



Salmonid Restoration Federation

23rd Annual Coho Confab on the Navarro River *Evolving Strategies to Enhance Coho Salmon Habitat* August 20-22, 2021

Salmonid Restoration Federation (SRF) is coordinating the 23rd Annual Coho Confab that will take place August 20-22 on the Navarro River in Mendocino County. This year's Coho Confab will be held at River's Bend Retreat Center in Philo which is nestled in the redwoods and adjacent to Hendy Woods State Park. This is the perfect tranquil location to have our first "in person" event while we ease out of COVID restrictions.

The Coho Confab is a field symposium to learn about watershed restoration and techniques to restore and recover coho salmon populations. The Confab provides an ideal opportunity to network with other restoration practitioners and to participate in field tours that highlight innovative salmon restoration techniques. This year, SRF is collaborating with California Department of Fish and Wildlife, Mendocino County Resource Conservation District, The Nature Conservancy (TNC), Trout Unlimited, and other restoration partners to produce this event.

The Coho Confab begins on Friday evening with inspiring orientation presentations. Sarah Gallagher from CDFW's Coastal Fisheries Program and Dave Ulrich from Mendocino Redwood Company will provide an overview of life cycle monitoring in the Navarro River. Monty Schmitt, TNC, and Linda Macelwee, MCRCD, will co-present on flow enhancement approaches in the Navarro watershed. Brock Dolman, Program Director and Co-Director of the Water Institute, Occidental Arts and Ecology Center will give a global

ridge to river talk about, *Rethinking & Retrofitting for Rehydration*.

On Saturday, there will be a morning flow enhancement workshop that will highlight the California Environmental Flow Framework, evolving flow enhancement techniques to address climate change, community-based water storage and forbearance efforts, water transactions to protect flows, and forest evapotranspiration implications for forest management. Presenters in this workshop will include Tasha McKee, Water Program Director of Sanctuary Forest; Julie Zimmerman, lead Freshwater Scientist with The Nature Conservancy; Matt Clifford, California Water Project Director, Trout Unlimited; and Matt O'Connor, PhD, Coast Range Watershed Institute.

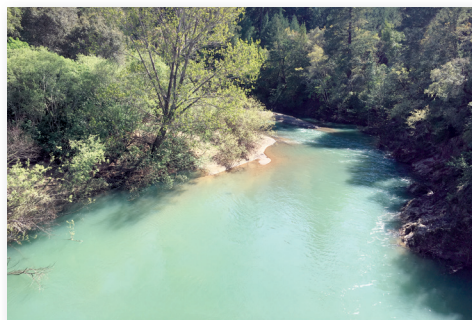
Saturday field tours will include tours of large wood installation projects in the North Fork of the Navarro and the Mendocino Coast, and a tour of water storage projects in the Navarro. *It Takes a Village: Working with the Mill Creek Community to Restore Stream Flows for*

the Benefit of People and Fish

tour will focus on flow enhancement strategies and projects in the Mill Creek watershed, including stream monitoring, and storage and forbearance. This tour will meander along the middle reach of Mill Creek and visit off stream storage and rainwater catchment, and large wood projects. This tour will end at Husch Vineyards to see the rainwater catchment pond, native plant/pollinator rain demonstration garden, and interpretive signage. After the tour, participants can sample Husch's delicious wines.

The Open Forum will focus on flow enhancement strategies for climate change resilience and will feature a roundtable discussion with some of the presenters from the morning flow enhancement workshop. The last day of the Confab will include a tour of Ten Mile River Estuary/Floodplain Restoration Project including three construction phases geared for coho and steelhead recovery on the Mendocino Coast led by Dave Wright (TNC) and Lauren Hammack of Prunuske Chatham, Inc. Concurrently, there will be a collaborative tour of the Laguna de Santa Rosa, *Realtering the Laguna: Restoring Lost Habitat and Improving Water Quality*.

