

Big Springs Ranch Wildlife Area

Site Plan Agreement between California Department of Fish and Wildlife (CDFW) and NOAA's National Marine Fisheries Service (NMFS) for the Template Safe Harbor Agreement for Conservation of Coho Salmon in the Shasta River

A. Introduction

This Site Plan Agreement for the Template Safe Harbor Agreement for Conservation of Coho Salmon in the Shasta River (Agreement), which is intended to provide conservation benefits for the Southern Oregon and Northern California Coast (SONCC) Evolutionarily Significant Unit (ESU) of coho salmon (the Covered Species), is between the California Department of Fish and Wildlife (Permittee) and NOAA's National Marine Fisheries Service (NMFS).

This Site Plan Agreement, combined with the provisions of the Agreement, may serve as the basis for NMFS to issue a federal Enhancement of Survival Permit (ESP) to the above named Permittee pursuant to section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended (ESA). The joint and respective responsibilities of NMFS, CDFW, and the Permittees are detailed in the Agreement. This Site Plan Agreement is subject to terms and conditions set forth herein and in the Agreement and ESP. The definitions included in Section 2 of the Agreement are incorporated herein by reference.

In accordance with Section 5.1 of the Agreement, this Site Plan Agreement includes the following:

- General description of the Enrolled Property, including map and water rights (Section B below);
- Description of Routine Agricultural Activities carried out on the Enrolled Property (Section C.1 below), applicable Avoidance and Minimization Measures (AMMs) (Section C.2 & G.1 below), and Beneficial Management Actions (BMAs) to be implemented by the Permittee, including a schedule and other terms and conditions for implementation (Section E below);
- Description of Baseline Conditions on the Enrolled Property (Section D below) and Actions Required to Maintain Baseline Conditions (Section E.1 below);
- Description of Elevated Baseline Conditions on the Enrolled Property if applicable (Section E.2 below) and description of Other Beneficial Management Activities on the Enrolled Property (Section E.3 below);
- Monitoring and reporting activities that the Permittee agrees to carry out (Section G below);

- Description of potential and existing funding sources and timeline for the Permittee to carry out BMAs, AMMs, and monitoring and reporting requirements (Section E, F, & G below); and
- Other information consistent with the terms and conditions of the Agreement and ESP (Section F, H & I below).

The AMMs, BMAs, and associated monitoring and reporting protocols described below derive from Appendix 2 and Appendix 3 of the Agreement. In the event there is any conflict between the AMMs, BMAs, and associated monitoring and reporting protocols as described below and as described in the appendices to the Agreement, the appendices to the Agreement control.

B. Enrolled Property

B.1. General Narrative and Map Describing the Enrolled Property

The Permittee purchased the Big Springs Ranch Wildlife Area (BSRWA) from The Nature Conservancy (TNC) in 2019. Permittee will operate the property as a State Wildlife Area for the purposes of protecting and enhancing natural habitats for fish and wildlife, and providing public use opportunities that are compatible with the long-term conservation needs of fish and wildlife populations and their habitats. Permittee may consider the use of cattle as a management tool for wildlife habitat benefits based on an adaptive management approach.

BSRWA includes two ranches covering a total of 6,000± acres. Approximately five miles of the Shasta River and 1.5 miles of Big Springs Creek are included within the BSRWA property boundaries. The ranch lies within what has been designated as the **Mid Shasta Reach and the Big Spring Creek Reach** in the Agreement and is described in the Agreement Appendix 2. Figure 1 depicts the approximate property boundaries, parcel numbers and general location of the property within the boundaries of the Covered Area.

B.2. Legal Description of Property Boundary

The legal description is specified in **Appendix A**.

B.3. Description of Water Rights

Based on the Shasta River Adjudication Proceedings Judgement and Decree – No 7035 (1932), the Permittee is authorized to divert a maximum combined adjudicated water rights in the amount of 18.11 cubic feet per second (cfs). Information related to the various water rights located on BSRWA is presented in Table 1. Figure 2 shows the BSRWA's place of use as stipulated in the Shasta River Decree (1932), the Department of Water Resources (DWR) irrigated acreage coverage, and water diversion locations.

Prior to the 2009 acquisition of BSRWA by TNC, 1,182 acres were irrigated and all of the water rights were exercised. TNC reduced the number of irrigated acres and the overall diversion rate down to 200 acres and 2.3 cfs respectively. In addition, TNC developed and recorded with the State Water Resources Conservation Board (SWRCB) a California Water Code (CWC) Section 1707 discretionary dedication to allow the consumed portion of the water rights to be preserved instream. The Permittee may only continue to irrigate pursuant to the conditions described in section E.1.a.

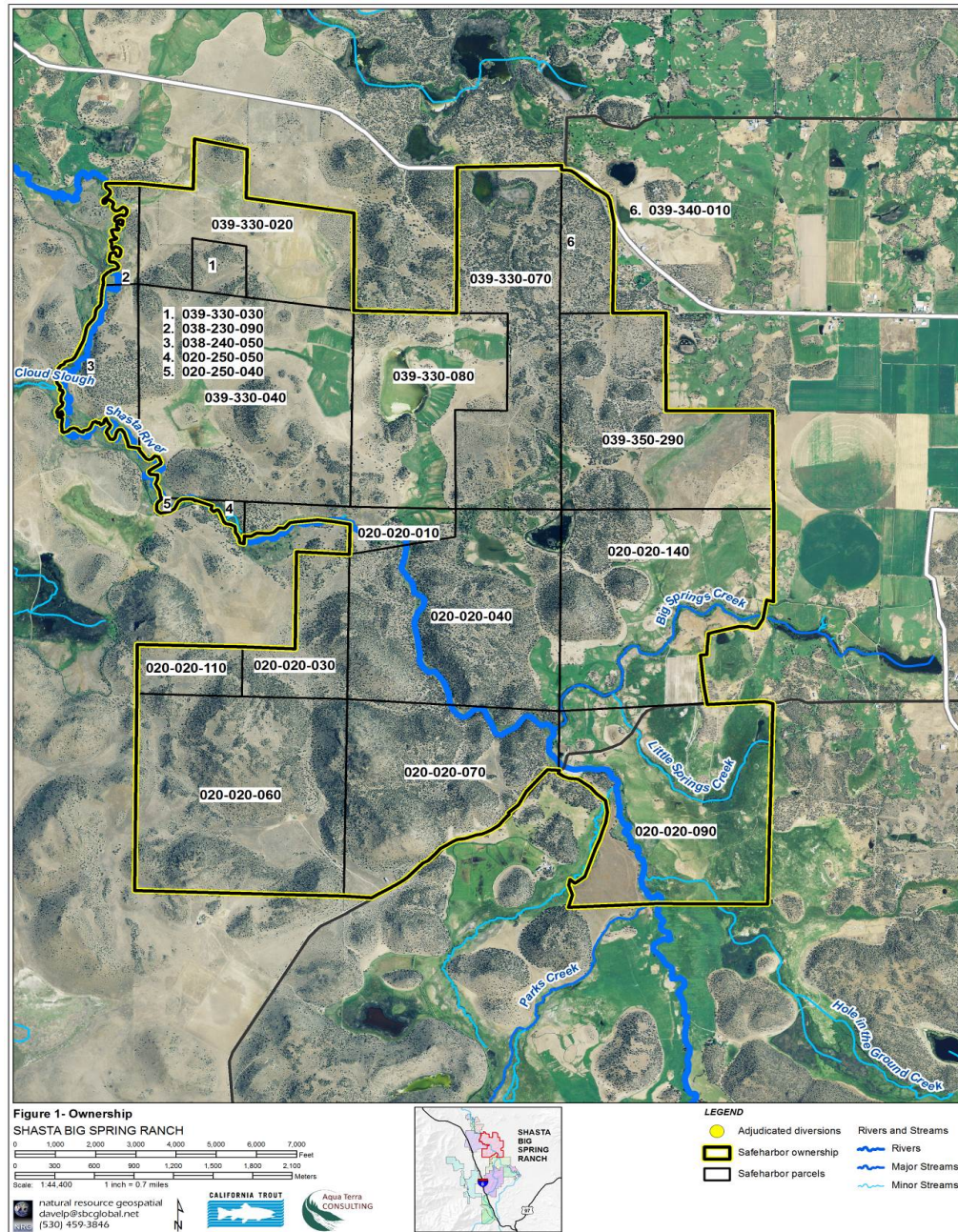


Figure 1 – General Ownership.

Table 1- Summary of Water Rights on the BSRWA per the Shasta River Decree, including water source, period of use and acreage irrigated.

Diversion #	Water Use (cfs)	Description	Season Duration	Total Ac-ft per season	Acreage Irrigated with diversion	Average Days per Season diverted
Adjudicated Irrigation Sources						
167-172	1.5	Hole in the Ground Creek	April 1- Oct 1	536	93.9	180
241	6.71	Big Springs Creek		2396	392.2	
243	4	Little Springs Creek		1428	251.3	
244	0.5	Little Springs Creek		179	17.0	
245	1.15	Little Springs Creek		411	122.0	
246	1.95	Little Springs Creek		696	83.0	
247-248	2.3	Shasta River-Nelson		821	187.4	
TOTAL COMBINED Adjudicated water rights	18.11	Entire BSRWA				
247-248	0.25	Shasta River-Nelson	Oct 1-March 31	Stock water		185

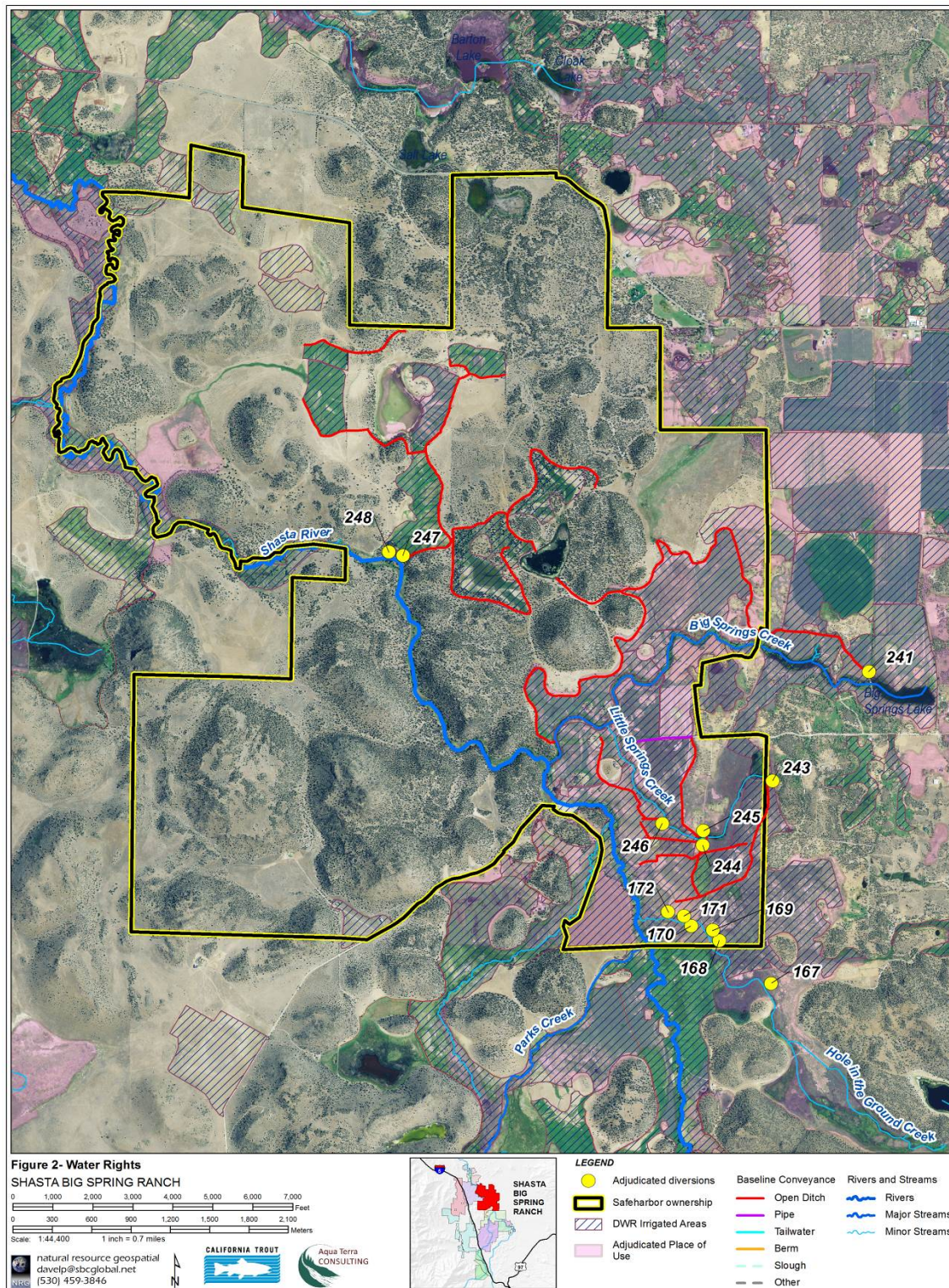


Figure 2- Place of Use and DWR Irrigated Acreage Coverage.

