

**Lowell L. Novy DBA Novy Ranches - Grenada - Site Plan Agreement between Lowell L. Novy, National Marine Fisheries Services (NMFS) and California Department of Fish and Wildlife (CDFW) For the Template Safe Harbor Agreement for Coho Salmon
(*Oncorhynchus kisutch*)**

A. Introduction

This Site Plan for the Template Safe Harbor Agreement (Agreement) for Southern Oregon and Northern California Coast (SONCC) Evolutionarily Significant Unit (ESU) of coho salmon (the Covered Species) is between Lowell L. Novy, DBA Novy Ranches – Grenada (hereinafter referred to as the Permittee, National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW). This Site Plan, combined with the measures prescribed in the Agreement, may serve as the basis for NMFS to issue a federal enhancement of survival permit (Permit) 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. The Site Plan Agreement is subject to terms of the Agreement and Permit.

This Site Plan documents site-specific information detailing the Permittee’s enrolled property, including the location of the Enrolled Property and the management authority of the Permittee, the Enrolled Property baseline conditions, existing and, as available, proposed future land-use activities, and the duration of this Site Plan Agreement and requested Permit. This Site Plan also documents the agreed-upon conservation measures to be undertaken by the Permittee on the Enrolled Property that are expected to benefit coho salmon.

B. Enrolled Property

B.1 General narrative and map describing the Enrolled Property

The Grenada Novy Ranches is owned by Lowell L. Novy in sole proprietorship, DBA Novy Ranches. As such, Lowell L. Novy will be the signatory. The Grenada Ranch is located along Highway A-12, approximately three miles east of Interstate 5, in Siskiyou County (41°38’11.56’’ N latitude, 122°29’22.88’’W longitude). The Grenada Ranch includes a total of ±1085 acres, with ±586 acres under irrigation based on GIS coverage. Novy Ranches has, and for the term of the Permit, will continue to lease pasture commonly referred to the Zenkus Property. The Zenkus Property is 73 irrigated acres and is contiguous to and surrounded by either the Novy or Rice property. Unless specifically identified as Zenkus Property within this Site Plan Agreement, reference to Grenada Novy Ranches is inclusive of the Zenkus Property hereinafter. Inclusive of the Zenkus Property, the Grenada Novy Ranches is managing 659 acres of Enrolled Property under this Site Plan Agreement.

Grenada Novy Ranches is located within the lower part of the Mid-Shasta Reach and is adjacent to the Rice Livestock Company, Inc. Ranch. The Enrolled Property is adjacent to approximately 12,400 feet of the Shasta River. The river forms the property line and

the ranch is on the right bank. The map included below shows the approximate property boundaries and general location within the Agreement Covered Area. Given Lowell L. Novy's ownership of multiple properties, for the purpose of this Site Plan Agreement, the Enrolled Property will be identified as Grenada Novy Ranches (the Ranch).

This site plan has numerous appendices that are important context of the site plan.

Grenada Novy Ranches - List of Appendices

- Appendix A - Property Deed
- Appendix B - Water Use Reports
- Appendix C - Zenkus Property Lease
- Appendix D - TMDL Waiver
- Appendix E - Soils Map
- Appendix F - Streambed Alteration Agreement
- Appendix G - Grazing Plan

B.2 Legal Description of Property Boundary

Grenada Novy Ranches APNs:

- 038-200-010 – Hay Field
- 038-170-180 – Contiguous Portion South of Hay Field
- 038-180-060 – Contiguous Portion North of Mid-North Portion
- 038-210-030 – Mid-North Portion
- 039-320-080 – Mid-North East Portion
- 038-220-030 – Mid-South Portion
- 038-220-020 – Mid-South West Portion
- 038-230-040 - South portion

Zenkus Property APN(s)

- 038-220-010 – Mid-South Portion
- 038-190-090 -

Legal Description from the Enrolled Property Deed is included as **Appendix A**.



Figure 1. Grenada Novy Ranches Ownership Map

B.3 Description of Water Rights

Grenada Novy Ranches utilizes two points of diversion for irrigation: Novy, Rice, Zenkus – a shared pre-1914 riparian right and Novy Pump – a sole pre-1914 riparian right. The eWRIMS number for the Novy, Rice, Zenkus is S000808 and the Novy Pump

is S024748. The Ranch filed Statements of Water Use with State Water Board for both diversions and they are included in **Appendix B**.

The Novy, Rice, Zenkus Pre-1914 Riparian Diversion: The Ranch has a share of one riparian claim named the Novy, Rice, Zenkus Riparian Diversion. The 2017 Novy, Rice, Zenkus Diversion Statement of Use shows continuous diversion of 10 cubic feet per second (cfs) from March 01 to November 01 annually or a total of 4,840 acre-feet per season spanning 244 days of diversion. This diversion is shared with Rice Livestock Inc. and Truttman-Zenkus on rotation. Novy Ranches has had an on-going long-term lease with Truttman-Zenkus since 1976 and intends to manage the leased Zenkus property for the term of the Agreement, **Appendix C**. The rotation is dependent on land ownership, with approximately 302 acres irrigated from the diversion owned between the three ranches. Grenada Novy Ranches currently irrigates approximately 194 acres from Novy, Rice, Zenkus Pre-1914 Riparian Diversion with wildland flood irrigation. Including the Zenkus property, Grenada Novy Ranches uses about 64% of the water diverted by the Novy, Rice, Zenkus Diversion. Duration of use is not defined but typically occurs from 3/1-11/1 of each season. This riparian right was not incorporated into the Shasta River Decree when developed in 1928.

During the winter/off-season, water is not diverted from the Novy, Rice, Zenkus Diversion as other alternative livestock watering options are available at this time.

The Novy Pump Pre-1914 Riparian Diversion: Grenada Novy Ranches has sole operation of the Novy Pump. It has a capacity of 5.5 cfs and generally operates from March 1st to November 1st every season. A total of approximately 465 acres are irrigated with this diversion. Throughout the year, water is pumped from the Novy Pump Diversion with a 1 horse power submersible pump to satisfy two 600 gallon stock-water troughs.

Table 1 shows the diversion numbers, amounts diverted, time frames, and amount of land that is irrigated. See map below that shows the place of use.

Table1: Summary and 2017 Statement of Use

Diversion #/Water Source	Description	Diversion Duration	Duration Statement Amounts	Total Ac-ft /season diverted	Acreage Irrigated W/Diversion	Average Days/Season diverted
S000808	Riparian - Rice-Novy	March 1- Nov 1	10 cfs	4840	+/-302 Novy, Rice, Zenkus	244
S024748	Riparian - Novy Pump	March 1- Nov 1	5.5 cfs	2661	+/-465	244
S024708	Stock water Riparian – Novy Pump	Nov 2- Feb 28	1.0 cfs	240	150 Livestock	121

Novy Ranches portion of Novy-Rice-Zenkus Riparian Diversion						
S000808	Riparian-Diverted Volume Apportioned to Novy & Zenkus	March 1-Nov1	6.4 cfs	Novy/Zenkus Annual use per diversion: 64% of 4,840 afy= 3,097 afy	Novy, Zenkus Land: +/- 194	Novy/Zenkus Usage +/- 157

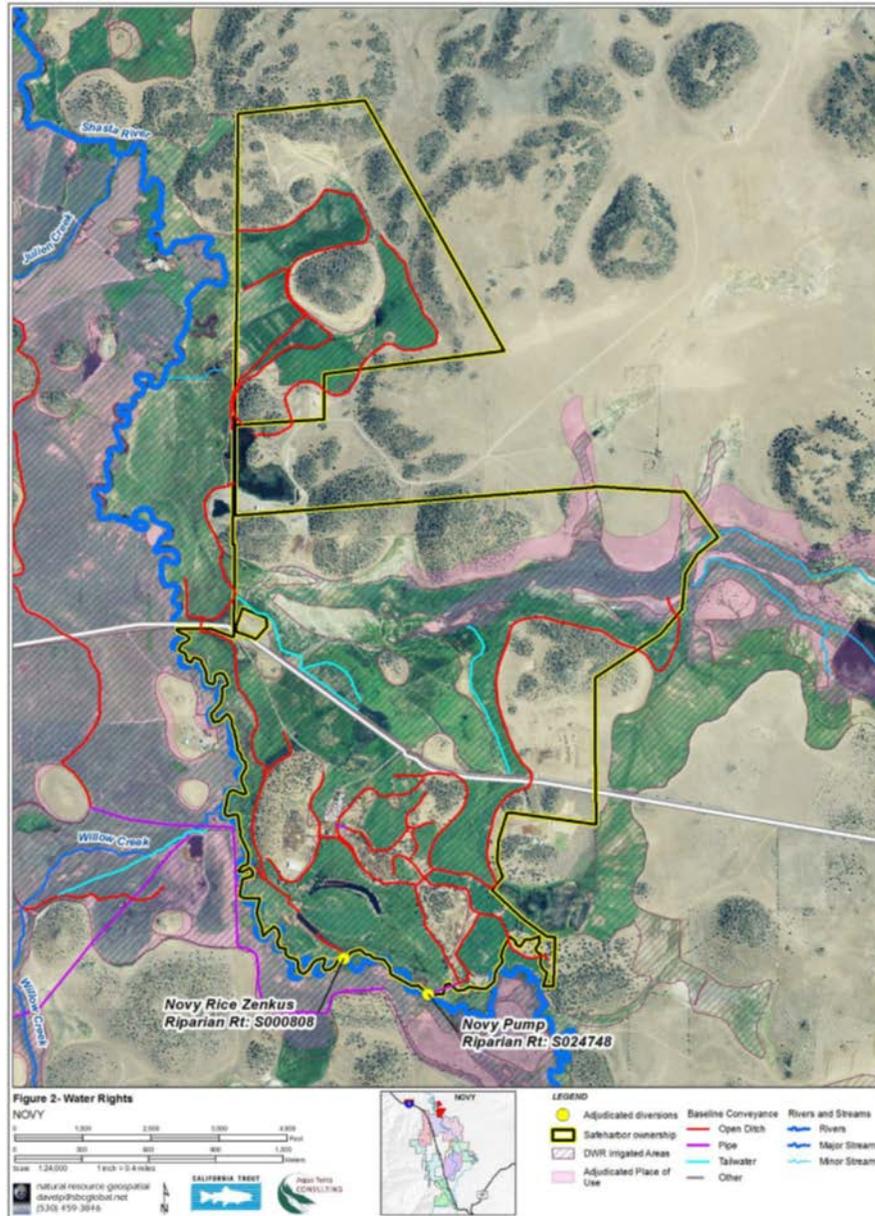


Figure 2. Grenada Novy Ranches Water Rights Map

C. Routine Land and Water Management Activities

C.1 Ongoing Routine Land and Water Management Activities

The Ranch consists of approximately ±1085 acres, with approximately ±659 acres under irrigation (including 73 acres leased from Zenkus). All of the ±659 irrigated acres are considered grass pasture and are flood irrigated. The ranch maintains approximately 10 miles of open ditch to convey water throughout its pastures. The ranch also has 2 ponds that are used to catch tailwater for re-use. There is one bridge stream crossing on the ranch. There is one water lane and two off-channel watering troughs. There are approximately 5 miles of aggregate base/rock ranch roads.

On November, 2, 2016 and August 22, 2017 the Grenada Novy Ranches and Zenkus Ranch obtained their Shasta River Dissolved Oxygen and Temperature Total Maximum Daily Load (TMDL) Conditional Waiver of Waste Discharge Requirements from Matthias St. John, Executive Officer of the California Water Boards North Coast Regional Water Quality Control Board. Grenada Novy Ranches agrees to maintain compliance and conditions as well as management practices of this waiver - included in **Appendix D1&2**.

Soil Description through Novy Ranches: Throughout the Grenada Novy Ranches, there are up to five different soil types, with 41% being Salisbury Cobbly Loam, a very shallow soil. A great deal of effort has been focused in building the tilth of the soil over the past four decades. By feeding in pastured areas, the cattle have naturally and organically improved the soil such that water efficiencies are being seen via a lengthening of time between irrigation rotation. Another 36% of our land is made up of Gazelle Silt Loam – an incredibly high alkaline soil. This soil, irrigated by the Novy, Rice, Zenkus and the Novy Pump diversions, needs a great deal more water than typical soils. Eighteen percent of our land is made up of Lithic Haploxerolls-Rock. These are non-irrigated regions where dryland pasture practices with rye and early spring grasses are dry-land grazed. Soil map with Descriptions of soils listed in **Appendix E**.

C.1.a Irrigation Management:

Novy, Rice, Zenkus Pre-1914 Riparian Diversion: Novy Ranches and Rice Livestock Inc. operate a flashboard diversion on the Shasta River at the Novy-Rice-Zenkus Diversion which irrigates approximately 302 acres. With this diversion, Grenada Novy Ranches, including the Zenkus Property(73 acres), irrigates approximately 194 acres, on the east side of the Shasta River, generally from March through October. The water right is a Pre-1914 Riparian Right and not included in the Shasta River Decree. The 2017 Novy, Zenkus, Rice statement of use shows continuous diversion of 10 cubic feet per second (cfs) from approximately March 1st through November 1st or a total of 4,840 acre-feet per season. This diversion is shared with Rice Livestock Inc. and Zenkus on rotation. The rotation duration per users is dependent on land ownership, with approximately 302 cumulative acres irrigated from that diversion owned between the three ranches. Grenada Novy Ranches irrigates about 64% of the property

serviced by Novy, Rice, Zenkus Riparian Diversion and uses approximately 64% of the total diversion volume is diverted for Grenada Novy Ranches. Assuming equal delivery efficiency and equal use of the reported 4,840 acre-feet annually diverted for irrigation, Grenada Novy Ranches approximately 3,097 acre feet year or 15.96 acre-feet per acre for irrigation. Investigations show that inefficiencies can be attributed to delivery loss as well as poor irrigation distribution.

Flood irrigation is conveyed via open ditch prior to reaching the Grenada Novy Ranches parcels where water is then distributed through on farm lateral and toe ditches and turned out on to non-checked and unleveled fields, although the Grenada Novy Ranches field(s) are within the flood plain and are generally level. Water is spread through swales and irrigation toe ditches.

Grenada Novy Ranches has been and is actively involved with the assessment and investigation being conducted on the Novy-Rice, Zenkus Riparian Diversion by the Shasta RCD. The investigation evaluates methods to improve delivery efficiency and irrigation methods to reduce the volume of water Grenada Novy Ranches applies to the 194 acres under irrigation by the Novy -Rice -Zenkus Riparian Ditch and under the management Grenada Novy Ranches, as well as livestock watering. Field check and leveling on these parcels are not alternatives due to loss of interim production and long-term production risk through disturbing shallow, alkali ground. In addition, this investigation evaluates fish passage at the diversion point

Tailwater from the Novy, Rice, Zenkus Riparian Diversion is prevented by historic berms that are maintained. The berms were constructed near the Shasta River and field borders and catch, redistribute and percolate flood irrigation water rather than allowing to flow to re-enter the Shasta River as unsuitable tail-water.

The Novy Pump Pre-1914 Riparian Diversion: The Grenada Novy Ranch irrigates approximately 465 acres on the north side of the Shasta River under the Novy Pump Pre-1914 Riparian Diversion from approximately March 01 through November 01. The 2015 Novy Pump Statement of Use shows continuous use of 5.5 cubic feet per-second from March 1st through November 1st resulting in the use of 2,661 acre-feet per year. If one were to assume equal delivery efficiency and equal use of the reported 2,661 acre-feet annually, Novy diverts approximately 5.72 acre-feet per acre. In addition, throughout the year, water is pumped from the Novy Pump Diversion with a 1 horse power submersible pump to satisfy two 600 gallon stock-water troughs.

Flood irrigation is currently conveyed via open ditch throughout the Grenada Novy Ranches parcels where water is then distributed in on farm lateral ditches and maneuvered via one lift pump. This water is turned out on to non-checked and unleveled fields through a series of culverts and gravity flood irrigation. Again, field check and leveling on these parcels are not alternatives due to loss of interim production risk through disturbance of shallow, alkali soils.

Tail-water from the Novy Pump Diversion is prevented by created and maintained berms that were constructed near the Shasta River that catch, redistribute and percolate flood irrigation water rather than allowing to flow into the Shasta River as tail-water.

C.1.b Irrigation Maintenance

Ditch cleaning

Open irrigation ditches on Grenada Novy Ranches are prone to vegetation growth, which slows the conveyance of water and clogs the buried openings. The ditches need to be cleaned several times per year to remove vegetation, as well as to repair breaches. Cleaning ditches on both the Novy, Rice, Zenkus and Novy Pump ditches consists of mechanical raking with a backhoe. Smaller clogged openings require hand-shoveling or hand-digging.

Diversion and Fish Screen Cleaning

Novy, Rice, Zenkus Diversion: Grenada Novy Ranches has the primary responsibility of maintaining this diversion and has the full responsibility of cleaning and operating the fish-screen and fish bypass return. The diversion requires the use of vertical flash boards and tarps which are inserted or removed based upon water flow to maintain necessary water diversion. Flash board insertion requires the use of heavy equipment to position the boards prior to placement against the flashboard dam. High water events require careful monitoring and full removal of the flash boards at the diversion. The fish screen needs daily maintenance, up to three times a day, to remove decaying aquatic vegetation other debris released from the river and ditches. An individual from the California Department of Fish and Wildlife comes once a week to inspect, clean and flush the diversion as well.

Novy Pump Diversion: Grenada Novy Ranches maintains the cone fish screen and pump solely. Maintaining the fish screen involves removing the sand/silt from around the cone screen while operating instream and these daily inspections also insure that the cone screen is operating correctly. Fish screen maintenance can involve a high water pressure hose as well as seasonal large equipment work. Maintaining the pump requires lubrication, maintenance, and sometimes a full shut-down, start up several times each week. The Novy Pump has a current, updated Streambed Alteration Agreement (**Appendix F**) for the operation and maintenance of the compliant self-cleaning fish-screen and diversion intake.

C.1.c Pasture Grazing Management

Grenada Novy Ranches has many pastures where cattle graze. Placement of cattle is dependent upon bull, steer, heifer replacement, heifer fattening, size and age. Cattle are rotated as able with the ideal goal of maintaining pasture grasses.

C.1.d Riparian Grazing Management

As developed within the 2016 Riparian Grazing Plan (**Appendix G**), produced by UC Cooperative Extension plan, grazing is currently allowed within the riparian area during periods that minimize the potential for impacts to fish and their habitat, and that have been determined by the Permittee to pose no threat to nesting water fowl. Currently the Grenada Novy Ranches riparian grazing occurs twice per year on the following schedule:

- #1: After July 15th (hatching waterfowl off nests by July 4th). Grazing allowed to an approximate 6” stubble height for herbaceous vegetation.
- #2: Non-irrigation Season – herbaceous riparian growth grazed to an approximate 6”

Duration and number of livestock is dependable upon available feed. Stubble height is the indicator for livestock removal therefore meets riparian grazing standards.

C.1.e Fence Maintenance

Riparian exclusion fencing was completed in 2006 for the entire ranch. Throughout the Shasta River reach approximately 20 acres of Novy Ranches land have been fenced via approximately 12,400 linear feet of fencing. General fence maintenance will continue to maintain fences to protect stream and riparian areas. Grenada Novy Ranches will not accept the financial responsibility of repairing loss from major floods or other events where greater than 20% of the fence needs replacement.

C.1.f Road Maintenance

All main ranch roads are covered in aggregate base/rock. The aggregate base is maintained on an annual basis, or as needed, to minimize erosion.

Vehicle Crossing Maintenance

- Grenada Novy Ranches and Rice Livestock share a bridge over the Shasta River. Shoring and abutment refurbishment of the bridge is necessary approximately once every 10 years, while replacement of running planks occurs as needed. LWD projects upstream of bridge shall consider size of LWD material and techniques used considering this bridge as well as other bridges potentially affected.

Cattle Crossing Maintenance

- There are no cattle crossings.

C.1.g Herbicide/Fertilizer/Pesticide Use

Grenada Novy Ranches does not broadly apply fertilizer, pesticides or herbicides to its pastures. Grenada Novy Ranches applies Crossbow or other approved alternative spot-treat noxious weeds such as whitetop, hemlock and other noxious woody species when present. This typically occurs within the riparian areas. Grenada Novy Ranches abides by the most sparingly use application standards on label of pesticide/herbicide manufacturer, on sunny non-windy days to ensure control during application. Application typically occurs upon observation of noxious weed or weed patch occurring from February through July with one application. Cumulative area treated within proximity of riparian area is less than .4 acres.

C.2 Avoidance and Minimization Measures

Avoid and Minimization Monitoring Commitments

I. Routine Land and Water Use

Land and water management practices considered under the Template SHA for which incidental take will be authorized on the enrolled properties are standard practices for production of livestock, pasture and hay, and other routine associated activities. For the purposes of the Agreement, standard practices for production of livestock, pasture and hay means: any lawful practices performed by a permittee, and persons associated with the permittee, that are incident to or in conjunction with livestock, pasture and haying operations including crop production, cultivation, growing, replanting, diversion of water, irrigation, irrigation runoff management (tailwater), harvesting, preparation for market, vehicle operation, moving of livestock and watering of livestock. Other routine associated activities include riparian area cultivation and maintenance, monitoring infrastructure activities, erosion control, flood and emergency protection, invasive plant removal and control, and installation, repair, maintenance and operation of: diversions, fish screens, instream habitat structures, fences, roads, and stream crossings. These activities will be described, as appropriate, by each permittee through a completed Site Plan Agreement. The potential effects of Routine Land and Water Use activities on the Covered Species shall be minimized and avoided through the implementation of AMMs.

The Template SHA and Site Plan Agreements will grant NMFS and CDFW, after reasonable prior notice to the permittees, access (in any form, including aerial) to enrolled properties for purposes of technical assistance related to monitoring and implementation, and to ascertain compliance with the Template SHA and Site Plan Agreements. Implementation monitoring of Routine Land and Water Use Activities and AMMs as specified in Individual Site Plan Agreements will be accomplished by the permittees or their consultants, with the assistance of the Parties, when appropriate, on a schedule specified in each Individual Site Plan Agreement, and using specific protocols set forth below. Permittees will document implementation of AMMs on their enrolled property using the monitoring protocols set forth below and submit documentation to the Parties in the annual report.