To register for the Confab or to view the full agenda please visit our website: www.calsalmon.org.



The 23rd Annual Coho Confab will take place on the Navarro River in Mendocino County
Photo: Linda Macelwee, MCRCD

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Collaborative Water Management Guidebook

Conserving limited freshwater resources requires proactive and collaborative water management approaches that can enhance instream flows and provide water security. Throughout the North Coast of California, rural communities are grappling with water shortages and navigating complex regulatory requirements. California's climate, coupled with the State Water Board's efforts to bring all water diverters into compliance with state water law, highlights the imperative of community-based water conservation planning. The Nature Conservancy, Salmonid Restoration Federation, and Alford Ecological recently produced a guidebook that explores collaborative water management and provides tools, resources, and guidance to advance flow enhancement efforts. Additionally, the guide outlines a communication plan, a framework for cooperative stakeholder-led efforts, and strategies to export and amplify collaborative water management planning. The guidebook also highlights recent initiatives including the California Environmental Flow Framework and the Salmon Habitat and Restoration Prioritization Process (SHaRP). The California Salmon and Steelhead Coalition funded the coordination and production of this guidebook.

This historic drought underscores how vulnerable California's watersheds and communities are to drought conditions. California has a Mediterranean climate, where most of the annual rainfall occurs in the winter with scant precipitation during the long dry summer seasons. California's hydrology is highly altered and increasingly vulnerable to climate change effects including longer dry seasons, reduced snowpack and snowmelt, and exacerbated fire conditions. Sustainably managing freshwater resources has become one of the most pressing issues in the state with debates raging over aging infrastructure, dam removal, groundwater management, water scarcity, and instream flows for beneficial uses.

Drought conditions, prolonged dry seasons, and fire risk are becoming the new normal and making it increasingly challenging to meet the state's water needs and protect native species that rely on freshwater resources. Ongoing population growth, development, and agriculture will necessitate improved water management strategies as well as vast improvements to aging water infrastructure and delivery systems. While there has been significant attention to these issues in the densely populated or agriculturally intensive areas of the state, these challenges also deeply affect rural, less intensively managed regions that often lack sufficient infrastructure to address water shortages. In northern watersheds, increasing diversions of water from rivers and streams has degraded important habitat for endangered salmonid populations. Collaborative, stakeholder-driven water management efforts are needed to engage landowners in order to improve water reliability for residents and enhance instream flows for salmon and other aquatic species in these areas.

The guidebook is informed by case studies and efforts in areas that have successfully utilized community-based water management approaches including the Mattole River headwaters, Dutch Bill watershed in the Russian River watershed, the Navarro River, and Bodega Bay. The guidebook provides a framework and the key elements for building a successful collaborative effort including a communication outreach strategy, transparently sharing ecological data, engaging stakeholders, and establishing criteria for project selection. The guidebook also includes chapters on existing resources, policy incentives, collaborative agreements, water transactions, and legal mechanisms to conserve flows. Templates for forbearance agreements, water management plans, tributary charters, and water planning resources are also available on the SRF website. <https://www.calsalmon.org/resources/community-water-management>

Collaborative Water Management

*A Guide to Enhancing Streamflow and Water Supply
Reliability in California's Rural Watersheds and Communities*



Nordic Aquafarms Proposed Aquaculture Facility

What Could Go Wrong?

Nordic Aquafarms plans to build an aquaculture facility for the purpose of producing 330,000 pounds of Atlantic salmon per day on a 77-acre site at the location of the former Louisiana-Pacific Pulp Mill on the Samoa Peninsula in Humboldt County. The project will withdraw 2.5 million gallons per day (MGD) from the Lower Mad River and 10 MGD from Humboldt Bay. Water will be recirculated through the project and 12.5 MGD of partially-treated effluent will be released daily into the nearshore marine environment via a 1.55-mile outfall pipe. Humboldt County is in the process of public scoping. Humboldt County information can be accessed at <https://humboldt.gov.org/2347/Major-Projects>

