

Planning for Resilience: Water Conservation and Flow Monitoring in Redwood Creek, South Fork Eel River



Background

California is experiencing one of the most severe droughts on record, and it is clear that longer dry seasons are already impacting Northern Californian residents and wildlife.

Early in 2013, Salmonid Restoration Federation (SRF) and Sanctuary Forest began efforts to determine the feasibility of transferring Sanctuary Forest's Mattole headwaters water storage and forbearance program to a neighboring watershed on the South Fork of the Eel River, where the native coho population is key to recovering the Southern Oregon Northern California Coast (SONCC) Evolutionary Significant Unit (ESU).

Sanctuary Forest's innovative program—where one million gallons of winter storage was established for sixteen residents along a one mile stretch of the Mattole headwaters—resulted in a 40% increase in streamflows within their project area. The idea is simple enough: store enough water in the winter when flows are plentiful to use during the summer, and forbear from pumping water during the dry season.



Redwood Creek borders the Mattole watershed and flows into the South Fork of the Eel River. This watershed has hundreds of unregulated water diversions.



The Redwood Creek Water Conservation Project

Redwood Creek is a 26 square mile watershed that flows into the South Fork of the Eel River near Redway, California. The Creek and its five tributaries have been identified by the California Department of Fish and Wildlife as important coho-bearing water courses, yet habitat degradation resulting from low summertime flows and high water temperatures pose a serious threat to the recovery of this endangered native salmon population. Additionally, these watersheds are home to rural residents that depend on healthy streamflows for their household and irrigation needs.

The Redwood Creek Water Conservation Project was designed to engage rural landowners and stakeholders in a coordinated, community-led water conservation effort. With the support of many partners, SRF has hosted several water conservation workshops and field tours in Southern Humboldt over the past two years, as well as created and distributed educational materials about water rights, water conservation, and drought resilience throughout the region.

A Place-based Collective Action Strategy

Collective efforts to transfer or scale-out voluntary water conservation strategies are more likely to be successful if local residents have an emotional and physical attachment to the watershed as their place, if the project is driven by the stakeholders and residents who stand to benefit from increased streamflows, and if the project stakeholders have sufficient access to ecological data (Schremmer 2014).

The Redwood Creek Water Conservation Project is utilizing a place-based, collaborative streamflow improvement strategy. The project puts a high value on local and inter-generational knowledge-sharing and participation, emphasizes the intrinsic value of non-human creatures indigenous to the watershed (particularly of native salmon), and is motivated by a desire to improve the landscape for the benefit and enjoyment of future generations.

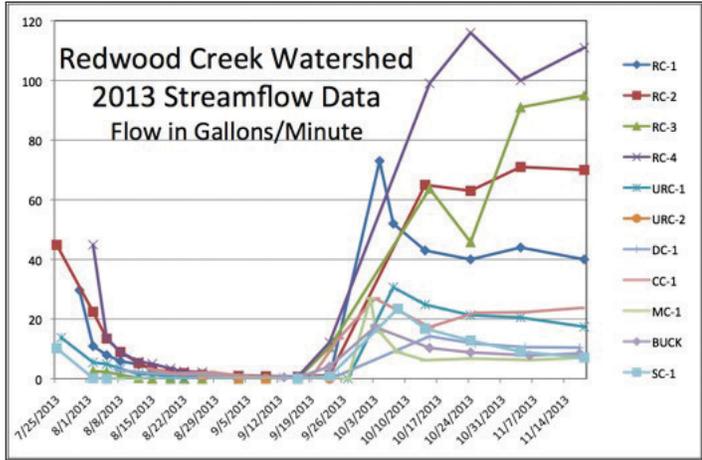


Under the right circumstances, place-based collaborative restoration can provide an effective framework for encouraging local citizens to become active participants and caretakers of the places that they call home.

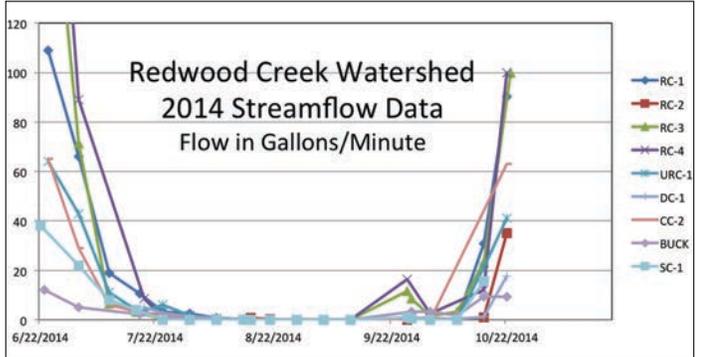
Flow Monitoring Initiated in 2013

During the initial year of flow monitoring conducted by Bill Eastwood of the Eel River Salmon Restoration Project in 2013, eleven monitoring sites were established. Between early August and mid-September of that year, most of the streams became intermittent and most pools were either very low or completely dry. Minimum flows at all of the monitoring sites were at less than one gallon per minute (GPM) by mid-September, which meant that just two households pumping at the same time could have potentially dewatered the creeks.