C. Routine Agricultural Activities

C.1. Ongoing Routine Agricultural Activities

Under the Agreement, the Permittee is authorized to irrigate BSRWA when water temperature thresholds and habitat requirements are met as outlined in Section E.1.a. The potentially flood irrigated acres are currently grass pastures. The water delivery system consists of approximately 2,510 feet of buried mainline with irrigation risers, 230-feet of conveyance pipeline and 100,000-feet of open ditch. There is a 2.5-acre-foot pond used to manage releases of tailwater to Big Springs Creek, described in section E.1.a. Management is based on tailwater temperature and nutrient loading at the pond's head gate.

There are four bridges and three culvert crossings on BSRWA. These crossings do not include the bridge and culvert on Louis Road which are the responsibility of Siskiyou County. No wet stream crossings exist on the ranch, but there are five water lanes and 15 off-channel watering troughs. There are 20 miles of ranch roads that are not paved or rocked and consist of exposed native soils.

Irrigation Management

There are four distinct irrigation units on the BSRWA that may be irrigated using surface water during the term of this Site Plan Agreement: Big Springs, Little Springs, Hole in the Ground, and Nelson.

The Nelson Unit includes approximately 200 acres that are irrigated by a 2.3 cfs water right that is diverted directly from the Shasta River (See Table 1). The diversion is located two miles downstream from the confluence of the Shasta River and Big Springs Creek. It is delivered to fields at the place of use via 1.6 miles of ditch.

The Little Springs Unit Irrigated Pasture Management Area totals 473 acres and is irrigated via Diversion #243 through #246 totaling 7.6 cfs.

The Hole in the Ground Unit Irrigated Pasture Management Area totals 94 acres and is irrigated via Diversion #167 through #172 totaling 1.5 cfs.

The Big Springs Creek Irrigated Pasture Management Area totals 294 irrigated acres. This unit is can be irrigated via Diversion #241 at Big Springs Lake and divert water from Big Springs Lake and delivers the water to Permittee's property boundary approximately 0.6-mile down ditch. Water delivered to this unit is a maximum of 10 cfs. A Stipulated Judgement describes the rotational system agreed to by TNC and Irene Busk (Appendix B). The portion of the ditch where it is located on the Enrolled Property is approximately three miles in length.

There are three groundwater wells on the property that are currently not being used. They may be used for domestic or stock water with no additional restrictions. Prior to the

wells being used for irrigation, a hydrogeologic assessment by professional engineer or geologist would be necessary; if the assessment concludes that a well's proposed use rate would substantially affect surface flows, it would not be used for irrigation; if there is no connection to surface water, or no substantial effect on surface flows, the wells may be used. There are also a few solar powered pumps on well that are dedicated stock water, and may be used with no restriction.

Irrigation Maintenance

Ditch cleaning

Open ditches are prone to clogging with vegetation, which slows the conveyance of water and clogs the buried mainlines. The ditches are not currently being utilized for irrigation. In order to use them they would need to be cleaned to remove vegetation and breaches would need to be fixed most likely, heavy equipment will be necessary. The head works of all the pipelines have grates that would need to be cleaned as needed to keep them functioning properly if in operation. The pipelines and the flood risers would be fully opened to flush the pipes of sediment and algae. This work would be necessary at minimum, annually, and as needed throughout the irrigation season.

Diversion cleaning

The diversion from Big Spring Lake is dependent on spring output and the influence on this spring from up gradient groundwater pumping. Occasionally, the outfall into Big Springs Creek becomes blocked and could limit the Permittee's ability to provide water instream using the CWC §1707. The outfall is located on the adjacent property owned by Irene Busk, (she is *not* a party to the SHA) and the Permittee has access to the outfall for cleaning or maintenance. The diversion at Big Springs Lake is cleaned periodically by the adjacent landowner, mostly using hand tools.

Fish Screen cleaning

The only fish screen on BSRWA is at the Shasta River Diversion (#247/248) on the Nelson Ranch and it is cleaned manually by the lessee's irrigator. The screen is tubular and is cleaned daily when in use. Cleaning and regular maintenance is a requirement under a Grazing Lease Agreement.

Pasture Grazing Management

The BSRWA has 21 distinct pastures where cattle graze. Cattle are rotated through the pastures as part of Permittee's Grazing Lease Agreement for pasture management. The cattle are moved based on several factors, to avoid over-grazing.

Riparian Grazing Management

The riparian corridor on BSRWA has been excluded from cattle from the eight miles of riparian area on the ranch, including approximately five miles of the Shasta River. If the Permittee decides to graze the riparian area, a grazing management plan will be necessary to minimize impacts. Riparian grazing recommendations are included in Appendix D.

Riparian Fence Maintenance

The Permittee's lessees will repair the fence lines as needed. Over ten miles of streams are located on BSRWA, which include portions of the Shasta River, Big Springs Creek, Hole in the Ground Creek, Parks Creek and all of Little Springs Creek. In 2006 and in 2009 TNC excluded livestock from grazing in and along the streams by installing riparian exclusion fencing. Over 14 miles of fence have been installed, excluding over 500 acres of riparian habitat from livestock grazing.

Road Maintenance

The ranch roads onto the Little Spring Unit, along Big Spring Creek and onto the Nelson Unit are not highly used roads and are native materials. Roads will be maintained to allow vehicular access. Maintenance may include placing road base and/or grading, and reshaping to evacuate storm water.

Crossing Maintenance

There are no wet crossings on the ranch, but there are four bridges and three culvert crossings. There are five watering lanes on the Shasta River (Nelson Ranch), which were rocked when the riparian fences were constructed in 2006 and 2012.

The four existing bridges are in varying degrees of condition, with only two being used for vehicular crossings at this time. The Permittee will not do any maintenance on these bridges, unless vehicular crossing is needed or there is a safety issue that must be resolved. There are also three culverts on Little Springs Creek that become blocked on a consistent basis with debris. The culverts are cleaned when needed by hand or with periodic use of heavy equipment depending on extent of blockage.

Herbicide/Fertilizer/Pesticide Use

The use of pesticides is limited to over-the-counter products such as Round-up, Milestone, or Telar. Use is done in accordance with the manufacturer's label directions for use, for application rates and periods of use to obtain the best response. All usage is conducted under the guidance of the California Department of Pesticide Regulation and under a CDFW licensed pest control advisor. All applications are done by holders of qualified applicators certificates or staff trained by them. Use of herbicides is limited to spot use for the control of yellow star thistle, perennial pepperweed, puncturevine and Dyer's Woad, and other non-native vegetation when other treatments such as mechanical, grazing or burning are not viable or effective.

To control large stands of invasive weeds the Permittee may contract a third party to spray appropriate herbicides such as Roundup or Transline as needed and in compliance with the guidance issued by the California Department of Pesticide Regulation and according to label directions for use. Spot treatments within riparian zones, utilizing chemicals such as Roundup and Telar, or Milestone and Telar, are done by hand utilizing backpack sprayers when necessary, not to exceed 2.6 ounces of Telar per acre. Herbicide will be applied in the late spring or early summer when the plants are bolting. Third party application of herbicides may also occur under County of Siskiyou weed abatement programs of which the Permittee would have no control over type, frequency, method, or

location of application, but that would most likely occur along Louie Road.

Grazing permittees may apply nitrogen fertilizer annually to the irrigated pastures at rates not to exceed label recommendations.

Baseline conditions and routine activities are presented in Figure 4.

C.2. Avoidance and Minimization Measures

The Permittee has agreed to carry out and monitor AMMs that are relevant to their Routine Agricultural Activities as listed in Table G1(Section G below) and as detailed in Appendix 3 of the Agreement.

D. Baseline Conditions and Beneficial Management Activities

Baseline Conditions means the habitat conditions for the Covered Species on the Enrolled Property when NMFS approves this Site Plan Agreement. The Enrolled Property is within the Big Springs Creek and Mid-Shasta Reaches of the Shasta River. Baseline Conditions for the Enrolled Property are the conditions described in Appendix 2 of the Agreement for these reaches of the Shasta River.

Elevated Baseline Conditions are certain Baseline Conditions that are improved because of the implementation of certain Beneficial Management Activities. Elevated Baseline for this Site Plan Agreement are:

- improved fish passage that will result from providing access for fish passage by implementing culvert removal projects on Little Springs Creek. A total of two culverts will be removed and one will be modified to provide unimpeded fish passage by the Permittee;
- screening any diversions that Permittee uses for diversion; and
- instream flow based on temperature and habitat criteria.

Table 2 summarizes the Beneficial Management Activities required to maintain Baseline Conditions and to achieve Elevated Baseline Conditions on the Enrolled Property for the term of the Site Plan Agreement. The Beneficial Management Activities implement habitat enhancement actions recommended in the Agreement (Appendix 2) for the Big Springs and Mid-Shasta reaches of the Shasta River.

Table 2- Summary of Beneficial Management Activities

Habitat Parameter	Beneficial Management Activities		
	Baseline Conditions (Section E1-Maintain)	Elevated Baseline Condition (Section E2-Restore, Implement, and Maintain)	Other Beneficial Management Activities (Section E3-Restore; Measures to Avoid and Minimize Impacts)
Hydrology/Water Quality	<ul style="list-style-type: none"> -Manage water diversions to benefit salmonids. -Maintain CWC §1707 dedications as described in E.1.a. - Continue to manage tailwater returns as described in E.1a. if needed. - Continue to maintain off-channel stock water troughs as described in Section E.1.a. 		<ul style="list-style-type: none"> -Operate real time water quality monitoring stations to track improvements on the Enrolled Property as described in E.3.a. -Provide easement for the proposed Cardoza pump station as described in Section E.3.a. -Permittee agrees to evaluate and implement if beneficial, HIG Creek channel restoration and/or reconnection projects as described in Section E.3.a. - Based on the results of the above evaluation on HIG Creek the Permittee will either permanently dedicate 1.5 cfs water right from Hole in the Ground Creek or explore other alternatives as described in Section E.3.a.

Habitat Parameter	Beneficial Management Activities		
	Baseline Conditions (Section E1-Maintain)	Elevated Baseline Condition (Section E2-Restore, Implement, and Maintain)	Other Beneficial Management Activities (Section E3-Restore; Measures to Avoid and Minimize Impacts)
Passage/Migration/Screening	<ul style="list-style-type: none"> - Until culverts are removed Permittee agrees to clean clogged culverts along Little Springs Creek as described in Section E.1.b. - Operate and maintain the Nelson fish screen when diversion is in use as described in Section E.1.b. 	Remove the two culverts and provided unimpeded fish passage at the third upstream of the County road on Little Springs Creek for fish passage and water quality as described in Section E.2.b.	<ul style="list-style-type: none"> -Implement beaver management as described in E.3.b. -Screen all active diversions.
Instream Habitat Complexity	-Leave woody debris from existing trees in place as described in Section E.1.c.		<ul style="list-style-type: none"> - Implement large wood enhancement on the BSC and Shasta River as specified on Habitat Improvement map and as described in Section E.3.c. - Implement projects to enhance up to four spring alcoves along the Shasta River as specified on the Habitat Improvement map and as described in Section E.3.c. -Implement projects to build off-channel habitat along the Shasta River, if deemed appropriate, as specified on the Habitat Improvement map and as described in Section E.3.c.

Habitat Parameter	Beneficial Management Activities		
	Baseline Conditions (Section E1-Maintain)	Elevated Baseline Condition (Section E2-Restore, Implement, and Maintain)	Other Beneficial Management Activities (Section E3-Restore; Measures to Avoid and Minimize Impacts)
Riparian Condition	-Perform yearly maintenance as needed on existing riparian fencing as described in E.1.d.		<p>-Replace 100% of riparian fencing if needed due to flood damage as stipulated in Section E.3.d.</p> <p>-Permittee will eliminate the watering lanes as described in E.1.d.</p> <p>-Implement riparian restoration projects on Little Spring Creek as described in Section E.3.d.</p> <p>- Plant riparian shrub species where determined appropriate, based on soil and groundwater data as described in Section E.3.d.</p> <p>- If riparian grazing occurs, Permittee will implement the riparian grazing plan as described in Section E.3.d and Appendix D.</p>

Habitat Parameter	Beneficial Management Activities		
	Baseline Conditions (Section E1-Maintain)	Elevated Baseline Condition (Section E2-Restore, Implement, and Maintain)	Other Beneficial Management Activities (Section E3-Restore; Measures to Avoid and Minimize Impacts)
Substrate Quality	-Permittee commits to maintain all riparian fencing as described in Section E.1.e.		- Implement spawning gravel enhancement if deemed appropriate on the Shasta River portion of BSRWA as specified on Habitat Improvement Map and as stipulated in Section E.3.e.
Pasture Management	-Permittee will request that the lessee's cattle continue to be rotated through the six pastures as part of Permittee's pasture management as described in Section E.1.f.		
Assessments/Studies	-Allow the Parties to use data from existing studies on the ranch to further understand Covered Species habitat use on the Enrolled Property. These studies are summarized in Appendix C. See E.1.g.		<p>- Allow access for studies as described in Section E.3.g.</p> <p>-Maintain water monitoring stations as part of the Effectiveness Monitoring plan and provide data to the Shasta Watershed Conservation Group (SWCG) and NMFS. The Permittee will allow access for salmonid supplementation and monitoring.</p>

Habitat Parameter	Beneficial Management Activities		
	Baseline Conditions (Section E1-Maintain)	Elevated Baseline Condition (Section E2-Restore, Implement, and Maintain)	Other Beneficial Management Activities (Section E3-Restore; Measures to Avoid and Minimize Impacts)
Education/Outreach			Permittee may develop parking areas and install educational/outreach kiosks as described in Section E.3.h.