Nordic Aquafarms has expressed a desire to work with the community to address environmental concerns, but the list of issues is long. Environmental issues raised prior to the scoping process were: the effect of the project effluent on Essential Fish Habitat conserved under the Magnussen Stevens Act and Critical Habitat for conservation of listed species under the Endangered Species Act (ESA); exposure of five ESA-listed species and their habitat to partially-treated effluent; risk to the local crab fishery from water temperature increases and domoic acid bioaccumulation; risk to recreational users from 13 to 14 trucks per day on the narrow access road; a high energy demand and carbon footprint from a 21.5 to 28 megawatt facility; the spread of fish diseases and antibiotic-resistant bacteria associated with fish farming and the untreated effluent streams; increased local dioxin and PCB contamination associated with fish farming; the global and local impacts caused by harvest of wild fish for fish food; sea-level rise and tsunami risk; and the risk of fish escape.

NMFS and other commenters raised the concern that the increased water temperatures from the project and nitrogen-laden effluent could be

expected to result in increased harmful algal blooms and domoic acid impacts on the marine environment. NMFS noted that domoic acid: "is responsible for well documented toxic events to marine mammals and birds and amnesiac shellfish poisoning in humans."

Project modeling of the effluent dispersal is incomplete, but preliminary modeling shows that effluent will enter Humboldt Bay with the incoming tides. The combination of increased water temperatures in the outfall, discharge of 298 metric tons of NHx and NOx per year, marine upwelling, and local currents distributing the warm effluent into local estuaries has not been thoroughly examined. The effect of project effluent on coho and Chinook salmon, steelhead, green sturgeon, and eulachon rearing areas in the near coastal and estuarine environments remains to be analyzed.

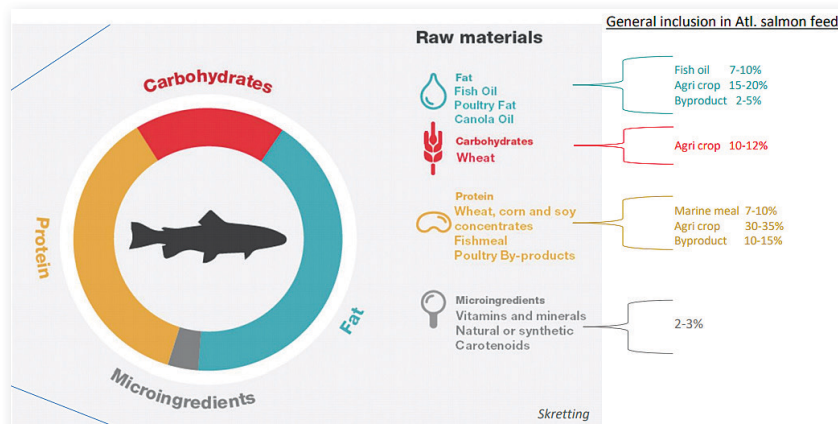
Recent research indicates that *Piscine Orthoreovirus*, first discovered in farmed Atlantic salmon in 2010, is now known to enter wild fish habitat in British Columbia directly from fish processing areas in salmon farms. Nordic Aquafarms does not have any plans to monitor viruses and does not have a treatment plan for the fish-processing effluent or for backwash

from the sludge reducers. Other viruses of immediate concern are: Infectious Pancreatic Necrosis Virus, Infectious Salmon Anemia Virus, Salmonid Alphavirus, Novel Totivirus, and Novel Piscine Reovirus.

All of these viruses pose a risk to juvenile salmonids growing to adulthood in the marine habitat in the area of the diffuser pipe and exposed to effluent during tidal cycles in Humboldt Bay, the Mad River Estuary, and the Eel River Estuary.