A. Water Diversion and Diversion Facilities

Water diversions included under the Template SHA include diversions of surface water through conduits or openings from streams, channels, or sloughs within the geographic scope of the Template SHA (as shown in Figure 1 of the Template SHA) by a permittee in accordance with a valid water right including the following activities associated with water diversion and diversion structures:

- Ongoing management and/or maintenance of existing flashboard dams, including the placement of boards into concrete abutments across the wetted channel to build head to divert water, and the removal of the boards.
- Ongoing maintenance, management, and repair of boulder weirs.
- Installing, operating, maintaining, and removing push-up dams or weirs. These are defined as temporary diversion structures created by using loaders, backhoes, or excavators to move bedload within the stream channel to form a flow barrier or weir that seasonally diverts a portion of the flow of the stream.
- Installing, operating, maintaining, and removing other temporary diversion structures that are not push-up dams. “Other temporary diversion structure” is defined as any temporary structure to divert water seasonally from a stream and is typically made with hay bales, hand-stacked rocks and cobble, tarps, wood, and/or a combination of these materials placed in the channel with or without the use of heavy equipment. Equipment may be used from the bank but not within the channel.
- Installing or placing pumps and sumps and maintaining existing pumps and sumps within or adjacent to the active channel of a stream, which sometimes requires the use of large machinery within or adjacent to the active channel.
- Installing head gates and measuring devices that meet NMFS and CDFW standards and is in compliance with Senate Bill 88 on or in a diversion channel, which usually is done by excavating the site to proper elevation using large machinery, positioning the head gate and measuring device at the appropriate elevation, and installing rock or other “armoring” around the head gate to protect the structure. During installation, the stream bank could be affected by the construction of concrete forms and other necessary construction activities.
- Operating head gates and measuring devices

The following AMMs may be applicable to the activities described above (specific AMMs for each enrolled property will be listed, as appropriate, in individual Site Plan Agreements):

- A.1** Install a locking head gate or valve sized appropriately for the authorized diversion, that can regulate flow, and a functional measuring device or flow meter on any structure or

facility connected to a stream used to divert water to facilitate better control and monitoring of water delivery within three years, unless specified otherwise in the site plan, of the effective date of the Agreement on or in all water diversion structures identified in this Agreement. The designs for head gates or valves and measuring devices in State Watermaster or Special Watermaster District Service areas shall be approved by DWR or said Special District, if applicable, in coordination with the Parties. All measuring devices and methods of water measurement shall be constructed and maintained to meet a 10% measuring accuracy for points of diversion that divert greater than or equal to 200 acre feet per year, and a 15% measuring accuracy for points of diversion that divert less than 200 acre feet per year. Data from these devices will be included in the annual SHA report, if required in the individual site plans.

- A.2** Fish passage will be provided for all life stages when sufficient flows are available per individual site plan descriptions.
- A.3** Contact NMFS and CDFW at least five (5) days before installing any dam or instream structure that could result in stranding of fish, or before changing the operation of any existing dam or instream structure that could result in stranding of fish. The types of activities that typically could result in stranding include rapid drawdown of flow or dewatering of the stream channel downstream of the diversion or within diversion ditches between the point of diversion, fish screen and bypass return flow channel.
- A.4** Construct, operate, maintain, and remove push-up and other temporary dams as described in the Agreement. Push-up dam or weir construction activities shall commence no earlier than May 1 and no later than November 1. Participant may commence push-up dam construction activities prior to May 1 if (a) permittee notifies NMFS and CDFW at least seven (7) days in advance of any dam construction proposed to occur prior to May 1, (b) a survey is completed by NMFS, CDFW or a mutually agreed-upon qualified biologist sufficient to determine the presence and distribution of any Covered Species, and (c) a determination by NMFS and CDFW whether and when the activity may proceed.
- A.5** Routine push-up dam construction and removal will be accomplished by the operation of a bucket attached to an excavator, or backhoe that is situated outside of the wetted portion of the stream channel. Participant will check and maintain vehicles used for push-up dam construction and removal on a daily basis during the construction and removal activities to prevent leaks of materials that could be deleterious to aquatic life, wildlife, or riparian habitat; minimize disturbance to the stream bed and bank and keep turbidity of the water to a level that is not deleterious to aquatic life; and allow the work area to “rest” to allow the water to clear after any activity that causes a plume of turbidity above background levels, resuming work only after the stream has reached the original background turbidity levels.

Monitoring Protocols for Implementation

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, if required in the individual site plans.
- Provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:
 1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc).
 2. Provide a Photo Point monitoring map which includes:
 - Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.
 3. Photo log which includes:
 - Site code
 - Photo's code (digital label)
 - Date photos were taken
 - Description of what was being documented (riparian growth, project implementation, etc)

B. Irrigation Management and Maintenance

This Routine Land and Water Use Activity includes management and maintenance of conveyance facilities on enrolled properties that are used for diverting surface waters including piping/buried mainline, buried mainline with risers, gated pipe, sprinkler systems, open ditches, sumps, storage ponds and tailwater capture ponds/sumps. The activities associated with irrigation management and maintenance may include; head gate on/off operation, moving sprinklers, turning risers on and off, board or tarp removal/placement in ditches, pump, ditch and pond maintenance, pipe clearing/cleaning,

maintenance of fish screens, operations of tailwater collection (pick-up ditches and ponds), storing water and irrigation runoff (tailwater production) and general diversion of water per the Shasta River Decree.

Irrigation maintenance activities frequently require the use of heavy equipment. At times this requires equipment and vehicles to cross flowing streams or intermittent channels and/or the construction of stream crossings at designated locations where potential spawning gravels, incubating eggs, and fry are not present based on repeated site specific surveys. Vehicle wet crossings are described in more detail below.

Irrigation management and maintenance also includes operation and maintenance of all types of fish screens. Types of screens include self-cleaning screens, including flat plate self-cleaning screens, and other self-cleaning designs, including, but not limited to, rotary drum screens and cone screens, with a variety of cleaning mechanisms. These screens are designed to continuously clean the screen surface. Periodic maintenance may be needed to remove siltation, debris, sedimentation and anything else that could inhibit normal operation, which would require lifting the screen and using heavy equipment to remove sedimentation/debris. The screens also require regular greasing of bearing and other mechanical parts. Non-self cleaning screens, including tubular, box, and other screen designs consistent with NMFS and CDFW screening criteria are generally cleared daily to remove aquatic vegetation and debris, which is usually done by hand.

- B.1** During regular maintenance work at diversions and fish screens, the permittee will minimize the discharge of sediments, debris, fine organic matter, and/or muddy, turbid, or silt-laden waters into natural waterways. The permittee will clean instream structures as necessary to maintain proper function.
- B.2** The permittee will regularly inspect all fish screens and bypass pipes or channels to verify that they are effectively protecting salmonids and other fish species in accordance with CDFW and NMFS fish screening criteria. When necessary, the permittee will clean and repair all fish screens and bypass pipes or channels. If a fish screen is removed for cleaning or repair and in channel work is necessary, the permittee will ensure either that a replacement screen is installed immediately or water is not flowing through the area where the screen is removed by either implementing isolation or dewatering of the work site in coordination with the fish relocation effort described later in this document.
- B.3** When a bypass pipe is present, the bypass entrance(s) shall be installed and operated such that all life stages of the Covered Species can easily locate and enter them. All components of the bypass system, from entrance to outfall, shall be designed and operated to minimize the potential for debris blockage and must be sized to accommodate all life stages of fish and aquatic species which may be drawn into the diversion. Sufficient flow (site specifically determined depending on the volume and type of bypass structure) will be supplied from the diversion into a fish bypass to safely and efficiently return fish back to the stream. Bypass outfalls shall be designed and located so that there is sufficient depth and velocity to avoid injury to all life stages of fish and aquatic life which may be directed into a bypass pipe.

- B.4** When cleaning/maintaining irrigation or drainage ditches or ponds, the permittee will work when the ditch is as dry as possible to minimize or eliminate surface water turbidity and sediment transport. The permittee will place sediment and organic materials excavated from ditches or ponds in a location where the materials cannot wash into any stream channel or Covered Species habitat.
- B.5** Permittee will regularly monitor and repair as necessary any earthworks or facilities designed to minimize tailwater entering natural waterways.
- B.6** Planned Instream work shall occur only when Covered Species are least likely to be present or affected by the project; between June 15 and November 1, or as approved by NMFS and CDFW.
- B.7** In the case where the fish screen is down ditch, the Permittee shall notify CDFW at least 5 days prior to closing a headgate or valve when fish stranding may occur in the diversion conduit, to allow fish rescue notification and coordination by qualified individuals, NMFS and CDFW or otherwise mutually agreed upon individuals.
- B.8** Water releases from off-channel impoundments, ponds, and tailwater basins will be conducted in a manner that minimizes turbidity, siltation, elevated temperatures, or pollution impacts to waterways supporting Covered Species. Water shall be released in the early morning (prior to 10:00 am) and/or during cool times of the year, and will be released as gradually as possible to minimize fine sediment discharges. If the release timing and rate is not feasible, landowner will contact NMFS and CDFW prior to release.
- B.9** When permittee is diverting water under the rotational provision under the decree, the river shall not be dewatered and an agreed upon bypass amount will always be provided, as stipulated under the reach wide flow management plans and/or the permittee's individual site plans.

Monitoring Protocols for Implementation

All relevant maintenance of irrigation facilities shall be monitored. Following are some examples of protocols:

- Log of maintenance activities carried out within the calendar year will be included in the yearly SHA report.

C. Pasture Grazing and Riparian Grazing Management

Pasture grazing management includes the movement of cattle between pastures, as well as harrowing, mowing, and haying of pastures. Riparian grazing management includes cattle grazing within riparian areas according to a riparian grazing management plan that is part of a permittee's Site Plan Agreement. Riparian grazing management plans have been developed cooperatively with University of California (UC) Cooperative Extension or other range management specialists.

- C.1** Develop riparian grazing management plans in coordination with UC Cooperative Extension or other range management specialists.
- C.2** Fenced riparian areas may be grazed in accordance with grazing management plans approved by the Parties. The grazing management plan will address standard grazing management principles, such as the seasonal timing, duration, and intensity (number of livestock allowable per unit area [i.e., stocking rate]), of livestock grazing within the riparian zone and will explain how the proposed management plan will result in improved riparian function and enhanced aquatic habitat. In addition, the grazing plan will describe the means by which the flash grazing will avoid and minimize impacts to streambanks, riparian vegetation, spawning and rearing areas, and avoid direct impacts to spawning and rearing coho salmon.
- C.3** To avoid direct impacts to Covered Species spawning, incubation, and emergence, grazing in riparian pastures with streams that are accessible to the Covered Species will be allowed from May 1 to November 1 or as approved by NMFS and CDFW. The permittee will perform at least one of the following actions prior to grazing livestock in riparian pastures where livestock could enter a stream between November 1 and May 9:
- Obtain written concurrence from NMFS and CDFW that potential Covered Species spawning habitat does not occur adjacent to the riparian pasture.
 - If potential spawning habitat occurs adjacent to the riparian pasture, perform weekly redd surveys between November 1 and January 15. Redd surveys may be performed by NMFS, CDFW, or a qualified biologist. If surveys are performed by a non-agency biologist, written survey results will be provided to NMFS and CDFW for concurrence prior to grazing. If redds are not detected during the redd surveys, riparian grazing may occur in conformance with the Participant's riparian grazing management plan.
 - If redds are determined to be present, livestock may graze within the riparian pasture between November 1 and April 30 if a temporary electric exclusion fence or wire is installed between the riparian pasture and the stream bank, and provisions are made to supply off-channel stockwater. The electric fence must be checked and maintained daily.

Monitoring Protocols

Riparian grazing management shall be monitored as follows:

- Three to five permanent 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. Permittee will provide a Photo Point monitoring map which includes:

- Points showing the exact location of each photo monitoring point on the ranch
- Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
- Directional orientation of photos
- Map scale and North marker
- Landmarks such as labeled road crossings and waterways.

Permittee will also provide a photo log which includes:

- Site code
 - Photo's code (digital label)
 - Date photos were taken
 - Description of what was being documented (riparian growth, project implementation, etc.)
- Maintain a log of grazing activities carried out within the calendar year and include in the yearly Site Plan monitoring report. At a 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 as a result of monitoring results including management cues used to determine the time to move livestock out of the riparian pasture.
 - NMFS and CDFW may initiate periodic inspection of grazed riparian pastures to ensure riparian grazing management plan is effective.
 - NMFS, CDFW, or a qualified party, approved by NMFS and CDFW, may conduct redd surveys to determine the need for livestock restrictions in streams. In the event surveys indicate redds are not present, then livestock access will follow the procedures described in riparian grazing management plan.

D. Fence Maintenance

Installation, construction, maintenance, and removal of fencing material, including mesh field fence, panels, or other designed fence barriers, within riparian areas for riparian zone protection, stream crossings & stock-water access.

- D.1** Inspect riparian exclusion fencing during and after each season of grazing and after high flow events where over bank flows may inundate fences and prior to and after riparian grazing has occurred. If riparian exclusion fencing is damaged, repair fencing and move

livestock, as appropriate, to minimize resource impacts. If cattle are present, riparian fences shall be repaired within 30 days.

- D.2** If riparian fences are lost due to a catastrophic event, the permittee shall notify agencies of the loss in the annual report. The permittee will repair up to the percentage of fencing they committed to replace in the Individual Site Plan, and request funding assistance for the remaining repairs beyond the percentage of its commitment. Cattle shall not have access to areas of riparian areas normally excluded through other provisions of the AMM's.

Monitoring Protocols

All maintenance of riparian fencing shall be monitored as follows:

- A short description of fence maintenance activities will be included in the annual report.

E. Road Use and Maintenance

Ranch roads are regularly used to access irrigation facilities, move cattle and equipment. Roads may be secondary, which are infrequently used or only utilized by cattle and ATVs, or primary, which are roads used more regularly by trucks and heavy equipment. This category is for both the use and the regular maintenance of all ranch roads, which could include grading, rocking, laying base, and culvert replacement.

- E.1** Ensure fish passage at road crossings of streams that are accessible to the Covered Species including at bridges, wet crossings and culverts. Any instream crossing structure will be designed and implemented in accordance with the fish passage evaluation methods specified in the 2010 4th edition of the Department's California Salmonid Stream Habitat Restoration Manual. The most current edition of the manual is available at: <http://www.dfg.ca.gov/fish/Resources/HabitatManual.asp>.
- E.2** Minimize erosion and sedimentation from roads and road work. Rock road crossings and approaches to stream channels to minimize sedimentation. Utilize mulch or other suitable materials, as necessary, to minimize sediment runoff and transport to surface waters. Apply mulch so that not less than 90% of the disturbed areas are covered. Apply all mulches, except hydro-mulch, in a layer not less than two (2) inches deep. Where appropriate, all mulches shall be kneaded or tracked-in with track marks parallel to the contour, and tracked as necessary to prevent excessive movement. All exposed soils and fills, including the downstream face of the road prism adjacent to the outlet of culverts, will be reseeded with non-invasive species at a rate which will ensure establishment.
- E.3** Planned Instream work shall occur only when Covered Species are least likely to be present or affected by the project, typically from June 15 through November 1.
- E.4** Avoid using native surface roads for heavy traffic during wet or thaw periods, and roads not designed and constructed for these conditions. Evaluate the future needs for a road and close roads that will not be needed. Inspect roads annually to determine the need for

structural maintenance. Conduct maintenance practices, when conditions warrant, including cleaning and replacement of deteriorated structures and erosion controls, grading or upgrading road surfaces with aggregate. Properly maintain permanent stream crossings and associated fills and approaches to reduce the likelihood (a) that stream overflow will divert onto roads, and (b) that fill erosion will not occur if the drainage structures become obstructed

Monitoring Protocols

All maintenance of roads that have an impact on water ways shall be monitored as follows:

- A short description of annual road maintenance activities will be included in the annual report.

F. Herbicide (Weed Management), Fertilizer and Pesticide Use

This category includes weed management, in the form of livestock grazing, use of California legal weed spray products, manual removal, burning, and mowing.

The following AMMs are applicable to the activities described above (specific AMMs for each enrolled property will be listed, as appropriate, in individual Site Plan Agreements).

- F.1** Ensure that any pesticide or herbicide is handled and applied by a licensed applicator (when required) in accordance with and all applicable, federal, state, local laws, regulations, procedures, and guidelines. Application of pesticides will be in conformance with the pesticide label as well as any required buffers from anadromous streams. The permittees will apply herbicides/pesticides, if any, in conformance with the applicable label directions, as well as any required buffers from anadromous streams in conformance with the Order entered in Washington Toxics Coalition et al. v. Environmental Protection Agency et al., (W.D. Wash No. C01-132C) (January 22, 2004). When possible, areas will be spot treated to reduce the amount applied. Use of broad spectrum insecticides will be minimized or avoided as they are more likely to be harmful to non-target organisms including fish and aquatic insects if exposed. Chemicals with the lowest possible toxicity rating will be used when possible. Use of mobile, pre-emergent herbicides will be minimized or avoided as they can impact non-target plants in the riparian area leading to other impacts such as sedimentation. The Applicant will avoid or minimize exposing aquatic resources by managing spray drift. This includes using modern spray equipment (e.g., low volume or electrostatic sprayers); routinely checking for nozzle wear and calibrating the sprayer frequently throughout the growing season; turning off the sprayer along creeks, drainages and in the turn-around areas; supervising the spraying to minimize effects to surface waters.
- F.2** Use care to minimize fertilizer use in applications that could result in nutrient loading to natural waterways.
- F.3** Review label information and avoid the use of any material known to be detrimental to fish where it could impact Covered Species.

- F.4** Use or store stationary petroleum-powered equipment in a manner to prevent the potential release of petroleum materials into natural waterways by use of drip pans or other measures.
- F.5** Refuel machinery and handle or store hazardous materials no less than one hundred and fifty (150) feet away from the edge of any water body. All unused or leftover materials will be transported off-site and properly disposed of, when applicable.

Monitoring Protocols

Herbicide, Fertilizer and Pesticide use shall be monitored as follows:

- Log of herbicide, fertilizer and pesticide use activities carried out within the calendar year to be included in the annual report.

G. Flood or Emergency Events

This category includes immediate work needed to prevent loss of or damage to property from emergencies, including flood, fire, storm, earthquake or other unexpected natural events. Activities may include sediment and debris removal, emergency fish screen repairs, fencing repairs, streambank or crossing stabilization and moving livestock or equipment across streams during emergencies. Emergency is defined in California Code of Regulations section 15359.

H1: Prior to, during or immediately after the event, NMFS and CDFW will be contacted and AMMs will be developed in coordination with the permittee for the particular flood or emergency circumstances.

H2: NMFS and CDFW will be notified within 14 days of beginning emergency work per Fish and Game Code 1610.

Monitoring Protocols

All flood repair shall be monitored as follows:

- Photographs of the emergency site repairs and a detailed description of the repairs to be included in the annual report.

H. Instream Habitat Structures and Improvements

Instream habitat structures and improvements are intended to provide predator escape and resting cover, increase spawning habitat, improve migration corridors, improve pool to riffle ratios, and add habitat complexity and diversity. Specific techniques for instream habitat improvement may include:

- placement of large woody debris (LWD) scour and cover structures, log weirs, upsurge weirs, single and opposing log-wing-deflectors, engineered log jams,

Hewitt ramps, divide logs, digger logs, spider logs; and log, root wad, and boulder combinations),

- boulder structures (boulder weirs, vortex boulder weirs, boulder clusters, and single and opposing boulder-wing-deflectors),
- install post-assisted wood structures (PAWS) or beaver dam analog structures (BDAS) to increase rearing habitat, and placement of imported spawning gravel. Implementation of these types of projects may require the use of heavy equipment (e.g., self-propelled logging yarders, excavators, backhoes, helicopters), however, hand labor will be used when possible. Projects will include both anchored and unanchored logs, depending on site conditions and wood availability.

II. Beneficial Management Activities

The primary objective of the Template SHA and Site Plan Agreements is to enhance, restore, or maintain habitat to benefit the Covered Species. To accomplish this, the Parties will implement BMAs (the types of actions to be implemented will vary with each Site Plan) that will result in improved habitat conditions for the Covered Species. Habitat restoration projects authorized under the Template SHA will be designed and implemented consistent with techniques and minimization measures presented in CDFG’s *California Salmonid Stream Habitat Restoration Manual, Third Edition, Volume II* with four chapters (*Part IX: Fish Passage Evaluation at Stream Crossings, Part X: Upslope Assessment and Restoration Practices, Part XI: Riparian Habitat Restoration, and Part XII: Fish Passage Design and Implementation*) added in 2003, 2004, and 2009, respectively (Flosi et al. 1998, hereafter referred to as CDFG Manual). The Template SHA requires AMMs for all projects to avoid or minimize adverse effects to the Covered Species and habitat.

Individual Site Plans will include property-specific BMAs that will be implemented on an enrolled property, and the monitoring protocol that will be implemented for each BMA. Project design and implementation of BMAs will include the AMMs provided below. Table 1 lists the entire suite of potential BMAs that could be implemented under the Template SHA on a given property and the type of monitoring that will be associated with each BMA. If grant funds are obtained to implement a given BMA on an enrolled property, data collection and reporting will be required to satisfy the grant contract obligations. Implementation monitoring of BMA’s, as described below will be used to inform the Parties and to confirm that each BMA has been constructed as intended, without any structural changes or omissions that would compromise the integrity of the project or reduce it’s intended benefits.

Table 1. Beneficial Management Activities and Associated Monitoring Techniques.

Beneficial Management Activity	Monitoring Techniques
Barrier Modification and Fish Passage	Photo monitoring, as-built surveys

Beneficial Management Activity	Monitoring Techniques
Improvement	
Fish Screen Installation or Replacement	Photo monitoring, screening criteria compliance monitoring
Instream Habitat Structures and Improvements	Photo monitoring, as-built surveys
Riparian Habitat Restoration, Bioengineering and Fencing	Photo monitoring, transects, survival monitoring
Off-channel and Side-channel restoration	Photo monitoring, as-built surveys
Road and Trail Erosion Control	Photo monitoring
Water Conservation Measures*	Photo monitoring, SB88 compliant diversion monitoring

*includes Water Exchange and Efficiency Measures, Tailwater Management and Collection Ponds, Irrigation Management, Water Storage Tanks, Piping Ditches and Loss Evaluation, Sprinkler/Pressurized Irrigation, Head gates and Water Measuring Devices)

A. Instream Habitat Structures and Improvements

Instream habitat structures and improvements are intended to provide predator escape and resting cover, increase spawning habitat, improve migration corridors, improve pool to riffle ratios, and add habitat complexity and diversity. Specific techniques for instream habitat improvement may include:

- placement of large woody debris (LWD) scour and cover structures, log weirs, upsurge weirs, single and opposing log-wing-deflectors, engineered log jams, Hewitt ramps, divide logs, digger logs, spider logs; and log, root wad, and boulder combinations),
- boulder structures (boulder weirs, vortex boulder weirs, boulder clusters, and single and opposing boulder-wing-deflectors),
- install post-assisted wood structures (PAWS) or beaver dam analog structures (BDAS) to increase rearing habitat, and placement of imported spawning gravel. Implementation of these types of projects may require the use of heavy equipment (e.g., self-propelled logging yarders, excavators, backhoes, helicopters), however, hand labor will be used when possible. Projects will include both anchored and unanchored logs, depending on site conditions and wood availability.

Monitoring Protocols:

- Provide Photo Monitoring in the Annual SHA report upon completion of the habitat structures that can clearly document changes over time. The Permittee will do the following as part of photo point monitoring:
 1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc).
 2. Provide a Photo Point monitoring map which includes:
 - Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.
 3. Photo log which includes:
 - Site code
 - Photo's code (digital label)
 - Date photos were taken
 - Description of what was being documented (riparian growth, project implementation, etc.)