E. Beneficial Management Activities

This section provides a detailed description of Beneficial Management Activities to be implemented on the Enrolled Property for the benefit of the Covered Species. Figures 4 and 5 at the end of this section represent a summary of these actions.

E.1. Actions Required to Maintain Baseline Conditions

This section details the actions required for the Permittee to maintain Baseline Conditions. This includes any land and/or water management activities that are being implemented or have been implemented on the enrolled property that benefit the Covered Species and will be maintained over the duration of the Agreement.

E.1.a. Hydrology/Water Quality

1707 dedications:

-TNC filed California Water Code Section 1707 petitions with the SWRCB in July 2012 with the expressed intent to recognize fish and wildlife preservation and enhancement as a beneficial use of BSRWA water rights, while retaining the beneficial uses of irrigation and stock water. TNC hired Davids Engineering to calculate the consumptive use of the water rights. The consumptive use is the portion of the water right that is evaporated, transpired by plants, incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the immediate water environment. To successfully add fish and wildlife as a beneficial use to the property's water rights, TNC showed that such an action would not harm other water right holders. As a result, SWRCB added instream flow as a beneficial use fish and wildlife preservation and enhancement to the water rights on the property (18.11 cfs) but only the consumptively used portion of these water rights can be bypassed downstream of the Montague USGS measuring weir (USGS 11517000) as specified in the Order approved by the

SWRCB on May 8, 2014. Table 3 provides a summary of the consumed use calculations of BSRWA water rights that could be expected to be bypassed by the Watermaster to the point of compliance (Montague USGS Gage). A Supplemental Decree was filed with the Siskiyou County Superior Court to add fish and wildlife preservation and enhancement as a beneficial use to the BSRWA water rights in in September 2014.

Annually, the Permittee will notify the Shasta Valley Watermaster District of its intent to leave the water rights instream per the Compliance Plan associated with the 1707 petition.

Table 3-Table of Consumed Water for the Enrolled Property.

Diversion Number	Irrigated Area, Acres	Water Right Flow (cfs)	Calculation of Consumed Water (CFS) ¹								Water Source
			Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
167-172	93.9	1.50		0.08	0.55	0.75	0.91	0.79	0.55		Hole in the Ground Creek
241	392.2	6.71		0.34	2.33	3.15	3.80	3.29	2.30		Big Springs Creek
243	251.3	4.0		0.18	1.43	2.02	2.43	2.11	1.48		Little Springs Creek
244	16.95	0.5		0.01	0.10	0.14	0.16	0.14	0.10		Little Springs Creek
245	122.01	1.15		0.09	0.70	0.98	1.18	1.02	0.72		Little Springs Creek
246	82.98	1.95		0.07	0.49	0.67	0.80	0.70	0.49		Little Springs Creek
247-248	187.39	2.3	0.01	0.16	1.11	1.50	1.81	1.57	1.10	0.33	Shasta River
TOTAL CFS	1146.73	18.11	0.01	0.93	6.70	9.21	11.10	9.61	6.73	0.33	

¹ Blank cells indicate that there are no water rights in that month

Diversion management Plan:

-Most of the source water associated with the BSRWA water rights are cold water springs that are highly valuable to salmonids, Coho Salmon in particular, and to the Shasta River Watershed in general (RWQCB TMDL). The primary objective of water management will be to benefit salmonids in Big Springs Creek, Little Springs Creek and the Shasta River. If water can be diverted and not diminish water quality or quantity in a way that affects meeting the objective above, or diversion improves downstream water quality, it may be diverted in coordination with NOAA, and as specified below.

-Permittee Irrigation Management

- Continue Nelson Ranch irrigation from the Shasta River.
- Divert Hole in the Ground (HIG) Creek tail water return if water quality conditions are detrimental to salmonids (e.g., temperature above 18 degrees C).
 - Permanently dedicate the HIG Creek water right to instream fish and wildlife beneficial use if restoration actions are successful.
- Little Springs Creek may be diverted from the spring if both of the following are met: 1) water temperature in Little Springs Creek is 16 degrees Celsius or less at the confluence with Big Springs Creek; and 2) culverts are removed.
 - Permanently dedicate water right amounts necessary to achieve the temperature criteria for Little Springs Creek.
 - Maximum diversion of Little Springs Creek is 5 cfs.
- Water from Big Springs Lake may only be diverted if diversion would not affect temperature and flow objectives stated below, or it would improve downstream water quality. The temperature objectives are: 1) water temperature in Big Springs Creek at the confluence with Shasta River is 18 degrees Celsius or less; and 2) salmonid habitat flow criteria in the Shasta River Canyon reach are met for upstream adult passage and downstream juvenile passage. Water may be diverted if the diversion would improve downstream water quality due to poor quality in Big Springs Lake.
 - Permanently dedicate water rights necessary to achieve the two criteria above for Big Springs Creek and the Shasta River Canyon reach in all months.
- Temperature and flow objectives:
 - 16 °C or less at the confluence of Little Springs Creek and Big Springs Creek.
 - 18 °C or less at the confluence of Big Springs Creek and Shasta River.
 - Juvenile emigration and adult migration flow needs within the canyon reach of the Shasta River.

- Juvenile rearing temperature and flow conditions needed in the Shasta River below Big Springs Creek.
- Permittee may irrigate in the winter for ground water recharge and to enhance wildlife habitat if legally allowed to do so.
 - Winter irrigation will be minimal and not impact temperature or habitat requirements.

Tailwater Reduction

-If irrigation occurs within the Big Springs Unit, and if tailwater measurably affects stream temperature (i.e., changes stream temperature by more than 0.1 degrees Celsius from upstream to downstream), Permittee will continue to manage the tailwater capture pond installed within the Big Springs unit to prevent tailwater coming from upslope pastures from entering Big Springs Creek. The pond is equipped with temperature monitoring stations that inform the Permittee when the temperature of the water is suitable to return into Big Springs Creek. Tailwater that is warmer than the creek is held in the pond until its temperature is the same or lower than Big Springs Creek water.

-When not irrigating, the Permittee will close the head gate after the spur ditch heading to Bass Lake to mitigate for any tailwater that may travel on to the property from adjacent properties.

Off-Channel Stock watering

-Permittee commits to maintain the existing off-channel stock water system if livestock are present.

E.1.b. Passage/Migration/ Diversion Screening

Little Springs Culverts

- The culverts on Little Springs Creek frequently become plugged with debris, blocking flow, impounding water, increasing water temperatures, degrading water quality and impeding fish passage. The Permittee commits to continuing to monitor and to unplug culverts on Little Springs Creek on an as needed basis until the culverts are removed. Permittee plans to remove the two upper culverts and provide unimpeded passage at the third to reduce thermal loading and provide fish passage. This is further addressed in Section E.2.b

Diversion Screens

- Permittee will evaluate the Nelson Unit diversion fish screen and make sure it meets NMFS fish screen criteria. If it does not meet criteria, Permittee shall install a new fish screen within one year from the signing the Agreement. If it does meet criteria, the Permittee will maintain the Nelson Unit fish screen when the diversion is in use.

-Permittee will screen all active diversions.

E.1.c. Instream Habitat Complexity

Large Woody Debris

-Natural woody debris from existing trees along the banks throughout the property will be left in place for refugia.

E.1.d. Riparian Condition

Riparian Fencing

-Riparian exclusion fencing has been completed for the entire ranch, excluding cattle from entering the riparian areas. This action has resulted in restored aquatic vegetation and improved bank stabilization. The Permittee commits to maintain all riparian fencing into the future if livestock is present.

Crossings

-The Permittee commits to eliminate the five (5) water lanes to reduce negative impacts to the watercourse and replaced with alternative stock water systems. No additional crossings will be developed during the term of the Template Safe Harbor Agreement.

E.1.e. Substrate Quality

Riparian Fencing

-Riparian exclusion fencing has been completed for the entire ranch, which benefits substrate quality due to more stable banks. Permittee commits to maintain all riparian fencing into the future if livestock is present.

E.1.f. Pasture Management

The Permittee may utilize existing pasture units for cattle grazing as an adaptive management tool for enhancing wildlife habitat.

E.1.g Assessments/Studies

See Appendix C for a list of studies that have been done that can be used to analyze net conservation benefit.

E.2. Actions Required to Achieve Elevated Baseline Conditions

This section details the actions required to achieve and maintain Elevated Baseline Conditions. This includes any land and water management activities that will be implemented and maintained on the enrolled property to improve unsuitable habitat conditions for the Covered Species for the duration of the Agreement.

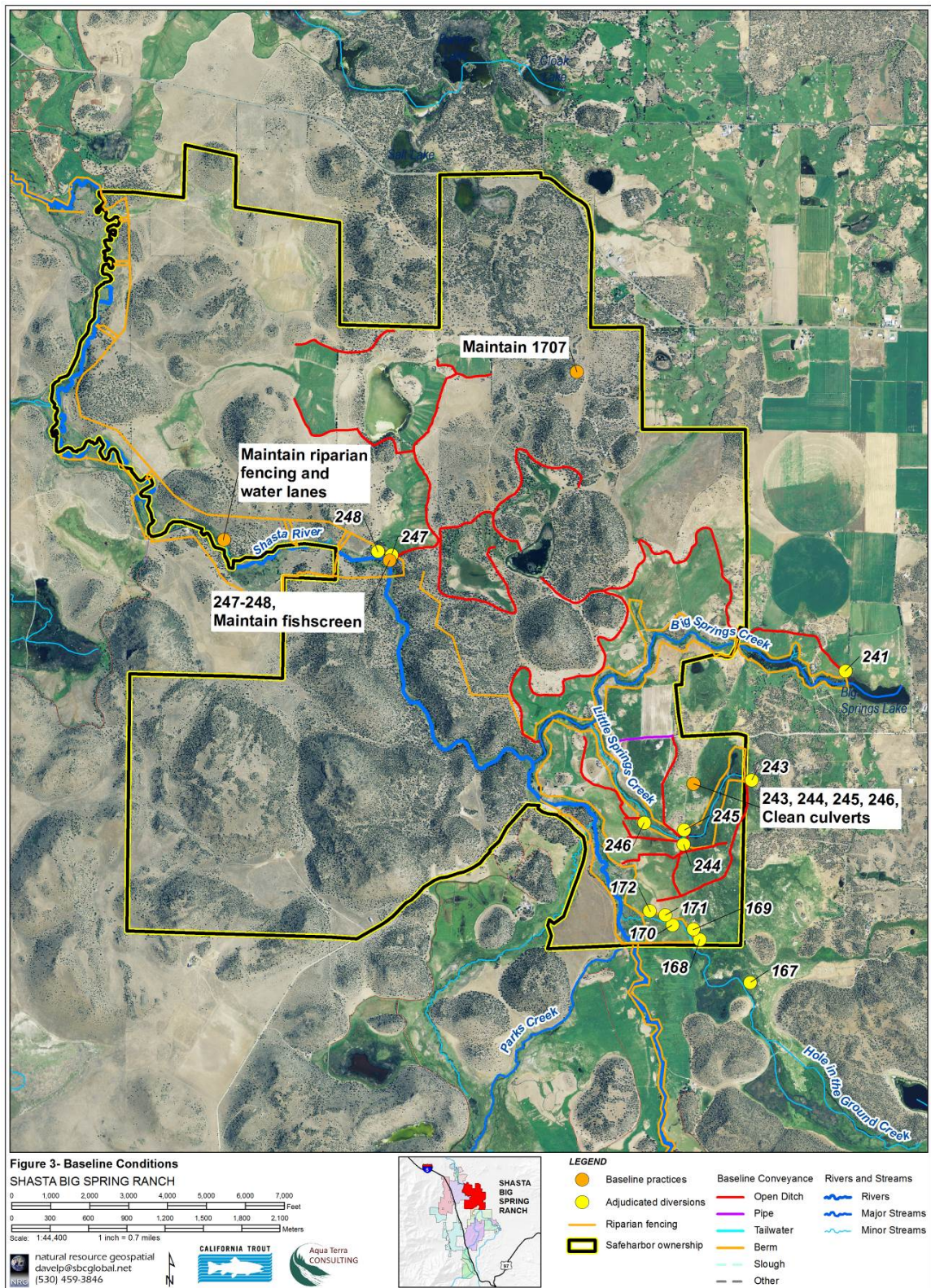


Figure 4- Baseline conditions and routine activities.