The North Coast Regional Water Quality Control Board has delayed meeting to decide on a National Pollutant Discharge Elimination System (NPDES) Permit for Nordic Aquafarms until after a Draft EIR is released. Additionally, a California Coastal Commission Coastal Development Permit will be needed for the project. California Department of Fish and Wildlife does not currently permit raising Atlantic salmon in the state, and an Aquaculture Registration approval will be needed.

The Nordic Aquafarms project remains controversial. To learn more about this project or to see the public comment letters that SRF has submitted, please visit <https://www.calsalmon.org/programs/humboldt-bay-aquaculture>



The two major issues with Nordic's Atlantic salmon feed sourcing are:

1. The 7-10% fish oil and 7-10% marine meal mean that 14-20% of the feed sourcing will be from wild fish that support marine ecosystems outside of the project area. In instances where this is Pacific herring, that means taking food resources away from wild salmon in the northwest.
2. The 2-5% poultry fat and 10-15% poultry byproducts means that 12-20% of Nordic's Atlantic salmon feed will be from an industry that is known to cause localized spread of antibiotic-resistant bacteria in poultry farming and fish farming.

Low Flow Monitoring in the South Fork Eel River

Redwood Creek and Sproul Creek, a Tale of Two Tributaries

California is experiencing an unprecedented drought that could decimate salmon in areas that still support wild salmon populations. Lack of instream flows, fire danger, and once in a millenium heat waves gravely impact human communities and aquatic species.

The South Fork Eel River provides critical habitat for coho salmon and other aquatic species including steelhead, red-tailed frogs, lamprey, and Pacific giant salamanders. Salmon utilize different parts of the watershed from the tributaries to the mainstem during various stages of their life cycle. The forested tributaries of the South Fork Eel provide sheltered refugia for imperiled species like coho salmon that need cool, clean water particularly when they are juveniles. Many of the tributaries of the South Fork Eel suffer from the legacy land use impacts of logging, ranching, and unregulated cannabis production. Even now, the post-legalization environment presents many questions about water management, carrying capacity, and how to balance economic drivers and environmental needs for endangered species.

The South Fork Eel is considered one of five priority watersheds in the state for flow enhancement efforts. Even though this region receives some of the highest precipitation in the state, there is relatively little municipal infrastructure available to allow for flow releases to meet the needs of coho salmon. This region is mountainous and has dozens of populated tributaries including Redwood and Sproul Creek in Southern Humboldt County. Both of these watersheds are considered priority watersheds for restoration since they provide habitat and have intrinsic recovery potential, despite legacy impacts and current land use practices. This potential can only be realized through coordinated and strategic water management actions that engage the community and address the effects of climate change and longer dry seasons.

Streamflow monitoring began in both watersheds in 2013. Low flow monitoring helps us understand the summer flow conditions when cool instream flows are most critical for juvenile salmonids and when human water use is at its highest.

Peak demand often coincides with the hottest days of summer when juvenile salmon are most vulnerable to high water temperatures. Throughout the monitoring effort, SRF has witnessed creeks in the Redwood Creek watershed becoming disconnected by mid-summer. Redwood and Sproul Creeks offer a lot of interesting comparisons since they are adjacent near the headwaters yet have a different mosaic of landowner patterns and hydrology.

Redwood Creek is a densely populated watershed with approximately 400 parcels, hundreds of residents, and countless water diversions for legal and unregulated cannabis cultivation as well as small domestic use and homestead gardens. Comparatively, Sproul Creek has significantly less consumptive human water use with large tracts of the watershed in private ownership including the Marshall and Wagner ranches and the former Barnum timberland that is now owned by Green Diamond Timber Company.

Both tributaries are considered significant for coho salmon recovery in the South Fork Eel. Similarly, the SF Eel is key to the overall survival of coho salmon in the SONCC Evolutionary Significant Unit (ESU) that extends from Northern California to Southern Oregon. According to the SHaRP process (Salmon Habitat and Restoration Priorities) spearheaded by NOAA Fisheries, Sproul Creek is considered one of the highest priority tributaries in the South Fork Eel River watershed for biological importance. Sproul Creek ranked high for habitat condition as well as “optimism and potential” for recovery.

