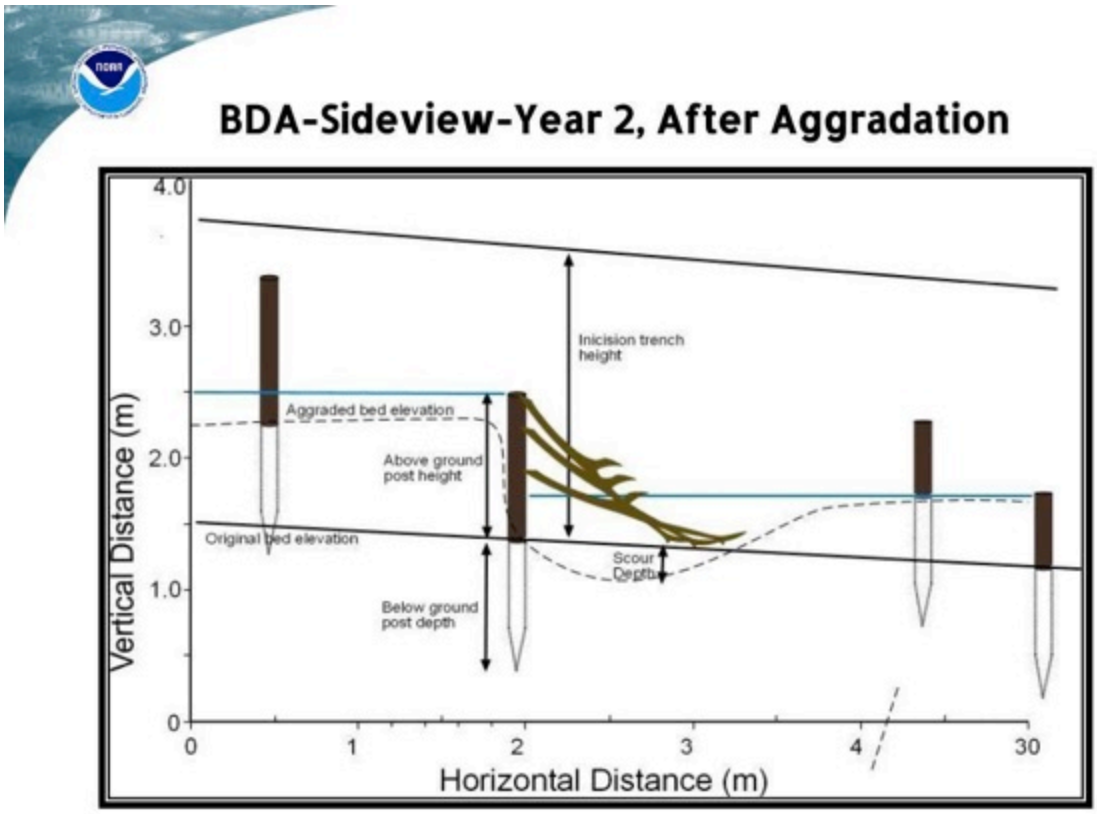
Understanding beaver utilization of BDAs is an important component of this project. SRWC will include a description of the state of beaver utilization of the constructed BDA habitat when submitting requests for Major or Moderate repairs.

1.0 Maintenance or Repair of Existing Beaver Dam Analogous Will Consist of:

1.1.1 Major Repair Definitions

a. Repairs needed to obtain properly functioning conditions of a structure following significant streamflow events.
b. Ancillary structures constructed to support the properly functioning condition of the primary structure. Ancillary structures may be placed at topographic low points within the primary structure, and upstream or downstream of the primary structure. These repairs may be required to adaptively manage movement of sediment and water under high water conditions, retain pool habitat under low flow conditions, and to increase opportunities for fish passage. These ancillary structures may be placed in the Sugar Creek main-channel, Sugar Creek RL side channel and/or in new low flow pathways across the Sugar Creek delta lying between these two primary flow paths. The maximum lateral extent of structure adaptive management activities is 100 ft. from the edge of the side channel top of bank on the east side of the main Sugar Creek Channel, at the 25' from top of bank west and southwest of the Sugar Creek RL channel and is inclusive of the existing Sugar Creek BDA 0.1 and ancillary BDAs, main Sugar Channel to 330 ft. upstream of BDA 0.2.. Examples of first year of BDA placement with subsequent adaptive management structures.