E.2.b. Passage/Migration/ Diversion Screening

Little Spring Creek Passage

-The culvert on Little Spring Creek at Louie Road is a partial passage barrier to fish. Siskiyou County has funding to replace this culvert with a larger one to reduce impoundment upstream on Little Springs Creek. This project will enhance fish passage to over one mile of habitat on Little Springs Creek. Permittee will provide access as needed to implement the project and tracking general project schedule.

Permittee has removed the two culverts, and plans to provide unimpeded fish passage at the third culvert upstream of the County road on Little Springs Creek for fish passage and water quality benefits within 3 years of signing this agreement.

E.2.c. Instream Habitat Complexity

The Permittee will continue existing management practices that protect instream habitat complexity and does not propose additional actions at this time.

E.2.d. Riparian Function

The Permittee will continue existing management that protects riparian function. Permittee will eliminate the watering lanes and replace with alternative stock water systems within three years.

E.2.e Substrate Quality

The Permittee does not propose additional actions currently.

E.2.f. Pasture Management

The Permittee may continue existing pasture management and does not propose additional actions at this time.

E.2.g Assessments/Studies

The Permittee will allow access for studies related to the Covered Species and will provide data from existing studies but does not propose additional actions at this time.

E.3. Other Beneficial Land and Water Management Activities

This section summarizes any other land and water management activities that will be implemented on the enrolled property to benefit the Covered Species.

E.3.a. Hydrology/Water Quality

Thermal, Stage and discharge monitoring

-Permittee commits to maintaining the real-time system and archive real-time data on water temperature and flow at locations described in Table 4 for the term of this agreement.

Table 4 – Water Quality Monitoring Stations.

Location	Name	Parameters
Shasta River above Big Springs Creek	SRBSC	Temperature (RT)
Big Springs Creek at Water Wheel	BSCWW	Flow and Temperature (RT)
Big Springs Creek at mouth	BSCM	Temperature (RT)
Little Springs Creek	LSC	Flow and Temperature
Hole in the Ground Creek	HGC	Temperature
RT = realtime		

Upgrade diversion facilities:

-The shared management of the water right on Big Spring Lake causes some fluctuation in stream flow that could impact fisheries in Big Springs Creek. The Permittee and the neighboring landowner have agreed to a detailed Stipulated Judgment to share the diversion over the irrigation season based on certain criteria.

-The Cardoza Ranch (an adjacent property owner and SHA Permittee) has a fish passage barrier on Parks Creek that will be alleviated by moving the point of diversion to the Shasta River on the Permittee's property upstream of the Louie Road Bridge. The Permittee will provide an easement for the proposed Cardoza pump station and all associated infrastructure upstream of the Louie Road Bridge. The implementation schedule for this action is currently estimated to occur within 2 years of the signing of this Site Plan Agreement. This action will ensure passage to more than 12 miles of Parks Creek habitat. The funding for this activity has been secured.

Hole in the Ground (HIG) Creek:

Water entering BSRWA from Hole in the Ground (HIG) Ranch via HIG Creek can possess elevated water temperatures (consistently over 20 °C) and significant discharge (up to 6.5 cfs) during the irrigation season due to off ranch activities outside the control of the Permittee. This water often has a negative impact to the Mid Shasta Reach and as conditions improve in the Mid Shasta Reach, this impact could be more significant. There are also cool, diffuse springs, and known habitat for Coho Salmon, near the mouth of HIG, which could also be impacted by upstream discharges. Permittee will prepare a feasibility analysis to identify enhancement and restoration opportunities in coordination with the adjacent landowner on HIG Creek. These opportunities may include enhancement of channel form and riparian vegetation, channel relocation, riparian fencing, reducing water temperatures, eliminating fish passage barriers, and comprehensive restoration of the entire reach of HIG Creek. This analysis will occur within 5 years of the signing of this Site Plan Agreement.

Depending on the results of the evaluation on HIG Creek identified above and

contingent on an approved SHA with Hole in the Ground Ranch, the Permittee will implement one of the following actions to ensure thermal impacts from this water source are minimized:

- a) If deemed feasible and beneficial to the Covered Species, the Permittee commits to designing, permitting and implementing restoration of HIG Creek on BSRWA. Upon completion of restoration activities (on both BSRWA and HIG Ranch) and if said activities address the water quality issues associated with this water, then the Permittee agrees to change the existing *permissive* CWC §1707 dedication of water rights associated with HIG Creek to a permanent dedication for the purposes of instream beneficial use. This would include the submission of necessary notifications to the Scott and Shasta Valley Watermaster District that describes the intent to dedicate these water rights instream permanently. If implemented, the project could restore two miles of habitat on HIG Creek; or
- b) If the above enhancement proposal is deemed infeasible and/or if HIG Creek water is still deemed an impact to the Upper Shasta River or the spring near the HIG mouth, alternatives shall be explored to minimize the negative water quality effects of HIG Creek entering the Upper Shasta River. If a feasible project can be developed, Permittee will pursue the project.

The completed implementation schedule of this action is currently estimated to occur within 5 years of the signing of this Site Plan Agreement, contingent on funding and permitting.

E.3.b. Passage/Migration/ Diversion Screening

Beaver management

-Beaver dams have been documented on Permittee's property and will not be discouraged if the beaver activity does not inhibit use of head gates or crossings. If infrastructure may be impacted by beaver activity, actions may be taken to dissuade dam building at that location.

E.3.c. Instream Habitat Complexity

Alcove Enhancement

-Permittee commits to the enhancement of up to four existing spring alcoves along the Shasta River adding up to five Large Woody Debris (LWD) structures for cover as designated on the Habitat Improvement map. The locations of these alcoves are shown in Figure 5. Permittee will install LWD from upland sources of juniper. The implementation schedule of this project is estimated to occur within 5 years of the signing of this Site Plan Agreement. These activities will be combined with other habitat improvement projects on Big Springs Creek and Mid-Shasta reaches.

Large Woody Debris

-Permittee commits to implementing a pilot LWD project on Big Springs Creek (BSC), which could include the construction of post-assisted complex wood structures within a 1,000-foot reach of channel as designated on the Habitat Improvement map. After the evaluation of the effectiveness, additional stretches of BSC may be treated with up to 40 structures installed. The total number of structures installed will be based on adaptive management and lessons learned as structures are installed. Permittee will design, permit and implement the project, and provide LWD from upland sources of juniper. The implementation schedule of this project is currently estimated to occur within 5 years of the signing of this Site Plan Agreement.

-Permittee commits to the placement of LWD bank stabilization along the Mid Shasta Reach in cooperation with adjacent property owners as designated on the Habitat Improvement map. The project would entail the placement of LWD structures on outside bends of meanders to provide cover and stabilize eroding banks. Permittee commits to design, permit and implement the project, and provide LWD from upland sources of juniper. The implementation schedule of this project is currently estimated to occur within 5 years of the signing of this Site Plan Agreement.

Off Channel Habitat

-Permittee commits to connecting to three disconnected oxbows within the Mid Shasta reach as designated on the Habitat Improvement map, if deemed appropriate. This would entail excavation to reconnect the oxbow, installing LWD in channel to provide sweeping velocities to keep oxbow connected and installing one LWD structure for every 50-feet of bank within the newly constructed off channel habitat for cover. Permittee commits to design, permit and implement the project, and provide LWD from upland sources of juniper. The implementation schedule of this project is currently estimated to occur within 5 years of the signing of this Site Plan Agreement

E.3.d. Riparian Function

Existing Riparian Fencing

-Replace 100% of riparian fencing if needed due to flood damage if grazing will occur.

Existing Riparian Planting

Within the fenced areas (exclusion zones), efforts to establish riparian trees have been taken throughout the riparian zone. The plantings will be monitored, weeded and planting cages removed as necessary.

Big Springs Creek Riparian Restoration

-Permittee may plant riparian species in areas where suitable environmental

conditions occur, if deemed appropriate. The implementation schedule of this project is estimated to occur within 10 years of the signing of this Site Plan Agreement

Revised Riparian Grazing Management plan:

-If the riparian exclusion zone is grazed, the Permittee agrees to adhere to the Riparian Grazing Management in Appendix D.

E.3.e Substrate Quality

Gravel Placement

-Permittee commits to the placement of a gravel stockpile on the Shasta River as designated on the Habitat Improvement map, if a gravel distribution analysis determines that it is appropriate. Permittee agrees to evaluate gravel placement as a potential habitat enhancement tool in the Shasta River. The implementation schedule of this project is currently estimated to occur within 5 years of the signing of this Site Plan Agreement. These activities will be combined with other habitat improvement projects on mid- Shasta reaches.

E.3.f. Pasture Management

None

E.3.g Assessments/Studies

-Permittee commits to continue to allow research entities such as UC Davis, SVRCD, USFWS, NMFS and others to conduct studies to describe salmonid habitat conditions, life history requirements, and productivity to help inform efforts to improve survival and productivity of Coho Salmon in the future, as long as they have the appropriate permits and follow the existing protocols for obtaining approval to conduct studies on State property.

-Permittee will allow for access to perform riparian grazing management evaluation plots on BSRWA if riparian grazing occurs.

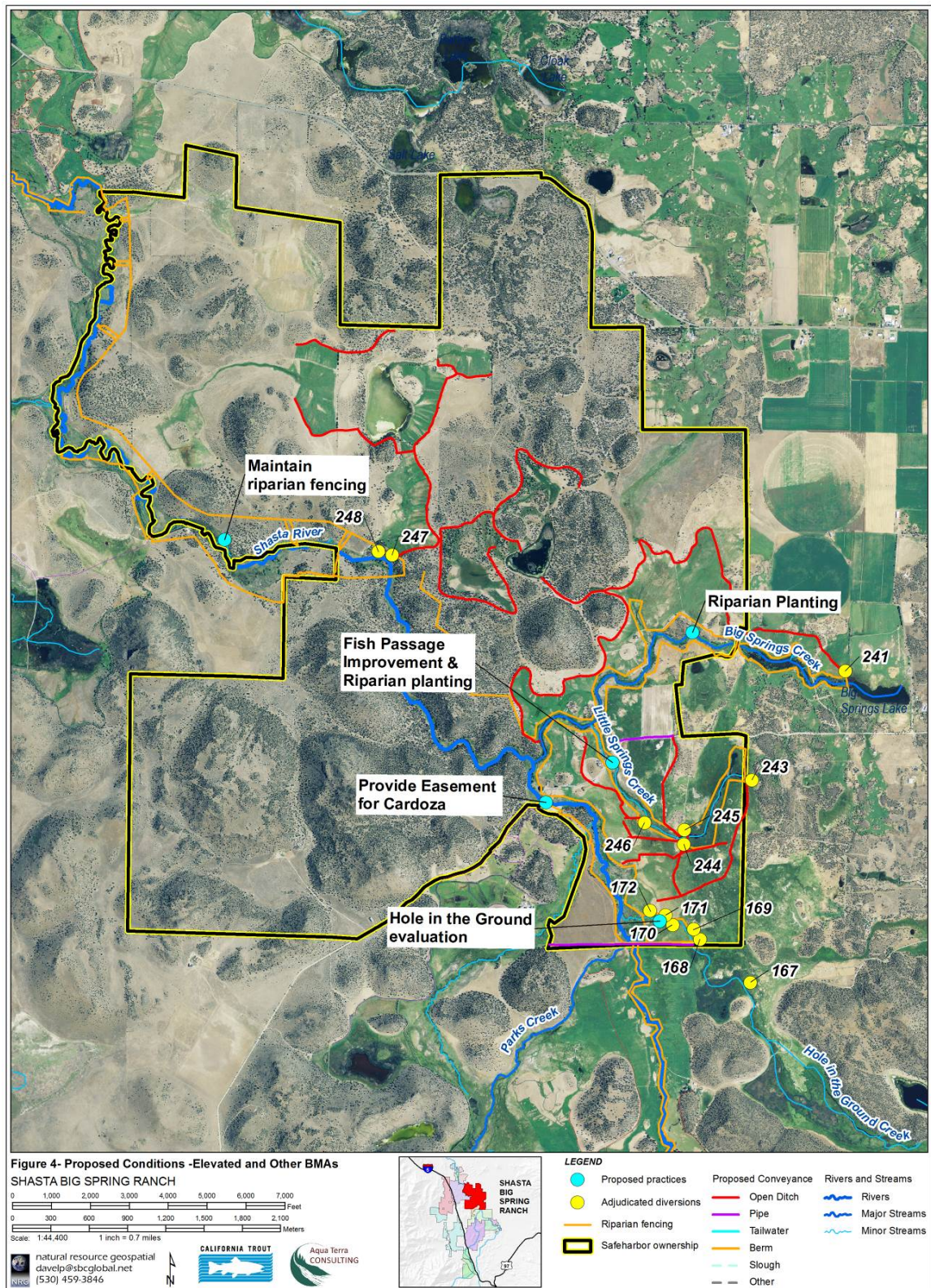


Figure 4- Beneficial Management Activities.