SRF has been able to continue monitoring the sites that Cal Trout had previously established in Sproul Creek. SRF and Cal Trout began their independent flow studies at the same



Redwood Creek flows on May 11, 2021 at the beginning of the flow season when flows were comparable to July 2019. Photo: Katrina Nystrom

time with the understanding that it would be beneficial to do a paired study to understand flow patterns in sub-watersheds with and without extensive human consumptive use (Redwood Creek and Sproul Creek respectively).

SRF is working closely with Stillwater Sciences, a leading consulting firm on the North Coast that is already actively working in the South Fork Eel on restoration and flow enhancement projects. SRF and Stillwater Sciences have been restoration partners for several years and their engineers and geologists have already completed a feasibility study for a portion of Redwood Creek (Miller Creek and a segment of the mainstem). Currently, the Stillwater Sciences project team is exploring flow enhancement opportunities in the remainder of Redwood Creek and Sproul Creek.

In May 2021, SRF began monitoring both Redwood and Sproul Creek in order to capture the spring recession which was especially important in this low water year. In Redwood, May 2021 flows were comparable to July 2019 flows at the same monitoring sites. SRF's streamflow monitor has been monitoring six sites in the Sproul Creek drainage every other week beginning May 11. At each monitoring event,



Sproul Creek flows are considerably higher than Redwood Creek flows likely due to far fewer diversions in this watershed. Photo by Katrina Nystrom

the streamflow monitor measures flow, dissolved oxygen and temperature, and photographs streamflow conditions. Pressure transducer data loggers are installed in all six sites that record water level every fifteen minutes. Lower Sproul Creek had 120 gpm of flow on July 7, 2021. Past measurements for this time of year ranged from 850 in 2015 to 11,000 gpm in 2016. Redwood Creek

has a similar drainage area to Sproul Creek yet flows are declining at a much faster rate. Currently, Sproul Creek has 12 times as much flow as neighboring Redwood Creek.

To help residents be aware of current flows, SRF maintains interactive graphs on the SRF website for both Redwood and Sproul Creeks. (<http://www.calsalmon.org/programs/redwood-creek-low-flow-monitoring>) that shows the dates and flows for each monitoring visit as well as comparative graphs for other monitoring years.

The idea is that if water users understand the current flows they will moderate their diversion amount or schedule. Many residents have built sufficient water storage to voluntarily forbear from diverting water during the dry summer months when salmon are most vulnerable to low flows and high water temperatures. As part of this planning project, SRF is also identifying participating landowners to partner with to design winter water storage and pond projects that cumulatively could enhance flows in Redwood Creek or Sproul Creek. To learn more about this project, see current flows, or learn about evolving flow enhancement strategies, please visit <https://vimeo.com/547731633>



Summer flow conditions in Redwood Creek are so low this year that the creek has an unusually large amount of algae and dissolved oxygen levels are diminishing. Photo: Katrina Nystrom

Redwood Creek Flow Enhancement Planning on the Marshall Ranch and Lost Coast Forestlands Property

Since 2013, Salmonid Restoration Federation has been conducting low flow monitoring in Redwood Creek and analyzing the feasibility of creating a suite of flow enhancement projects that would enhance instream flows for salmon and provide water security for rural landowners. With support from the Wildlife Conservation Board's Streamflow Enhancement program and the State Coastal Conservancy, SRF has been working to design offstream ponds that will release flows into Redwood Creek during the dry season.

Redwood Creek is a critical tributary for juvenile salmonids in the South Fork Eel watershed. For nine years, Salmonid Restoration Federation (SRF) has been conducting low flow monitoring in order to understand low flow trends and prioritize water conservation efforts in this impaired watershed that is home to hundreds of residents as well as threatened species like coho salmon.