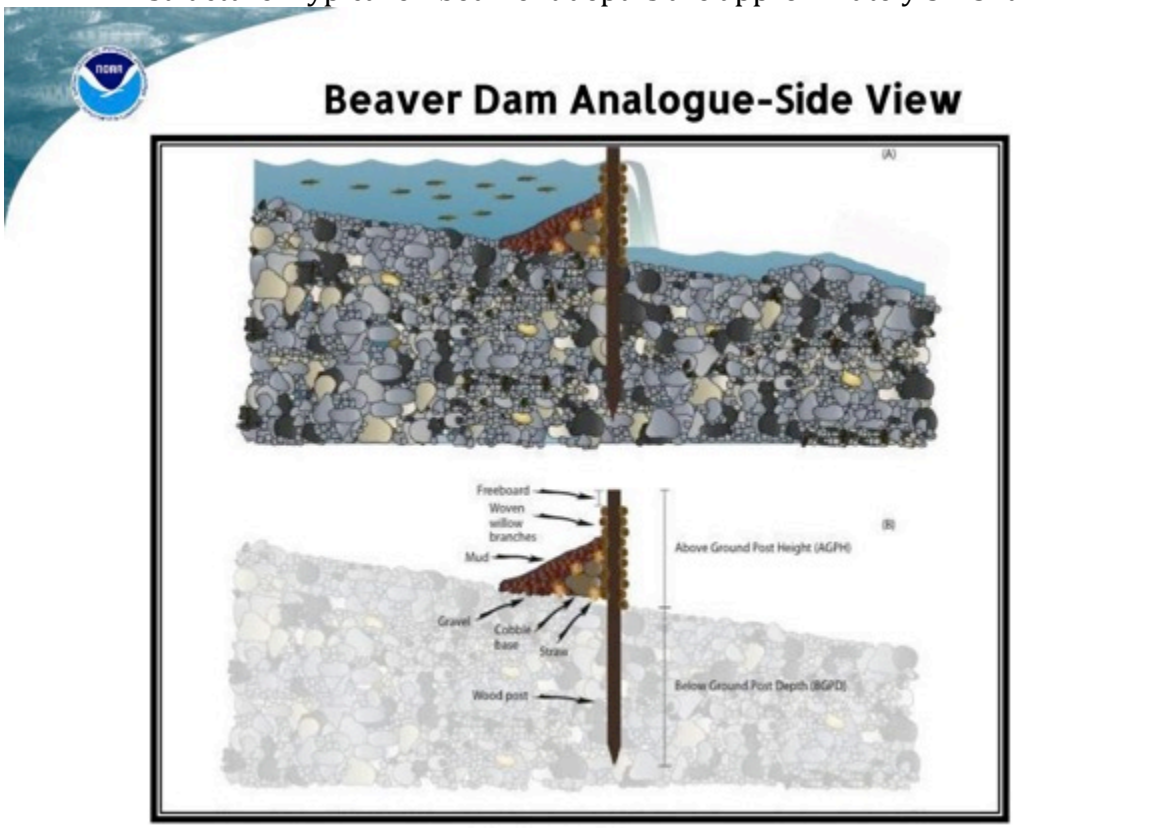


c. Relocation segments of a structure immediately upstream or downstream to achieve properly functioning conditions. Relocation may be needed when changes due to scour, deposition or possible unforeseen conditions limit effective post placement at the original structure location.

1.1.2 Techniques and Tools for Construction and/or Major Repairs

a. If streambed is wetted, a handheld hydraulic pounder, placed in an appropriate containment system, will be used to place posts.
b. If streambed is dry, or at baseflow conditions, a handheld hydraulic post pounder, or an excavator appropriately sized to meet project objectives and BMPs may be used to place posts within the channel. Under typical conditions, excavators with the following specifications will be used: 8 to 10 ft. track width, 18 to 22 ft. reach, < 3 to 8 psi, ($\leq$ 4 psi per track) ground pressure. If an excavator within this size class is not available, the next smaller or larger excavator may be used.
c. If streambed is wetted and flows are above baseflow, an excavator of above description may be used from streambank following the appropriate BMPs.
d. If streambed is wetted and at baseflow, an excavator of the above description may operate within the wetted channel following the appropriate BMPs. Contained in Sections 2.3.5, 2.3.10, 2.3.11 and 2.3.12

e. Post embedment depth will be at least 1.5 times the height of the structure. Typical embedment depths are approximately 5-15 ft.



f. Posts will be placed 12-24 inches apart (center to center). An occasional variance (1/5 posts) will be allowed to account for technical difficulties of post placement causing inadvertent variation in spacing.
g. If streambed is dry, or at base flow, pickup trucks or heavy equip such as a loader may enter stream channel to deliver material to the structure. If wet, materials will be delivered to the streambank and carried to the BDA for placement.
h. Willow (or similar) of 1-5" diameter will be woven between posts and compacted.
i. Grass, forbs, sedges, hay or straw will be compacted and layered into the interstitial spaces between the woven material.
j. Rock, gravel cobble to anchor and additional seal interstitial spaces.
k. Mud, muck or other fine grained material will also be layered into the berm to adjust permeability.
l. All techniques and materials defined in moderate and minor repairs are included in major repairs.

1.2 Moderate Repair Definitions

a. Repairs needed to obtain properly functioning conditions of a structure following average stream flow events.

b. Posts and weave will be added or replaced to repair washed out sections- < 30% total structure length.

1.2.1 Tools and techniques for Moderate Repairs

a. Hand tools will include items such as shovels, picks, bars and chainsaws.
b. A handheld hydraulic post pounder may be used. The power pack will be placed on streambank, or within adequate containment systems, and with appropriate BMPs.
c. Post embedment depth will be at least 1.5 times the height of the structure. Typical embedment depths are approximately 5-15 ft.
d. Posts will be placed 12-24 inches apart (center to center). An occasional variance (1/5 posts) will be allowed to account for technical difficulties of post placement causing inadvertent variation in spacing.

1.3 Minor Repair Definitions

a. Permeability adjustment of flow through structure
b. Patching minor holes and leaks

1.3.1 Tools and Techniques for Minor Repairs

a. Hand tools will include items such as shovels, picks, bars and chainsaws, non-hydraulic post pounders.

1.4 Materials and techniques for construction and all types of repairs

a. Wood posts will be locally sourced, untreated, 2-12 inch diameter, and length sized according to site conditions.
b. Willow cuttings (or similar material) will be interwoven between the posts to create a self-supporting structure and semipermeable.
c. Willow cuttings (or similar material) may be placed to buttresses the upstream or downstream face(s) of the structure. Willow will be obtained within the sub-watershed from the landowner's property. If inadequate amounts of willow are unavailable on site, willow will be obtained from within the Scott River watershed. All nesting bird precautions contained within this document will apply to willow harvest activities.
d. Rock and cobble may be placed to create a scour resistant berm along the upstream and downstream faces of the structure. The berm will be used to enhance structure stability as deemed necessary based on site specific conditions, including streambed sediment size, channel confinement, and streambank erosion considerations.
e. Local or nearby alluvium such as muck, sand, and rock may be hand shoveled onto the structure for permeability adjustment. Desired soil types to adequately seal BDAs are: Sandy Loam, Clay, Clay Loam, Silty Clay. Local alluvium in channel of Sugar Creek was found to be sand and gravel and on adjacent floodplain was loamy sand (see photo below). On landowner's property there is a borrow site of clay material stockpiled