In 2014, stream flow declined earlier than in the previous year, the low flow period lasted longer, the streams were more severely impacted, and it took longer for stream flow to recover after the rains started.



The graph above shows the flows in the various Redwood Creek monitoring sites. Between early August and the middle of September most of the streams in the Redwood Creek watershed became intermittent in both 2013 and 2014. Many pools with juvenile coho salmonids and steelhead became completely dry. Some of the tributaries in Redwood Creek have lost one or two year classes in the salmon life cycle during this extended drought.

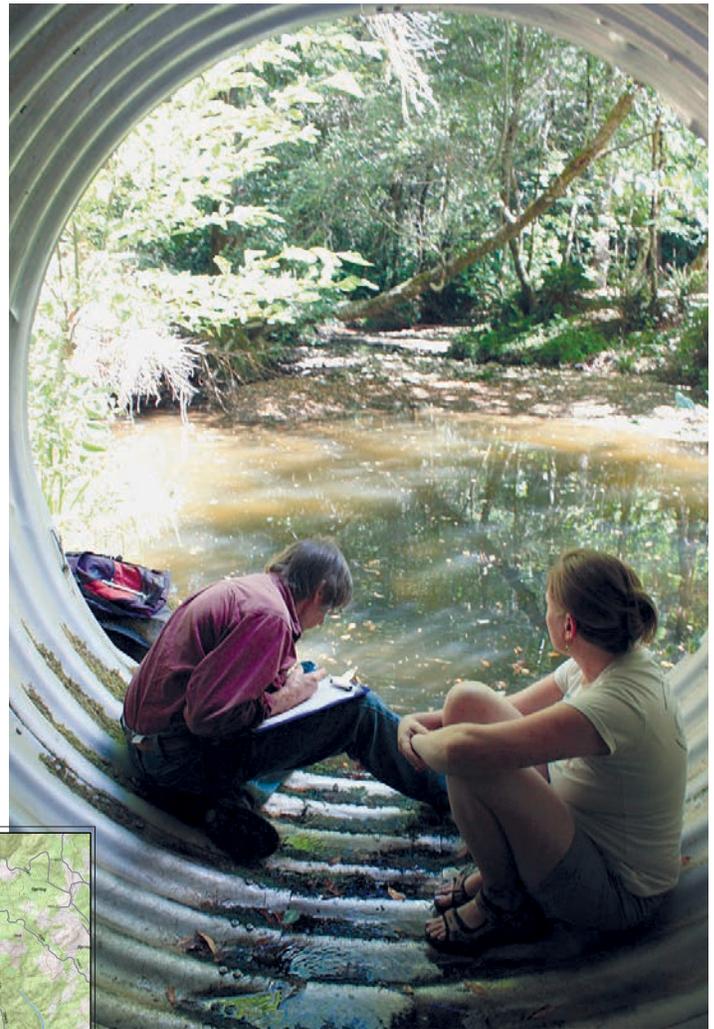


Next Steps for the Feasibility Study

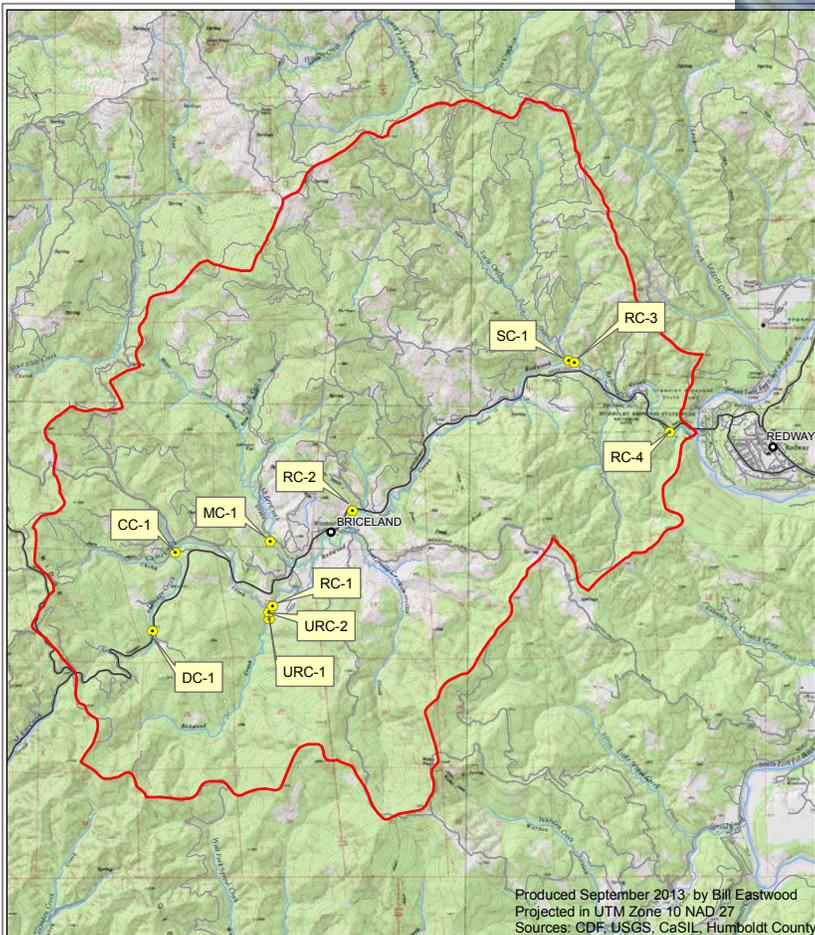
SRF has received funding from the State Water Resources Control Board's 319h grant program to expand the flow monitoring and community education efforts in the Redwood Creek watershed over the next two years. With the support and technical expertise of hydrologist Randy Klein, we will be gathering low flow and water temperature data during the summer months to understand what flow levels are required to keep pools connected, maintain juvenile salmon populations, and to maintain cool enough water temperatures for all life stages to survive within this critical habitat area.