Stillwater Sciences is the technical lead on the project and they had previously completed a feasibility study that identified the Marshall Ranch as the most

feasible site for a large-scale pond project based on the geologic suitability of the site—a flat and stable terrace adjacent to Redwood Creek. The Marshall Ranch, where the proposed project is situated, is a rare example of a large, contiguous land area in the Redwood Creek watershed. The 2,942-acre ranch comprises 34 legal parcels all under one family ownership, which has been managed sustainably for timber production and livestock since the 1880s while also providing extensive habitat for fish and wildlife as evidenced by the presence of coho, Chinook, and steelhead. The Marshall Ranch is fully protected under a conservation easement ensuring protection of the land as a working ranch in perpetuity.

The Marshall Ranch Flow Enhancement Project was originally designed as a 15.3 million gallon off-channel pond which would have the capacity to release approximately 50 gpm of cool clean water into 5.5 miles of Redwood Creek during the five-month dry season. In fall 2020, 90% Design Plans and Basis of Design Report were submitted to the Humboldt County



Engineer Joel Monschke leading a tour of the Lost Coast Forestland proposed site during the rainy season. Photo: Dana Stolzman

Planning Department and the CEQA approval process was initiated through a Mitigated Negative Declaration (MND) whereby significant mitigation measures are incorporated into the project design to ensure that the project would be a net benefit to the environment. Ancillary project components included gully stabilization, large wood placement for instream habitat enhancement in Redwood Creek, and stored water for fire emergencies.

During the public comment period, community members and prominent scientists provided letters of support to the Planning Department in support of the project and several community members wrote letters of opposition due to their concern about the size, stability, and mechanization of the proposed pond, as well as a desire to see the water storage and flow augmentation spread throughout the watershed since the headwaters of Redwood Creek also contains important aquatic habitat.



Members of the project team and Technical Advisory Committee touring the upper terrace of the proposed pond on the Marshall Ranch. Photo: SRF archives

In January, SRF was approached by Lost Coast Forestlands (LCF), who had recently acquired over 1,000 acres in the headwaters of Redwood Creek. This property had been impacted by previous logging and unpermitted cannabis operations. LCF is dedicated to sustainably managing the second-growth forest and working with SRF and Stillwater Sciences to design flow enhancement projects designed to benefit coho, steelhead, and lamprey. Beginning in January 2021, SRF and Stillwater Sciences have conducted topographic surveys, cultural resource investigations, and regulatory agency outreach to analyze the feasibility for pond capacity and flow augmentation on the LCF property. Fortunately, both the Marshall Ranch and the LCF properties have suitable sites for off-stream ponds based on the analyses conducted to date (i.e. relatively flat and stable terrain), landowner willingness to dedicate large acreage to water storage and flow enhancement, and consideration of environmental benefits/constraints.

After a preliminary feasibility study on the LCF ownership conducted over the past six months, it appears that offstream ponds with a total volume of 5.5 million gallons are feasible on the LCF property. Based on this finding, we are now proceeding with a new design on the Marshall Ranch which includes downsized total water storage volume of



Stillwater Sciences staff and Tim Metz (RPF and property manager for LCF) during topo surveys of the Lost Coast Forestland property. Photo: Katrina Nystrom