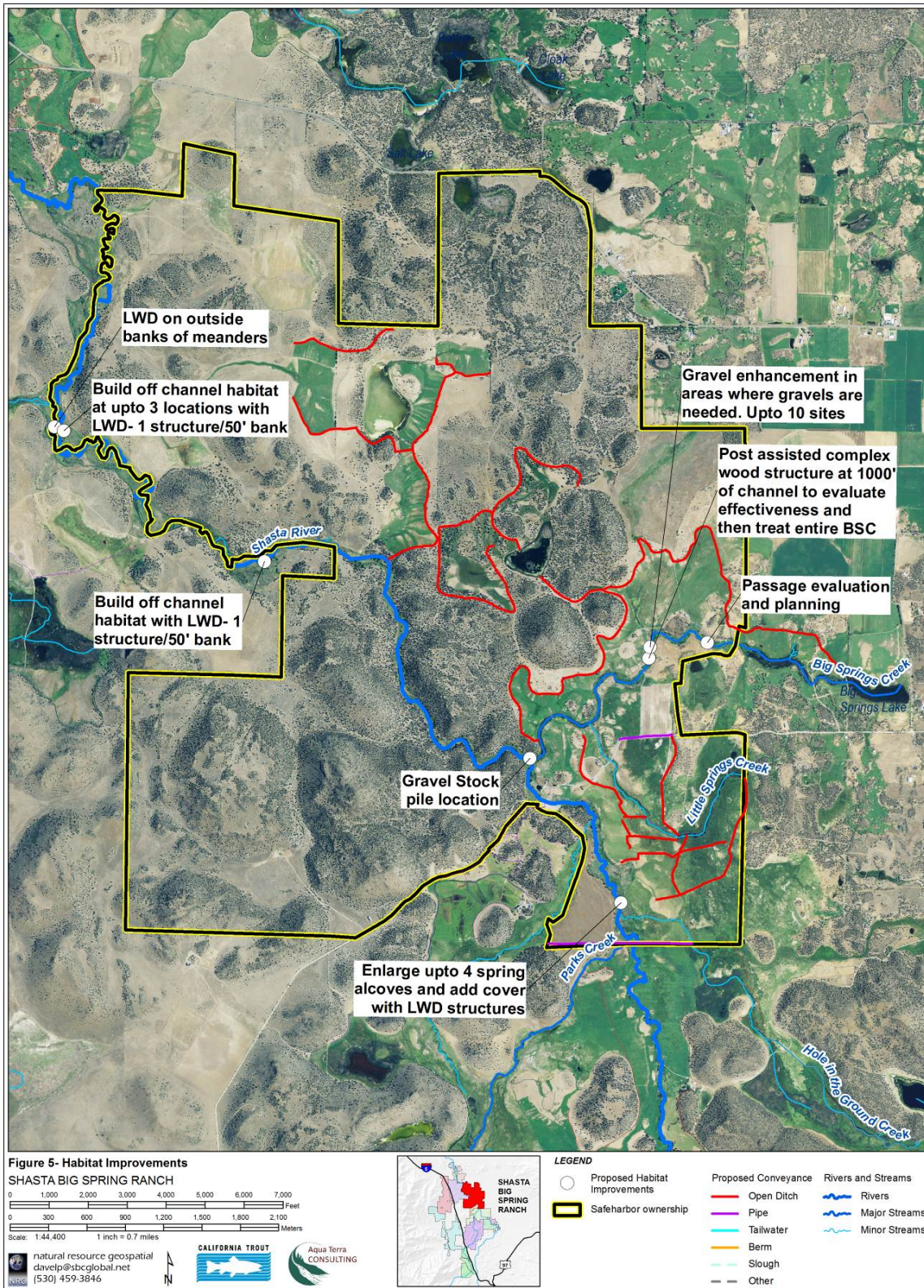


Figure 5- Beneficial Management Activities – Instream Habitat.

F. Effective Date and Term of the Site Plan Agreement

The Agreement, Site Plan Agreement, and ESP take effect when signed by the Permittee, NMFS, and CDFW. The Agreement, Site Plan Agreement, and ESP have a term of 20 years, which may be extended by mutual written consent of the Permittee, NMFS, and CDFW. One (1) year prior to end of term of the Agreement, Site Plan Agreement and ESP, the Permittee, NMFS, and CDFW will meet to decide whether to extend the term of the Agreement, Site Plan Agreement, and ESP.

G. Monitoring and Reporting

AMMs are intended to minimize or reduce potential adverse impacts that may occur during implementation of BMAs or during Routine Agricultural Activities. The Permittee commits to implement the AMMs and the AMM monitoring protocols listed in Table G1 below and described in Appendix 3 of the Agreement.

Implementation monitoring includes those monitoring tasks associated with construction and implementation of BMAs (e.g. construction of habitat restoration projects) and associated AMMs. Implementation monitoring of BMAs serves to verify that habitat restoration projects are constructed as designed and managed as intended. The Permittee commits to monitoring actions as summarized in Table G2. Permittee also commits to all relevant AMMs included in Appendix 3 of the Agreement related to the implementation of the BMAs identified in Section E above.

AMM and implementation monitoring will be conducted by the Permittee, the SWCG, or a contractor.

G.1. Avoidance and Minimization Monitoring Commitments

Covered Activity	Big Spring Ranch –AMM (See Appendix 3 of Agreement for full description)	AMM Monitoring Technique
Irrigation Management	A1 A2 A3	All maintenance of instream diversion structures shall be monitored as follows: -Log of what in-water work had occurred and what minimization measures were implemented will be included in the Annual SHA report - Data from measuring devices will be included in the annual SHA report. -When construction or repair work is being done, three to five photo points will be taken, or an annual agency inspection can be requested.
Irrigation Maintenance	B1 B2 B4 B5 B6	All maintenance of instream irrigation facilities shall be monitored. Following are some examples of protocols: -Log of maintenance activities carried out within the calendar year is included in the yearly SHA report.
Riparian Grazing Management	C1 C2 C3	Riparian grazing management shall be monitored as follows: -An appropriate number of photo point stations will be established and marked at locations within each riparian pasture designed to show both vegetation changes before and after seasonal grazing activities, and long-term trends. Digital photographs will be taken at each photo point station once per year for trend monitoring, and before and after riparian pasture grazing takes place for annual implementation reporting. -Maintain a log of grazing activities carried out within the calendar year and include in the yearly Site Plan monitoring report. At a

Covered Activity	Big Spring Ranch –AMM (See Appendix 3 of Agreement for full description)	AMM Monitoring Technique
Riparian Grazing Management	C1 C2 C3	minimum, the log will include the following information: beginning and end dates of riparian pasture grazing; number of animals, monitoring practices during the riparian grazing period, and management actions taken because of monitoring results including management criteria used to determine the time to move livestock out of the riparian pasture. -NMFS may initiate periodic inspection of grazed riparian pastures to ensure riparian grazing management plan is effective. -Annual Redd Survey report
Fence Maintenance	D1 D2	-A short description of fence maintenance activities will be included in the annual report.
Road Use and Maintenance	E1 E2 E3 E4	- A short description of annual road maintenance activities will be included in the annual report.
Herbicide/Fertilizer/ Pesticide Use	G1 G2 G3 G4 G5	- Permittee commits to log use of herbicide, fertilizer and pesticide activities carried out within the calendar year is included in the annual report.
Flood Repair	H1 H2	- Permittee shall take photographs of the emergency site repairs and a detailed description of the repairs to be included in the annual report.
Public Use	P1	

G.2 Implementation and Effectiveness Monitoring Commitments

Habitat Parameter	BSRWA- Beneficial Management Activity	Implementation on Monitoring Technique	Effectiveness Monitoring Technique
Hydrology/Water Quality	<ul style="list-style-type: none"> -Maintain diversions and 1707 dedications as described in E.1.a. - Continue to manage tailwater returns as described in E.1a. if needed. - Continue to maintain off-channel stock water troughs as described in Section E.1.a. -Continue acceptable diversion management plan as described in Section E.2.a. -Operate real time monitoring at stations to track improvements on the Enrolled Property and on an associated reach as described in E.3.a. -Clear Big Springs Lake outfall culvert and add a monitoring device to outfall as described in E.3.a. -Provide easement for the proposed Cardoza pump station as described in Section E.3.a. -Evaluate whether to continue to operate the diversion on Big Spring Lake at its current point of diversion and quantity as described in Section E.1.a. -Evaluate HIG creek channel restoration and/or reconnection projects as described in Section E.3.a. - Based on the results of the above evaluation on HIG Creek the Permittee will either permanently dedicate 1.5 cfs water right from Hole in the Ground Creek or explore other alternatives as described in Section E.3.a 	<ul style="list-style-type: none"> - An appropriate number of photo points will be established documenting functioning stock water system, diversion - Data from measuring devices will be included in the annual SHA report -Written easement will be submitted with annual report. -Provide HIG Creek evaluation for restoration project. -If dedication happens, provide paper work or communication to water master district to change the permissive to permanent dedication. 	<ul style="list-style-type: none"> - Water monitoring stations will be maintained. Provide yearly data to NMFS and SWCG

Habitat Parameter	BSRWA- Beneficial Management Activity	Implementation on Monitoring Technique	Effectiveness Monitoring Technique
Passage/Migration/Screening	<ul style="list-style-type: none"> -Until culverts are removed Permittee agrees to clean clogged culverts along Little Springs Creek as described in Section E.1.b - Maintain the Nelson Unit fish screen when diversion is in use as described in Section E.1.b. -Implement fish passage projects on Little Springs Creek as described in Section E.2.b. -Implement beaver management as described in E.3.b. 	<ul style="list-style-type: none"> - An appropriate number of photo points will be established to document culvert replacement/removal project on Little Springs construction and fish screen maintenance on Nelson Unit. -Water measuring protocol that is in concurrence with SB88 at new point of diversion. - An appropriate number of photo points will be established to document culvert replacement/removal project on Little Springs construction and fish screen maintenance on Nelson Unit. 	

Habitat Parameter	BSRWA- Beneficial Management Activity	Implementation on Monitoring Technique	Effectiveness Monitoring Technique
Instream Habitat Complexity	<ul style="list-style-type: none"> -Continue to leave woody debris from existing trees in place as described in Section E.1.c. -Implement large wood enhancement on the BSC and Shasta River as specified on Habitat Improvement map and as described in Section E.3.c. -Enhance up to four spring alcoves along the Shasta River as specified on the Habitat Improvement map and as described in Section E.3.c., if deemed appropriate. -Build off-channel habitat along the Shasta River as specified on the Habitat Improvement map and as described in Section E.3.c., if deemed appropriate. 	<ul style="list-style-type: none"> -An appropriate number of photo points will be established documenting habitat improvements 	
Riparian Condition	<ul style="list-style-type: none"> -Will continue to perform yearly maintenance as needed on existing riparian fencing as described in E.1.d. -Consider planting additional riparian species along and in Big Springs Creek as described in Section E.3.d. - If riparian grazing occurs, Permittee will implement the riparian grazing plan as described in Section E.3.d and Appendix D. 	<ul style="list-style-type: none"> - Establish an appropriate number of photo points to document riparian grazing area and crossing and stock water systems in proper function. 	<ul style="list-style-type: none"> -Survival rates of riparian planting will be reported by Permittee to NMFS for a minimum period of 3 years after planting occurs.

Habitat Parameter	BSRWA- Beneficial Management Activity	Implementati on Monitoring Technique	Effectiveness Monitoring Technique
Substrate Quality	<ul style="list-style-type: none"> -Permittee commits to maintain all riparian fencing as described in Section E.1.e. - Evaluate gravel enhancement on the Shasta River portion of BSRWA as specified on Habitat Improvement Map and as stipulated in Section E.3.e. 	<ul style="list-style-type: none"> - An appropriate number of photo points will be established to document gravel augmentation. 	
Pasture Management	<ul style="list-style-type: none"> -Permittee will require lessee to rotate cattle through the pastures as part of Permittee’s pasture management as described in Section E.1.f. 	<ul style="list-style-type: none"> - An appropriate number of photo points will be established to document pasture condition. 	
Assessment/Studies	<ul style="list-style-type: none"> --Allow the Parties to use data from existing studies on the ranch to further understand Covered Species habitat use on the Enrolled Property. These studies are summarized in Section E.1.g and Appendix C. - Allow access for studies as described in Section E.3.g. 	<ul style="list-style-type: none"> -Reports of new studies will be written/summari zed/ obtained and provided in the annual report 	<ul style="list-style-type: none"> -Maintain tag arrays and trap and tag fish as feasible.

H. Annual Report and Adaptive Management

The Permittee will complete an annual report yearly and report as stipulated in the Agreement.