B. Beaver Management

Two of the most common undesirable impacts to ranching activities that are caused by beavers include cutting of trees and flooding of properties or facilities important to the routine agricultural activities that occur on the property. Potential non-lethal measures that may be considered to mitigate for unwanted tree cutting in critical locations include the installation of wire mesh cages or the application of paint and sand mix at the base of trees in need of protection. Where the construction of beaver dams have raised the water level to cause unwanted flooding of ranch infrastructure landowners should consider installation of pond levelers or Clemson levelers as described Chapter 9 of The Beaver Restoration Guidebook (Pollock et al. 2015). If it is determined that implementation of the measures described in the Beaver Restoration Guidebook would not alleviate the impacts to agricultural activities caused by beaver dam construction, then the landowner is permitted to modify the structure and discourage future beavers from utilizing the site

in the future when NMFS and CDFW have assessed the situation and agree on the extent of dam modification.

Monitoring Protocols:

- Provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:
 1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc).
 2. Provide a Photo Point monitoring map which includes:
 - Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.
 3. Photo log which includes:
 - Site code
 - Photo's code (digital label)
 - Date photos were taken
 - Description of what was being documented (riparian growth, project implementation, etc.)

C. Barrier Modification for Fish Passage Improvement

Barrier modification projects are intended to improve passage for the Covered Species by (1) providing access to upstream habitat, and (2) increasing the duration of accessibility (both within and between years). Projects may include those that improve Covered Species passage through beaver dams, existing culverts, diversions, dams, bridges, and paved and unpaved fords through replacement, removal, or retrofitting. In particular, these practices may include the use of gradient control weirs upstream or downstream of barriers to control water velocity, water surface elevation, or provide sufficient pool habitat to facilitate jumps, or interior baffles or weirs to mediate velocity and the

increased water depth. BMAs also include log jam and beaver dam modifications to facilitate passage by juvenile and adult life stages of the Covered Species. Implementing these types of projects may require the use of heavy equipment (*e.g.*, self-propelled logging yarders, mechanical excavators, backhoes), however, hand labor will be used wherever possible.

The chapter in the CDFG Manual (Part XII), entitled *Fish Passage Design and Implementation*, provides technical guidance for the design of Covered Species passage projects at stream crossings, small dams and water diversion structures and should be referenced when developing Covered Species passage remediation projects. Part XII is intended to “guide designers through the general process of selecting a design approach for passage improvement. Where there is further opportunity to protect the Covered Species, additional site-specific criteria may be appropriate and recommended by agencies.

Monitoring Protocols

All Covered Species passage projects shall be monitored using the following protocols:

- Provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:
 1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (*i.e.* fencepost, hillside, large tree, etc).
 2. Provide a Photo Point monitoring map which includes:
 - Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.
 3. Photo log which includes:
 - Site code
 - Photo’s code (digital label)
 - Date photos were taken

- Description of what was being documented (riparian growth, project implementation, etc.)
- The NOAA Restoration Center’s Fish Passage Barrier Removal Performance Measures and Monitoring Worksheet which includes longitudinal profiles, cross sections and socio/economic information. http://www.habitat.noaa.gov/toolkits/restoration_center_toolkits/forms_and_guidance_documents/ori_monitoring_sheet_w_guidance.pdf

D. Bioengineering and Riparian Habitat Restoration

These projects are intended to improve Covered Species habitat through increased stream shading intended to lower stream temperatures, increase future recruitment of LWD to streams, and increase bank stability and invertebrate production. Riparian habitat restoration projects will aid in the restoration of riparian habitat by increasing the number of plants and plant groupings, and will include the following types of projects: natural regeneration, livestock exclusion fencing, bioengineering, and revegetation. Part XI of the CDFG Manual, *Riparian Habitat Restoration*, contains examples of these techniques and should be referenced when planning riparian projects. Reduction of instream fine sediment will improve Covered Species habitat and Covered Species survival by increasing fish embryo and alevin survival in spawning gravels, reducing injury to juveniles from high concentrations of suspended sediment, and minimizing the loss of, or reduction in size of, pools from excess sediment deposition.

The proposed activities will reduce stream sedimentation from bank erosion by stabilizing stream banks with appropriate site-specific techniques including: boulder-streambank stabilization structures, log-streambank stabilization structures, tree revetment, native plant material revetment, willow wall revetment, willow siltation baffles, brush mattresses, check dams, brush check dams, water bars, and exclusion fencing.

Guidelines for stream bank stabilization techniques are described in Part VII of the CDFG Manual, *Project Implementation*. These types of projects usually require the use of heavy equipment but hand labor will be used where ever possible.

Monitoring Protocols:

- CDFW Quantitative Effectiveness Monitoring of Bank Stabilization and Riparian Vegetation Restoration, 2007. Reports on field testing specific protocols for bank stabilization and riparian vegetation restoration. <http://cesonoma.ucanr.edu/files/27283.pdf>
- Provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:

1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc).
2. Provide a Photo Point monitoring map which includes:
 - Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.
3. Photo log which includes:
 - Site code
 - Photo's code (digital label)
 - Date photos were taken
 - Description of what was being documented (riparian growth, project implementation, etc.)

E. Removal of Small Dams (permanent and flashboard)

The CDFG Manual does not cover the removal of small dams, however guidelines and minimization measures have been developed here. Types of small dams covered are permanent, flash board, and seasonal dams with the characteristics listed below. Implementing these types of projects may require the use of heavy equipment (e.g., mechanical excavators, backhoes, etc.). Dams removed in part or in whole, by the use of explosives are not included as a BMA. Dams included here are less than 25 feet in height from the natural bed of the stream or watercourse at the downstream toe of the barrier, or from the lowest elevation of the outside limit of the barrier to the maximum possible water storage elevation. In addition, BMAs will only include dam removal that will result in the formation of a channel at natural grade and shape upstream of the dam, naturally or with excavation, in order to minimize negative effects on downstream habitat. Candidate dam removal projects will (1) have a relatively small volume of sediment available for release, that when released by storm flows, will have minimal effects on downstream habitat, or (2) are designed to remove sediment trapped by the dam down to the elevation of the target thalweg including design channel and floodplain dimensions. This can be accomplished by estimating the natural thalweg using an adequate longitudinal profile (CDFG Manual Part XII *Fish Passage Design and Implementation*) and designing a

natural shaped channel that provides the same hydraulic conditions and habitat for the Covered Species that is provided by the natural channel and has the capacity to accommodate flows up to a 2-year flood.

Data Requirements and Analysis

- A longitudinal profile of the stream channel thalweg for at least a distance equal to 20 channel widths upstream and downstream of the structure and long enough to establish the natural channel grade, whichever is farther, shall be used to determine the potential for channel degradation (as described in the CDFW Manual).
- A minimum of five cross-sections: one downstream of the structure, three roughly evenly spaced through the reservoir area upstream of the structure, and one upstream of the reservoir area outside of the influence of the structure to characterize the channel morphology and quantify the stored sediment.
- Sediment characterization within the reservoir and within a reference reach of a similar channel to determine the proportion of coarse sediment (>2mm) in the reservoir area and target sediment composition.
- Prior to project initiation, further consultations with CDFW and NMFS will be required prior to removing a small dam to determine if: (1) sediments stored behind dam have a reasonable potential to contain environmental contaminants [dioxins, chlorinated pesticides, polychlorinated biphenyls (PCB's), or mercury] beyond the freshwater probable effect levels (PELs) summarized in the NMFS Screening Quick Reference Table guidelines or (2) the risk of significant loss or degradation of downstream spawning or rearing areas by sediment deposition is high. Sites shall be considered to have a reasonable potential to contain contaminants of concern if they are downstream of historical contamination sources such as lumber or paper mills, industrial sites, or intensive agricultural production going back several decades (*i.e.*, since chlorinated pesticides were legal to purchase and use). In these cases, preliminary sediment sampling is advisable.

Monitoring Protocols:

- Provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:
 1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (*i.e.* fencepost, hillside, large tree, etc).
 2. Provide a Photo Point monitoring map which includes:

- Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.
3. Photo log which includes:
- Site code
 - Photo's code (digital label)
 - Date photos were taken
 - Description of what was being documented (riparian growth, project implementation, etc.)
- The NOAA Restoration Center's Fish Passage Barrier Removal Performance Measures and Monitoring Worksheet which includes longitudinal profiles, cross sections and socio/economic information. http://www.habitat.noaa.gov/toolkits/restoration_center_toolkits/forms_and_guidance_documents/ori_monitoring_sheet_w_guidance.pdf

F. Creation of Off-channel/Side Channel Habitat

The creation of off-channel or side channel habitat is not included in the CDFG Manual however, guidelines and minimization measures have been developed for this BMA. Types of side channel or off-channel restoration projects that are eligible as a BMA under the Template SHA are:

- Connection of abandoned side channel or pond habitats to restore Covered Species access
- Connection of adjacent ponds
- Connection of oxbow lakes on floodplains that have been isolated from the meandering
- Channel by river management schemes, or channel incision
- Creation of side channel or off-channel habitat with self-sustaining channels

- Creation of alcoves
- Improvement of hydrologic connection between floodplains and main channels

Projects that involve the installation of a flashboard dam, head gate or other mechanical structure are not part of the BMAs under the Template SHA. Off channel ponds constructed under the Template SHA will not be used as a point of water diversion. The use of logs or boulders as stationary water level control structures will be allowed.

Restoration projects in this category may include: removal or breaching of levees and dikes, channel and pond excavation, creating temporary access roads, constructing wood or rock tailwater control structures, and construction of LWD habitat features. Implementation of these types of projects may require the use of heavy equipment (*e.g.*, self-propelled logging yarders, mechanical excavators, backhoes).

Information regarding consideration of water supply (channel flow/overland flow/groundwater), water quality, and reliability; risk of channel change; as well as, channel and hydraulic grade should be considered when developing off channel habitat features. A good reference document for designing off channel habitat features can be found in “Section 5.1.2 Side Channel/Off Channel Habitat Restoration in the Washington Department of Fish and Wildlife 2004 Stream Habitat Restoration Guidelines” (Saldi-Caromile, et al. 2004).

Monitoring Protocols:

- Provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:
 1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc).
 2. Provide a Photo Point monitoring map which includes:
 - Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.
 3. Photo log which includes:

- Site code
 - Photo's code (digital label)
 - Date photos were taken
 - Description of what was being documented (riparian growth, project implementation, etc.)
- Pre- and post-construction and design flow surveys of constructed inlet and outlet structures, including any other critical or controlling hydraulic features.

G. Developing Alternative Stockwater Supply

Many riparian fencing projects will require the development of off channel watering areas for livestock. These are often ponds that have been excavated and are filled either by rainwater, overland flow, surface diversions or groundwater (either through water table interception or pumping). BMAs under the Template SHA also include small wells with solar pumps, water lines, watering troughs, and piping used to provide ground or surface water to livestock. All pump intakes associated with surface diversions will be screened in accordance with NMFS Southwest Region "Fish Screening Criteria for Salmonids" (NMFS 1997). Stockwater ponds will be located at a distance from the edge of the active channel as to avoid or minimize stranding of juvenile salmonids or channel avulsion during flood events.

Monitoring Protocols:

- Provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:
 1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc).
 2. Provide a Photo Point monitoring map which includes:
 - Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.

3. Photo log which includes:
 - Site code
 - Photo's code (digital label)
 - Date photos were taken
 - Description of what was being documented (riparian growth, project implementation, etc.)

H. Riparian Restoration and Revegetation

This category includes revegetation of riparian areas and only other types of restoration that are consistent with the methods specified in the most current edition of the CDFW Salmonid Stream Habitat Restoration Manual, or as otherwise approved in writing by CDFW. The most current edition of the manual is available at www.dfg.ca.gov/fish/resources/habitatmanual.asp.

Typically, riparian vegetation is planted within or adjacent to the active channel, and often in or near the wetted channel. Plantings include native herbaceous perennials, emergent species, grasses, trees, and shrubs. Planting methods vary by species, site, and size of material planted, ranging from hand planting to using a backhoe or excavator. For riparian trees, planting densities range from 130 to 300 plantings per acre, depending on the restoration goals (e.g., shading, sediment trapping, and bank stabilization), substrate, soil chemistry and hydrology. Trees and cuttings range in size from small rooted plugs to large diameter pole plantings. When installing pole plantings, heavy equipment may be used to excavate to or below water table depth. Maintenance activities include the occasional use of hand tools, portable pumps, pick-up trucks and/or water trucks in or near the bed, bank, or channel, for irrigation, debris removal, and replanting of restoration sites.

Monitoring Protocols:

- CDFW Quantitative Effectiveness Monitoring of Bank Stabilization and Riparian Vegetation Restoration, 2007. Reports on field testing specific protocols for bank stabilization and riparian vegetation restoration. <http://cesonoma.ucanr.edu/files/27283.pdf>
- Provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. Photo point locations will be selected to give a sense of extent of planting and survival. These locations will be likely located along the fence line and revisited yearly, for 5 years, to establish qualitative success rates.
- The Permittee will do the following as part of photo point monitoring:

1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc).
2. Provide a Photo Point monitoring map which includes:
 - Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.
3. Photo log which includes:
 - Site code
 - Photo's code (digital label)
 - Date photos were taken
 - Description of what was being documented (riparian growth, project implementation, etc.)

I. Monitoring and Research

This includes monitoring required by permittee's ESA Section 10 permits, CDFW's 1600 permit and all other regulatory requirements. Other studies and research that landowners will allow to further the understanding of the Shasta River are also included such as studies for riparian survival, Covered Species surveys, habitat improvement, and food availability.

Monitoring Protocols:

- Reports on all monitoring and research done within a reporting year be included in the annual SHA report if author of the research gives consent for inclusion.

J. Water Storage and Tailwater Capture Systems

This BMA addresses water storage that results from storage of water diverted from surface or groundwater sources and tailwater capture (off channel). A water storage facility enables a landowner to use stored water at a later date or when desired. Water storage facilities can have many benefits that go beyond agricultural use including

groundwater recharge, and allowing diversion during winter and early spring when instream discharge is ample. Water storage, when paired with reduction of water use later in the season, can be a benefit to the Covered Species.

Tailwater is created in flood irrigation operations as unabsorbed, untranspired, and unevaporated irrigation water that may flow back into the stream. Restoration projects to address tailwater input will include construction of tailwater capture systems (pond, berms or pick up ditches) to intercept tailwater before it enters streams as surface flow. Water held in capture systems, such as a pond, can be reused for future irrigation purposes, therefore reducing the need for additional stream diversions. Tailwater ponds are used primarily during the irrigation season (dry summer months).

A tailwater pond allows a landowner the ability to irrigate between set irrigation cycles (if in an irrigation district). The State Water Board allows for captured water to be put to beneficial use, not used to irrigate ground that may not have been in production in the past or otherwise harm other legal users of water. Tailwater ponds will be located at a distance from the edge of the active channel to avoid causing stranding of juvenile salmonids or channel avulsion during flood events. Tailwater ponds must be combined with a reduction in diversion amounts or be utilized at an existing point of diversion to ensure water allocation is consistent with adjudication. Tailwater berms allow for intercepting tailwater before it enters the stream, but is not able to be reused. Berms allow tailwater to be kept on the fields and percolate into soils and back to the river. These shall be placed in areas where they will not pose any channel pressure in the event of a flood and in areas where soils have high permeability (well-draining) and not be an excessive amount. Tailwater pick up ditches allow the landowner to intercept tailwater and convey it to another place of use to utilize for irrigation, thereby reducing demand for surface water diversion.

Monitoring Protocols:

- Report of amount of water stored or captured and reused where possible.

K. Piping Ditches

Piping projects consist of constructing a pipe to transport irrigation water as an alternative to conveying water in an open ditch, thereby reducing water loss including from evaporation and absorption. A water budget/balance or consumptive use analysis will be completed to determine actual amount of water saved by these projects. The amount determined to be saved will remain in the stream to benefit the Covered Species. These projects must demonstrate that they intend to dedicate the saved water for instream beneficial use, and make progress towards instream dedication through a means mutually agreeable to the permittee and NMFS and CDFW.

Monitoring Protocols:

- Provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:
 1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc.).
 2. Provide a Photo Point monitoring map which includes:
 - Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.
 3. Photo log which includes:
 - Site code
 - Photo's code (digital label)
 - Date photos were taken
 - Description of what was being documented (riparian growth, project implementation, etc.)
- Real time water diversion monitoring protocol (TBD) or water measuring protocol that is in concurrence with SB88.

L. Fish Screens

This category includes the installation, operation, and maintenance of the types of fish screens described below, provided they meet the NMFS (1996, 1997) fish screening criteria. Installing a fish screen usually includes site excavation, forming and pouring a concrete foundation and walls, excavation and installation of a fish bypass pipe or channel, and installation of the fish screen structure. Dewatering is often required and could be implemented through coffer dams or sheet piling. Heavy equipment is typically used for excavation of the screen site and bypass. If the fish screen is placed within or near flood prone areas, typically rock or other armoring is installed to protect the screen. Fish screen types include:

- Self-cleaning screens, including flat plate self-cleaning screens, and other self-cleaning designs, including, but not limited to, rotary drum screens and cone screens, with a variety of cleaning mechanisms, consistent with NMFS fish screening criteria (1996, 1997).
- Non-self-cleaning screens, including tubular, box, and other screen designs consistent with NMFS screening criteria (1996, 1997).

Monitoring Protocols:

- In the event the fish screen is installed, repaired, replaced, and/or relocated, provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:
 1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc).
 2. Provide a Photo Point monitoring map which includes:
 - Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.
 3. Photo log which includes:
 - Site code
 - Photo's code (digital label)
 - Date photos were taken
 - Description of what was being documented (riparian growth, project implementation, etc.)
- Pre- and post-construction and design flow surveys of structure and any other critical or controlling hydraulic features.

M. Headgates and Water Measuring Devices

Measuring devices are typically installed with the head gate to allow water users to determine the volume of water diverted. These devices will help diverters ensure that are diverting their legal water right. Head gate designs will be approved by a NMFS or CDFW engineer prior to installation; *provided, however*, that such approval will be deemed to have occurred if an agency fails to take action within 60 days of submission of head gate designs by a permittee to NMFS and CDFW. This category includes the installation and maintenance of stream gages in the active stream channel, usually using pipe 2” or greater in diameter. Typically, the pipe is secured to the bank by notching it into the bank and by then attaching it to the bedrock, a boulder, or a concrete buttress. Generally, heavy equipment is not needed to install and maintain stream gages. Water measuring devices will have the ability to record diversion volumes hourly for points of diversion that have water rights greater than or equal to 1,000 acre feet per year and daily for points of diversion with water rights less than 1,000 acre feet per year. For points of diversion with water rights less than or equal to 10 acre feet per year should be recorded monthly.

Monitoring Protocols:

- In the event a head gate is installed, replaced, repaired, and/or relocated, Permittee will provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:
 1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc.).
 2. Provide a Photo Point monitoring map which includes:
 - Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.
 3. Photo log which includes:
 - Site code
 - Photo’s code (digital label)
 - Date photos were taken

- Description of what was being documented (riparian growth, project implementation, etc.)
- Include the water measuring data as specified in the individual site plan.

N. Combining or moving points diversions

Combining or moving current points of diversion can be employed as a BMA in order to enhance flows in certain reaches, maintain cold water springs or provide fish passage so long as operations are undertaken in compliance with law. Each permittee shall affirm its operations complies with law if it undertakes operations under this section.

Monitoring Protocols:

- To document the construction of new infrastructure that will facilitate moving a point of diversion or combining diversions the Permittee will provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:
 1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc.).
 2. Provide a Photo Point monitoring map which includes:
 - Points showing the exact location of each photo monitoring point on the ranch
 - Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
 - Directional orientation of photos
 - Map scale and North marker
 - Landmarks such as labeled road crossings and waterways.
 3. Photo log which includes:
 - Site code
 - Photo's code (digital label)
 - Date photos were taken
 - Description of what was being documented (riparian growth, project implementation, etc.)

- Temperature Monitoring Protocol (TBD) as specified in the Individual site plan or in the Flow Management Plan.
- Real time water diversion monitoring protocol (TBD) as specified in the Individual site plan or in the Flow Management Plan.

O. Water Exchanges

Water exchanges may be done in certain reaches where additional stream flow can be diverted in lieu of a cold water source. The act of diverting additional water at a point of diversion must not impact bypass flow requirements past that point of diversion or any downstream point. These exchanges must be monitored sufficiently to document the exchanges are of equal amounts (stream diversion to spring water) to ensure dewatering of the channel is not occurring. The State Water Board will require any exchanges to be documented through a 1740 and 1707 process.

Monitoring Protocols:

- Temperature Monitoring Protocol (TBD) as specified in an individual Site Plan Agreement or in the Flow Management Plan.
- Real time water diversion monitoring protocol (TBD) as specified in individual Site Plan Agreement or in the Flow Management Plan.

P. 1707 Dedications

Permittees who divert water under any legal basis of right, including riparian, permitted, and licensed water rights, may petition the State Water Board pursuant to Water Code section 1707 for a “change for purposes of preserving or enhancing wetlands habitat, fish and wildlife resources, or recreation in, or on, the water.” The section 1707 petition may be coupled with an application for a water right or a petition to amend an existing permit or license in order to modify an existing project so that diversion will occur in a manner that improves conditions for Covered Species. Forbearance may be another method of providing water for instream benefit that could be utilized and verified using similar monitoring protocols

Monitoring Protocols:

- Temperature Monitoring Protocol (TBD)
- Real time water diversion monitoring protocol (TBD)

IIA. Avoidance and Minimization Measures for Beneficial Management Activities

The following general minimization measures, as they apply to particular BMAs, shall be incorporated into Site Plan Agreements authorized under the Template SHA, as appropriate. Specific to this site plan, most construction BMA’s and protection measures

will focus on the proposed design plans for the Novy-Zenkus-Rice Riparian Diversion project located on the Shasta River.

A. General Protection Measures

- The general construction season shall be from June 15 to November 1st. Restoration, construction, fish relocation, and dewatering activities within any wetted or flowing stream channel shall only occur within this period. Revegetation outside of the active channel may continue beyond November 1, if necessary.
- Prior to construction, any contractor shall be provided with the specific protective measures to be followed during implementation of the project. In addition, a qualified biologist shall provide the construction crew with information on the listed species in the project area, the protection afforded the species by the ESA, and guidance on those specific protection measures that must be implemented as part of the project.
- All activities that are likely to result in negative aquatic effects, including temporary effects, shall proceed through a sequencing of effect reduction: avoidance, reduction in magnitude of effect.
- Poured concrete shall be excluded from the wetted channel until the water surrounding the concrete structure has a PH between 6 and 8.5 to avoid water quality issues for Covered Species.
- If the thalweg (location of the deepest and fastest part) of the stream has been altered due to construction activities, efforts shall be undertaken to reestablish it to its original configuration¹.