from landowner routine maintenance activities. Landowner has agreed to allow this material to be used for structure sealing. Material is stored outside of the floodplain. Landowner will use a tractor/backhoe to scoop material into a truck/dump trailer for transport and delivery to the project site. If sufficient clay or clay/loam is unavailable at landowner's source, clay will be obtained from a commercial source within the watershed (Moore's Gravel Co.). Moore's Gravel Co. excavates clay from the hillside for admixing into a "road base material". They have agreed to sell the straight run hillside clay. SRWC/technical consultant experience has shown that use of the typically available channel material of sand, gravel provides almost no reduction of permeability through a BDA and results in very high rates of underscour and structure patency loss. The lack of clay and organic materials in the Scott watershed is speculated to be a result of the granite soil types, and the high stream velocities resulting from channelization, and rip-wrapping of the stream systems. Adjustment for this manifestation of local degraded conditions in BDA construction often requires the use of off-channel clays and fines. SRWC will notify CDFW and NCRWQCB prior to the utilization of off-site fine grained clay materials.

Sugar Creek alluvium immediately below BDA 0.1

f. Cobble and rock materials are available within the channel or the nearby tailing piles, however, some round, washed river run 1-8" rock may be imported from Moore's gravel for ease of transportation.
g. Permeability of the structures may be adjusted by using locally sourced finer materials such as mud, grass, leaves and other plant materials. Locally sourced weed free straw, or locally sourced weed free pasture grass hay may be used to adjust permeability. Use of straw reduces the demand for locally sourced native plant materials, does not introduce non-native materials, and has the potential for positive impacts.
h. Additional materials may be used upon request and approval by North Coast Regional Water Quality Control Board (NCRWQCB) and CDFW.

1.5 Adaptive Management

a. This is site lies within the very dynamic confluence of the Scott River and Sugar Creek. It is expected that ongoing site evolution and change will occur and that adaptive management activities will be needed throughout the life of the permit.

2.0 Measures to Protect Fish and Wildlife Resources

2.1 Administrative Measures

SRWC will meet each administrative requirement described below.

A. Documentation at Project Site. SRWC will have copies of all agreements and permits available at the project site and provide them upon request to any representative of a regulatory agency.
B. Providing Agreement to Persons at Project Site: SRWC will provide copies of all agreements and permits to all persons working at the project site, including contractors and subcontractors
C. Notification of Conflicting Provisions: If SRWC determines that permits from any regulatory agency are in conflict with those of another agency, SRWC shall notify the appropriate agencies for resolution of the conflict.
D. Project Site Entry: SRWC and landowner will allow access to project site for regulatory authorities provided they provide 24 hours advance notice and allow project permittee, or representative, to be present.
E. Other Permitting Requirements. SRWC and project partners will abide by all project permits.

2.2 Work Plan Coordination

2.2.1 Seasonal Work Plan

SRWC will submit a work plan for construction of ancillary structures or major repair activities to NCRWCQB and CDFW at least 30 days prior to the proposed work window. The work plan will provide details on specific construction activities for each project site, including equipment type, materials, access and BMPs. NCRWCQB and CDFW will work with SRWC to provide a notice to proceed (NTP) within 30 business days of receiving the work plan. Construction will not commence until the NTP is received and the BMPs are in place.

2.2.2 Major Repairs and Construction of Ancillary Structures

Major repairs and construction of ancillary structures will occur during the period commencing June 15 and ending Oct. 30, provided that the stream is dry or at base flow, defined here as the normal work window for new construction and major repairs. If weather conditions allow and stream is dry or at base flow, new construction or major repair work may be performed within the stream bed or

banks outside of the normal work window, provided SRWC has obtained written permission from the appropriate agencies and the activities are conducted in accordance with the BMPs described herein and any additional requirements deemed necessary by the regulatory agencies.

2.2.3 Minor Repairs and Maintenance

Minor repair and maintenance work to any constructed or reinforced instream structure may occur on an on-going basis as long as the activities are conducted in accordance with the BMPs described herein. These activities may occur throughout the year and in the wetted channel without specific authorization as needed to maintain structure stability and fish passage. Such work will employ the same type of materials used in the original construction and occur in the location of existing features unless otherwise specified in a written workplan amendment.

2.2.4 Moderate Repairs and Maintenance

Moderate repairs and maintenance work to any constructed or reinforced instream structure may occur on an on-going basis as long as the activities are conducted in accordance with the BMPs described herein. These activities may occur throughout the year and in the wetted channel. SRWC will notify the NCRWQCB and CDFW Department in writing at least five working prior to proposed work for review and written approval of proposed work. Such work will employ the same type of materials used in the original construction and occur in the location of existing features unless otherwise specified in a written workplan amendment.

2.3 Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish, wildlife and water resources The SRWC will implement each measure listed below.

2.3.1 Weather Considerations

For any ground disturbing work SRWC shall do all of the following:

a. Stage appropriate erosion and sediment control materials at the work site prior to ground disturbing activities.
b. Complete all required work and implement erosion control measures prior to the onset of significant precipitation (greater than 2.0 inches) over the succeeding 7-day period or by October 31th, whichever comes first.
c. Ground disturbing work outside the normal work window may be conducted if it can be completed on a day-to-day basis and all ground disturbance is storm-proofed prior to the onset of significant precipitation (greater than 2.0 inches) over the succeeding 5-day period.
d. The California Nevada River Forecast Center (CNRFC) forecasts for the Scott River at Fort Jones will be used as the primary weather guidance for BMP implementation. This website is available at: http://www.cnrfc.noaa.gov/graphicalRVF.php?id=FTJC1

2.3.2 Worksite Notification and Compliance

SRWC will instruct all persons conducting any ground disturbing activities at the worksite to comply with the conditions set forth herein and will inspect each worksite before, during, and after the completion of any ground disturbing activity at the work site.

2.3.3 Water Quality Management

SRWC experience has shown that post pounding by either the hand held post pounder or with heavy equipment causes very little rise in turbidity, because of the decomposed granite sands, rock and cobble typical of Scott River substrates. These materials are the typical substrate at Sugar Creek. To manage any potential turbidity from post pounding activities, SRWC will monitor water quality 25-50 ft downstream and if a significant decrease in clarity occurs, work will be paused until background clarity has returned.