I. Regulatory Assurances

Upon execution of the Agreement and this Site Plan Agreement and the satisfaction of all other applicable legal requirements, NMFS will issue a ESP under Section 10(a)(1)(A) of the ESA to assure the Permittee may incidentally take Covered Species, in accordance with the Site Plan Agreement and Agreement, as a result of implementing the Covered Activities described in this Site Plan Agreement, and except where such activities would result in the diminishment or non-achievement of the Baseline and/or Elevated Baseline Conditions

established for the Enrolled Property. This assurance depends on the Permittee maintaining the Baseline Conditions and/or achieving the Elevated Baseline Conditions set forth in the Site Plan Agreement, complying fully with the Agreement and the Site Plan Agreement, and so long as the continuation of Covered Activities would not be likely to result in jeopardy to Covered Species or the adverse modification or destruction of their designated critical habitat. NMFS provides no assurances with regard to any action that may affect species not covered under the Agreement, including the take of non-Covered Species and the adverse modification or destruction of their designated critical habitat.

NOAA's National Marine Fisheries Service:




February 26, 2021

Barry A. Thom
Regional Administrator
NOAA's National Marine Fisheries Service
West Coast Region

Date

Permittee:

DocuSigned by:

1D82ADE7303A474...

2/25/2021

Big Springs Ranch Wildlife Area

Date

Appendix A

Legal Description

Exhibit A

All that real property situate in the State of California, County of Siskiyou, described as follows:

Parcel A:

The following legal description is for the Big Springs Ranch/ Former Busk property.

All of Section 7, Township 43 North, Range 5 West, M.D.M., and portions of Sections 4, 5, 6, 8 and 9, Township 43 North Range 5 West M.D.M., and portions of Sections 28, 29, 32 and 33, Township 44 North Range 5 West M.D.M., described as a whole as follows:

BEGINNING at the center of said Section 33; thence easterly along the East-West midline of Section 33 to the East 1/4 corner of Section 33; thence southerly along the East line of Section 33 to the Southeast corner thereof; thence S 00° 17'05" W, 2496.07 feet along the East line of Section 4 to a 2" iron pipe monument at the 1/4-section corner common to said Sections 3 and 4 as shown on that certain map entitled RECORD OF SURVEY FOR E. J. LOUIE & SONS, Inc., filed May 31, 1989 in Book 15 of Record Surveys at Page 80, Siskiyou County Records

thence N 74°29'31" W, 169.62 feet; thence S 11°09'40" W, 519.06 feet; thence S 30°48'55" W, 276.43 feet; thence S 73°35'25" W, 64.50 feet; thence N 83°45'30" W, 86.99 feet; thence N 64°42'42" W, 90.58 feet; thence N 88°04'44" W, 213.01 feet; thence S 75°25'37" W, 659.63 feet; thence S 77°22'51" W, 135.00 feet; thence S 00°37'36" E, 148.96 feet; thence S 08°08'17" W, 203.12 feet; thence S 01°47'57" W, 223.12 feet; thence S 85°31'02" W, 163.56 feet; thence S 06°16'29" E, 617.41 feet; thence S 00°32'11" E, 83.19 feet; thence S 08°26'10" E, 223.17 feet; thence S 09°47'23" E, 370.77 feet to a 5/8-inch rebar at the southerly side of the northerly right-of-way fence of Louie Road; thence continuing S 09°47'23" E, a distance of 19.24 feet to a point on the centerline of the traveled roadway of Louie Road; thence, along said center of roadway, N 87°24'14" E, 1340.76 feet to the beginning of a curve concave to the south and having a radius of 500 feet; thence easterly along said curve through a central angle of 18°16'53", an arc distance of 159.53 feet; thence S 74°18'53" E, 141.09 feet to a point on the East line of said Section 9, from which point the section corner common to Sections 3, 4, 9, and 10 of Township 43 North, Range 5 West bears N 01°20'30" E, 109.08 feet as shown on the said Record of Survey for E.J. Louie & Sons;

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thence, leaving said centerline of roadway, southerly along the East line of said Section 9 to the Southeast corner of Section 9; thence westerly along the South line of Section 9 to the Southwest corner of that certain parcel conveyed from Dennis to Louie in deed recorded March 9, 1917 in Book 96 of Deeds at pages 236 & 237 in the office of the Siskiyou County Recorder, from which corner the South 1/4-corner of said Section 8 bears West 44.50 chains (record); thence N 16° 30' E, 346.50 feet; thence N 19° 24' W, 280.50 feet; thence N 31° E, 153.78 feet; thence S 51° 47' E, 157.74 feet; thence N 53° 42' E, 304.92 feet; thence N 19° 28' E, 764.28 feet; thence N 21° E, 182.82 feet; thence N 24° 52' E, 98.34 feet; thence N 16° 28' E, 151.80; thence N 16° 58' E, 80.52 feet; thence N 21° 12' E, 100.32 feet; thence N 18° 10' E, 153.78 feet; thence N 10° 20' E, 287.10 feet; thence N 9° 30' W, 311.52 feet; thence N 49° W, 297.66 feet; thence N 42° 40' W, 215.16 feet; thence N 54° W, 388.08 feet; thence N 85° 30' W, 224.40 feet; thence N 69° W, 149.16 feet; thence N 56° 30' W, 153.78 feet; thence, leaving the said westerly line of last said deed, N 21° 40' E, 83.16 feet to the center of the County Road; thence along the center line of the County Road N 86° 32' W, 306.90 feet; thence S 41° 44' W, 789.36 feet; thence S 28° 20' W, 402.60 feet; thence S 42° 20' W, 760.98 feet; thence S 59° 20' W, 281.82 feet; thence S 72° 30' W, 966.90 feet to a point on the North-South centerline of said Section 8; thence continuing southwesterly along the County Road to a point on the South line of Section 8; thence westerly along the South line of said Section 8 and along the South line of said Section 7 to the Southwest corner of Section 7; thence northerly along the West line of Section 7 to the Northwest corner of Section 7; thence northerly along the West line of said Section 6 to the Southwest corner of the North half of Lot 2 of the Southwest quarter of Section 6; thence easterly along the South line of the North half of Lots 1 and 2 of the Southwest quarter of Section 6 to the Northwest corner of the Southwest quarter of the Southeast quarter of Section 6; thence easterly along the North line of the Southwest quarter of the Southeast quarter of Section 6 to the 1/16th corner at the center of the Southeast quarter of Section 6; thence northerly along the West line of the East half of Southeast quarter and along the West line of the East half of Lot 1 of the Northeast quarter of Section 6 to the Southwest corner of the East half of Lot 2 of the Northeast quarter of Section 6; thence easterly along the South line of said Lot 2 to the Southeast corner of said Lot 2 on the East line of said Section 6; thence northeasterly to a point on the East Line of the Northwest quarter of the Northwest quarter of said Section 5, distant 100 feet northerly from the Southeast corner of the Northwest quarter of the Northwest quarter of Section 5; thence northeasterly to a point on the North-South centerline of said Section 5, distant 389 feet northerly from the Southeast corner of the Northeast quarter of the Northwest quarter of said Section 5; thence northerly along the North-South centerline of Section 5 and along the North-South centerline of said Section 32 to the center of said Section 32; thence easterly along the East-West midline of Section 32 to the Southwest corner of the Southeast quarter of the Northeast quarter of Section 32; thence northerly along the West line of the East half of the Northeast quarter of Section 32 to the 1/16th-

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corner on the North line of the Northeast quarter of Section 32; thence westerly along the North line of Section 32 to the North 1/4-corner of Section 32; thence northerly along the North-South centerline of said Section 29 to the Northwest corner of the Southwest quarter of the Northeast quarter of said Section 29; thence easterly along the North line of the South half of the Northeast quarter of Section 29 to the 1/16th-corner on the East line of the Northeast quarter of said Section 29; thence southerly along the East line of Section 29 to the southerly line of the Old Count Road (Grenada to Mayten) thence following said southerly line of Old County Road in a southeasterly direction to the intersection of said southerly line of road with the East line of the West half of the Northwest quarter of said Section 28; thence southerly along the East line of the West half of the Northwest quarter and along the East line of the West half of the Southwest quarter of Section 28 to the 1/16th corner on the South line of the Southwest quarter of Section 28; thence easterly along the South line of Section 28 to the South 1/4-corner of Section 28; thence southerly along the North-South centerline of Section 33 to the Point of Beginning.

Assessor's Parcel No: 020-020-030, 020-020-040, 020-020-060, 020-020-070, 020-020-090, 020-020-110, 020-020-140, 039-330-070 , 039-340-010 and 039-350-290

Parcel: B:

The following legal description is for the Former Nelson Ranch property.

PARCEL I:

The West half and the West half of the Northeast quarter of Section 32, Township 44 North, Range 5 West, M.D.M.

EXCEPTING THEREFROM a strip of land 60 feet in width for road purposes, as granted in the deed from Sedgley D. Nelson to the County of Siskiyou dated October 19, 1948 and recorded April 15, 1949 in Volume 240 of Official Records, page 305.

PARCEL II:

The Southeast quarter of the Northwest quarter, the North half of the Southwest quarter, the Southwest quarter of the Southwest quarter, and the Southeast quarter of Section 30, Township 44 North, Range 5 West, M.D.M.

PARCEL III:

The Southeast quarter of the Southwest quarter of Section 30, Township 44 North, Range 5 West, M.D.M.

PARCEL IV:

Section 31, Township 44 North, Range 5 West, M.D.M.

EXCEPTING THEREFROM that portion of the Southwest quarter lying Westerly of the center line of the Shasta River, as said river traversed the land on October 28, 1943.

PARCEL V:

All that portion of the North half of the Northwest quarter of Section 5, Township 43 North, Range 5 West, M.D.M., lying Northerly of a line commencing at the Southwest corner of the Northwest quarter of the Northwest quarter of said Section 5; thence running Northeasterly to a point on the North-South center line of said Section 5, 389 feet North of the Southeast corner of the Northeast quarter of the Northwest quarter of said Section 5.

Also that portion of the North half of the Northeast quarter of Section 6, Township 43 North, Range 5 West, M.D.M. lying Northerly of the centerline of the Shasta River, as said river centerline traversed the land on October 21, 1942.

PARCEL VI:

All that portion of the North half of the Northwest quarter of Section 6, Township 43 North, Range 5 West, M.D.M., lying Northerly and Easterly of the centerline of the Shasta River, as said river centerline traversed the land on October 28, 1943.

EXCEPTING THEREFROM the dam site of the Grenada Irrigation District.

PARCEL VII:

All that portion of the East half of the Southeast quarter of Section 25, Township 44 North, Range 6 West, M.D.M. lying Easterly of the centerline of the Shasta River, as said river centerline traversed the land on October 28, 1943.

PARCEL VIII:

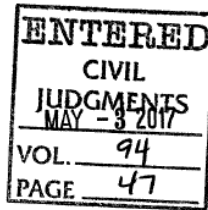
All that portion of the East half of Section 36, Township 44 North, Range 6 West, M.D.M., lying Easterly and Northerly of the centerline of the Shasta River, as said river centerline traversed the land on October 28, 1943.

Assessor's Parcel No.: 020-020-010, 020-250-040, 020-250-050, 038-230-090, 038-240-050, 039-330-020, 039-330-030, 039-330-040, and 039-330-080

Appendix B

Busk Stipulated Judgement

1 SOMACH SIMMONS & DUNN
2 A Professional Corporation
3 Stuart L. Somach (SBN: 090959)
4 Michael A. Gheleta (SBN: 137726)
5 500 Capitol Mall, Suite 1000
6 Sacramento, CA 95814
7 Telephone: (916) 446-7979
8 Facsimile: (916) 446-8199



FILED
SUPERIOR COURT OF CALIFORNIA
COUNTY OF SISKIYOU
MAY -3 2017
ENDORSED- R. DICKERSON
BY: _____
DEPUTY CLERK

Attorneys for Plaintiff The Nature Conservancy

SUPERIOR COURT OF CALIFORNIA
COUNTY OF SISKIYOU

THE NATURE CONSERVANCY,
Plaintiff,

v.

IRENE BUSK, and also as Trustee of the
RODNEY BUSK TRUST,
Defendant.

CASE NO. SCCVCV14-01175

STIPULATED JUDGMENT

INTRODUCTION

1. On September 26, 2014, Plaintiff, The Nature Conservancy ("TNC"), filed its Complaint in this case against Defendant Irene Busk, individually and as Trustee of the Rodney Busk Trust ("Busk"). On February 16, 2016, Defendant Irene Busk, individually and as Trustee of the Rodney Busk Trust ("Busk"), filed an Answer to the Complaint. Settlement discussions proceeded, and no further pleadings were filed.

2. The Court has not addressed the merits of the underlying dispute in this litigation, which involves certain water rights, water uses, agreements and decrees, referenced chronologically below for purposes of historical context.

3. On or about December 29, 1932, the Superior Court in and for the County of Siskiyou, California, entered a Judgment and Decree, in Case No. 7035 ("1932 Decree"), adjudicating the

STIPULATED JUDGMENT

-1-

1 waters of the Shasta River and its tributaries. The Decree stated in paragraph 234 that John
2 Louie, Manuel Louie and Frank Louie, jointly, were "entitled to divert from the natural or
3 developed flow of Big Springs, through the Louie-Rose Ditch and/or the Coonrod Ditch" and
4 apply to beneficial use a total of up to 10.00 cubic feet per second (cfs). Paragraph 234 identifies
5 Diversion 241 as a point of diversion through the Louie-Rose Ditch (aka Main Ditch) and
6 Diversion 242 as a point of diversion through the Coonrod Ditch.