B. Requirements for Covered Species Relocation and Dewatering Activities

1 ***Guidelines for dewatering.*** Project activities funded or permitted under the Template SHA may require Covered Species relocation or dewatering activities. Dewatering may not be appropriate for some projects that will result in only minor input of sediment, such as placing logs with hand crews, or installing boulder clusters. Dewatering can result in the temporary loss of aquatic habitat, and the stranding, or displacement of Covered Species. Increased turbidity may occur from disturbance of the channel bed. The following guidelines may minimize potential effects for projects that require dewatering of a stream:

- In those specific cases where it is deemed necessary to work in flowing water, the work area shall be isolated and all flowing water shall be temporarily diverted around the work site to maintain downstream flows during construction. Restoration actions such as installing LWD, boulder

¹ Projects that may include activities, such the use of willow baffles, which may alter the thalweg are allowed

structures or spawning gravel, where heavy equipment does not enter the stream and can operate from the streambank, do not need to occur in a dewatered stream channel.

- Exclude Covered Species from occupying the work area by blocking the stream channel above and below the work area with fine-meshed net or screens. Mesh will be no greater than 1/8 inch diameter. The bottom of a seine must be completely secured to the channel bed. Screens must be checked twice daily and cleaned of debris to permit free flow of water. Block nets shall be placed and maintained throughout the dewatering period at the upper and lower extent of the areas where Covered Species will be removed. Block net mesh shall be sized to ensure Covered Species upstream or downstream do not enter the areas proposed for dewatering between passes with the electrofisher or seine.
- Prior to dewatering, determine the best means to bypass flow through the work area to minimize disturbance to the channel and avoid direct mortality of Covered Species and other aquatic vertebrates (as described more fully below under *General conditions for all Covered Species capture and relocation activities.*)
- Coordinate project site dewatering with a qualified biologist in coordination with NMFS and CDFW to perform Covered Species relocation activities. The qualified biologist(s) must be familiar with the life history and identification of the Covered Species within the action area.
- Prior to dewatering a construction site, qualified individuals will capture and relocate Covered Species and other native fish and amphibians to avoid direct mortality and minimize adverse effects. This is especially important if listed species are present within the project site.
- Minimize the length of the dewatered stream channel and duration of dewatering, to the extent practicable.
- Any temporary dam or other artificial obstruction constructed shall only be built from materials such as sandbags or clean gravel which will cause little or no siltation. Cofferdams should be constructed to minimize water seepage into the construction areas. Cofferdams and stream diversion systems shall remain in place and fully functional throughout the construction period.
- When coffer dams with bypass pipes are installed, debris racks will be placed at the bypass pipe inlet. Bypass pipes will be monitored a minimum of two times per day, seven days a week. All accumulated debris shall be removed.

- Bypass pipes will be sized to not create scour at the outflow and to accommodate the existing streamflow.
- The work area may need to be periodically pumped dry of seepage. Place pumps in flat areas, well away from the stream channel. Secure pumps by tying off to a tree or stake in place to prevent movement by vibration. Refuel in an area well away from the stream channel and place fuel absorbent mats under pump while refueling. Pump intakes shall be covered with 1/8 inch mesh to prevent potential entrainment of Covered Species that failed to be removed. Check intake periodically for impingement of Covered Species.
- If pumping is necessary to dewater the work site, procedures for pumped water shall include requiring a temporary siltation basin for treatment of all water prior to entering any waterway and not allowing oil or other greasy substances originating from operations to enter or be placed where they could enter a wetted channel. Projects will adhere to NMFS Southwest Region *Fish Screening Criteria for Salmonids* (NMFS 1997).
- Discharge sediment-laden water from construction areas to an upland location or settling pond where it will not drain sediment-laden water back to the stream channel.
- When construction is complete, the flow diversion structure shall be removed as soon as possible in a manner that will allow flow to resume with the least disturbance to the substrate. Cofferdams will be removed so surface elevations of water impounded above the cofferdam will not be reduced at a rate greater than one inch per hour. This will minimize the probability of Covered Species stranding as the area upstream becomes dewatered.

2 *General conditions for all Covered Species capture and relocation activities:*

- Covered Species relocation and dewatering activities shall only occur between June 15 and November 1 of each year.
- All seining, electrofishing, and relocation activities shall be performed by a qualified fisheries biologist. The qualified fisheries biologist shall capture and relocate the Covered Species prior to construction of the water diversion structures (*e.g.*, cofferdams). The qualified fisheries biologist shall note the number of salmonids observed in the affected area, the number and species of salmonids relocated, where they were relocated to, and the date and time of collection and relocation. The qualified fisheries biologist shall have a minimum of three years field experience in the identification and capture of salmonids.. The qualified biologist will adhere to the following requirements for capture and transport of Covered Species:

1. Determine the most efficient means for capturing Covered Species (*i.e.*, seining, dip netting, trapping, electrofishing). Complex stream habitat generally requires the use of electrofishing equipment, whereas in outlet pools, Covered Species may be concentrated by pumping-down the pool and then seining or dipnetting Covered Species.
 2. Notify NMFS and CDFW one week prior to capture and relocation of Covered Species to provide NMFS and CDFW an opportunity to monitor.
 3. Initial Covered Species relocation efforts will be conducted several days prior to the start of construction. This provides the fisheries biologist an opportunity to return to the work area and perform additional seining or electrofishing passes immediately prior to construction. In many instances, additional Covered Species will be captured that eluded the previous day's efforts.
 4. In streams with high water temperature, perform relocation activities during morning periods.
- Prior to capturing Covered Species, determine the most appropriate release location(s). Consider the following when selecting release site(s):
 1. Similar water temperature as capture location
 2. Ample habitat for captured Covered Species
 3. Low likelihood of Covered Species reentering work site or becoming impinged on exclusion net or screen.
 4. Covered Species must be released in the nearest suitable location within the same stream . If another location is proposed, this will be approved in advance by NMFS or CDFW.
 - Periodically measure air and water temperatures. Cease activities when measured water temperatures exceed 18 °C if Covered Species are present. Temperatures will be measured at the head of riffle tail of pool interface.
- 3 ***Electrofishing Guidelines.*** The following methods shall be used if Covered Species are relocated via electrofishing:
- All electrofishing will be conducted according to NMFS Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act (2000).
 - The backpack electrofisher shall be set as follows when capturing Covered Species:

Voltage setting on the electrofisher shall not exceed 300 volts.

A) Voltage:	100 Volts	300 Volts
B) Duration:	500 μ s (microseconds)	5 ms (milliseconds)
C) Frequency:	30 Hertz	70 Hertz

- A minimum of three passes with the electrofisher shall be conducted to ensure maximum capture probability of Covered Species within the area proposed for dewatering.
- No electrofishing shall occur if water conductivity is greater than 350 microSiemens per centimeter (μ S/cm) or when instream water temperatures exceed 18 °C. Water temperatures shall be measured at the pool/riffle interface. Direct current (DC) shall be used.
- A minimum of one assistant shall aid the fisheries biologist by netting stunned fish and other aquatic vertebrates.

4 ***Seining guidelines.*** The following methods, shall be used if Covered Species are removed with seines.

- A minimum of three passes with the seine shall be utilized to ensure maximum capture probability of Covered Species within the area.
- All captured Covered Species shall be processed and released prior to each subsequent pass with the seine.
- The seine mesh shall be adequately sized to ensure Covered Species are not gilled during capture and relocation activities.

5 ***Guidelines for relocation of Covered Species.*** The following methods shall be used during relocation activities associated with either method of capture (electrofishing or seining):

- Covered Species shall not be overcrowded into buckets; allowing approximately six cubic inches per young-of-the-year (0+) individual and more for larger individuals.
- Every effort shall be made not to mix 0+ salmonids with larger salmonids, or other potential predators. Have at least two containers and segregate 0+ age Covered Species from larger age-classes. Place larger amphibians in containers with larger fish.
- Covered Species predators, such as sculpins (*Cottus sp.*) collected and relocated during electrofishing or seining activities shall be relocated so as to not concentrate them in one area. Particular emphasis shall be placed on avoiding relocation of sculpins to relocation sites identified for the

Covered Species. To minimize predation on Covered Species, these species shall be distributed throughout the wetted portion of the stream so as not to concentrate them in one area.

- All captured Covered Species shall be relocated, preferably upstream, of the proposed construction project and placed in suitable habitat. Captured Covered Species shall be placed into a pool, preferably with a depth of greater than two feet with available instream cover.
- All captured Covered Species will be processed and released prior to conducting a subsequent electrofishing or seining pass.
- All Covered Species and other native fish captured will be allowed to recover from electrofishing before being returned to the stream.
- Minimize handling of Covered Species. When handling is necessary, always wet hands or nets prior to touching Covered Species. Handlers will not wear DEET based insect repellents.
- Temporarily hold Covered Species in cool, shaded, aerated water in a container with a lid. Provide aeration with a battery-powered external bubbler. Protect Covered Species from jostling and noise and do not remove Covered Species from this container until time of release.
- Place a thermometer in holding containers and, if necessary, periodically conduct partial water changes to maintain a stable water temperature. If water temperature reaches or exceeds 18 °C., Covered Species shall be released and rescue operations ceased.
- In areas where aquatic vertebrates are abundant, periodically cease capture, and release at predetermined locations.
- Visually identify species and estimate year-classes of fishes at time of release. Record the number of Covered Species and other fish captured. Avoid anesthetizing or measuring Covered Species.
- If more than three percent of the Covered Species captured are killed or injured, the project lead shall contact NMFS and CDFW. The purpose of the contact is to allow the agencies a courtesy review of activities resulting in take and to determine if additional protective measures are required. All salmonid mortalities must be retained, placed in an appropriately sized whirl-pak or zip-lock bag, labeled with the date and time of collection, fork length, location of capture, and frozen as soon as possible. Frozen samples must be retained until specific instructions are provided by NMFS.

C. Measures to Minimize Disturbance from Instream Habitat Restoration Construction

Measures to minimize disturbance associated with instream habitat restoration construction activities are presented below.

- Construction will only occur between June 15 and November 1.
- Debris, soil, silt, excessive bark, rubbish, creosote-treated wood, raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances which could be hazardous to aquatic life, resulting from project related activities, shall be prevented from contaminating the soil or entering waterways. Any of these materials, placed within or where they may enter a stream or lake, by the applicant or any party working under contract, or with permission of the applicant, shall be removed immediately. During project activities, all trash that may attract potential predators of Covered Species will be properly contained, removed from the work site, and disposed of daily.
- Where feasible, the construction shall occur from the bank, or on a temporary pad underlain with filter fabric.
- Use of heavy equipment shall be minimized in a channel bottom with rocky or cobbled substrate. If access to the work site requires crossing a rocky or cobbled substrate, a rubber tire loader/backhoe is the preferred vehicle. Only after this option has been determined infeasible will the use of tracked vehicles be considered. The amount of time this equipment is stationed, working, or traveling within the creek bed shall be minimized. When heavy equipment is used, woody debris and vegetation on banks and in the channel shall not be disturbed if outside of the project's scope.
- Hydraulic fluids in mechanical equipment working within the stream channel shall not contain organophosphate esters. Vegetable based hydraulic fluids are preferred.
- The use or storage of petroleum-powered equipment shall be accomplished in a manner to prevent the potential release of petroleum materials into waterways.
- Areas for fuel storage, refueling, and servicing of construction equipment must be located in an upland location.
- Prior to use, clean all equipment to remove external oil, grease, dirt, mud and potential invasive species. Wash sites must be located in upland locations so wash water does not flow into a stream channel or adjacent wetlands.
- All construction equipment must be in good working condition, showing no signs of fuel or oil leaks. Prior to construction, all mechanical equipment shall be

thoroughly inspected and evaluated for the potential of fluid leakage. All mechanical equipment shall be inspected on a daily basis to ensure there are no motor oil, transmission fluid, hydraulic fluid, or coolant leaks. All leaks shall be repaired in the equipment staging area or other suitable location prior to resumption of construction activity.

- Oil absorbent and spill containment materials shall be located on site when mechanical equipment is in operation with 100 feet of the proposed watercourse crossings. If a spill occurs, no additional work shall commence in-channel until (1) the mechanical equipment is inspected by the contractor, and the leak has been repaired, (2) the spill has been contained, and (3) CDFW and NMFS are contacted and have evaluated the impacts of the spill.

D. Measures to Minimize Degradation of Water Quality

Construction or maintenance activities for projects covered under the Template SHA may result in temporary increases in turbidity levels in the stream. The following measures will be implemented to reduce the potential for adverse effects to water quality during and post-construction:

1 General erosion control during construction:

- When appropriate, isolate the construction area from flowing water until project materials are installed and erosion protection is in place.
- Effective erosion control measures shall be in place at all times during construction. Do not start construction until all temporary control devices (*e.g.*, straw bales with sterile, weed free straw, silt fences) are in place downslope or downstream of project site within the riparian area. The devices shall be properly installed at all locations where the likelihood of sediment input exists. These devices shall be in place during and after construction activities for the purposes of minimizing fine sediment and sediment/water slurry input to flowing water and detaining sediment-laden water on site. If continued erosion is likely to occur after construction is complete, then appropriate erosion prevention measures shall be implemented and maintained until erosion has subsided. Erosion control devices such as coir rolls or erosion control blankets will not contain plastic netting of a mesh size that would entrain reptiles (*esp.* snakes) and amphibians.
- Sediment shall be removed from sediment controls once it has reached one-third of the exposed height of the control. Whenever straw bales are used, they shall be sterile and weed free, staked and dug into the ground 12 cm. Catch basins shall be maintained so that no more than 15 cm of sediment depth accumulates within traps or sumps.

- Sediment-laden water created by construction activity shall be filtered before it leaves the settling pond or enters the stream network or an aquatic resource area.
- The contractor/applicant to the Program is required to inspect, maintain or repair all erosion control devices prior to and after any storm event, at 24 hour intervals during extended storm events, and a minimum of every two weeks until all erosion control measures have been completed.

2 Guidelines for temporary stockpiling:

- Minimize temporary stockpiling of material. Stockpile excavated material in areas where it cannot enter the stream channel. Prior to start of construction, determine if such sites are available at or near the project location. If nearby sites are unavailable, determine location where material will be deposited. Establish locations to deposit spoils well away from watercourses with the potential to deliver sediment into streams supporting, or historically supporting populations of the Covered Species. Spoils shall be contoured to disperse runoff and stabilized with mulch and (native) vegetation. Use devices such as plastic sheeting held down with rocks or sandbags over stockpiles, silt fences, or berms of hay bales, to minimize movement of exposed or stockpiled soils.
- If feasible, conserve topsoil for reuse at project location or use in other areas. End haul spoils away from watercourses as soon as possible to minimize potential sediment delivery.

Pre Rainstorm and Post construction erosion control:

- Prior to a forecasted precipitation event of $> \frac{1}{2}$ inch, immediately after project completion and before close of seasonal work window, stabilize all exposed soil with erosion control measures such as mulch, seeding, and/or placement of erosion control blankets. Remove all artificial erosion control devices after the project area has fully stabilized. All exposed soil present in and around the project site shall be stabilized after construction. Erosion control devices such as coir rolls or erosion control blankets will not contain plastic netting of a mesh size that would entrain reptiles (esp. snakes) and amphibians.
- All bare and/or disturbed slopes (> 100 square ft of bare mineral soil) will be treated with erosion control measures such as hay bales, netting, fiber rolls, and hydroseed as permanent erosion control measures.
- Where straw, mulch, or slash is used as erosion control on bare mineral soil, the minimum coverage shall be 95 percent with a minimum depth of two inches.

- When seeding is used as an erosion control measure, only seeds from native plant species will be used. Sterile (without seeds), weed-free straw, free of exotic weeds, is required when hay or hay bales are used as erosional control measures.

E. Measures to Minimize Loss or Disturbance of Riparian Vegetation

Measures to minimize loss or disturbance to riparian vegetation are described below. The revegetation and success criteria that will be adhered to for projects implemented under the Template SHA that result in disturbance to riparian vegetation are also described below.

1 Minimizing disturbance:

- Retain as many trees and brush as feasible, emphasizing shade-producing and bank- stabilizing trees and brush.
- Prior to construction, determine locations and equipment access points that minimize riparian disturbance. Avoid entering unstable areas. Use project designs and access points that minimize riparian disturbance without affecting less stable areas, which may increase the risk of channel instability.
- Minimize soil compaction by using equipment with a greater reach or that exerts less pressure per square inch on the ground than other equipment, resulting in less overall area disturbed or less compaction of disturbed areas.
- If riparian vegetation is to be removed with chainsaws, only use vegetable-based bar oil.

2 Revegetation and success criteria:

- Any stream bank area left barren of vegetation as a result of the implementation or maintenance of the practices shall be restored to a natural state by seeding, planting, or other means with native trees, shrubs, or grasses prior to November 1 of the project year. Barren areas shall typically be planted with a combination of willow stakes, native shrubs and trees and/or erosion control grass mixes.
- Native plant species shall be used for revegetation of disturbed and compacted areas. The species used shall be specific to the Shasta Valley, and comprise a diverse community structure (plantings shall generally include both woody and herbaceous species, in coordination with NMFS and CDFW).

- For projects where re-vegetation is implemented to compensate for riparian vegetation impacted by project construction, a re-vegetation monitoring report will be required after 5 years to document success. Success is defined as 50 percent survival of plantings or 50 percent native ground cover for broadcast planting of seed after a period of 3 years. If revegetation efforts will be passive (*i.e.*, natural regeneration), success will be defined as total cover of woody and herbaceous material equal to or greater than pre-project conditions. If at the end of five years, the vegetation has not successfully been re-established, the project applicant to the Program will be responsible for replacement planting, additional watering, weeding, invasive exotic eradication, or any other practice, to achieve the above success standards. If success is not achieved within the first 5 years, the project applicant will need to prepare a follow-up report in an additional 5 years. This requirement will proceed in 5 year increments until success is achieved.
- All exclusion netting or fencing placed around plantings will be removed after 3 years, or later until plantings are no longer being substantially impacted by livestock or wildlife.

F. Measures to Minimize Impacts to Roads in Project Area

Upon the completion of restoration activities, roads within the riparian zone used for implementation of BMAs and AMMs shall be weather proofed according to measures as described in *Handbook for Forest and Ranch Roads* by Weaver and Hagans (1994) of Pacific Watershed Associates and in Part X of the CDFG Manual entitled “*Upslope Assessment and Restoration Practices.*” The following are some of the methods that may be applied to roads impacted by project activities implemented under the Template SHA.

- Establish waterbreaks (*e.g.*, waterbars and rolling dips) on all seasonal roads, skid trails, paths, and fire breaks by October 15. Do not remove waterbreaks until May 15.
- Maximum distance between waterbreaks shall not exceed the following standards: (1) 100 feet for road or trail gradients less than 10 percent slope; (2) 75 feet for road or trail gradients from 11 to 25 percent; (3) 50 feet for road or trail gradients from 26 to 50 percent slope; and (4) 50 feet for road or trail gradients greater than 50 percent slope. Depending on site-specific conditions more frequent intervals may be required to prevent road surface rilling and erosion.
- Locate waterbreaks to allow water to be discharged onto some form of vegetative cover, slash, rocks, or less erodible material. Do not discharge waterbreaks onto unconsolidated fill.
- Waterbreaks shall be cut diagonally a minimum of six inches into the firm roadbed, skid trail, or firebreak surface and shall have a continuous firm

embankment of at least six inches in height immediately adjacent to the lower edge of the waterbreak cut.

- The maintenance period for waterbreaks and any other erosion control facilities shall occur after every major storm event for the first year after installation.
- Rolling-dips are preferred over waterbars. Waterbars shall only be used on unsurfaced roads where winter use (including use by bikes, horses, and hikers) will not occur.
- After the first year of installation, erosion control facilities shall be inspected for failure prior to the winter period (October 15) after the first major storm event, and prior to the end of the winter period (May 15). If the erosion controls have failed, additional erosion control elements will be installed to the project site.
- Applicant will establish locations to deposit spoils well away from watercourses with the potential to delivery sediment into streams supporting, or historically supporting Covered Species. Spoils shall be contoured to disperse runoff and stabilized with mulch and (native) vegetation.
- No berms are allowed on the outside of the road edge.

III. References

National Marine Fisheries Service. 1996. Juvenile Fish Screen Criteria for Pump Intakes. National Marine Fisheries Service, Southwest Region. http://www.westcoast.fisheries.noaa.gov/publications/hydropower/fish_screen_criteria_for_pumped_water_intakes.pdf

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National Marine Fisheries Service. 2014. Final Recovery Plan for the Southern Oregon/Northern California Coast Evolutionarily Significant Unit of Coho Salmon (*Oncorhynchus kisutch*). National Marine Fisheries Service. Arcata, CA. http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/southern_oregon_northern_california/sonccfinal_ch1to6_mainchapters__1_.pdf

Pollock, M.M., G. Lewallen, K. Woodruff, C.E. Jordan and J.M. Castro (Editors) 2015. The Beaver Restoration Guidebook: Working with Beaver to Restore Streams, Wetlands, and Floodplains. Version 1.02. United States Fish and Wildlife Service, Portland, Oregon. 189 pp. Online at: <http://www.fws.gov/oregonfwo/ToolsForLandowners/RiverScience/Beaver.asp>

Weaver, W., E. Weppner, and D.Hagans. 1994. Handbook for Forest, Ranch & Rural Roads. A Guide for Planning, Designing, Constructing, Reconstructing, Upgrading, Maintaining and Closing Wildland Roads. Pacific Watershed Associates. Arcata, CA. http://www.pacificwatershed.com/sites/default/files/roadsenglishbookapril2015b_0.pdf

Saldi-Caromile, K., K. Bates, P. Skidmore, J. Barenti, D. Pineo. 2004. Stream Habitat Restoration Guidelines: Final Draft. Co- published by the Washington Departments of Fish and Wildlife and Ecology and the U.S. Fish and Wildlife Service. Olympia, Washington.

A. Description of Baseline Conditions

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 Middle Shasta Reach of the Agreement Area. Baseline conditions for the Enrolled Property are the Conditions described in Appendix 2 of the Template Safe Harbor Agreement for these reaches of the Shasta River.

Elevated Baseline Conditions are certain Baseline Conditions improved as a result of certain Beneficial Management Activities.

Table 2 Summarizes the Beneficial Management Activities required to maintain Baseline Conditions and achieve Elevated Baseline Conditions on the Enrolled Property for the term of the Site Plan Agreement. Section E (Description of Beneficial Management Activities) describes the activities in more detail. The Beneficial Management Activities implement habitat enhancement actions recommended in the Template Safe Harbor Agreement (Appendix 2) for the Mid-Shasta reach of the Shasta River.

Table 2. Beneficial Management Activities required to maintain Baseline Conditions and achieve Elevated Baseline Conditions on the Enrolled Property.