However, the berming of the BDA with imported fines has been shown to increase stream turbidity, so SRWC shall install turbidity barriers downstream to catch sediment and control turbidity. Barriers may include clean gravel berms and/or turbidity curtains.

If work requires heavy equipment to work directly within channels where flowing water is present, the equipment will work on a series of posts laid out as a temporary corduroy road. The posts will be placed to minimize disturbance of the wetted streambed and removed as the work is completed.

2.3.4 Habitat Protection

Instream work will be conducted to avoid disturbing or interfering with spawningfish or redds. During regular inspections, qualified surveyors will identify the location of spawning grounds that are within the project site, and avoid disturbance to any identified redds or fish.

2.3.5 Site Access and Staging

The SRWC will conduct all activities involving site access and staging in a manner to avoid or minimize disturbance to riparian vegetation and ground surfaces. Key BMPs include:

a. Existing roads, trails, landings and areas of disturbed ground will be used for access and staging of materials and equipment to the greatest extent feasible.
b. Temporary access trails will be oriented to approach the streambank with a perpendicular alignment. This BMP has two objectives: 1) minimize the length and area of disturbance immediately adjacent to the stream, and 2)

reduce the potential for the stream to flow or avulse down the length of a trail, which is more likely with bank parallel alignments.

c. Disturbance or removal of riparian vegetation, related to trail construction and use, will be avoided or minimized to greatest extent feasible. Temporary trails will preferentially avoid removal of larger vegetation that provides shade on the bed and banks of the stream. Any trees removed during project implementation activities will be utilized onsite to increase habitat complexity. At the end of each work season crews will: 1) mulch established access routes with organic, seed-free straw to a minimum depth of two inches to prevent erosion; and 2) plant two native trees in the project area for each tree removed

2.3.8 Willow Flycatcher Protection and other nesting bird protection.

All willow harvest sites, whether at actual structure site, or at alternative harvest sites, will be identified for review by CDFW Biology qualified biologist staff prior to the start of willow harvest. The Biographic Information and Observation System (BIOS) Habitat Suitability Model will be used to determine if the site needs to be considered as potential Willow Flycatcher habitat. If determined to be Willow Flycatcher habitat the following protection measures will be employed:

a) Conduct vegetation removal and other ground disturbing activities associated with construction from September 1 through January 31, when birds are not nesting; or

b) Conduct pre-construction surveys for nesting birds if vegetation removal or ground disturbance activities are to take place during the nesting season (February 1 through August 31). These surveys shall be conducted by a qualified biologist no more than one week prior to vegetation removal or construction activities during the nesting season. If an active nest is located during the pre-construction surveys, a non-disturbance buffer shall be established around the nest by a qualified biologist in consultation with the Department. No vegetation or construction activities shall occur within this non-disturbance buffer until the young have fledged, as determined through additional monitoring by the qualified biologist. The results of pre-construction surveys shall be sent to the Department at: California Department of Fish and Wildlife, Attn: CEQA, 601 Locust Street, Redding, CA, 96001.

c) For other nesting birds a qualified biologist shall examine areas during willow collection to ensure that no nests are present . If an active nest is located during the pre-construction surveys, a non-disturbance buffer shall be established around the nest by a qualified biologist. The buffer shall be established in consultation with the Department prior to vegetation removal. No vegetation or construction activities shall occur

within this non-disturbance buffer until the young have fledged, as determined through additional monitoring by the qualified biologist.

Willows may be harvested without concern about Willow Flycatcher or other nesting birds between Sept 1 and April 15th of any year. Willow will be harvested at a rate of > 30% of the vegetative coverage at any site. This may consist of removal of 30% of an individual clump, or entire clumps at not > 30% of the number of clumps based on the density, age and vigor of the plants.

2.3.9 Coho Salmon Protection Measures

a. BDA locations and vehicular access routes will be surveyed for the presence of coho salmon or any salmon redds. If coho are found to be present at the time of construction, fish will be excluded from area by block nets upstream and downstream. If redds are found, construction will be delayed until fish have hatched and juveniles are > 50 mm in size.
b. Prior to Project implementation, CDFW Yreka fisheries personnel will be consulted as to the best mechanism to ensure salmonid, and other species protection during work windows. These measures may include placing fish exclusion netting will be placed to ensure that all salmonids are precluded entry to the Project work site. Once exclusion netting is in place, wetted portions of the channel within the Project work area will be dived, or visually surveyed if too shallow to dive, to ensure that no SONCC coho salmon are present. If SONCC coho salmon are observed within the Project work area, exclusion netting will be removed to allow volitional movement of fish throughout the area. When habitat conditions in the side channel have changed sufficiently, exclusion netting will again be placed to preclude salmonid access to the Project work area, and dived to confirm that no SONCC coho salmon are present. This procedure will be repeated until either there are no SONCC coho present in the Project work site, or the Project work site is dry. CDFW personnel may participate in activities to remove salmonids from work areas. All snorkel surveys will be conducted by staff from NMFS, the Scott River Watershed Council, and/or the Siskiyou Resource Conservation District. Alternative salmonid protection procedures may include simply allowing juvenile salmonids to volitionally move away from work areas. In habitats with significant complexity it may be impossible to successfully exclude tham and allowing them to move away may be a preferable alternative. The decision as to which method to utilize will be made by CDFW Fisheries and NMFS personnel in collaboration with SRWC staff.
c. Fish passage considerations: Adult fish passage has been well documented over the past three years of BDAs. SRWC will continue to provide visual fish passage evaluations and make necessary adjustments in BDAs if adult fish

are identified as holding up below any BDA. A specific objective of the construction of the new BDAs requested in this NOI is to improve ease of juvenile fish passage particularly under low flow conditions. SRWC will continue with the established protocol of twice weekly juvenile fish passage inspections during low flow periods with on going discussions with CDFW Yreka fisheries personnel. If fish passage issues are identified, adaptive management adjustments will be made with consultation from CDFW Fisheries Personnel. If, through ongoing PIT Tag and other monitoring, it becomes established that juvenile salmonids are passing through the BDAs without difficulty and/or regulations change such that fish passage for all life stages at all times is no longer required, CDFW and SRWC may, by mutual consent, determine a different juvenile fish monitoring protocol.

d. SRWC will follow all provision of permit holders Scientific Collection Permit and ESA Section 4D permits for fish handling activities.