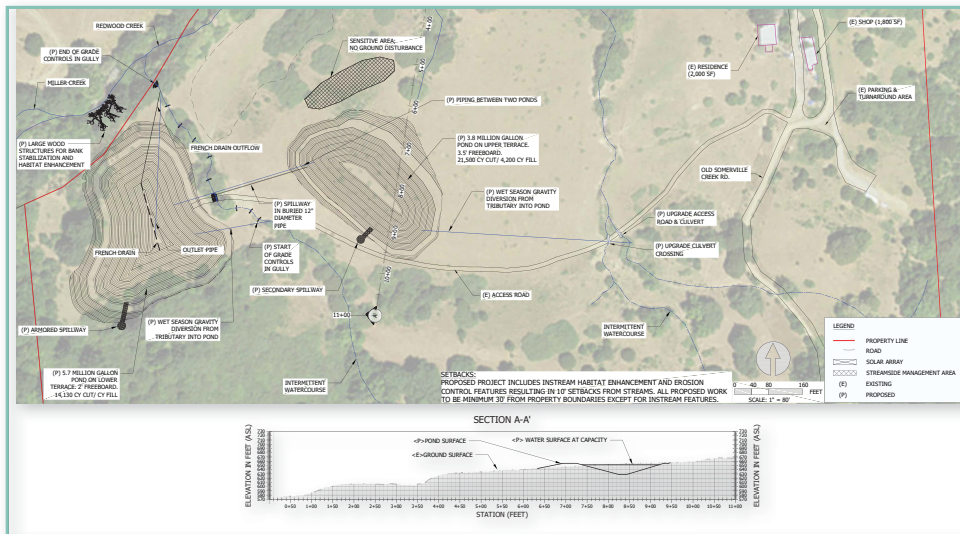
10 million gallons in two smaller ponds and several large water tanks. The reduced volume and new pond layout allow for the ponds to be fed with rainfall and gravity diversion from small tributaries, greatly reducing the mechanization of the design.

Cumulatively, the Marshall Ranch and LCF projects will result in over 15 million gallons in total water storage and provide the target flow of 50 gpm in mainstem Redwood Creek downstream from Briceland while providing approximately

20 gpm of flow augmentation to an additional several miles of critical aquatic habitat in Redwood Creek upstream from Briceland. We believe that the new design on the Marshall Ranch combined with the proposed project on the LCF property effectively address all of the substantive items raised in the letters of opposition.

After initial discussions with neighbors, agency staff, and other stakeholders, Stillwater Sciences is now revising the Marshall Ranch project documents including the 90% Design Plans and a Basis of Design Report and we will be re-submitting a revised MND to the Humboldt County Planning Department later this summer to re-initiate the CEQA approval process.

Designs on the LCF property will still require further investigations and surveys, but we hope to move from conceptual designs to 65% designs within the next year. Meanwhile, SRF will pursue storage and forbearance opportunities with private landowners downstream of the Marshall Ranch project to ensure that water releases dedicated to instream flows remain in the creek for the benefit of salmonids and other aquatic habitat.



Stillwater Sciences' conceptual design for preferred alternative scenario on Marshall Ranch.

Salmonid Restoration Federation

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Large Wood Field School

November 10-12, 2021

SRF and Trout Unlimited will be offering a Large Wood Field School on the Mendocino Coast on November 11 and 12, 2021. This two-day field school will train forestry and restoration professionals in both engineered and non-engineered large wood augmentation techniques that have been proven effective in restoring stream habitats on the Northern California coast. Participants will practice how to effectively design and implement large wood restoration projects by learning how to identify geomorphic conditions of a treatment stream and select appropriate implementation methods to achieve desired results. Each day will include classroom lectures, hands-on activities, field demonstrations, project site tours, and ample group discussion.

Hands-on group activities will include buoyancy and other engineering computations and the construction of large wood site scenarios in the classroom. Field school sites will include projects at Ten Mile Creek and the Mendocino Woodlands. To learn more or to register, please visit www.calsalmon.org

39th Annual Salmonid Restoration Conference

April 19-22, 2022 in Santa Cruz, CA

SRF earnestly hopes to offer the long-awaited conference in Santa Cruz, CA on April 19-22, 2022. This conference will feature field tours, workshops, and concurrent sessions. SRF will post an Open Call for Proposals this August.



SRF Merchandise

Please visit our website at
www.calsalmon.org
to see our merchandise page.

Support SRF by purchasing this Ray Troll design that was adapted from the California Salmonscape artwork that he created for NOAA Fisheries.