Habitat Parameter	Net Conservation Benefit Actions		
Present Day Baseline (Complete & Maintain)		Elevated Baseline Condition (Restore)	Other Beneficial Management Activities
Hydrology/Water Quality		<ul style="list-style-type: none"> - Installed 6 tailwater berms throughout Novy Ranches from 2009 to 2013 to reduce tailwater inputs and water quality impacts - B.1.a - Continue to monitor and repair 	Seek funding and assist with implementation of efficiency project on the Novy, Rice, Zenkus Riparian Diversion conserving up to 5 cfs conveyance subject to funding conditions

Habitat Parameter	Net Conservation Benefit Actions		
Present Day Baseline (Complete & Maintain)		Elevated Baseline Condition (Restore)	Other Beneficial Management Activities
		<p>tailwater berms as needed - B.1.a</p> <ul style="list-style-type: none"> - Continue irrigation practices to ensure there are no tailwater impacts - B.1.a - Continue to use handheld soil moisture sensors to optimize irrigation start and end times - B.1.a - Installed Novy Pump in 2007 to replace usage of the Huseman Ditch, thus leaving at least 5.5 cfc in stream for additional 3.5 miles. Continue to maintain pump to standards - B.1.a 	<p>- B.3.a</p> <ul style="list-style-type: none"> -Implement efficiency projects on the Novy Pump conveyance - B.3.a -Work with UC Extension to further understand soil moisture and further optimize irrigation efficiency – B.3.a -Participate in a reach-wide diversion management strategy. - B.3.a -Add instream beneficial use of secondary benefit of Novy, Rice, Zenkus and Novy Pump Diversions once projects are completed and one full irrigation season has occurred - B.3.a -Abide by SWRCB measuring and reporting standards. - B.3.A
Passage/Migration/Screening		<ul style="list-style-type: none"> - Installed Novy Pump with compliant in-channel cone fish screen in 2007 - B.1.b 	<ul style="list-style-type: none"> -Assist and participate in seeking funding for the redesign and engineering of the Novy, Rice, Zenkus

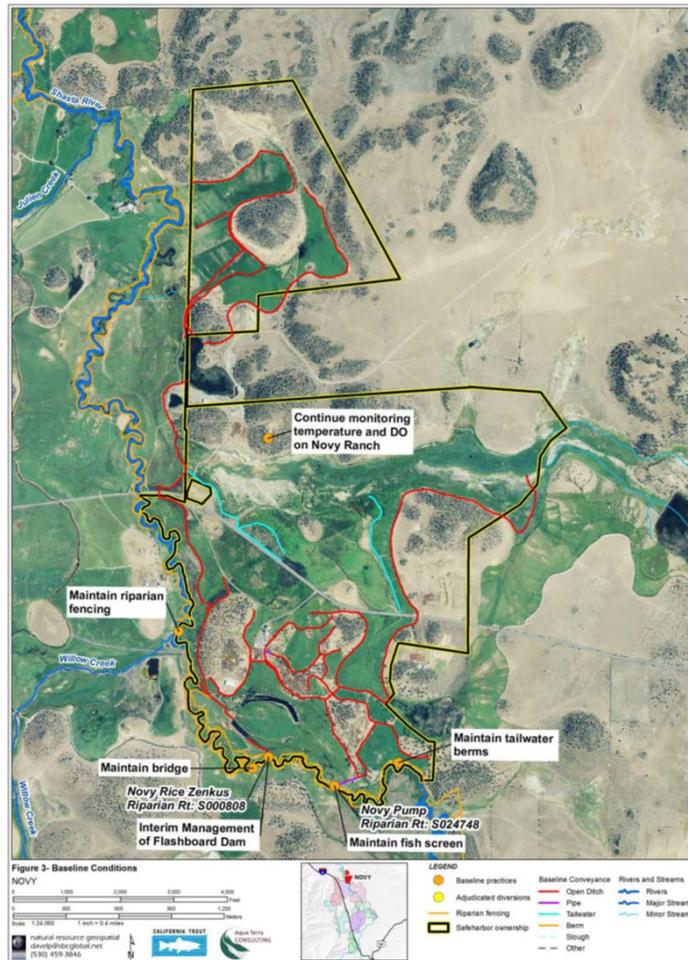
Habitat Parameter	Net Conservation Benefit Actions		
Present Day Baseline (Complete & Maintain)		Elevated Baseline Condition (Restore)	Other Beneficial Management Activities
		<p>-Maintain unimpeded fish passage conditions at the Novy Pump diversion - B.1.b</p> <p>-Manage and adjust flashboards and bypass volume at Novy, Rice, Zenkus diversion structure based on fish passage objectives – B.1.b</p>	<p>Diversion to meet criteria for all life-stages of salmonids. - B.2.b</p> <p>-Assist and participate in seeking funding for the implementation of the project Novy, Rice, Zenkus Diversion - B.2.b</p> <p>-Participate in the construction of a new fish screen on channel for the Novy, Rice, Zenkus Diversion - B.2.b</p> <p>-Seek funding, aid in implementation, operate and maintain fish screen and fish passage facility components of Novy, Rice, Zenkus Diversion – B.3.b</p>
Instream Habitat Complexity			<p>-Agrees to provide reasonable access per AMMs for implementation of habitat enhancement projects including LWD for bank stabilization as shown on attached Habitat Improvement Map. Appendix H -</p>

Habitat Parameter	Net Conservation Benefit Actions		
Present Day Baseline (Complete & Maintain)		Elevated Baseline Condition (Restore)	Other Beneficial Management Activities
			<p>B.3.c</p> <p>-For proposed LWD site on right bank meander opposite of “Frog” pond, analyze and implement measures to prevent channel evulsion into pond. – Appendix H</p> <p>- B.3.c</p>
Riparian Function	<p>- Continue to minimize the potential impacts of grazing in riparian areas by limiting the season of use and by maintaining an approximate 6” stubble heights for herbaceous vegetation - B.1.d</p> <p>-Continue to perform yearly maintenance on existing riparian fencing - B.1.d</p> <p>-Maintain the few remaining trees/shrubs from four test plots along the Shasta River that were planted in 2015. - B.1.d</p> <p>-Continue to maintain bridge crossing - B.1.d</p>		<p>-Agrees to allow for and participate in further riparian plantings that benefit and improve salmonid habitat as well as bank stabilization, in coordination with the agencies as funding becomes available. B.3.d</p>

Habitat Parameter	Net Conservation Benefit Actions		
Present Day Baseline (Complete & Maintain)		Elevated Baseline Condition (Restore)	Other Beneficial Management Activities
Substrate Quality	-Agrees to provide reasonable access per approved AMMs to implement spawning gravel enhancement within the engineered roughened channel as part of the Novy, Rice, Zenkus Diversion Project - B.3.e		
Pasture Management	-Continue beneficial rotational grazing practices – B.1.f		- Manage pasture grazing as described in B.3.f
Assessments/Studies	-Participated within flow study across the Shasta River Reach in 2016 - B.1.g -Continued participation in temperature monitoring at ingress, middle and egress and DO monitoring at the ingress of the Grenada Novy Ranches Shasta Reach via RCD - B.1.g		Allow reasonable access for monitoring as described in Section G.2.
Supplementation	-Allow access for salmonid supplementation when proper protections for ESA liability are in place -		

Habitat Parameter	Net Conservation Benefit Actions		
Present Day Baseline (Complete & Maintain)		Elevated Baseline Condition (Restore)	Other Beneficial Management Activities
	B.3.h		

Figure 3. Grenada Novy Ranches -Baseline Conditions



B. Description of Beneficial Management Activities

This section provides a detailed description of Conservation and Habitat Enhancement Activities to be implemented on the Enrolled Property for the benefit of the Covered Species.

B.1 Present Baseline

This section details the actions required 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 Template Safe Harbor Agreement.

B.1.a Hydrology/Water Quality

Increased water delivery as a result of irrigation efficiencies

Diversion relocation/combination

- Novy Pump replaced usage of the Huseman Ditch in 2007, thus moving it downstream. This improvement left at least 5.5 cfs in the river for an additional 3.5 miles. Grenada Novy Ranches agrees to continue to maintain pump to standards.

Tail Water Reduction

- Installed 6 tail water berms throughout Novy Ranches from 2009 to 2013 to reduce tail water temperature impact upon the Shasta River. Grenada Novy Ranches agrees to continue to monitor and repair tailwater berms as needed. In addition, irrigation practices will be monitored to ensure that there are no new tailwater impacts.

Soil Moisture Monitoring Program

- Hand-held soil moisture sensors have been used by irrigators to identify when to begin and stop irrigating. We currently use the Soil Moisture Meter product by LIC. This product rates soil moisture on a scale of 1-10, where 1 is dry and 10 is wet. Throughout the ranch, Soil Moisture Tool Boxes have been placed for easy usage by the irrigator. Grenada Novy Ranches tries to keep its field moisture levels within the 4-6 (average wet) range.

B.1.b Passage/Migration/Diversion Screening

- Installed Novy Pump with compliant in-channel cone fish screen in 2007. The Novy Pump has a current, updated Streambed Alteration Agreement for operation of the compliant self-cleaning fish-screen and diversion intake. Grenada Novy Ranches agrees to maintain the diversion facility and fish screen.
- Manage and adjust flashboards and by-pass volume at Novy, Zenkus Rice diversion structure based on fish passage objectives. Currently this is managed with a minimum 4-foot constant opening at all times when flashboards are installed. The flashboards are removed between early October through mid-April annually. Downstream smolt outmigration occurs annually. Chinook and Coho

salmon adult migration is documented by spawning counts conducted annually upstream of the diversion.

B.1.c Instream Habitat Complexity

-No current activity

B.1.d Riparian Function

Riparian Fencing

- Approximately 12,400 linear feet of riparian exclusion fencing within Grenada Novy Ranches will continue to be maintained. However, the Ranch will not accept the responsibility of repairing loss from major floods or other events where 20% of the fence or greater needs replacement. If riparian fencing loss greater than 20 percent occurs, Grenada Novy Ranches will work with partners to obtain funding to repair or replace the fencing.

Reduced Riparian Grazing Intensity/Frequency

-Pastures adjacent to the river have been fenced, to restrict free access by the cattle.

-Current grazing management in accordance with the grazing plan developed by UC Extension Service. Grazing is currently allowed within the riparian area during periods that minimize the potential for impacts to fish and their habitat, and that have been determined by the Permittee to pose no threat to nesting water fowl. Currently the Novy Ranches riparian grazing occurs twice per year on the following schedule:

- #1: Mid-July 15th (hatching waterfowl off nests by July 4th). Grazing allowed to an approximate 6” stubble height for herbaceous vegetation. Vegetation stubble height has been shown to be a good indicator of:
 - 1) the effect of grazing on the physiological health of the individual plant, and
 - 2) the ability of the vegetation to provide stream-bank protection and to filter out and trap sediments from overbank flows; and
 - 3) stubble height correlates to root depth and increases the water retention of the soil.
- #2: Non-irrigating season – herbaceous riparian growth grazed to approximately 6” which is accordance with the Riparian Grazing Plan **Appendix G**

Crossings

Riparian Management Evaluation Plots

- Four test plots along the Shasta River have been planted at different elevations and locations in April, 2015 to better understand survival ability, to further provide future river shading and riparian habitat enhancement. Each plot contained plantings of apple, hazelnut, peach, black walnut, ash, plum, choke cherry, and elderberry. Primarily due to small rodents, flooding and cattle destruction, survival of these trees has had low success. The time involved with watering, upkeep, building of solid fencing as well as implementing rodent barriers has been greater than expected. Grenada Novy Ranches agrees to further monitor these four plots.

B.1.e Substrate Quality

-Substrate for spawning has not been observed on the enrolled property; however, a site visit will be conducted with agency staff to address this question as outlined above.

B.1.f Pasture Management:

-Continue beneficial rotational grazing practices.

B.1.g Assessments/Studies

-Participated within the flow study conducted by the Resource Conservation District (RCD) across the Shasta River Reach in 2016.

-Currently Grenada Novy Ranches has participated in monitoring the following parameters:

-Temperature – seasonal w/equipment from the RCD conducted at ingress, middle, egress, and at Highway A-12 (Truttman).

-Dissolved Oxygen – seasonal w/equipment from the RCD conducted at ingress and at Highway A-12 (Truttman).

-Grenada Novy Ranches will continue to allow access to monitor water quality parameters and will consider allowance and participation in future assessments and inventories that enhance agricultural viability and/or instream enhancement.

B.2 Elevated Baseline

This section details the land and water management activities that will be implemented on the enrolled property to improve unsuitable habitat conditions for the Covered Species.

B.2.a Hydrology/Water Quality: See B.3.a (Other Land and Water Use Beneficial Management Activities)

B.2.b Passage/Migration/Diversion Screening

-Novy, Rice, Zenkus Pre-1914 Riparian Diversion: The existing fish screen is located in the diversion ditch approximately 1,700' below the POD and the bypass does not meet current screening criteria. Grant-funded studies are ongoing on the Grenada Novy Ranches to determine the best design options that will insure year-round compliance with fish passage criteria. The 100% design is estimated to be completed by in 2019.

-Grenada Novy Ranches agrees to work with the agencies to seek funding, and assist with installation, of a compliant fish passage facility with a functional diversion facility. Once the screen is installed, Grenada Novy Ranches commits to operate and maintain an effective diversion facility that provides year-round fish passage per fish passage criteria. Barrier remediation implementation funding will be applied for through FRGP, Prop 1, NRCS and other funding sources from 2019-2020. Implementation is expected to be completed by 2022, but will be based on funding availability.

B.3 Other Land and Water Management Use Beneficial Management Activities

In addition to the baseline and elevated baseline actions listed in Table 2 the Permittee agrees to implement other activities (described below) that will benefit the Covered Species.

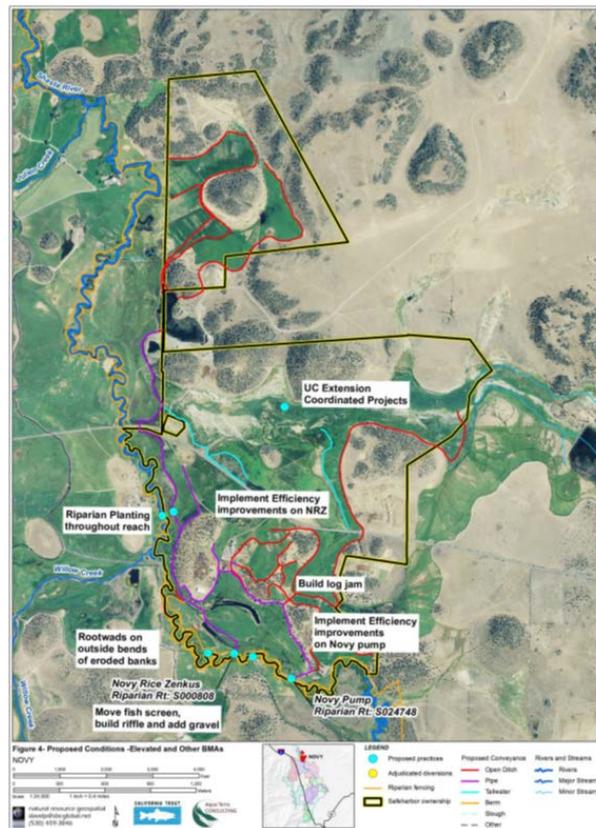


Figure 4. Grenada Novy Ranches Proposed Conditions Map

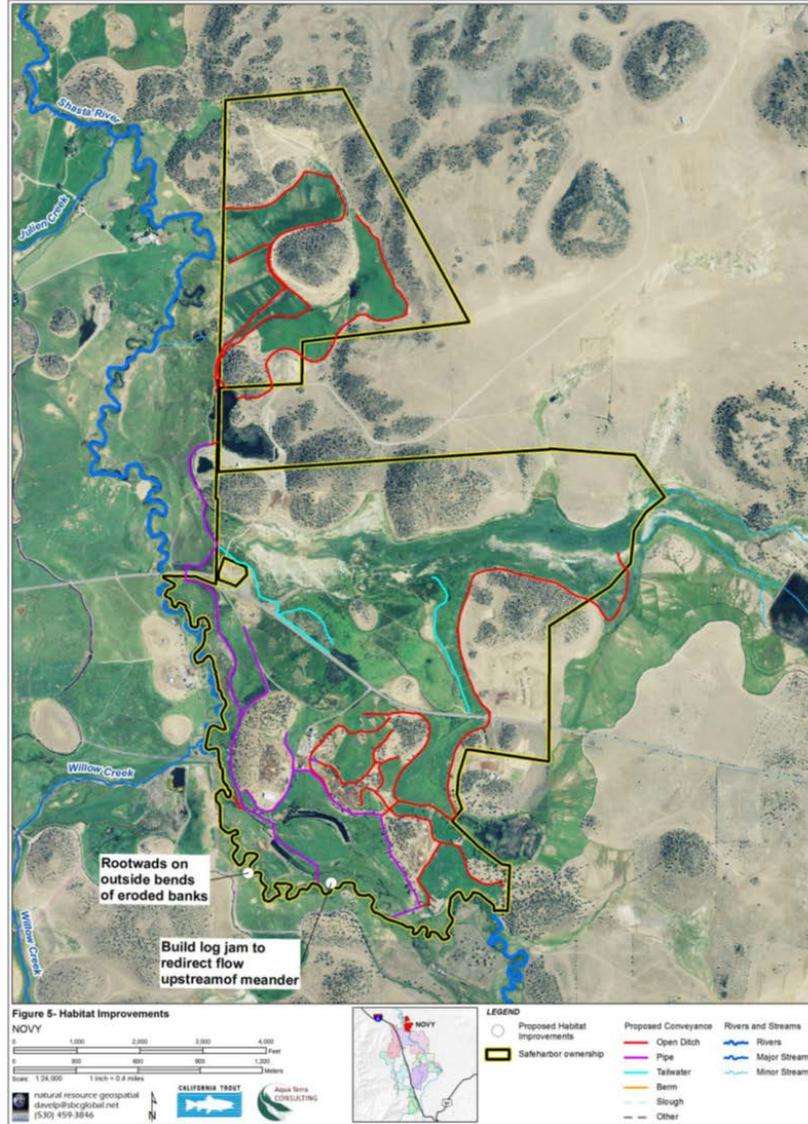


Figure 5. Grenada Novy Ranches Habitat Improvement Maps

B.3.a Hydrology/Water Quality

Increased Delivery and Irrigation Efficiency:

Novy, Rice, Zenkus Pre-1914 Riparian Diversion: Grenada Novy Ranches will commit to the efficiency improvements recommended in the assessment and work to develop and implement conservation solutions. Scope includes reducing diversion from 10.00-cfs to 5.00-cfs through converting main ditch and lateral to piping, lift pump and flood valves.

Novy, Rice, Zenkus Riparian by Grenada Novy Ranches:
 Current Grenada Novy Ranches use: 3,098.0 afy
 Commitment after piping continuation project 1,549.0 afy

**1,549 afy provided to 194 acres results in 7.98 feet applied per acre

-Improve distribution and irrigation as a result of Novy, Rice, Zenkus Riparian Diversion cooperative assessment. Water conservation project implementation funding will be applied for through Fisheries Restoration Grant Program (FRGP), Prop 1, NRCS and other funding sources beginning in 2018-2019. Implementation is expected to be completed by 2022, but implementation will be based on funding availability

Novy Pump Diversion: Grenada Novy Ranches, in coordination with NRCS and secondary funding, will commit to the efficiency improvements recommended in the assessment and work to develop and implement conservation solutions. Scope includes creating irrigation efficiencies via piping of the Novy Pump diversion and open ditch. If feasible, with funding in place, this action will be implemented. Water conserved as a result of delivery efficiency will result in cessation of diversion per rotation based upon noticed efficiencies. Implemented pipeline may result in cessation of diversion for several days a month during March, April, May June and October. Novy Pump Diversion water conservation implementation funding will be applied for through FRGP, Prop 1, NRCS and other funding sources from 2019-2020. Implementation is expected to be completed by 2022, but will be based on funding availability

Soil Moisture Monitoring Program: Grenada Novy Ranches will enroll the assistance of UC-Cooperative Extension to discuss implementation and usage of other soil moisture sensors (while still using current hand-held soil moisture sensors), including the use of randomly selected soil sampling sites throughout ranch to further adjust irrigation practices accordingly. This element will be completed within one year of signing the Template Safe Harbor Agreement.

Participation in Mid Shasta reach flow strategy: In addition to that which is already mentioned within B.1.a, Grenada Novy Ranches will additionally cooperate in the Mid-Shasta Flow strategy per commitments described below:

-Abide by SWRCB water measuring and reporting requirements including continuous measurement and recording of diverted flow.

-Grenada Novy, Rice, Zenkus Riparian and Novy Pump commits to participate in Mid-Shasta Flow Strategy through the following measures:

-Grenada Novy Ranches agrees to limit diversion to half of the maximum diversion from 4/1-4/10 of each spring to aid in reducing rapid flow reduction that occurs at the onset of irrigation season since 2014.

-Maximum diversion volume of the Novy, Rice, Zenkus diversion will reduce from 10.0cfs -5.0 cfs as a result of the piping and conservation project with acknowledgement that a substantial portion of the currently used 10 cfs returns to the Shasta River as tail water or sub-surface water. Note: Zenkus Investigation being confirmed regarding 4.0 cfs being sufficient.

-Grenada Novy Ranches, in coordination with the Shasta Water Trust, agrees to limit the diversion to half of the maximum diversion from 9/20-9/30 of each fall to aid in enhancing flows for adult Chinook and Coho migration that can be impacted by late season diversion, which the ranch has done since 2013.

-Participate in spring pulse flows per Mid-Shasta comprehensive flow plan when piping projects are complete and water is readily available to turn-on/turn-off in a non-time impeding delivery system.

In-stream Beneficial Use

-Grenada Novy Ranches will work with SWCG to add instream beneficial use as a secondary benefit for the water conserved by proposed projects for Novy-Rice-Zenkus diversion. The estimated timeframe for seeking funding is 2019 and 2020. The timeframe for implementation is 2022.

B.3.b Passage/Migration/Screening

-Seek funding, aid in implementation, operate and maintain fish screen and fish passage facility components of Novy, Rice, Zenkus Diversion. The estimated timeframe for seeking funding is 2019 and 2020. The timeframe for implementation is 2022.

B.3.c Instream Habitat Complexity:

Large Woody Debris

-The Permittee will allow investigations and will participate in design and placement of instream structures including large woody debris (LWD) structures, off-channel habitat and developing existing oxbows. The Permittee is willing to allow development of back-water rearing areas, if feasible, in this stretch of the Shasta River as long as liabilities and impacts to ranching are not elevated. If actual projects are developed, the Permittee will provide trees and on-site rock.

-The Permittee is willing to re-work one specific bank erosion site that is just upstream of the Novy, Rice, Zenkus Diversion. At this site, a log jam would be incorporated in addition to adding LWD, as funding is available. This action will stabilize the bank and reduce sedimentation while increasing habitat complexity. Permittee will provide trees and on-site rock. It is anticipated that a grant application for these LWD projects will be submitted within the first year after signing the Template Safe Harbor Agreement. The estimated timeframe for

implementation of LWD features is between 3-6 years after signing the Agreement

B.3.d Riparian Function

Off-Channel Stock watering

-Off-channel stock water facilities were completed in 2013. With the potential piping of the Novy, Rice, Zenkus Diversion and Novy Pump, the Permittee will allow additional off-channel stock watering options once they are identified.