2.3.10 General Habitat Protection Measures

a. Vehicles operating in the wetted channel will operate in accordance with all BMPs listed in this document and specifically with in Provisions 2.3.1, 2.3.3, 1.3.4, 2.3.5, and 2.3.11.

b. Structures and associated materials not designed to withstand high seasonal flows shall be removed to areas above the high water mark before such flows occur.

c. No alteration of the streambed, bank or channel shall occur, except as otherwise permitted in this Agreement. The removal of soil, native vegetation and vegetative debris from the streambed or stream banks is prohibited, except as described in work activities and/or to gain access to a project location.

d. Hand tools (e.g., trimmer, chain saw, etc.) will be the preferred method to trim vegetation to the extent necessary to gain access to the work sites. Larger equipment may be used to remove vegetation along temporary access trails following the BMP describe in Section 4.3.5.

e. Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations.

f. Stream bank modifications to facilitate project construction operations shall be performed in a manner that will not cause negative impacts upstream and downstream in the stream channel, such as accelerated bank erosion or loss of vegetation.

g. SRWC may conduct moderate or major maintenance activities to any constructed or reinforced instream structure authorized by this workplan, provided the SRWC obtains written approval from CDFW and Waterboard prior to commencing any activities. Such work shall employ the same type of materials used in the original construction and shall occur only in the locations of existing features unless otherwise specified in the written approval. SRWC may undertake minor repair activities as needed without prior approval.

h. SRWC shall ensure that the spread or introduction of invasive exotic plants will be avoided to the maximum extent possible. When practicable, invasive exotic plants at the work site will be removed.

i. SRWC will ensure, through the monitoring program, that the structures at no time present impediments to migration to any salmonid species at all life stages (see 2.3.9).

j. SRWC will include number equipment entries in to Sugar Creek and /or other wetted areas in annual workplan submissions. Every effort will be made to hold these entries to one crossing in each direction of Sugar Creek per season. Any deviation from this standard will be reviewed with CDFW and NCRWQCB.

2.3.11 Petroleum, Chemical and Other Pollutants

a. Staging, storage, and re-fueling areas for machinery, equipment, and materials shall be located outside of the stream a minimum distance of 150 feet from the channel.
b. All equipment or vehicles driven and/or operated within or adjacent to the stream channel shall be checked and maintained daily to prevent leaks of materials that, if introduced to water, could be deleterious to aquatic life, wildlife, or riparian habitat.
c. SRWC shall employee licensed contractors, experienced in in-stream restoration work, for operation of heavy equipment entering riparian zones.
d. Stationary equipment such as motors, pumps, generators, and welders that contain hazardous materials, located within or adjacent to a stream shall be positioned over drip pans, and comprehensive containment systems such as plastic troughs.
e. All activities performed in or near a stream shall have absorbent materials designated for spill containment and clean-up activities on-site for use in an accidental spill. The Permittee shall immediately notify the California Emergency Management Agency at 1-800-852-7550 and immediately initiate the clean up activities. CDFW shall be notified by the Permittee and consulted regarding clean-up procedures.
f. No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, asphalt, paint or other coating material, oil or petroleum

products or other organic or earthen material from any construction, or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream.

2.3.12 Erosion and Sediment Control

a. SRWC will maintain adequate erosion and sediment control devices to prevent the degradation of water quality.

b. SRWC will prevent discharge of sediment, and/or muddy, turbid, or silt-laden waters, resulting from the project, into the stream channel following the BMPs described in Section 2.3.3

c. Soils exposed by project operations shall be mulched to prevent sediment runoff and transport. Mulches shall be applied so that not less than 90% of the disturbed areas are covered. All mulches (except hydro-mulch) shall be applied in a layer not less than two inches deep. All exposed soils and fills, shall be reseeded with a mix of native grasses common to the area, free from seeds of noxious or invasive weed species, and applied at a rate which will ensure establishment.

d. Soils adjacent to the stream channel that are exposed by project operations shall be adequately stabilized when rainfall has a 30% chance of occurring during construction, and immediately upon completion of construction, to prevent the mobilization of such sediment into the stream channels or adjacent wetlands. The 72 hour National Weather Service forecasts shall be monitored by the Permittee to determine the chance of precipitation.

e. Upon CDFW determination that turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation, shall be halted until effective CDFW approved control devices are installed, or abatement procedures are initiated.

f. All bare mineral soil exposed in conjunction with project activities shall be treated for erosion prior to the onset of precipitation capable of generating run-off or the end of the normal work window, whichever comes first. Erosion control will include seeding and mulching of bare soil with weed-free, organic straw mulch and native grass seed mix.

REPORTING MEASURES

The SRWC will submit annual monitoring reports to NCRWCQB and CDFW as required by the monitoring plan, no later than April 1 for each year that the monitoring plan is in place. The monitoring plan described on page 29 of this NOI will be undertaken regardless of funding source.

Project monitoring as described in Attachment D funded by the Coho Enhancement Fund through 2017. An even more intensive monitoring proposal has been submitted to FRGP and is in the possession of Yreka CDFW and Hab Con personnel. If funded, monitoring activities will be undertaken as described and will include evaluations of these new BDAs. The monitoring plan in Attachment D may be revised by the consent of all interested parties: SRWC, Scientific Lead, Dr. Michael Pollock, CDFW, NCRWQCB, USFWS and funders NFWF, and Coho Enhancement Fund.