7 4. On or about February 27, 2008, TNC and Busk entered into an Option Agreement
8 concerning the purchase of certain lands and associated rights.

9 5. On or about March 5, 2009, Busk executed a Grant Deed in favor of TNC, conveying to
10 TNC certain lands, water and water rights, and retaining or reserving to Busk certain lands, water
11 and water rights.

12 6. Contemporaneous with the Grant Deed, Busk executed a Conservation Easement Deed in
13 favor of TNC concerning the lands and associated rights retained by Busk.

14 7. On or about July 17, 2014, the Hon. Judge Laura Masunaga signed and filed a
15 Supplemental Decree in Case/Decree No. 7035, the Shasta River water rights adjudication. The
16 Supplemental Decree provided in paragraph 1.e. that the 1932 Decree was hereby amended to
17 include certain rights of TNC to make instream use of a portion of the water right recognized in
18 the 1932 Decree for Point of Diversion 241.

19 8. The above-captioned case, initiated by TNC's filing of its Complaint on September 26,
20 2014, involves differences between the parties concerning water use, water rights, and the
21 conveyances and reservations discussed above. Both TNC and Busk desire to resolve the
22 disputes underlying this litigation, and to work in a cooperative fashion in the future with respect
23 to use of water on their respective properties. The parties have met in an effort to settle this
24 action, and have reached agreement on the terms of a Stipulated Judgment.

25 **STIPULATION FOR JUDGMENT**

26 Accordingly, the parties HEREBY STIPULATE that judgment be entered in the above-
27 captioned case in accordance with the following terms:
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1. When 9 to 10 cfs Available – When there is sufficient water in Big Springs Lake to deliver 9 to 10 cfs from Diversion 241, Diversion 242, or some combination of both, the parties will share the water as follows:

b. During each nine (9) day rotation of water, Busk will have a 16-18 hour period of exclusive use, occurring over two consecutive days, to flood irrigate out of the Main Ditch. The first day, Busk will irrigate with exclusive use of the water from approximately 6:00 a.m. until approximately 4:00 p.m. At that time, Busk will turn the water in the Main Ditch over to TNC, which will have exclusive use of the entire head of water until approximately 6:00 a.m. the following morning. At approximately 6:00 a.m. the following morning, Busk will again have exclusive use of the entire head of water in the Main Ditch from 6:00 a.m. until 2:00 pm.

d. When neither Busk nor TNC is making exclusive use of the water under the nine (9) day rotation described above, Busk and TNC will share the water, with TNC receiving two-thirds (2/3) and Busk receiving one-third (1/3) of the available supply.

2. When 3 to <9 cfs Available – When there is only sufficient water in Big Springs Lake to deliver 3 to <9 (less than 9) cfs from Diversion 241, Diversion 242, or some combination of both, Busk shall receive 3 cfs and TNC shall receive the remainder. The nine (9) day rotation and use of the entire head of the ditch for 16 hours per nine (9) day rotation shall remain the same as in paragraph 1 above.

3. When 0 to <3 Available – When there is only sufficient water in Big Springs Lake to deliver 0 to <3 (less than 3) cfs from Diversion 241, Diversion 242, or some combination of both, Busk shall stop diverting from Diversion 241 and Diversion 242, and TNC may use the water available at Diversion 241 for instream uses in Big Springs Creek under the Supplemental Decree issued on or about July 17, 2014 by the Superior Court for the County of Siskiyou in the Shasta River Adjudication, Case/Decree No. 7035.

4. Subject to the herein described operations, the parties agree and acknowledge that the water right provided for in paragraph 234 of the Decree is owned one-third (1/3) by Busk and two-thirds (2/3) by TNC.

5. Busk does not object to TNC diverting its share of the water, other than the time period Busk has exclusive use, directly into Big Springs Creek, so long as there are accurate measuring devices to ensure that each party receives its respective share of water.

6. TNC agrees to install at its own expense a measuring device at the Big Springs Lake outlet that will, to the satisfaction of the water master, measure and record the controlled releases from Big Springs Lake pursuant to the decreed instream flow right in the Supplemental Decree referenced above. TNC shall use its best efforts to complete the installation of the measuring device expeditiously and within a reasonable time, taking into account any permitting requirements and physical flow conditions that will affect such installation.

7. TNC may install at its own expense a measuring device or sensor at the headgate or in the Coonrod Ditch for Diversion 242.

Additional Provisions

8. The parties agree that the Complaint, the Answer, and this entire litigation shall be

1 dismissed without prejudice, and with each party bearing its own costs and attorney's fees.

2 9. This Stipulated Judgment shall run with ownership of the lands presently owned by TNC
3 and Busk, and shall be recorded in the Office of the Siskiyou County Recorder.

4 10. The provisions of the Stipulated Judgment are applicable to, binding upon and inure to the
5 benefit of not only the parties to this action, but also to their respective heirs, executors,
6 administrators, successors, assigns, lessees, licensees and to the agents, employees and attorneys
7 in fact of any such persons.

8 11. Nothing herein is intended to, nor shall, preclude the application of other applicable laws
9 or regulations associated with the actions and activities set forth in and otherwise governed by the
10 provisions of this Stipulated Judgment.

11 12. This Stipulated Judgment may be signed in counterparts, and the counterparts together
12 shall form a single instrument. The counterparts shall be binding on the signatories as if fully
13 executed all on one copy.

14 IN WITNESS WHEREOF, the undersigned hereby execute this proposed Stipulated
15 Judgment on the dates set forth opposite their signatures.

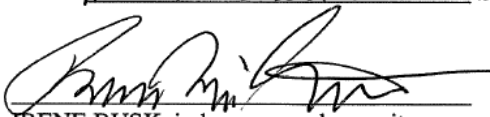
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18 Dated: April 19, 2017

THE NATURE CONSERVANCY

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20 By: 

21 Title: Assoc. Dir. Conservation Investments

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23 Dated: April 13, 2017


24 IRENE BUSK, in her personal capacity,
25 and as Trustee of the Rodney Busk Trust,
26 by HANS KAI CHRISTENSEN,
27 her Attorney in Fact
28

STIPULATED JUDGMENT

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1 APPROVED AS TO FORM AND CONTENT.
2

3 SOMACH SIMMONS & DUNN
4 A Professional Corporation

5 Dated: April 24, 2017

6 By: Michael A. Gheleta
7 Stuart L. Somach
8 Michael A. Gheleta
9 Attorneys for Plaintiff
10 The Nature Conservancy

11 LAW OFFICE OF DARRIN W. MERCIER

12 Dated: April 13, 2017

13 By: Darrin W. Mercier
14 Darrin W. Mercier
15 Attorney for Defendant
16 Irene Busk

17 **ORDER/JUDGMENT**

18 Based on a review of the Stipulation of the parties, and the files and records in this matter,
19 and good cause appearing, IT IS HEREBY ORDERED that Judgment in the above referenced
20 action be entered in accordance with the above Stipulation of the parties.

21 Dated: _____

22 **LAURA MASUNAGA**

23 Judge of the Superior Court

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STIPULATED JUDGMENT

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Appendix C

List of Existing Assessments and Studies

Working title/topic	Deliverable, product, report, paper	Strategic purpose, associated data	Authors; key collaborators	Full citation
Spawning gravel surveys	report to CDFW	survey to determine locations and extent of suitable spawning gravels for salmonids in the Shasta River	McBain and Trush	
Genetics workshop for Shasta coho	workshop	Two day meeting to consider the genetic diversity of the coho in the Shasta in relation to that in other tributaries and the hatchery. Important consideration in the discussion of coho supplementation	organized by Amy Campbell	
Ecological trap for coho in the Shasta River	peer reviewed publication	Discussion of the effects of choices in coho spawning locations in the Shasta and their implications for the growth and survival of juveniles during over-summering	Jeffries et al.	Jeffries C, Moyle PB. 2012. When Good Fish Make Bad Decisions: Coho Salmon in an Ecological Trap. North American Journal of Fisheries Management. 32:87-92
Growth and survival of juvenile coho salmon along a thermal and productivity gradient in the Shasta River	PhD dissertation	penned coho were positioned at 5 different distances from the cold, nutrient rich springs that feed the Shasta. The fishes' growth and survival were assessed across a gradient of temperature and food availability	Rob Lusardi	
Habitat use and behavior of Juvenile coho in Big Springs Creek, the Shasta and Salmon Rivers	report to funders and probable peer-reviewed paper.	snorkel surveys will be conducted to assess habitat use and movement behavior along a thermal and productivity gradient	Joshua Strange, Stillwater Consulting	
Instream flow studies	report to CDFW	study to define minimum and desired instream flow targets for salmonids in the Shasta River	McBain and Trush	
Nelson Ranch Baseline Documentation Report	report	Baseline documentation of the physical, biotic and built environment of Nelson Ranch	John Dittes, Dittes and Guardino Consulting	
Shasta Big Springs Ranch Easement Documentation Report	report	Baseline documentation of the physical, biotic and built environment of Shasta Big Springs Ranch	John Dittes, Dittes and Guardino Consulting	
Improving Managed Environmental Water Use: Shasta River Flow and Temperature Modeling	PhD dissertation		Null	http://www.waterplan.water.ca.gov/docs/cwrpu2009/0310final/rdcl0a05_cwp2009.pdf
Little Springs Shallow ground water piezometers	technical memorandum	Monitoring of shallow ground water to understand interactions with irrigation practices.	Fowler and Babcock.	
Shasta Big Springs Ranch Big Ditch Infiltration Technical Memo	Internal TNC report for NOAA-ARRA	Part of the NOAA assessment of irrigation efficiency	H2O Tech and Aquaterra	
Within and among year variation in groundwater elevations	reports	Ongoing monitoring to understand effect of irrigation from groundwater on groundwater levels, with Buck dissertation modeling groundwater pools and fluxes in the the Pluto's Caver aquifer.	Fowler and Babcock. Buck	C. Connell-Buck 2013. Managing Groundwater for Environmental Stream Temperature. UC Davis dissertation. A. C. Fowler. 2010 Technical Memorandum. Ground water monitoring on Shasta Big Springs Ranch
Groundwater database		Multi-year database on groundwater levels from Shasta Big Spring Ranch wells	Babcock and Fowler	
Irrigation monitoring database		Multiple year database on water use for irrigation	Babcock and Fowler	
Effects of late season irrigation deficits on pasture productivity and quality	report, spring 2015, peer reviewed paper #5	Assessment of the effects on pasture quality and productivity with early cessation of irrigation will be examined to inform water use and quantify costs to ranchers	Steve Orloff, Chris Babcock, Amy Campbell	
Shasta Basin Monitoring plan: a multi-scale, science approach to support conservation activities in the Shasta Basin	Monitoring Plan		Willis, Deas, Nichols and Jeffries	