Riparian Management Evaluation Plots (e.g. planted vs. natural recruitment)

-Grenada Novy Ranches will allow for and participate in further native and non-native riparian plantings, in coordination with the agencies, as time and funding (for supplies and labor) become available.

B.3.e Substrate Quality

-Substrate beneficial for spawning activity is assumed not present in this stream reach.

Providing Access for Gravel Augmentation Projects

-This reach of the Shasta River does not currently have spawning substrate. Permittee is open to allowing spawning gravel to be placed at the proposed re-constructed riffle during the Novy, Rice, Zenkus Riparian diversion retrofit.

B.3.f Pasture Management

Pasture Grazing Management

B.3.g Assessment Studies

-Grenada Novy Ranches is agreeable to water temperature and DO monitoring on the Enrolled Property.

-Grenada Novy Ranches is agreeable to providing access for and having PIT tag antennas on site after hearing proposal and understanding/negotiating level of access.

-Grenada Novy Ranches will allow access for juvenile presence/absence surveys and juvenile tagging on the property if given SWCG standard notice prior to survey efforts.

B.3.h Supplementation

The Ranch is open to salmonid supplementation when proper protections against Take liability are in place (e.g. the Agreement).

B.3.i Covered Species Effects and Considerations Specific to Grenada Novy Ranches:

While this section is technically not a component of the site plan, Grenada Novy Ranches provides the information below to further elaborate upon the uniqueness of the enrolled property.

During the summer months, the water temperatures within the Shasta River entering Novy Ranches appear too warm for the rearing of juvenile salmonids/coho. This, coupled with the absence of adult spawning gravels as well as deep-channels with fast-moving water through the Novy Ranches makes this reach basically a pass-thru conduit for adult and juvenile salmon at this time. Cumulative benefits as a result of the SWCG may improve conditions for summer rearing, winter rearing and outmigration survival over time.

Hydrology: With the exception of high flood flows that originate from Parks Creek, Streamflow in the Mid-Shasta River is primarily dependent on discharges from Big Springs Creek and, to a lesser extent, Parks Creek and releases from Dwinnell Dam. Significant surface water diversions occur upstream of Novy Ranches' two points of diversion. Spring and summer streamflows within the Novy reach of the Shasta River are largely dictated by upstream and downstream adjudicated water right priorities as well as riparian diversions. Cumulative benefits as a result of the SWCG may improve long-term conditions for summer rearing, winter rearing and outmigration survival over time.

Groundwater derived streamflow from Big Springs Creek provides various and unstable baseflows possibly influenced by the ground water or broader pumping in the Pluto Caves Complex to the valley portion of the Shasta River. Parks Creek regularly provides late winter and early spring runoff flows. Streamflow throughout the mid-Shasta River progressively decreases during the spring and summer seasons. Water mastering pursuant to Shasta River Adjudication priorities indirectly maintains summer streamflows in the Novy reach that provide suitable depths and wetted widths to support juvenile rearing. However, the cumulative effects of diversions of flows upstream of the Novy Ranches, lack of mature woody riparian vegetation, and the geomorphological aspects of the Shasta River, likely contribute to elevated summer water temperature conditions.

Water Quality: Preliminary data collected during recent (2017 – an excellent water year) water temperature and dissolved oxygen (DO) monitoring on the Novy reach (Reach 4) of the Shasta River are consistently cooler throughout the irrigation season than in all other reaches within the Shasta River. Temperatures, did however, exceed the MWMT criterion 103 or 171 days monitored, with an overall average temperature of approximately 19-20C. Summer DO concentrations did not fall below the NCWQCP minimum objective (6ml/L DO) during 147 days monitored. Furthermore, DO readings just down stream of Novy/Zenkus Ranches at “Reach 3” also did not fall below minimum objectives. (Site RCD Shasta River Irrigation Water Management and Watershed

Stewardship project Agreement No. 13-501-251-2, Annual Monitoring Report 2017) Novy Ranches will continue to participate in temperature and DO monitoring through the Shasta Valley RCD.

Spawning Substrate: Site-specific channel substrate evaluations of the Novy Ranches reach of the Shasta River have not been conducted, but field observations indicated that substrate particle sizes within this portion of the watershed are generally too small to support successful spawning by the Covered Species and are a reflection of natural hydrogeomorphic processes that are dominated by very gradual channel gradients and groundwater-derived baseflows and infrequent flood flows.

Channel Structure: As described by Nichols et al. (2010), channel gradients of the Shasta River downstream of Big Springs Creek are less than 1% as the river meanders through the central portions of the Shasta River Valley. This portion of the river exhibits channel morphologies typical of spring-fed rivers that derive the majority of streamflow from groundwater sources. Such rivers exhibit remarkably homogenous channel morphologies conspicuously absent of channel bars or other bedforms typical of runoff-dominated rivers. Observations of the Shasta River channel along Novy Ranches are consistent with this generalized description.

Floodplain Function: Novy Ranches is located within the laterally unconfined valley portion of the watershed, and hydrologic connectivity to the floodplain is present during large flow events. Floodplain function enhancement opportunities and constraints are discussed in more detail within the Template Agreement.

Winter Habitat: Throughout Novy Ranches, the Shasta River meanders creating cut banks for juvenile rearing when conditions are suitable. Extensive tulle growth as developed along the banks, covering ~75% since riparian fencing has been in place (2006). Currently, no oxbows exist on the Shasta River throughout Novy Ranches. While aerial maps make it appear that oxbows are present, these are tail water catch basins. If a natural oxbow occurs within the Novy Ranches reach, it will be left to enhance juvenile rearing.

C. Effective Date and Duration of the Site Plan and Agreement

The Template Safe Harbor Agreement, Site Plan Agreement and Permit take effect when signed by the Participants/Permittees, NMFS, and CDFW. The Template Safe Harbor Agreement, Site Plan Agreement and Permit have a term of 20 years, which may be extended by mutual written consent of the Participants/Permittees, NMFS, and CDFW as stipulated in the Agreement. One (1) year prior to end of term of the Template Safe Harbor Agreement, Site Plan Agreement and Permit, the Participant/Permittees, NMFS, and CDFW will meet to decide whether to extend the term of the Template Safe Harbor Agreement, Site Plan Agreement and Permit.

D. Monitoring and Reporting

D.1 Avoid and Minimization Monitoring Commitments

The Permittee agrees to the following AMMs and Monitoring actions:

Covered Activity	Novy Ranches - AMM	AMM Monitoring Technique
Irrigation Management	<p style="text-align: center;">A1</p> <p style="text-align: center;">A2</p>	<p>All maintenance of instream diversion structures shall be monitored as follows:</p> <p>-Log of what in-water work had occurred and what minimization measures were implemented will be included in the Annual SHA report</p> <p>-When construction or repair work is being done, three to five photo points using USDA Forest Service Photo Point Monitoring Handbook, 2002 http://www.fs.fed.us/pnw/pubs/gtr526/ or an annual agency inspection can be requested.</p>
Irrigation Maintenance	<p style="text-align: center;">B1</p> <p style="text-align: center;">B2</p> <p style="text-align: center;">B3</p> <p style="text-align: center;">B4</p> <p style="text-align: center;">B5</p> <p style="text-align: center;">B6</p> <p style="text-align: center;">B7</p> <p style="text-align: center;">B8</p>	<p>All maintenance of instream irrigation facilities shall be monitored. Following are some examples of protocols:</p> <p>-Log of maintenance activities carried out within the calendar year be included in the yearly SHA report.</p>
Riparian Grazing Management	<p style="text-align: center;">C1</p> <p style="text-align: center;">C2</p> <p style="text-align: center;">C3</p>	<p>Riparian grazing management shall be monitored as follows:</p> <p>-Three to five permanent 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.</p>

Covered Activity	Novy Ranches - AMM	AMM Monitoring Technique
		<p>Photo points shall be established using USDA Forest Service Photo Point Monitoring Handbook, 2002 http://www.fs.fed.us/pnw/pubs/gtr526/. 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.</p> <p>-Maintain a log of grazing activities carried out within the calendar year and include in the yearly Site Plan monitoring report. At a 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 as a result of monitoring results including management cues used to determine the time to move livestock out of the riparian pasture.</p> <p>-NMFS and CDFW may initiate periodic inspection of grazed riparian pastures to ensure riparian grazing management plan is effective.</p> <p>--NMFS, CDFW, or a qualified party, approved by CDFW or NMFS, may conduct redd surveys to determine the need for livestock restrictions in streams. In the event surveys indicate redds are not present, then livestock access will follow the procedures described in riparian grazing management plan.</p>

Covered Activity	Novy Ranches - AMM	AMM Monitoring Technique
Fence Maintenance	D1 D2	-A short description of fence maintenance activities will be included in the annual report template.
Road Maintenance	E2 E3	-A short description of annual road maintenance activities will be included in the annual report.
Crossing Maintenance	No In-Stream Crossings	
Herbicide/Fertilizer/Pesticide Use	G1 G2 G3 G4 G5	- Participant commits to log use of herbicide, fertilizer and pesticide activities carried out within the calendar year be included in the annual report.
Flood Repair	H1 H2	- Participant shall take photographs of the emergency site repairs and a detailed description of the repairs to be included in the annual report.

D.2 Implementation and Effectiveness Monitoring Commitments

The Permittee agrees to the following monitoring actions:

Habitat Parameter	Novy Ranches – Net Conservation Benefit Actions	Implementation Monitoring Technique	Effectiveness Monitoring Commitment? Technique?
Hydrology/Water Quality		- Three to five photo points using USDA Forest Service Photo Point Monitoring Handbook, 2002	- Diversion monitoring station will be maintained and operated as designed.

		documenting functioning diversion, pipeline improvements and spring source enhancements. -Soil Moisture sensor data	Provide yearly data.
Passage/Migration/Screening		- Three to five photo points using USDA Forest Service Photo Point Monitoring Handbook, 2002 documenting fish passage and fish screen. -Water measuring protocol that is in concurrence with SB88 of diversion, submit diversion data.	
Instream Habitat Complexity		- Three to five photo points using USDA Forest Service Photo Point Monitoring Handbook, 2002 Habitat improvements	
Riparian Condition		- Three to five photo points using USDA Forest Service Photo Point Monitoring Handbook, 2002 To document riparian grazing area, and crossing and stock water systems in proper function.	-Survival rates of riparian planting will be reported by Shasta Valley RCD or other implementing organization for a minimum period of 3 years after planting occurs or term will be stipulated by the grants utilized for implementation.
Substrate Quality		- Three to five photo points using USDA	

		Forest Service Photo Point Monitoring Handbook, 2002 To document fence maintenance.	
Pasture Management		- Three to five photo points using USDA Forest Service Photo Point Monitoring Handbook, 2002 To document pasture condition.	
Assessment/Studies		-Reports of studies will be written/summarized/obtained and provided in the annual report	-Access to maintain existing pit tag array and trap and tag fish as deemed feasible by agency staff -Juvenile surveys for presence absence and for capturing and PIT tagging fish with 7 day notification of landowner.
Supplementation			

E. Annual Report and Adaptive Management

The Participant will complete the Annual Report Form, attached in Appendix D, yearly and reported as stipulated in the Agreement.

F. Regulatory Assurances (NMFS' section - see example below)

“Upon execution of this Agreement by the Parties, and the satisfaction of all other applicable legal requirements, NMFS will issue a permit under Section 10(a)(1)(A) of the ESA to assure the Participant may incidentally take Covered Species, in accordance with the Site Plan and Agreement, as a result of Routine Land Use and Beneficial Management Activities as described in each Agreement, and except where such Routine Land Use 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 Participant maintaining the Baseline and/or achieving the Elevated Baseline Conditions set forth in the Site Plan, complying fully with the Agreement and

their Site Plan, and so long as the continuation of Routine Land Use and Beneficial Management 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 Non-Covered species, including the take of Non-Covered Species and the adverse modification or destruction of their designated critical habitat.

G. Signatures of NMFS, CDFW and the Permittee

Permittee _____ **Date** _____

NMFS _____ **Date** _____

SEPARATE SIGNATURE BLOCK FOR CDFW:

By signing the Template Safe Harbor Agreement CDFW expresses its expectation that the Agreement along with a Permittee’s Site Plan Agreement signed by NMFS, and the NMFS ESP, could meet the requirements of section 2089.22 of the California Fish and Game Code with respect to the particular property described in the Site Plan Agreement. However, CDFW will not make such determination until reviewing that Site Plan Agreement signed by NMFS and the NMFS ESP.

CDFW _____ **Date** _____

APPENDIX A

Deed for Grenada Novy Ranches

Recording Requested by &
When Recorded Return To:

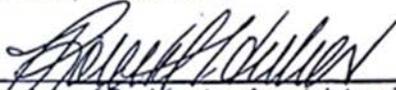
Lowell L. Novy, D.V.M.
653 Allegro Court
Simi Valley, CA 93065

Siskiyou County Recorder
Leanna Dancer, Recorder

DOC - 08-0009404
Check Number 6087
Monday, AUG 25, 2008 11:50:11
Ttl Pd \$23.00 Nbr-0000149317
JES/CI/1-6

QUITCLAIM DEED

Documentary Transfer Tax \$-0-



Signature of Declarant or Agent determining tax.

HUBER & TAKASUGI
Firm Name

This conveyance is not pursuant to sale; is to the inter vivos trust for the benefit of grantor(s) and is exempt. R&T 11911

FOR VALUABLE CONSIDERATION, receipt of which is hereby acknowledged, LOWELL L. NOVY hereby remises, releases and forever quitclaims to LOWELL L. NOVY, Trustee of the LOWELL L. NOVY TRUST, under Declaration of Trust, Dated June 22, 2004, the following described real property in the County of Siskiyou, State of California:

PARCEL I:

Being a part of Section 19, Township 44 North, Range 5 West, M.D.M., described as:

BEGINNING at a point on the West line of said Section 19 from which the Southwest corner of said Section 19 bears South 1200 feet; thence North 56° 04' East, 1200.0 feet; thence North 40° 51' East 524.0 feet; thence North 8° 56' East 538.4 feet; thence North 28° 45' East 363.1 feet; thence North 53° 00' East 396.0 feet to a point; thence on a diagonal line Northwesterly to the Northeast corner of the South half of the Northwest quarter of the Northwest quarter of said Section 19; thence Westerly along the North line of the South half of the Northwest quarter of the Northwest quarter to a point on the West line of said Section 19; thence South along the West line of said Section 19 to the place of beginning.

PARCEL II:

The North half of the Southwest quarter of the Southwest quarter of Section 13, and all that part of the North half and the North half of the South half of

said Section 13 lying West of a diagonal line running from the Southeast corner of the Northwest quarter of the Southeast quarter of said Section 13 to the Northeast corner of the West half of the Northeast quarter of the Northwest quarter of said Section 13, all in Township 44 North, Range 6 West, M.D.M.

PARCEL III:

All that portion of the Southeast quarter of the Southeast quarter of Section 14 and the Northeast quarter of the Northeast quarter of Section 23, Township 44 North, Range 6 West, M.D.M., described as:

BEING a strip of land 20 feet in width beginning at the Southeast corner of the Northeast quarter of the Northeast quarter of Section 23; thence North along the East line of said Sections 23 and 14, a distance of 1900.0.

PARCEL IV:

All that portion of the North half of Section 25, Township 44 North, Range 6 West, M.D.M., lying North and East of the centerline of the Shasta River.

EXCEPTING THEREFROM the following Exceptions A and B and the following described easements.

EXCEPTION A: A strip of land 660 feet wide and 158_ feet in length beginning at the East one-quarter corner of said Section 25. (Said 660 feet runs East and West and said 1582 feet runs North and South.)

EXCEPTION B: All that portion of Section 25, Township 44 North, Range 6 West, Mount Diablo Meridian, described as follows:

Commencing at a 2 inch iron pipe at the East one-quarter corner of Section 24, Township 44 North, Range 6 West, as shown on that certain map recorded in Record Survey Book No. 6 at page 118, Siskiyou County Records; thence S. 0° 38' 35" W., 3757.14 feet to an iron pipe on the Northerly line of the C. T. Drummond parcel in the Northeast one-quarter of said Section 25 and the TRUE POINT OF BEGINNING; thence N. 88° 50' 23" W., 654.22 feet along said North line of said Drummond property to an iron pipe at the Northwest corner thereof; thence S. 0° 34' 25" W., 904.26 feet along the West line of said Drummond property to an iron pipe; thence N. 77° 17' 35" W., 121.11 feet; thence N. 52° 10' 36" W., 464.31 feet; thence N. 47° 32' 13" W., 608.25 feet; thence N. 40 48' 20" E., 222.60 feet; thence N. 20° 29' 49" W., 252.71 feet; thence N. 03° 10' 52" E., 314.50 feet; thence N. 17° 22' 32" E., 400.60 feet; thence S. 82° 16' 20" E., 1429.03 feet to a 3/4 inch iron pipe set in the existing stone and wire fence between Drummond and Jenkins; thence S. 82° 15' 20" E., to a point on the East line of said Section 25 and the West line of the Drummond property; thence Southerly

along said East line of Section 25 to a point which bears S. 88° 50' 28" E. from the TRUE POINT OF BEGINNING; thence N. 88° 50' 28" W. to the TRUE POINT OF BEGINNING.

ALSO RESERVING a non-exclusive easement for access to the Shasta River over 20.00 foot wide strip of land lying adjacent to and Westerly and Northerly of the following described line:

Beginning at the most Southerly corner of the above described Exception B, which corner lies on the West line of the Drummond property; thence Southerly along said West line of property to the East-West midline of Section 25; thence Westerly along said East-West sideline to the Shasta River.

ALSO RESERVING a non-exclusive easement for electrical power transmission over a strip of land 10.00 feet wide lying 5 feet on each side of the following described centerline:

Beginning at a point from which the Northwest corner of the above described Exception B bears N. 17° 22' 32" E., 235.0 feet; thence N. 89° 03' 28" W., 2553.0 feet, more or less to the existing electrical power facilities near the North one-quarter corner of Section 25.

ALSO RESERVING a non-exclusive easement for purposes of operating and maintaining water conveyance facilities, including pumps, pipelines, canals, ditches or flumes over a strip of land 20.00 feet wide lying 10 feet on each side of the following described centerline:

Beginning at a point in the centerline of the existing ditch which bears W. 40° 28' 20" E. from the most Westerly corner of the above described Exception B, thence following the centerline of said ditch Northwesterly, Westerly and Southeasterly to the beginning of said ditch at the outfall of the existing pipeline; thence Southeasterly along the centerline of said pipeline to the Shasta River.

PARCEL V:

The South half of the North half of the North half, the South half of the North half of Section 24, and the South half of Section 24, lying East of the centerline of the Shasta River, all in Township 44 North, Range 6 West, M.D.M.

RESERVING from Parcels IV and V a non-exclusive easement for ingress and egress and public utilities over a 60.00 foot wide strip of land lying 30 feet on each side of the following described centerline:

Beginning at a point on the Northerly line of Exception B described above, (following Parcel 5) from which the East one-quarter corner of said Section 24 bears N. 15° 46' 49" E., 3022.97 feet, and from which point of beginning the Northwest corner of the above described Exception B bears N. 82° 16' 20" W., 623.53 feet; thence N. 09° 14' 22" W., 620.06 feet to the centerline of existing County Road A-12.

BEGINNING at a point in the Shasta River from which the Southwest corner of Section 24 bears S. 5° 03' 32" W. 695.99 feet; thence S. 72° 41' E. 642.0 feet; thence N. 33° 49' E. 741.0 feet, more or less, to the South line of the Big Springs Road; thence S. 69° 29' E. 372.0 feet to a point on the intersection of fence and North line of Big Springs Road: thence N. 47° 52' E. 573.0 feet along fence, thence N. 39° 29' W. 762.0 feet along fence; thence N. 73° 35' W. 935.5 feet along fence; thence N. 6° 07' W. 233.0 feet along dump ground fence; thence N. 31° 02' W. 488.0 feet along dump ground line to the East line of the Big Springs Road; thence N. 36° 59' W. 244.0 feet to the point of intersection of the West line of Section 24 and the North and East Big Springs Road fence.

ALSO EXCEPTING THEREFROM that certain portion of the Northwest quarter of Section 24, Township 44 North, Range 6 West, M.D.B. & M., more particularly described as follows, to-wit:

BEGINNING at corner 25 of Grenada Ranch Tract as recorded in Map Book 2, page 153; thence N. 65° 17' 20" East 3381.22 feet to a point on Section line common to Sections 23 and 24, Township 44 North, Range 6 West, M.D.B. & M.; thence South 66° 42' 13" East 21.98 feet to the "TRUE POINT OF BEGINNING"; thence North 0° 47' 48" East 84.61 feet and parallel with the aforesaid section line; thence North 20° 29' 12" East 262.14 feet; thence South 61° 36' 4" East 371.95 feet; thence South 7° 45' 48" East 17.53 feet; thence South 42° 5' 12" West 229.51 feet; thence North 53° 51' 26" West 70.15 feet; thence North 66° 42' 18" West 243.14 feet to the true point of beginning.

ALSO EXCEPTING THEREFROM all that portion of Section 24, Township 44 North, Range 6 West, M.D.M., described as follows:

A strip of land 20 feet in width to be used for road purposes, the side lines of which are described as BEGINNING at a point on the North line of the Country Road leading from Grenada to Big Springs where said North line of said road intersects the West Section line of Section 24, Township 44 North, Range 6 West, M.D.M.; thence in a Southeasterly direction along the North line of said County Road to a point (said point being identical to the point of intersection of a line drawn perpendicular to and 20 feet in length from said

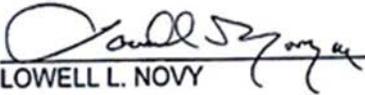
Section line with the North line of said Country Road); thence Northerly and parallel to said Section line 1030 feet, more or less, to point on the North line of the Southwest quarter of the Northwest 1/4 of said Section 24; thence approximately North 63° 26' East 1455 feet, more or less, to a point on the East line of the Northwest quarter of the Northwest quarter and 660 feet South of the North line of said Section; thence West and parallel to the North line of said Section to a point that bears 20 feet from and perpendicular to the last-described right-of-way line; thence approximately South 63° 26' West 1459 feet , more or less, to a point on the West Section line of said Section 24; thence Southerly along said Section line to a point on the North line of said Country Road and the point of beginning.

ALSO EXCEPTING from all the above-described parcels the right of way and easement of County Records.

ALSO TOGETHER with that certain easement described in the Grant of Easement between Jerald J. Jenkins and Barbara Jenkins, husband and wife, Grantor and Lowell L. Novy and Esther Novy, husband and wife, Grantee dated June 23, 1976 and recorded June 29, 1976, Official Records, Siskiyou County Records.