Attachment C:

SRWC BDA Repair Report

To be used for moderate/major repairs as defined by the adaptive management- permit.

Location: _____

BDA: _____

Date(s) of Repair: _____ to _____

Photos: Attach pre-repair photo point photos, post-repair photo point photos, photos of any unique/interesting features.

Work-plan: Attach copy of authorizing work-plan with approvals from CDFW/NCRWQCB.

Beaver Activity: Describe any evidence of beaver activity pre/post repair.

Flow: Measure flow entering BDA pool and below BDA pre/post repair
Pre-repair: entering pool_____
Pre-repair: below BDA _____
Post-repair: entering pool_____
Post-repair: below BDA_____

Reason flow not measured:

BDA pool depth:
How measured 1: (staff gage, logger) _____
location_____
Pre-repair measurement 1: _____
Post Repair measurement 1: _____
How measured 2: (staff gage, logger) _____
location_____
Pre-repair measurement 2: _____
Post Repair measurement 2: _____

Repair Metrics:
Width (distance of BDA from one end to the other) BDA prior to repair_____
Width (distance of BDA from one end to the other) BDA post repair_____
Materials:
- Posts: (number)_____Cost:_____
- Willow (or similar)_____Cost:_____
- Vegetative material: type (hay, straw, other)_____, amount_____ Cost_____
- Fines: type (stream bed, local, imported)_____, amount_____ Cost _____
- Total Material cost_____

Equipment:
- Post pounding: type (excavator, hand held)_____

Other Equip: type (truck etc)_____

Total Equipment Cost:_____

Time:

Post Pounding: Days_____

Staff_____

Berming: Days_____

Staff_____

Sealing: Days_____

Staff_____

Other: What_____

Days:_____

Staff_____

Estimated Project Management/monitoring/reporting time:

Days_____

Total personnel costs: (Calculate w/ ED and Bookkeeper):_____

Total Project Cost:_____

Descriptive Report:

BDA feature requiring repair:

Environmental goal for repair

Unique issues

Interesting features,

Post repair condition.

Fish passage (adult/juvenile) considerations:

Attachment D

Existing Scott River BDA Monitoring Program

Monitoring Parameter Adult Fish Passage Across BDAs:
Annual spawning surveys (carcass and redd counts) performed by the Siskiyou RCD will be used by the SRWC to assess adult fish passage over Post-Assisted Wood Structures (PAWS). The RCD provides the spawner survey data to the SRWC at the end of each spawning season (March). After a structure is installed, the spatial distribution of redds and carcasses upstream and downstream of each structure will quantified and compared to distributions in previous years to assess whether the structures are affecting spawning patterns within the watershed, and specifically, if there are any indications that structures are reducing upstream spawner densities (preliminary analysis from the 2014-2015 survey suggests a spawner distribution consistent with previous years). When adult Chinook and coho salmon are present (November – January) the SRWC will visit each BDAs 2x/wk) to ensure they are passable. If fish are present below a structure, ie: "kegged up", the structure will be breached sufficiently to allow fish movement. CDFW Fisheries also estimates adult returns on the Scott River using a video counting system near the mouth of the Scott Valley. The USGS) also maintains a streamflow monitoring station that measures discharge and stage height on the Scott River near Fort Jones (USGS #11519500). These data will be used to place the spatial distribution of redds relative to BDA's locations in the context of total run size and hydrologic regime during the spawning season, since year-to-year variation in the spatial distribution of spawning is affected by these variables.

Juvenile Fish Passage Across BDAs: Juvenile fish passage will be assessed at BDAs through placement of PIT tag monitoring station with two antennae, one upstream and one downstream of a structure. The PIT tag infrastructure (hardware, power supply and antennae) will be provided by CDFW. The SRWC will visit PIT monitoring stations 1x/wk to perform a systems check to ensure that they are functioning properly and to download and analyze data. There is currently a PIT tag monitoring station at the PAWS at the mouth of Sugar Creek that is being maintained and operated by CDFW. Routine maintenance of the station and data downloading will transfer to SRWC this spring. Coho and steelhead juveniles, minimum size 60mm, will be tagged above and below the PAWS until a minimum

sample size of 50-100 salmonids above and 50-100 salmonids below each structure is reached during a tagging event, though ideally thousands of fish can be tagged, as this will greatly improve the chances for obtaining statistically meaningful results. SRWC monitoring supervisor, Erich Yokel, under supervision by CDFW personnel this coming year, will perform tagging. Similar numbers will be tagged at the control sites, if possible, so that relative movement patterns can be compared. As many juveniles as is reasonably possible should be PIT tagged because previous studies have shown that high numbers of PIT tagged juveniles often move away from study areas and are no longer observed. At a minimum, tagging events should occur twice/year, once 39 in the spring/summer and once in the fall/winter. Additional tagging events may be needed if fish move off site or otherwise disappear such that sample sizes become too small to make reasonable statistical inferences in regards to juvenile fish passage. (see Lotkeff 2012 for a similar study). Juvenile fish passage will be assessed at the site through placement of portable PIT tag antennae, which will be provided by CDFW. Placement of PIT tag antennae upstream and downstream of the structures will enable us to better quantify the number and frequency with which juveniles cross beaver dams or BDAs. We do not have enough antennae sufficient to monitor movement at all sites all the time, so antennae will be rotated through the treatments and control sites, with efforts concentrated at locations where juvenile salmon are most abundant (i.e., we are not going to expend a lot of effort measuring fish movement in places where there are few fish). An alternate, acceptable method to access juvenile movement is use of a portable Pit Tag wand both upstream and downstream of the structures in lieu of more permanent arrays. Use of the wand would reduce cost in comparison to purchase of arrays, and also reduce expense as compared taking down and setting up arrays in a rotational system. CDFW will be responsible for major repairs or replacement of the Pit Tag Arrays when notified of need by SRWC. SRWC will download data from arrays and/or portable wand, submit it to CDFW who will be responsible for data entry, data management and analysis. Juvenile Salmonid Use of BDA Habitat One of our project partners, CDFW operates a juvenile outmigrant trap at the mouth of the Scott River to estimate annual outmigrant production of the watershed. At the trap, outmigrants are captured and scanned for PIT tags. These CDFW data, in combination with the data provided by SWRC, will be explored and analyzed by NOAA, another of our project partners, to determine if estimates of the outmigrant production of the habitat restored by this project can be compared to overall outmigrant production in the Scott River.