Working title/topic	Deliverable, product, report, paper	Strategic purpose, associated data	Authors; key collaborators	Full citation
2014 temperature assessment of coho habitat	report	comparison of 2014 thermal conditions with those of previous years during projected large juvenile coho cohort	Jeffries, Nichols, Willis	
Little Springs Creek baseline assessment	reports	Geomorphology, flow, thermal profile, vegetation, stream insects, and fish use of Little Springs Creek	TNC, CDFW, UCD, Watercourse	
Shasta River 2007 Year-in-the-Life	report	Collect information on the physical habitat, water flow and quality, nutrient flux, food web structure and fish use of the Nelson Reach of the Shasta River (water year 2007) to guide restoration management decisions.	Carson Jeffries, J. Mount, P. Moyle, A. Nichols, R. Dahlgren, A. King, M. Deas, et al.	Jeffries C, Mount JF, Moyle PB, Deas M, Buckland E, Hammock B, Kiernan JD, King AM, Kingbaum N, Nichols AL et al. 2007. Baseline Assessment of Salmonid Habitat and Aquatic Ecology of the Nelson Ranch, Shasta River, California Water Year 2007.
Big Spring Creek and Shasta assessment	report	Results from baseline studies of the Busk property during the 2008 "option to buy" period.	Jeffries et al.	Jeffries C, Dahlgren RA, Kiernan JD, King AM, Lusardi RA, Nichols AL, Null SE, Tanaka S, Willis AD, Mount JF et al. 2009. Baseline Assessment of Physical and Biological Conditions Within Waterways on Big Springs Ranch, Siskiyou County, California.
Shasta Big Springs Ranch restoration assessment	report	Assessment of restoration actions on Shasta Big Springs Ranch.	Jeffries et al.	Jeffries C, Nichols AL, Willis AD, Mount JF, Moyle PB, Deas M. 2010. Assessment of Restoration Actions on Big Springs Creek, Shasta River, California 2009-2010.
Shasta Big Springs Ranch restoration assessment	report	Assessment of restoration actions on Shasta Big Springs Ranch.	Willis et al.	Willis AD, Deas M, Jeffries C, Mount JF, Moyle PB, Nichols AL. 2011. Executive Analysis of Restoration Actions in Big Springs Creek March 2008-September 2011.
NOAA-ARRA Final report	report to NOAA	Account of restoration actions and results	Campbell, Fowler, Babcock and Hoss	
Riparian breeding bird response to cattle exclusion/passive restoration on the Shasta River, 2006-2014	peer reviewed paper #1	demonstrate that conservation actions targeting salmon have positive effects on other species of concern (riparian obligate Neotropical migrant songbirds).	A da Fowler, Chris Babcock, ? Point Blue?	
Response of riparian plant community composition and density to cattle exclusion along the Shasta River, 2006-2014	peer reviewed paper #2	quantify changes in riparian plant community following removal of previously dominant grazer using a BACI (Before/After Control/Impact) study design.	Chris Babcock, A da Fowler	
Common garden riparian planting experiment	report to USFWS	Willows were planted in 30 common gardens that were characterized by 3 different soil salinity/moisture classes and survival response was monitored	Fowler and Babcock	
Survival of riparian tree plantings by species/season/propagule	peer reviewed paper #3	Nearly 6000 willows, birch and alder trees were planted as part of a riparian restoration project on the Shasta River and their survival was followed and related to species, stock and season of planting	Fowler and Babcock	
SBSR weed management plan	report	decision tree for control of invasives especially those that occur in the riparian zone and compete with native vegetation	Babcock and Obermeyer (Coda Fellow)	
LIDAR based predictive elevation model validation using survival of riparian plantings	peer reviewed paper #4	A LIDAR-based prescriptive model was tested against survival data from riparian riparian plantings on the Shasta River	Daniel Van Dyke (USFWS), Fowler	
Response to restoration: water temperature in Big Springs Creek and surrounding waterways 2009-2011	Internal TNC report for NOAA-ARRA		Ann Willis and Mike Deas	
Thermal characterization of Big Springs Creek and the Shasta River in relation to thermal tolerances of juvenile coho salmon.	peer reviewed publication	Comparisons of observed water temperature ranges and published temperature tolerances for juvenile coho salmon.	Nichols et al.	Nichols AL, Willis AD, Jeffries C, Deas ML. 2013. Water Temperature Patterns Below Large Groundwater Springs: Management Implications For Coho Salmon In The Shasta River, California. River Research and Applications.
Thermal response model of Big Springs Creek to restoration actions	peer reviewed paper #6	"Assessing cold-water management strategies in spring-fed streams using 2D water temperature models"	Ann Willis, Mike Deas, Drew Nichols, A da Fowler, Chris Babcock	
Real-time and archived water temperature database		Multi-year database of water temperature from Shasta River, Big Springs and Little Springs	Fowler and Babcock	

Working title/topic	Deliverable, product, report, paper	Strategic purpose, associated data	Authors; key collaborators	Full citation
Response of emergent plant cover and composition to exclusion of cattle	peer reviewed paper #7	cattle exclusion from grazing emergent vegetation in Big Springs Creek leads to increases in plant cover and important shading effects to keep waters cool	Fowler and Babcock	
Absence intermediate host polychaetes for myxozoan salmon parasite in the Shasta River	Yurok Tribal Fisheries report to BoR	Surveys on the Nelson Reach of the Shasta River demonstrate the obligate intermediate polychaete host for the myxozoan fish parasite (<i>Ceratomyxa shasta</i>) is not present in the Shasta River and remains restricted to the main stem of the Klamath River.	Joshua Strange, Yurok Tribe	http://www.yuroktribe.org/departments/fisheries/documents/ShastaRiverPolychaeteSurvey/FINAL-REPORT2009.pdf
Distribution and Abundance of Freshwater Mussels in the mid Klamath Subbasin, California	peer reviewed paper	included study areas on SBSR	Emily A. Davis, Aaron T. David, Kari Marie Norgaard, Timothy H. Parker, Kara McKay, Christine Tennant, Toz Soto, Kate Rowe, and Ronaki Reed	http://dx.doi.org/10.3955/046.087.0303
Soil organic fraction and water holding capacity under different grazing pressures	MS thesis	soil properties were assessed inside and outside cattle grazing enclosures to examine effects of grazing on organic matter storage and soil moisture	Cori Hutchins, Babcock, John Nichols	Hutchins, C. 2011 The role of soil organic matter in range land sustainability. MS thesis, CSU Chico
SBSR pasture productivity and biomass consumption	annual reports	Cattle grazing enclosures and biomass plot clipping provide annual estimates of pasture productivity and grazing off-take	Babcock and Fowler	
Preliminary assessment of irrigation options for the Little Springs agricultural unit	report	consideration of options to re-irrigate pastures formerly irrigated by diversions from Little Springs Creek	Davids Engineering	
SBSR ranch management plan	report to RWQCB as part of the TMDL for the Shasta River	plan outlines actions to assess irrigation water use and minimize tailwater returns to the river		
Monitoring of flows contributed to the Shasta River by the agricultural community in support of migrating Fall Chinook, September 2012	report and peer reviewed paper	Assess impact of voluntary fall releases on pool size in the lower Shasta River	Campbell, Fowler, Babcock and Willis	
Water rights management modeling summary	Internal TNC report for NOAA-ARPA		Ann Willis and Mike Deas	
Shasta Big Springs Ranch and Nelson crop Evapotranspiration Estimates	Internal TNC report	Used to calculate consumptive use for 1707 petitions. The work defines monthly consumptive use, which equals the maximum amount of water that can be dedicated to the area	Gant Davids, Davids Engineering	
Exploration of Conveyance Loss in the Shasta River from Shasta Big Springs Ranch to Montague (Grenada Road)	Internal TNC report	Used to calculate consumptive use for 1707 petitions	Mike Deas, Watercourse Engineering	
Monitoring of pulse flows contributed to the Shasta River- April 2013	report and peer reviewed paper	Assess impact of spring releases flows in upper Shasta River	Campbell, Fowler, Babcock and Willis	
1707 Petition to State water board	Petition	1707 policy engagement		
Shasta Water Transaction Strategic Plan	TNC Conservation Business Plan	Water transactions Business Plan for the Shasta River	Amy Campbell, Klamath Team	
Instream Flow guidance document	Guidance document	Increase use of 1707 provision	Amy Hoss, Amy Campbell, SWIFT team	
Little Springs Baseline Assessment	report spring 2015	Gather information on LS Creek temperature, flow, geomorphology, macrophytes, invertebrates, and fish to assess habitat quality and availability	Deas, Nichols, Jeffers, Phillips, Willis	
Baseline Aquatic Ecosystem Assessment of Lower Hole in the Ground Creek: 2013-2014	report spring 2015	Lower Hole Creek information on temperature, flow, spring groundwater source, plant and insects to assess fish habitat quality and availability	Nichols and Phillips	
Big Springs Creek Channel Morphology Changes	report draft, spring 2015	fine resolution study of macrophyte/sediment seasonal dynamics 2013-2015	Nichols and Willis	
HIG assessment 2015	report	baseline ecology, water quality, and geomorph	Nichols and Phillips	
channel morphology monitoring	memo 2015	changes in BSC channel morphology over time	Nichols and Willis	
SBSR monitoring plan	plan 2015	recommended parameters and schedule for ecological monitoring	Willis et al.	
Big Springs IFN report	final report 2015	Shasta River Big Springs Complex criteria instream flow needs assessment	McBain and Tush	
TBSM validation and water rights assessment	final report 2014	validation of thermal mass balance model for BSC using empirical data	Willis and Deas	
2013 water temperature analysis	report 2013	flow in water temperature monitoring on SBSR	Willis and Deas	
2014 water temperature analysis	report 2014	flow in water temperature monitoring on SBSR	Mino and Deas	
season aquatic plant growth mediates stream temperature patterns	manuscript submitted for publication 2016	affects of seasonal macrophyte growth on temperature and flow in BSC	Willis et al.	

Appendix D

Riparian Grazing Management Plan

Big Springs Ranch Wildlife Area

Draft Prescribed Riparian Grazing Management Recommendation (January 11, 2016)

Prepared by:

Kenneth W. Tate, Professor and UCCE Rangeland Watershed Specialist, UC Davis

California Certified Rangeland Manager #79; CA Department of Forestry and Fire Protection

Certified Rangeland Professional #00-104; Society for Range Management

Carissa Koopmann Rivers, Livestock and Natural Resources Advisor, Siskiyou County, UCCE

Riparian Areas on the Ranch

Approximately 8 miles of the Shasta and 1.5 miles of Big Springs Creek run through The Nature Conservancy's (TNC's) Shasta Big Springs Ranch. There are three riparian reaches, two that incorporate the Shasta River, the Upper Shasta reach (which includes Little Springs reach) and the Lower Shasta reach, and one on Big Springs Creek (Figure 1). Each of these reaches are permanently fenced on both sides of the waterway with wide buffers. Riparian fencing runs along the top of a natural terrace, creating long riparian pastures on each side of the stream in each reach.

Riparian Grazing Management Recommendations

Riparian Management Goals- The ranch owner has expressed interest in developing an adaptive grazing strategy to reduce weeds within the riparian corridor – while limiting negative livestock impacts to riparian native vegetation, streambank stability, and instream habitat quality. There is good reason to expect that prescribed riparian grazing with livestock can reduce the cover and competitive advantage of invasive weeds throughout the riparian reaches – improving odds for native riparian species recruitment.

These reaches could benefit from prescribed grazing. A primary target for riparian grazing in much of the corridor should be Yellow Star Thistle (YST). Livestock impacts to other existing invasive species including; bull thistle, tall pepper weed, teasel, poison hemlock, and blackberry will primarily result from physical damage (i.e., lodging, breakage, trampling) during grazing bouts timed to target YST control. Strong research evidence demonstrates that timing (season) of grazing is key to effective YST management via livestock grazing. YST is a palatable and sought-after forage species for cattle at all growth stages prior to bolting and emergence of spiny seed heads (reproductive stage).

Cross-Fencing- Cross-fencing to create sub-grazing units within each riparian reach will increase managerial control and weed reduction outcomes while simultaneously achieving stream enhancement objectives (see above) and staying below management triggers (see below). Targeted grazing and use of portable electric fencing and livestock drinking water infrastructure increases the intensive nature of the livestock management through frequent rotation, but can maximize weed control, while creating complete managerial control of the timing, frequency, and intensity of grazing along the streambank and other sensitive resources.

Off-stream livestock drinking water sources need to be established to provide drinking water access away from the riparian source. Portable water systems will need to be utilized, or extension of existing upland systems, to distribute drinking water to riparian pastures and sub-grazing units.

Seasons of Grazing and Livestock Management Decision Triggers. The units should not be grazed continuously throughout the season— there should be appropriate periods of rest during the growing season which will enhance productivity and persistence of desired riparian species. If sub-grazing units are established, then a grazing rotation should be implemented to maximize weed control and resource protection from inadvertent livestock impacts. Management decision triggers described below will ensure grazing intensity and livestock impacts to the stream channel are in balance with short and long-term goals listed above. For complete protection of streambanks and in-stream habitat – electric fencing will be established along the stream green line.

Managers must have real-time indicators they can observe directly on the ground to make decisions about the readiness of riparian grazing units for grazing (e.g., sufficient forage for grazing), and when livestock need to be moved from a riparian unit to achieve conservation goals (e.g., excessive browse on recruiting riparian woody plants <5ft in height, excessive streambank disturbance). For this site we recommend during any grazing bout that 1) physical hoof damage to streambanks be limited to no more than 20% of streambank per each side of stream; 2) minimum stubble height of browsed herbaceous vegetation at the stream green line not go below 3”; and that 3) browse on recruiting riparian woody plants (< 5ft in height – below cattle maximum browse height) be limited to no more that 20% of current year’s leader growth within the riparian unit. Once any of these three triggers are hit during a grazing bout, livestock should immediately be rotated out of that riparian unit or sub unit.

Table 1- Management triggers

Indicator	Trigger
Browse use on recruiting riparian woody species < 5 ft. in height	20% of current years leader growth
Streambank Hoof action	20% of each side of a streambank

Recommended Grazing Monitoring and Documentation- Siskiyou County UCCE and UC Davis will collaborate annually to provide hands-on, in-the-field training on assessing real-time status of the livestock management decision triggers recommended in the section above. We will base this training on standard, national methods developed in the “Multiple Indicator Monitoring (MIM) of Stream Channels and Streamside Vegetation” (<http://www.blm.gov/nstc/library/pdf/MIM.pdf>). We recommend progress towards these management triggers be assessed

every 2 days during all riparian grazing bouts where livestock have direct access to the stream channel. We recommend, and will provide training on, the establishment of permanent photo monitoring points in the riparian grazing unit. Photos should be taken at the beginning and end of each grazing bout (certainly within the first few years of grazing). Photo points should be established so that riparian woody species, herbaceous stubble height at the stream green line, and streambank conditions can be clearly observed and thus conditions and outcomes documented. Finally, we recommend that dates on and off, and numbers of livestock by species and class used during each grazing bout be recorded for each riparian grazing unit.