APN: 038-200-01
038-210-03
038-220-02 and -03
038-230-04
039-320-08

Dated: August 15, 2008


LOWELL L. NOVY

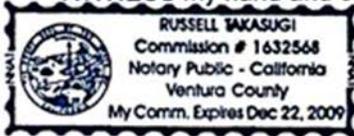
ACKNOWLEDGMENT

State of California)
) ss
County of Ventura)

On August 15, 2008, before me, Russell Takasugi, a Notary Public, personally appeared **LOWELL L. NOVY**, who proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same in his authorized capacity, and that by his signature on the instrument he executed said instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.




Notary Public

[SEAL]

Appendix B1

Statements of Water Use – Novy/Rice/Zenkus

[SUMMARY OF FINAL SUBMITTED VERSION]

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE FOR 2016

Primary Owner: NOVY RANCHES
Statement Number: S000808
Date Submitted: 02/04/2017

1. Water is used under	Riparian Claim Pre-1914 Claim
2. Year diversion commenced	1900

3. Purpose of Use	
Irrigation	488 Acres Pasture
Stockwatering	350. cattle

4. Changes in Method of Diversion	

Special Use Categories	
C1. Are you using any water diverted under this right for the cultivation of cannabis?	No

5-6. Maximum Rate of Diversion for each Month and Amount of Water Diverted and Used				
Month	Rate of diversion (CFS)	Amount directly diverted (Acre-Feet)	Amount diverted or collected to storage (Acre-Feet)	Amount beneficially used (Acre-Feet)
January	0	0	0	0
February	0	0	0	0
March	4	226	0	226
April	4	226	0	226
May	4	226	0	226
June	4	226	0	226
July	4	226	0	226
August	4	226	0	226
September	4	226	0	226
October	4	226	0	226
November	0	0	0	0
December	0	0	0	0
Total		1808	0	1808
Type of Diversion	Direct Diversion Only			
Comments				

Water Transfers	
6d. Water transferred	No
6e. Quantity transferred (Acre-Feet)	
6f. Dates which transfer occurred	/ to /

Appendix B2

Statements of Water Use – Novy Pump

[SUMMARY OF FINAL SUBMITTED VERSION]

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE FOR 2016

Primary Owner: NOVY RANCHES
Statement Number: S024748
Date Submitted: 02/04/2017

1. Water is used under	Riparian Claim Pre-1914 Claim
2. Year diversion commenced	1900

3. Purpose of Use	
Irrigation	465 Acres Pasture
Stockwatering	200 <i>cattle</i>

4. Changes in Method of Diversion

Special Use Categories
C1. Are you using any water diverted under this right for the cultivation of cannabis? No

5-6. Maximum Rate of Diversion for each Month and Amount of Water Diverted and Used				
Month	Rate of diversion (CFS)	Amount directly diverted (Acre-Feet)	Amount diverted or collected to storage (Acre-Feet)	Amount beneficially used (Acre-Feet)
January	0	0	0	0
February	0	0	0	0
March	5.50	319.60	0	319.60
April	5.50	319.60	0	319.60
May	5.50	319.60	0	319.60
June	5.50	319.60	0	319.60
July	5.50	319.60	0	319.60
August	5.50	319.60	0	319.60
September	5.50	319.60	0	319.60
October	5.50	319.60	0	319.60
November	0	0	0	0
December	0	0	0	0
Total		2556.80	0	2556.80
Type of Diversion	Direct Diversion Only			
Comments				

Water Transfers	
6d. Water transferred	No
6e. Quantity transferred (Acre-Feet)	
6f. Dates which transfer occurred	/ to /

Appendix B3

Statements of Water Use - Zenkus

[SUMMARY OF FINAL SUBMITTED VERSION]

SUPPLEMENTAL STATEMENT OF WATER DIVERSION AND USE FOR 2016

Primary Owner: RITA A ZENKUS
Statement Number: S000792
Date Submitted: 02/04/2017

1. Water is used under	Riparian Claim Pre-1914 Claim
2. Year diversion commenced	1900

3. Purpose of Use	
Irrigation	98 Acres Pasture

4. Changes in Method of Diversion	

Special Use Categories	
C1. Are you using any water diverted under this right for the cultivation of cannabis?	No

5-6. Maximum Rate of Diversion for each Month and Amount of Water Diverted and Used				
Month	Rate of diversion (CFS)	Amount directly diverted (Acre-Feet)	Amount diverted or collected to storage (Acre-Feet)	Amount beneficially used (Acre-Feet)
January	0	0	0	0
February	0	0	0	0
March	2.50	141.25	0	141.25
April	2.50	141.25	0	141.25
May	2.50	141.25	0	141.25
June	2.50	141.25	0	141.25
July	2.50	141.25	0	141.25
August	2.50	141.25	0	141.25
September	2.50	141.25	0	141.25
October	2.50	141.25	0	141.25
November	0	0	0	0
December	0	0	0	0
Total		1130.00	0	1130.00
Type of Diversion	Direct Diversion Only			
Comments				

Water Transfers	
6d. Water transferred	No
6e. Quantity transferred (Acre-Feet)	
6f. Dates which transfer occurred	/ to /
6g. Transfer approved by	

Appendix C

Zenkus Lease Agreement

Your copy

LEASE/SUBLEASE AGREEMENT

February 2017

We, Joseph and Rita Zenkus (Leasers) lease to Lowell Novy, also known as Novy Shasta Ranch, (Lessee) our Shasta River property, also known as Parcels 38-220-010 and 38-190-090 of meadow pasture for one year beginning on March 1, 2017 for use as pasture for cattle. Lease payment of \$4,500.00 should be received by April 15, 2017. A "No Hunting" control and the use of the riparian water rights of the leased property is included in this agreement.

The property will not be subleased without the prior written permission of the leasers. Any sublease agreement information is to include the subleases individual(s) name(s), address (es) and current telephone number(s). Additionally one-half of any sublease payment exceeding the basic lease amount will be due and paid to the leasers within 30 days of the sublease payment. Lessee shall save leasers harmless from any and all suits, actions, claims or demands arising out of injuries to or death of any person or persons to or loss of any property in or about the leased premises caused by the act of the lessees, their servants, agents, employees, patrons, customers or invitees, whether due to the negligence of lessees or otherwise. The lessee shall provide all expenses of defending any suits, actions, claims or demands that may be filed or claimed against the leaser. Lessee will also be responsible for maintaining all property fences, fertilizing, dragging and irrigation of the property in the scheduled rotation.

Dated: 2/28/17

Joseph A Zenkus
Joseph A Zenkus
Rita A Zenkus
Rita A Zenkus

Lowell Novy
Lowell Novy

Appendix D1

Grenada Novy Ranches NCRWQCB - TMDL Waiver



North Coast Regional Water Quality Control Board
November 2, 2016

Ms. Judy Novy Holmes Novy Ranches P.O. Box 144 Gazelle, CA 96034 judy@novyranches.com

Dear Ms. Holmes: Subject: Shasta TMDL Waiver Compliance and Novy Ranch Assessment Report File: Shasta River DO & Temperature TMDL; TMDL Waiver Assessments

Thank you for meeting with my staff and providing the tour of your ranches on March 9 and August 18, 2016. In the attached ranch assessment reports, Rebecca Fitzgerald states that you and your family manage the assessed portions of the Novy Grenada Ranch and Novy Gazelle Ranch in a manner consistent with water quality goals.

I commend you and your family's stewardship of the Shasta River. You have proactively installed fencing along the river, planted riparian trees, installed upslope stockwater systems, upgraded the Novy diversion pump, and worked with others on watershed stewardship and monitoring projects. Additionally, cattle grazing in riparian areas along the Shasta River are limited to the spring and fall, and cattle are removed when vegetation stubble height reaches eight inches. This helps to ensure the natural establishment and persistence of riparian vegetation, which will improve shade and essential riparian functions.

Ms. Fitzgerald observed that the management measures and practices employed on the ranches prevent, minimize, and control anthropogenic discharges of nutrients, animal waste, other oxygen consuming materials, fine sediment, and elevated solar radiation loads, including the loss of riparian vegetation, from affecting the Shasta River. Assuming no significant changes in conditions and management practices, you are in compliance with the Shasta River Dissolved Oxygen and Temperature Total Maximum Daily Load (TMDL) Conditional Waiver of Waste Discharge Requirements (Resolution No. R1-2012-0083).

JOHN W. CORBETT, CHAIR | MATTHIAS ST. JOHN, EXECUTIVE OFFICER

5550 Skyline Blvd., Suite A, Santa Rosa, CA 95403 | www.waterboards.ca.gov/northcoast

Ms. Judy Novy Holmes - 2 - November 2, 2016

Your efforts to manage the two ranches in a manner consistent with water quality goals are acknowledged and appreciated. Additionally, I encourage your continued involvement in salmonid habitat improvement projects at the ranch and throughout the watershed. Thank you for your efforts to protect the quality of water on and adjacent to your ranches and in the Shasta River Watershed.

Please contact Ms. Fitzgerald regarding any questions at 707-576-2650, or rebecca.fitzgerald@waterboards.ca.gov.

Sincerely,

Matthias St. John Executive Officer

161102_RMF_dp_NovyGrenada&GazellRanch_ComplianceLtr

Attachments: Novy Grenada Ranch Assessment Report Novy Gazelle Ranch Assessment Report

cc: Mr. Tim Beck, Beck Consulting & Repair, 20015 Gazelle Callahan Road, Gazelle, CA, 96034, tbeck@hughes.net

Appendix D2

Zenkus Property NCRWQCB - TMDL Waiver



North Coast Regional Water Quality Control Board

August 22, 2017

Judy Novy Holmes Novy Ranches P.O. Box 144 Gazelle, CA 96034 judy@novyranches.com

Joseph and Rita Zenkus 1869 Baron Court Yuba City, CA 95991

Dear Ms. Holmes and Mr. and Ms. Zenkus: Subject: Zenkus Ranch Follow-up Assessment Report and TMDL Waiver Compliance File: Shasta River DO & Temperature TMDL; TMDL Waiver Assessments

Thank you for meeting with my staff and providing the tour of your ranch on July 21, 2017. In the attached ranch assessment report, Eli Scott states that you and your families manage the assessed portions of the Zenkus parcels in a manner consistent with maintaining water quality protections. The purpose of Mr. Scott's visit was to follow up on an assessment completed by Rebecca Fitzgerald on August 18, 2016, where she observed a swale that could provide surface water connectivity to the Shasta River and introduce tailwater during irrigation season.

In order to address an observed water quality issue and remain in compliance with the Shasta River Dissolved Oxygen and Temperature Total Maximum Daily Load Conditional Waiver of Waste Discharge Requirements, Resolution No. R1-2012-0083 (Shasta River TMDL Conditional Waiver), you were required to develop and submit a plan to describe actions and a timeline to disconnect the one observed swale and any other non-bermed swales from draining to the Shasta River. Mr. Scott is in receipt of this plan and observed the berm repairs during his assessment.

I commend your stewardship of the Shasta River. With the completion of this work, your operation is in compliance with the Shasta River TMDL Conditional Waiver. Your efforts to manage the Zenkus properties in a manner consistent with maintaining water quality protections are acknowledged and appreciated. Additionally, I encourage your continued

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Zenkus Ranch - 2 - August 22, 2017

involvement in salmonid habitat improvement projects at the ranch and throughout the watershed. Thank you for your efforts to protect the quality of water on and adjacent to your ranch and in the Shasta River Watershed.

Please contact Mr. Scott regarding any questions at 707-576-2610 or Elias.Scott@waterboards.ca.gov.

Sincerely,

Matthias St. John Executive Officer

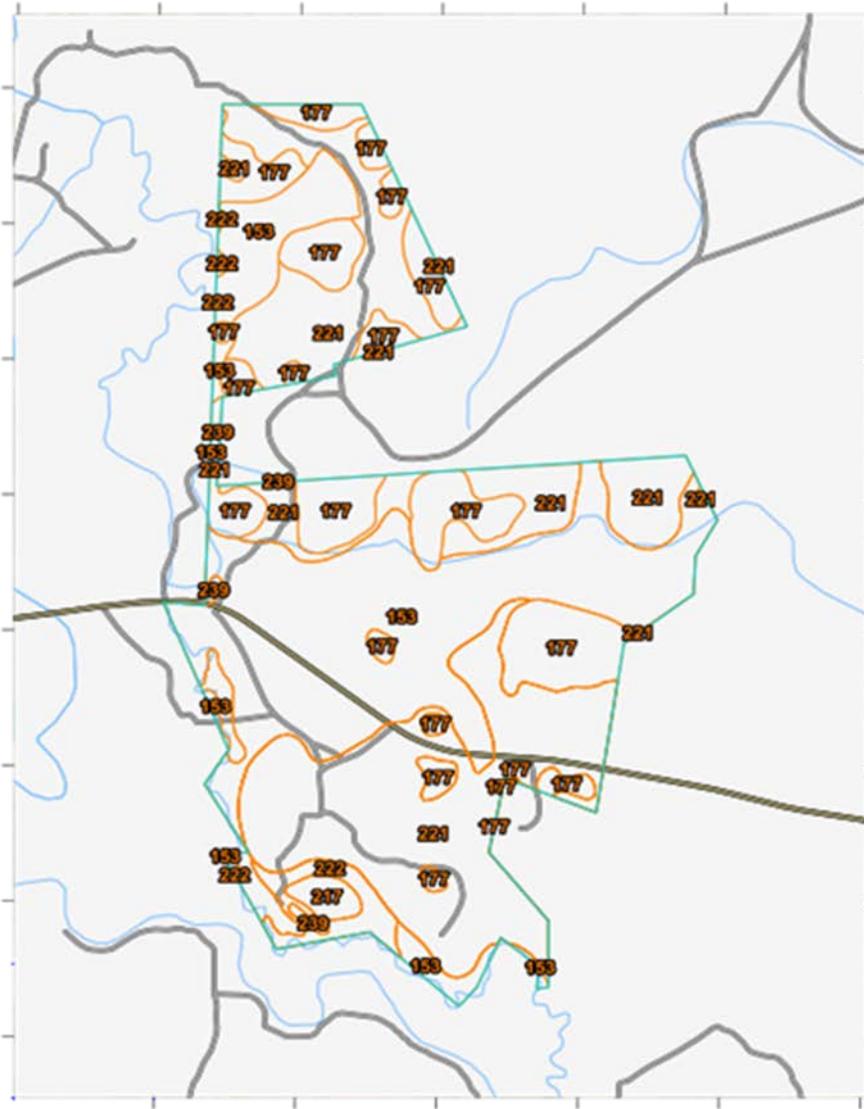
170822_EWS_dp_ZenkusRanch_ComplianceLtr

Attachment: Zenkus Ranch Follow Up Assessment Report

cc: Mr. Tim Beck, Beck Consulting & Repair, 20015 Gazelle Callahan Road, Gazelle, CA, 96034, tbeck@hughes.net

Appendix E1

Grenada Novy Ranches Soils Map



Appendix E2

Grenada Novy Ranches Soil Descriptions

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Soil survey

152—Facey loam, 5 to 15 percent slopes. This deep, well drained soil is on toe slopes of mountains. It formed in colluvium derived dominantly from metamorphosed rock. The native vegetation is mainly perennial grasses, shrubs, forbs, and a few scattered juniper trees. Elevation is 2,500 to 5,000 feet. The average annual precipitation is about 18 inches, the average annual air temperature is about 46 degrees F, and the average frost-free period is about 125 days.

Typically, the surface layer is dark grayish brown and grayish brown loam about 10 inches thick. The subsoil is brown, yellowish brown, and very pale brown clay loam about 49 inches thick. Bedrock is at a depth of 59 inches.

Included in this unit are small areas of Bonnet soils that have slopes of 5 to 15 percent, Jilson gravelly loam, and a soil that is similar to this Facey soil but has bedrock at a depth of more than 60 inches. Also included are a few areas of soils that have slopes of 15 to 30 percent. Included areas make up about 15 percent of the total acreage.

Permeability of this Facey soil is moderately slow. Available water capacity is low to high. Effective rooting depth is 40 to 60 inches. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used for cultivated crops, hay and pasture, rangeland, and homesite development. The main crops are irrigated and nonirrigated wheat and barley.

This unit is suited to crops commonly grown in the area. It is limited mainly by slope. Sprinkler or contour ditch irrigation is suited to the unit. The method used generally is governed by the crop grown. Pipe, ditch lining, or drop structures should be installed in irrigation ditches to facilitate irrigation and prevent excessive ditch erosion. Irrigation water should be applied at a rate that insures optimum production without increasing runoff, deep percolation, and erosion.

Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tith. All tillage should be on the contour or across the slope.

This unit is suited to hay and pasture. It has few limitations. Proper grazing practices, weed control, and fertilizer are needed for maximum quality of forage. Grazing when the soil is wet results in compaction of the surface layer, poor tith, and excessive runoff.

This unit is suited to use as rangeland. It has few limitations. The soil in this unit responds well to fertilizer, to range seeding, and to proper grazing use. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock. If the shrubs are managed to create open areas, the soil produces a good stand of desirable grasses and forbs.

The potential plant community on this unit includes bottlebrush squirreltail, Thurber needlegrass, Idaho fescue, bluebunch wheatgrass, and beardless wheatgrass.

This unit is suited to homesite development. The main limitations are load supporting capacity, shrink-swell potential, moderately slow permeability, and slope. Only the part of the site that is used for construction should be disturbed. Plans for homesite development should provide for the preservation of as many trees as possible. Establishing and maintaining plant cover can be achieved through proper fertilizing, seeding, mulching, and shaping of the slopes.

If this unit is used for septic tank absorption fields, the limitation of moderately slow permeability can be overcome by increasing the size of the absorption field. The steepness of slope is a concern in installing absorption fields. Absorption lines should be installed on the contour.

If buildings are constructed on the soil in this unit, properly designing foundations and footings and diverting runoff away from buildings help to prevent structural damage as a result of shrinking and swelling. Buildings and roads should be designed to offset the limited ability of the soil to support a load.

This map unit is in capability unit IIIe-1(21), irrigated and nonirrigated.

153—Gazelle silt loam. This very poorly drained soil is in basins. It is moderately deep to a hardpan. The soil formed in alluvium derived from mixed rock sources and is slightly affected by salts. Slope is 0 to 2 percent. The vegetation in areas not cultivated is mainly salt-tolerant grasses, shrubs, and forbs. Elevation is 2,500 to 3,500 feet. The average annual precipitation is about 13 inches, the average annual air temperature is about 50 degrees F, and the average frost-free period is about 125 days.

Typically, the surface layer is light brownish gray and light gray, strongly alkaline silt loam about 11 inches thick. The upper 14 inches of the underlying material is white silt loam. The next 13 inches is a white, strongly cemented hardpan. The lower part to a depth of 60 inches or more is white silt loam. In some areas the surface layer is sandy loam.

Included in this unit are small areas of Montague clay and Salisbury clay loam. Also included are a few areas of soils that are similar to this Gazelle soil but are free of salts or are moderately affected by salts and contain sodium. Included areas make up about 15 percent of the total acreage.

Permeability of this Gazelle soil is moderately rapid above the hardpan. Available water capacity is low to moderate. Effective rooting depth is 20 to 40 inches. Runoff is very slow. A seasonal high water table is at a depth of 0 to 18 inches from December through March. This soil is subject to long periods of flooding from November through May.

This unit is used for hay and pasture, rangeland, and homesite development.

This unit is suited to hay and pasture. The main limitations are slight salinity, depth to the hardpan, the seasonal high water table, and the hazard of flooding.

The concentration of salts in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table; however, the concentration of salts can be reduced if drainage is provided and an adequate irrigation water management program is followed. Sprinkler irrigation is the most suitable method of applying water. Salt-tolerant species are most suitable for planting.

The hardpan can be ripped and shattered. This increases the effective rooting depth and improves internal drainage.

Proper grazing practices, weed control, and fertilizer are needed for maximum quality of forage. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excessive runoff.

This unit is suited to use as rangeland. The main limitations are the seasonal high water table and slight salinity. The soil in this unit responds well to range seeding and to proper grazing use. Plants that tolerate wetness and slight salinity should be seeded. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

The potential plant community on this unit includes inland saltgrass, carex, and rush.

This unit is poorly suited to homesite development. The main limitations are salinity, the hazard of flooding, depth to the hardpan, and the seasonal high water table. Plants that tolerate a high water table and slight salinity should be selected to establish lawns, shrubs, trees, and vegetable gardens. Drainage is needed for best results with most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens.

Drainage is needed if roads and building foundations are constructed. Flooding can be controlled only by use of major flood control structures. The hardpan is ripable and therefore is not a serious limitation for most engineering uses.

Onsite sewage disposal systems often fail or do not function properly during periods of high rainfall because of the hardpan. The high water table increases the possibility of failure of septic tank absorption fields.

This map unit is in capability subclass Vw(21), irrigated and nonirrigated.

154—Gazelle Variant sandy clay loam. This very poorly drained soil is in basins. It is shallow to a hardpan. The soil formed in alluvium derived from mixed rock sources. It is slightly affected by salts. Slope is 0 to 2 percent. The vegetation in areas not cultivated is mainly salt-tolerant grasses, shrubs, and forbs. Elevation is 2,500 to 3,500 feet. The average annual precipitation is about 13 inches, the average annual air temperature is

about 50 degrees F, and the average frost-free period is about 125 days.

Typically, the surface layer is light brownish gray sandy clay loam about 12 inches thick. The next layer is a light brownish gray and dark grayish brown, moderately cemented hardpan about 6 inches thick. The underlying material to a depth of 60 inches or more is white silt loam.

Included in this unit are small areas of Montague clay and Salisbury clay loam. Also included are a few areas of soils that are similar to this Gazelle Variant soil but are free of salts or are moderately or strongly affected by salts and contain sodium in places. Included areas make up about 15 percent of the total acreage.

Permeability of this Gazelle Variant soil is moderately slow above the hardpan. Available water capacity is very low to low. Effective rooting depth is 10 to 20 inches. Runoff is very slow. A seasonal high water table is at a depth of 0 to 12 inches from December through April. This soil is subject to brief periods of flooding in December and January.

This unit is used for hay and pasture, rangeland, and homesite development.

This unit is poorly suited to irrigated and nonirrigated hay and pasture. The main limitations are salinity, depth to the hardpan, the seasonal high water table, and the hazard of flooding. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excessive runoff.

The concentration of salts in the surface layer limits the production of plants suitable for hay and pasture. Leaching the salts from the surface layer is limited by the high water table. However, the concentration of salts can be reduced if drainage is provided and an irrigation water management program is followed. Salt-tolerant species are most suitable for planting.

The hardpan can be ripped and shattered. This increases the effective rooting depth and improves internal drainage.

This unit is suited to use as rangeland. The main limitations are the seasonal high water table, salinity, and the hazard of flooding. The soil in this unit responds well to range seeding and to proper grazing use. Plants that tolerate wetness and salinity should be seeded. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

The potential plant community on this unit includes inland saltgrass, carex, and rush.

This unit is poorly suited to homesite development. The main limitations are salinity, the hazard of flooding, depth to the hardpan, and the seasonal high water table. Plants that tolerate a high water table and slight salinity should be selected to establish lawns, shrubs, trees, and vegetable gardens. Drainage is needed for best results with most lawn grasses, shade trees, ornamental trees, shrubs, vines, and vegetable gardens.