Stream Temperature: The SRWC has 50 Onset tidbit dataloggers (accuracy + 0.2 oC) provided by one of our project partners (NOAA), that will be used to measure stream temperatures above and below PAWS. Because of the high spatial variability of temperature in the complex habitat surrounding PAWS, we will employ multiple data loggers at each site during the summer. We will measure the spatial variation in stream temperatures for the purposes of identifying the extent of "thermally available" habitat, relative to control sites. Forty dataloggers will be used in a rotating panel design to measure spatial variability at control and treatment sits, while the remaining ten dataloggers will be used to continuously monitor stream

temperatures at each of the sites throughout the year Groundwater and Surface Water Monitoring The SRWC has 26 Onset Hobo U20 water level dataloggers (range 0-9 m, accuracy 0.5 cm) provided by NOAA, that are being used to measure groundwater and surface water elevations and temperatures. These dataloggers have been placed in wells at 40 control and treatment sites, upstream and downstream of the structures (see figure xx for locations, see figure xx for an example of an installed well). A total of 32 monitoring wells have been installed, including 26 groundwater wells, four surface water stations, and two surface/flow stations at the control sites. Some wells do not have water level loggers installed and these wells are being measured on weekly basis using a Solinst (model 101) P7) water level tape. The data will be analyzed to assess the spatial extent to which elevated surface water tables upstream of PAWS also increase groundwater levels relative to control sites. Temperature data can be used as a "tracer" to assess the extent of groundwater-surface water connectivity, but those data will not be analyzed as part of this monitoring plan.

Dissolved Oxygen: The SWRC has four Hobo DO dataloggers (U26-001) which have been provided by two or our project partners, USFWS and NOAA, that will be used to monitor dissolved oxygen levels. Because of the high spatial variability of temperature in the complex habitat surrounding PAWS, it is reasonable to expect that there will also be a certain amount of spatial variation in dissolved oxygen levels. We will measure the spatial variation in dissolved oxygen for the purposes of identifying the extent of "oxygen available" habitat, relative to control sites and to determine the variation in the extent of oxygen available habitat on a seasonal and diurnal basis. The four data loggers will be used in a modified rotating panel design to measure spatial variation in dissolved oxygen at control and treatment sites. Additionally, we will utilize a YSI handheld DO meter to spot check DO at locations where data loggers are not present. Juvenile Coho Salmon Habitat Capacity The abundance of juvenile coho salmon habitat will be measured at control and treatment sites. The extent of velocity, depth and cover conditions favorable to juvenile salmon during the summer and winter seasons will be approximated by taking a series of cross-sectional measurements at each of the treatment and control sites. Such measurements will be used to quantify the increases in juvenile coho salmon habitat capacity resulting from the restoration action (For details, see Beechie et al. 2015. Comparison of potential increases in juvenile salmonid rearing habitat capacity among alternative restoration scenarios, Trinity River, California. Restoration Ecology: 323:75-84). Assessment of increased rearing capacity for juvenile coho salmon is particularly important in places such as the Scott River and elsewhere throughout the Klamath basin, where populations are currently depressed. This is because direct measurement of fish response to the restoration treatment may not necessarily be a viable means of quantitatively assessing the benefits of the restoration action simply because there are a limited number of fish currently available to use the habitat.

Beaver: The SRWC will survey treatment and control sites for beaver habitat potential and usage, using a modified version of a survey form used by the Methow Valley Beaver project (unpublished). We will perform such surveys no less than

2x/yr, once in the summer and once in the fall. Features indicative of beaver use include constructed dams, areas flooded, stick lodges, bank lodges, canals, feeding stations, food caches, scent mounds, sticks with beaver teeth marks, and live trees and stumps with beaver teeth marks.

Vegetation: The extent of vegetative cover will be approximated by comparing pre- and postproject aerial surveys provided at regular intervals using remotely-sensed data, such as the (2102) aerial LiDAR and orthophoto surveys provided by one of our project partners, USFWS. One of our other project partners, NOAA, will be responsible for all aspects of any vegetation surveys, but SRWC may assist as time allows. We may also obtain inexpensive high resolution aerial photographs from local UAV flights, as that technology becomes available. Because years may pass in between such aerial surveys, the effects of the treatments on vegetative cover may not be known for some time (i.e. years). Therefore, we will also establish a series of monumented photo points at each of the sites so that qualitative assessments of the effect of the treatments on riparian vegetation can be assessed. The standard of success will be a quantifiable increase in the coverage of riparian vegetation, as measured by aerial photographs, or a qualitative increase in the amount of riparian vegetation as measured by photopoints.

Measuring Hydrogeomorphic Changes in Habitat: The restoration treatments are expected to create general hydrogeomorphic changes that benefit salmon, such as side channel formation, floodplain connectivity, aggradation that elevates water levels and increases inundation duration for offchannel habitat, and scour pool formation. These changes will be measured by comparing pre-treatment (2012) digital elevation models derived from aerial LiDAR surveys and companion color orthophotos (provided by USFWS), with similar posttreatment surveys, if these data become available. Approximately $25,600 is needed for another aerial LiDAR survey along the mainstem of the Scott River, from the mouth of Sugar Creek to the mouth of Etna Creek, and another $20,300 is needed for a simultaneous aerial orthophoto survey of the same area. Currently, funding is not available for a 2015 aerial LiDAR/color orthophoto survey. If funding becomes available and aerial LiDAR/color orthophoto survey data are obtained, the data will be analyzed by NOAA using GIS-based geomorphic change detection tools, which in combination with orthophoto interpretation and groundbased habitat surveys will enable a quantitative assessment of the improvements in aquatic and riparian habitat that have occurred as a result of the restoration treatments. Up-to-date aerial LiDAR and orthophoto surveys are also very useful for planning and design of future restoration projects, and are much more cost-effective than ground surveys for restoration planning and design over large areas. Thus data 42 acquired from such surveys has multiple applications and future restoration projects will benefit from these data being available. Reporting Annually by April 1 to NFWF, USFWS, CDFW and NOAA. We request that the annual report due date be moved to be April 1, so that the spawner survey data from the RCD can be incorporated into the report. SRWC will be responsible for routine grant compliance reporting. Project partner, NOAA, will be responsible for April 1 monitoring reports.