Additionally, with funding from the California Department of Fish and Wildlife, SRF will work with Stillwater Sciences and Trout Unlimited on a feasibility study in Miller Creek and the adjacent portion of the main-stem of Redwood Creek to understand what types of large-scale water conservation and forbearance programs could enhance flows in this watershed.

SRF is working closely with Sanctuary Forest to learn how to build capacity for a forbearance program in the Redwood Creek watershed. We have followed the recommended sequencing for building community support and the scientific foundation for a feasibility study: 1) conduct a water usage study; 2) community outreach and education; 3) low flow monitoring in all tributaries of Redwood Creek; 4) technical education; and 5) planning, assessment, and continued monitoring (funded by the NCRWQCB 319h grant).



Geologist Bill Eastwood, Redwood Creek stream monitor, and Sara Schremmer, SRF, at a monitoring site where the summer flow trickles through a culvert designed for massive storm events.
photo: Dana Stolzman



REDWOOD CREEK LOW FLOW STUDY MONITORING STATIONS

SALMONID RESTORATION FEDERATION

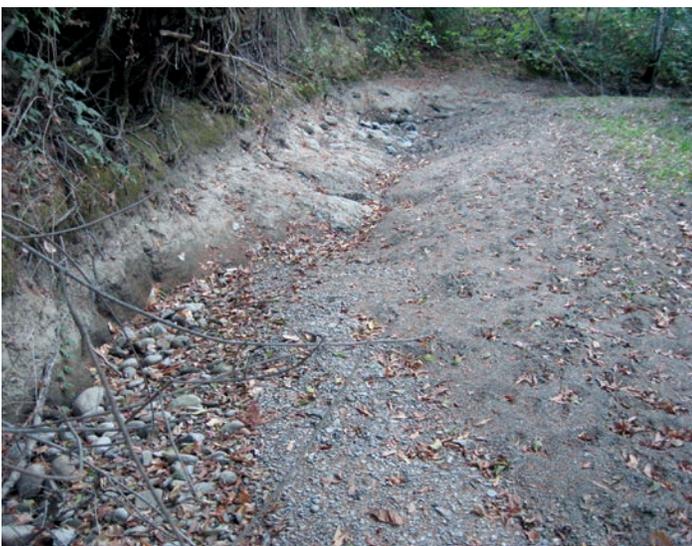
Legend

DC = Dinner Creek, CC = China Creek
URC = Upper Redwood Creek, RC = Redwood Creek
MC = Miller Creek, SC = Seely Creek

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SRF is actively conducting landowner outreach, developing educational materials describing how to most efficiently use water, encouraging landowners to invest in additional winter storage, identifying landowners who are willing to participate in a forbearance program and stop diverting water during the dry months, offering technical assistance to willing landowners, developing materials that can be shared at workshops and an online platform, and hosting water rights clinics for tributary associations.





Miller Creek, a tributary of Redwood Creek, had juvenile salmonids earlier in the 2013 and 2014 season and then became disconnected with juvenile survival unknown. Most of the Redwood Creek tributaries were running at less than one gallon per minute by mid-July to early August. Flows are expected to be more lethal this year.

photos: Bill Eastwood

For Information about the Redwood Creek Water Conservation Project:

Salmonid Restoration Federation



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www.calsalmon.org/programs/redwood-creek-water-conservation-project

For Information on Water Rights:

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Visit: www.waterboards.ca.gov/waterrights

calsalmon.org/programs/water-rights-education

For Information on Water Quality:

Bryan McFadin, North Coast Regional Water Quality Control Board, (707) 576-2751

Bryan.Mcfadin@waterboards.ca.gov

For questions about permits to install diversion facilities or other structures in the stream:

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(707) 441-5671, Jane.Arnold@wildlife.ca.gov

Schremmer, Sara. 2014. *Resilience in a Time of Drought: A Transferable Model for Collective Action in North Coast Watersheds*. Sociology Graduate Thesis, Humboldt State University. Arcata, CA.