This map unit is in capability subclass VIII(22), nonirrigated.

176—Lava flows-Xerorthents complex, 0 to 50 percent slopes. This map unit is on mountains. The vegetation is mainly brush, shrubs, annual grasses, and forbs. Elevation is dominantly 3,000 to 5,000 feet but ranges to nearly 8,300 feet on Gooseneck Mountain. The average annual precipitation is 20 to 40 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free season is 60 to 125 days.

This unit is about 40 percent Lava flows and 30 percent Xerorthents.

Included in this unit are small areas of soils that are similar to Xerorthents but are underlain by bedrock at a depth of 40 to 60 inches. Also included are areas of Rubble land and Riverwash. Included areas make up about 30 percent of the mapped acreage.

Lava flows consists of sharp jagged surfaces, crevices, and angular lava blocks.

Xerorthents are very shallow to moderately deep, excessively drained soils that formed in residual material derived from basalt and andesite. These soils have a surface layer that is variable in texture and is underlain by bedrock at a depth of 8 to 40 inches.

This unit is used for wildlife habitat and watershed.

This map unit is in capability subclass VIII(22), nonirrigated.

177—Lithic Haploxerolls-Rock outcrop complex, 0 to 65 percent slopes. This map unit is on mountains.

The vegetation is mainly brush, shrubs, annual grasses, and forbs. Elevation ranges from 2,000 to 6,000 feet. The average annual precipitation is 20 to 50 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free season is 60 to 125 days.

This unit is about 40 percent Lithic Haploxerolls and 30 percent Rock outcrop.

Included in this unit are soils that are similar to Lithic Haploxerolls but have a clay loam or clay subsoil or are underlain by bedrock at a depth of 10 to 40 inches. Also included are areas of Rubble land and Riverwash. Included areas make up about 30 percent of the mapped acreage.

The Lithic Haploxerolls are very shallow, excessively drained soils that formed in residual material derived from intrusive igneous or metamorphic rock. These soils have a dark colored surface layer that is variable in texture and is underlain by bedrock at a depth of 8 to 10 inches. Reaction is slightly acid or neutral.

Rock outcrop consists of exposures of intrusive igneous or metamorphic rock that is barren of vegetation.

This unit is used for wildlife habitat and watershed.

This map unit is in capability subclass VIII(5,22), nonirrigated.

178—Lithic Xerorthents-Rock outcrop complex, 0 to 65 percent slopes. This map unit is on mountains. The vegetation is mainly brush, shrubs, annual grasses, and forbs. Elevation is 2,000 to 6,000 feet. The average annual precipitation is 20 to 50 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free season is 50 to 125 days.

This unit is about 40 percent Lithic Xerorthents and 30 percent Rock outcrop.

Included in this unit are small areas of soils that are similar to Lithic Xerorthents but are 10 to 40 inches deep to bedrock, Rubble land, Riverwash, and areas where slopes are more than 65 percent. These included areas make up about 30 percent of the mapped acreage.

Lithic Xerorthents are very shallow and excessively drained. They formed in residual material derived from intrusive igneous, sedimentary, or metamorphic rock. These soils have a surface layer that varies in texture and is underlain by bedrock at a depth of 8 to 10 inches.

Rock outcrop consists of exposures of intrusive igneous, sedimentary, or metamorphic rock.

This unit is used for wildlife habitat and watershed.

This map unit is in capability subclass VIII(5), nonirrigated.

179—Louie loam, 0 to 2 percent slopes. This well drained soil is on terraces. It is moderately deep to a hardpan. The soil formed in alluvium derived dominantly from extrusive igneous rock. The vegetation in areas not cultivated is mainly perennial grasses, shrubs, and scattered juniper. Elevation is 2,500 to 3,500 feet. The average annual precipitation is about 13 inches, the average annual air temperature is about 50 degrees F, and the average frost-free period is about 125 days.

Typically, the surface layer is light brownish gray loam about 12 inches thick. The upper 9 inches of the subsoil is yellowish brown loam. The lower 8 inches is yellowish brown sandy clay loam. The next layer is a light yellowish brown, strongly cemented hardpan about 3 inches thick. The underlying material to a depth of 60 inches or more is stratified sand, gravel, cobbles, and some stones. In some areas the surface layer is sandy loam.

Included in this unit are small areas of a soil that is similar to this Louie soil but has a hardpan at a depth of more than 40 inches. Also included are small areas of Redola loam. Included areas make up about 15 percent of the total acreage.

Permeability of this Louie soil is moderately slow above the impervious hardpan but is rapid below. Available water capacity is low to moderate. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight.

This unit is used for cultivated crops, hay and pasture, rangeland, and homesite development.

This unit is suited to irrigated wheat and barley. It is limited mainly by low to moderate available water

Included in this unit are small areas of shallow and very shallow soils that vary in texture, Mary loam, Jilson gravelly loam, Terwilliger loam, sedimentary rock, serpentine, and soils that have slopes of 50 to 80 percent. Included areas make up about 15 percent of the mapped acreage.

This unit is used for wildlife habitat and watershed. A few areas are also used for quarrying limestone.

This map unit is in capability subclass VIII(5,21,22), nonirrigated.

217—Salisbury clay loam, 0 to 2 percent slopes.

This well drained soil is on terraces. It is moderately deep to a hardpan. The soil formed in alluvium derived from mixed rock sources. The vegetation in areas not cultivated is mainly perennial grasses, forbs, and shrubs. Elevation is 2,500 to 4,500 feet. The average annual precipitation is about 13 inches, the average annual air temperature is about 48 degrees F, and the average frost-free period is about 125 days.

Typically, the surface layer is gray clay loam about 4 inches thick. The upper 4 inches of the subsoil is dark grayish brown clay loam. The lower 16 inches is dark grayish brown and dark brown clay. The next layer is a strongly cemented hardpan about 8 inches thick. Below this to a depth of 60 inches or more is stratified sand, gravel, and some stones.

Included in this unit are small areas of a Kuck clay loam, Lassen clay, and Mary loam that have slopes of 0 to 2 percent. Also included are a few areas of Medford clay loam. Included areas make up about 15 percent of the total acreage.

Permeability of this Salisbury soil is slow above the impervious hardpan and rapid below it. Available water capacity is low to moderate. Effective rooting depth is 20 to 40 inches. Runoff is slow, and the hazard of water erosion is slight.

This unit is used for cultivated crops, hay and pasture, rangeland, and homesite development.

This unit is suited to irrigated and nonirrigated wheat and barley. It is limited mainly by depth to hardpan. The hardpan can be ripped and shattered. This increases the effective rooting depth and improves internal drainage.

Furrow, border, corrugation, and sprinkler irrigation systems are suited to this unit. The method used generally is governed by the crop grown. In areas where the hardpan has not been ripped, irrigation water must be applied carefully to prevent the development of a perched water table. Drainage may also be required.

Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth.

This unit is suited to hay and pasture. It has few limitations. Proper grazing practices, weed control, and fertilizer are needed for maximum quality of forage. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excessive runoff. Irrigation

water can be applied by the sprinkler and border methods.

This unit is suited to use as rangeland. It has few limitations. The soil in the unit responds well to fertilizer, to range seeding, and to proper grazing use. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

The potential plant community on this unit includes bottlebrush squirreltail, Idaho fescue, bluebunch wheatgrass, and sagebrush.

If this unit is used for homesite development, the main limitations are the depth to the hardpan, low load supporting capacity, the potential for shrinking and swelling, and slow permeability. Mulching, fertilizing, and irrigating are needed to establish lawn grasses and other small seeded plants.

If buildings are constructed on the soil in this unit, properly designing foundations and footings and diverting runoff away from buildings help to prevent structural damage as a result of shrinking and swelling. Buildings and roads should be designed to offset the limited ability of the soil to support a load.

The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan to increase permeability. The limitation of slow permeability can also be overcome by increasing the size of the absorption field.

This map unit is in capability unit III(3-21), irrigated and nonirrigated.

218—Salisbury clay loam, 2 to 9 percent slopes.

This well drained soil is on terraces. It is moderately deep to a hardpan. The soil formed in alluvium derived from mixed rock sources. The vegetation in areas not cultivated is mainly perennial grasses, forbs, and shrubs. Elevation is 2,500 to 4,500 feet. The average annual precipitation is about 13 inches, the average annual air temperature is about 48 degrees F, and the average frost-free period is about 125 days.

Typically, the surface layer is gray clay loam about 4 inches thick. The upper 4 inches of the subsoil is dark grayish brown clay loam. The lower 16 inches is dark grayish brown and dark brown clay. The next layer is a strongly cemented hardpan about 8 inches thick. Below this to a depth of 60 inches or more is stratified sand, gravel, cobbles, and some stones.

Included in this unit are small areas of Kuck clay loam, Lassen clay, Mary loam, and Medford clay loam. Included areas make up about 15 percent of the total acreage.

Permeability of this Salisbury soil is slow above the impervious hardpan and rapid below it. Available water capacity is low to moderate. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used for cultivated crops, hay and pasture, rangeland, and homesite development.

If this unit is used for homesite development, the main limitations are the depth to rock, low load supporting capacity, the potential for shrinking and swelling, gravel in the surface layer, and slow permeability. Removal of pebbles in disturbed areas is required for best results when landscaping, particularly in areas used for lawns. Mulching, fertilizing, and irrigating are needed to establish lawn grasses and other small seeded plants.

If buildings are constructed on the soil in this unit, properly designing foundations and footings and diverting runoff away from buildings help to prevent structural damage as a result of shrinking and swelling. Buildings and roads should be designed to offset the limited ability of the soil to support a load.

The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan to increase permeability. The limitation of slow permeability can also be overcome by increasing the size of the absorption field.

This map unit is in capability unit IIIe-3(21), irrigated and nonirrigated.

220—Salisbury gravelly clay loam, 5 to 9 percent slopes. This well drained soil is on terraces. It is moderately deep to a hardpan. The soil formed in alluvium derived from mixed rock sources. The vegetation in areas not cultivated is mainly perennial grasses, forbs, and shrubs. Elevation is 2,500 to 4,500 feet. The average annual precipitation is about 13 inches, the average annual air temperature is about 48 degrees F, and the average frost-free period is about 125 days.

Typically, the surface layer is gray gravelly clay loam about 4 inches thick. The upper 4 inches of the subsoil is dark grayish brown gravelly clay loam. The lower 16 inches is dark grayish brown and dark brown gravelly clay. The next layer is a strongly cemented hardpan about 8 inches thick. Below this to a depth of 60 inches or more is stratified sand, gravel, cobbles, and some stones.

Included in this unit are small areas of Kuck clay loam, Lassen clay, Mary loam, and Medford clay loam. Included areas make up about 15 percent of the total acreage.

Permeability of this Salisbury soil is slow above the impervious hardpan and rapid below it. Available water capacity is low to moderate. Effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used for cultivated crops, hay and pasture, rangeland, and homesite development.

This unit is suited to irrigated and nonirrigated wheat and barley. It is limited mainly by the depth to the hardpan and gravel in the surface layer. The hardpan can be ripped and shattered. This increases the effective rooting depth and improves internal drainage.

Furrow, border, corrugation, and sprinkler irrigation systems are suited to this unit. Irrigation water should be applied at a rate that insures optimum production without increasing runoff, deep percolation, and erosion. In areas where the hardpan has not been ripped, irrigation water must be applied carefully to prevent the development of a perched water table. Drainage may also be required.

Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Diversions and grassed waterways may be needed. All tillage should be on the contour or across the slope. Gravel in the surface layer causes rapid wear of equipment used for tillage.

This unit is suited to hay and pasture. It has few limitations. Proper grazing practices, weed control, and fertilizer are needed for maximum quality of forage. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excessive runoff. Irrigation water can be applied by the border and sprinkler methods.

This unit is suited to use as rangeland. It has few limitations. The soil in this unit responds well to fertilizer, to range seeding, and to proper grazing use. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock.

The potential plant community on this unit includes bluebunch wheatgrass, Douglas rabbitbrush, sagebrush, and Idaho fescue.

If this unit is used for homesite development, the main limitations are depth to rock, low load supporting capacity, the potential for shrinking and swelling, slow permeability, and gravel in the surface layer. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed.

Removal of pebbles and cobbles in disturbed areas is required for best results when landscaping, particularly in areas used for lawns. Mulching, fertilizing, and irrigating are needed to establish lawn grasses and other small seeded plants.

If buildings are constructed on the soil in this unit, properly designing foundations and footings and diverting runoff away from buildings help to prevent structural damage as a result of shrinking and swelling. Buildings and roads should be designed to offset the limited ability of the soil to support a load.

The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan to increase permeability. The limitation of slow permeability can also be overcome by increasing the size of the absorption field.

This map unit is in capability unit IIIe-3(21), irrigated and nonirrigated.

221—Salisbury cobbly loam, 0 to 9 percent slopes.

This well drained soil is on terraces. It is moderately deep to a hardpan. The soil formed in alluvium derived

from mixed rock sources. The vegetation in areas not cultivated is mainly perennial grasses, forbs, and shrubs. Elevation is 2,500 to 4,500 feet. The average annual precipitation is about 13 inches, the average annual air temperature is about 48 degrees F, and the average frost-free period is about 125 days.

Typically, the surface layer is gray cobbly loam about 4 inches thick. The upper 4 inches of the subsoil is dark grayish brown gravelly clay loam. The lower 16 inches is dark grayish brown and dark brown gravelly clay. The next layer is a strongly cemented hardpan about 8 inches thick. Below this to a depth of 60 inches or more is stratified sand, gravel, cobbles, and some stones. A few cobbles are on the surface in most places.

Included in this unit are small areas of Kuck clay loam, Lassen cobbly clay, a Mary loam that has slopes of 2 to 9 percent, Medford clay loam, and soils that have slopes of as much as 15 percent. Included areas make up about 15 percent of the total acreage.

Permeability of this Salisbury soil is slow above the impervious hardpan and rapid below it. Available water capacity is very low to moderate. Effective rooting depth is 20 to 40 inches. Runoff is slow to medium, and the hazard of water erosion is slight to moderate.

This unit is used as rangeland and for homesite development.

This unit is suited to use as rangeland. The production of vegetation suitable for livestock grazing is limited by cobbles on the surface. The soil in the unit responds well to fertilizer, to range seeding, and to proper grazing use. Use of mechanical treatment practices is not practical because of the cobbly surface and steepness of slope.

The potential plant community on this unit includes Idaho fescue, western juniper, bluebunch wheatgrass, and sagebrush.

If this unit is used for homesite development, the main limitations are the depth to the hardpan, low load supporting capacity, the potential for shrinking and swelling, slow permeability, and cobbles on the surface. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed.

Removal of pebbles and cobbles in disturbed areas is required for best results when landscaping, particularly in areas used for lawns. Mulching, fertilizing, and irrigating are needed to establish lawn grasses and other small seeded plants.

If buildings are constructed on the soil in this unit, properly designing foundations and footings and diverting runoff away from buildings help to prevent structural damage as a result of shrinking and swelling. Buildings and roads should be designed to offset the limited ability of the soil to support a load.

The suitability of the soil for septic tank absorption fields can be improved by ripping the hardpan to increase permeability. Use of sandy backfill for the

trench and long absorption lines helps to compensate for the slow permeability.

This map unit is in capability unit IVe-7(21), irrigated and nonirrigated.

222—Settlemyer loam, 0 to 2 percent slopes. This very deep soil is on flood plains. It formed in alluvium derived from mixed rock sources. The vegetation in areas not cultivated is mainly perennial grasses, sedges, and other water-tolerant plants. Elevation is 2,000 to 4,000 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 50 degrees F, and the average frost-free period is about 125 days.

Typically, the surface layer is gray loam about 10 inches thick. The next layer is gray fine sandy loam, loam, and silt loam about 34 inches thick. Below this to a depth of 66 inches is a buried surface layer of gray silt loam and sandy clay loam.

Included in this unit are small areas of Esro silt loam, Diyou loam, Stoner gravelly sandy loam, and Riverwash. Also included are areas, in Scott Valley, where precipitation is as much as 18 inches. Included areas make up about 15 percent of the total acreage.

Permeability of this Settlemyer soil is moderately slow. Available water capacity is high. Effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. A seasonal high water table is at the surface from December through June but fluctuates between depths of 12 and 24 inches the rest of the year. This soil is subject to flooding about 3 years out of 10 during prolonged, high-intensity storms. Channeling and deposition are common along streambanks.

This unit is used as rangeland.

This unit is suited to use as rangeland. The production of vegetation suitable for livestock grazing is limited by the high water table and the hazard of flooding. The soil in this unit responds well to fertilizer, to range seeding, and to proper grazing use. Plants that tolerate wetness should be seeded. Grazing should be delayed until the soil has drained sufficiently and is firm enough to withstand trampling by livestock. If the plant cover is disturbed, protection from flooding is needed to control gulying, streambank cutting, and sheet erosion.

The potential plant community on this unit includes carex, rush, tufted hairgrass, bluegrass, and redtop.

This map unit is in capability unit VIw-2(21), irrigated and nonirrigated.

223—Settlemyer loam, drained, 2 to 5 percent slopes. This very deep, poorly drained soil is on flood plains. It formed in alluvium derived from mixed rock sources. The vegetation in areas not cultivated is mainly perennial grasses, sedges, and other water-tolerant plants. Elevation is 2,000 to 4,000 feet. The average annual precipitation is about 15 inches, the average

Appendix F

Novy Riparian Pump Streambed Alteration Agreement



California Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Northern Region
601 Locust Street
Redding, CA 96001
530-225-2300
www.wildlife.ca.gov

EDMUND G. BROWN, Jr., Governor
CHARLTON H. BONHAM, Director



July 22, 2016

Lowell L. Novy
Novy Ranches
845 E. Los Angeles Ave
Simi Valley, CA 93065

Subject: Final Lake or Streambed Alteration Agreement
Notification No. 1600-2015-0517-R1
Novy Pump

Dear Mr. Novy:

Enclosed is the final Streambed Alteration Agreement (Agreement) for the Novy Pump project (Project). Before the California Department of Fish and Wildlife (Department) may issue an Agreement, it must comply with the California Environmental Quality Act (CEQA). In this case, the Department, acting as a lead agency, filed a Notice of Determination (NOD) within five working days of signing the Agreement. The NOD was based on information contained in the 2008 Klamath River Restoration Grant Program Initial Study/Mitigated Negative Declaration prepared by the California Department of Fish and Wildlife.

Under CEQA, the filing of an NOD triggers a 30-day statute of limitations period during which an interested party may challenge the filing agency's approval of the Project. You may begin the Project before the statute of limitations expires if you have obtained all necessary local, state, and federal permits or other authorizations. However, if you elect to do so, it will be at your own risk.

If you have any questions regarding this matter, please contact Brad Henderson, Senior Environmental Scientist, at 530-225-2362 or Brad.Henderson@wildlife.ca.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Curt Babcock".

Curt Babcock
Environmental Program Manager

cc: Brad Henderson, Senior Environmental Scientist
Brad.Henderson@wildlife.ca.gov

Conserving California's Wildlife Since 1870

Appendix G

Grenada Novy Ranches Grazing Plan

Novy Ranch

Prescribed Riparian Grazing Management Recommendation (October 22, 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 2.3 miles of the Shasta River flow through this property, along the south, southwest boundary of the ranch (see Figure 1). The entire river reach through this ranch is riparian corridor fenced on both sides with permanent wire fence that is in excellent condition and effective at controlling livestock access to the river and riparian area. Noxious weeds are common throughout this stream corridor. Weeds including yellow starthistle (YST), teasel, poison hemlock and irrigated pasture grass species occur throughout the riparian area. It is likely that invasive weeds are inhibiting recruitment of native riparian vegetation, and are competing with established native riparian vegetation along the entire reach. The reach has primary potential to support *Juncas* and *Carex* spp. Given the fine substrates and relatively high water table, the potential to support riparian woodies is less certain.

Riparian Grazing and Weed Management Recommendations

Grazing Management Objective. The ranch owner and managers have an existing prescribed riparian grazing strategy that has been in place since 2006. Their riparian grazing management goals are 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 corridor – improving odds for native riparian species recruitment. Based upon our site visit to this ranch, it appears that the current riparian grazing program on this ranch is effective in achieving the intended goals. Due to high water table – it is unlikely this reach has the potential to support a significant riparian woody population. However, the prescribed riparian grazing recommendation below will allow riparian woodies to establish and grow if the reach does have the potential to support them.

Riparian Grazing Infrastructure. Again, the entire reach through this ranch is riparian corridor that is fenced on both sides with permanent wire fencing. This enclosure is in excellent working condition and is effectively controlling livestock access to the riparian reach. There are no accessible livestock crossings or watering areas within the riparian corridor, however, there are accessible gates which provide rotational opportunities to move livestock in and out of the fenced riparian area with available, off-site water sources as it winds through the ranch. At this point of the recommendation, the riparian area through the ranch is broken into an upper, middle,

and lower unit (see Figure 1). Portable electric cross fencing can be used to further segment the riparian corridor into practical grazing units if desired.

Recommended Seasons of Grazing. This reach of the Shasta River is not considered to be coho spawning habitat, but is only used as a pass through for Coho. Thus grazing bouts should occur in this grazing unit during the standard irrigation-growing season (spring through fall) and may be beneficial when reasonable residual dry matter is present throughout the year and monitored using management decision triggers below. The unit should not be grazed continuously through the grazing season. It should be worked into the normal rotation of livestock throughout pastures on the ranch. Rest periods must occur during the growing season (i.e., early, mid, and/or late growing season rest from grazing should occur each year). Management decision triggers described below will ensure grazing intensity (e.g., stocking rate) and livestock impacts are in balance with goals listed above.

Recommended Livestock Management Decision Triggers. 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 greenline 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 than 20% of current year’s leader growth within the riparian unit. Once any of these three triggers is hit during a grazing bout, livestock should immediately be rotated out of the riparian 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 weekly during grazing bouts where livestock are allowed access to riparian units from adjoining pastures (the current management regime), and every 1 to 2 days if livestock are enclosed in riparian units. We recommend, and will provide training on, the establishment of permanent photo monitoring points in each 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, weedy species, 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 species and class of livestock used during each grazing bout be recorded for each riparian grazing unit.

Recommended Supplementary Riparian Weed Management Practices. Grazing alone will likely not achieve the desired level of control on the weedy species on this site. Practices such as targeted herbicide application and burning are valuable components of an integrated weed management strategy. Targeted herbicide use should be considered a conservation practice on this site – with herbicide type, timing, and rates selected based upon real-time site specific conditions. Targeted mowing is another key practice that should be available to managers on this site. As with grazing, all of these practices should be implemented in a manner that does not negatively impact native riparian species recruitment and survival, or streambank stability and instream habitat conditions. Technical support for site specific integrated weed management is available from Siskiyou County UCCE and other local technical service providers.

Note: Siskiyou County UCCE and UC Davis will collaborate in the coming year to provide workshops on integrated riparian weed management for conservation and agricultural outcomes.