Attachment C

Fish Passage:

Update on Sugar Creek BDA 0.1 Fish Passage Monitoring
Betsy Stapleton

Photos taken 8/13 & 8/14 2017

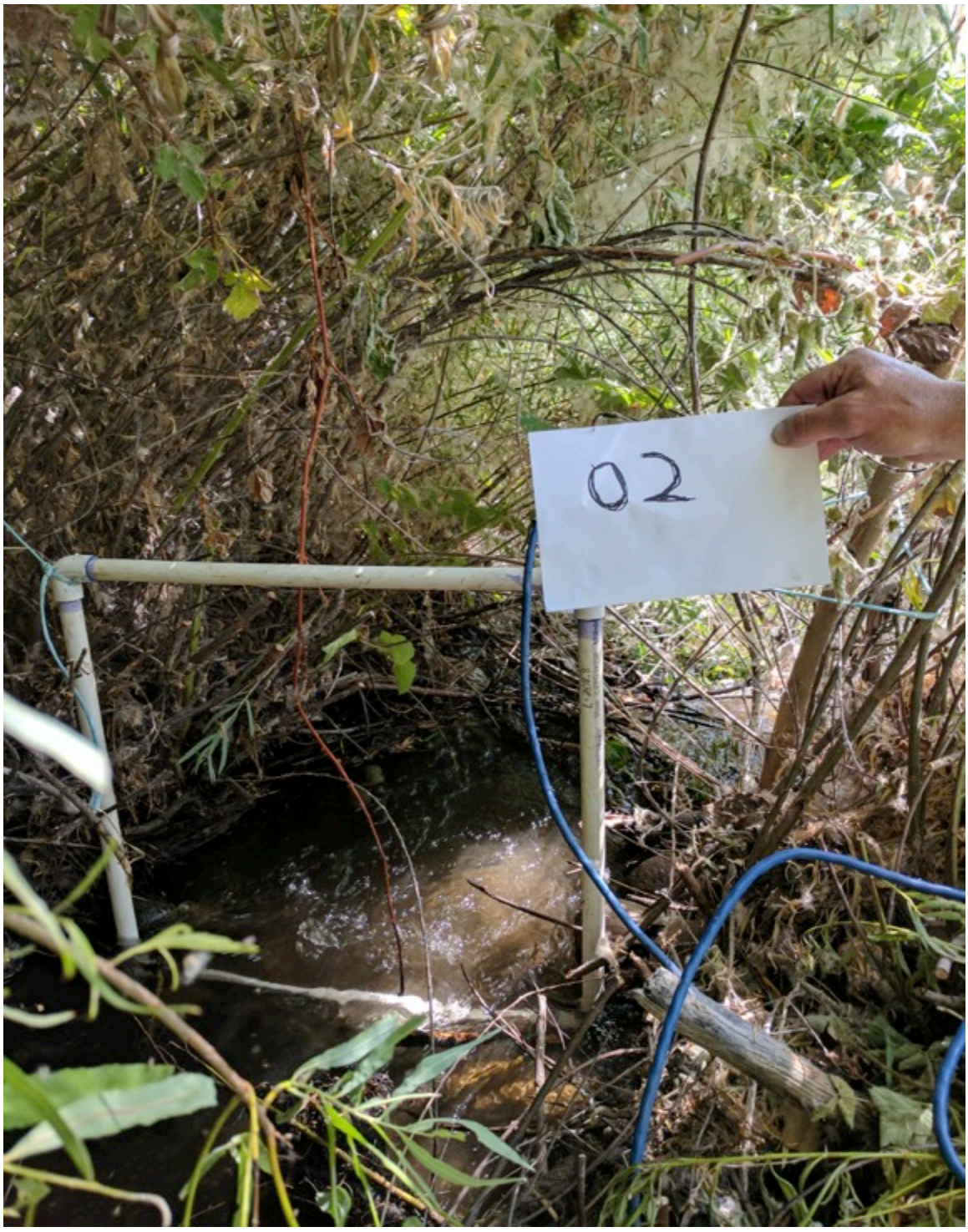
OA 05 Bottom of “Fry Way” looking Downstream

OA 05 Bottom of “Fry Way” looking upstream

OA 03 Midway on “Fry Way” looking downstream

OA 03 midway on “Fry Way” looking upstream.

OA 02 At top of “fry way”, looking downstream



OA 02 At top of “Fry Way” looking upstream

OA 04 Between MC and RL

OA 00 Below RL BDA, recording pathway spilling between RL and Main and entering RL.

Sugar Creek Main Channel PIT Array 79” below BDA

RL Channel PIT Array 230’ Below RL BDA

Scott River at Sugar Creek Confluence Sampling Totals													
		Coho				STHD				Chinook			
	Total Catch	Marks	Recaps	Mort	Total Catch	Marks	Recaps	Mort	Total Catch	Marks	Recaps	Mort
7/25/2017	12	12	0	0	1	1	0	0	0	0	0	0
8/17/2017	7	6	0	0	66	15	0	0	5	5	0	0
Total Effort to date	19	18	0	0	67	16	0	0	5	5	0	0

Lower Sugar Creek - PIT Tag Antenna Stations

SCOTT RIVER WATERSHED COUNCIL

E. Yokel - 8/30/2017

N

0 75 150 300 Feet