



Photo credit: Stewards of the Coast and Redwoods

Willow Creek Fish Passage Project - Bridge #2

Background

Willow Creek is a tributary to the lower Russian River in the estuary near Jenner in Sonoma, County. Lower Willow Creek has been subject to agricultural practices since 1850, degrading a large portion of its historic wetland habitat, including clearing of the wetlands for grazing and dredging a ditch to reroute the creek. Since California State Parks took ownership of the property in 1996, they abandoned the practice of dredging and phased out grazing operations, which led to significant regrowth of the wetland habitat. The stream channel migrated back to the southern part of the valley and six 3-foot culverts were installed to pass streamflow under the road. These culverts quickly plugged with debris, and fish were forced to swim over the road during high flows, significantly compromising fish passage.

The Willow Creek Fish Passage Project restored fish passage options for adult and juvenile coho salmon (*Oncorhynchus kisutch*) and steelhead (*Oncorhynchus mykiss*) via the construction of a 43-foot clear span bridge in 2011. Project leaders removed six debris-plugged culverts and installed a 43-foot clear-span bridge to reconnect the wetlands, reducing flooding and providing coho salmon and steelhead trout with access to seven miles of high quality spawning, rearing and winter refugia habitat. Restoring access to the Willow Creek watershed was intended to influence salmon production in the entire Russian River watershed.

Monitoring Timeline

Baseline fisheries monitoring occurred in the winter prior to construction and during the summer of construction. Fisheries monitoring has occurred on a regular basis since bridge construction in 2011.

Monitoring Purpose

A comprehensive fish monitoring program was implemented to assess the effectiveness of the installation of the new bridge to re-establish fish passage and colonization of the watershed as well as overall effectiveness of coho salmon reintroductions within the watershed and the larger Russian River basin as a result of the Russian River Coho Salmon Captive Broodstock Program.

Monitoring Methods

Spawner/red surveys in winter documented the presence of spawning salmonids to determine spatial spawning distribution within the watershed. Data collected included survey reach and team, weather conditions, stream visibility, and fish and red observations. Juvenile presence/absence survey occurred in late-July through September and documented successful spawning through the presence of rearing juvenile salmonids, density of fish, and spatial distribution in the watershed. A downstream migrant trap was installed and operated to estimate the number and migration timing of smolts migrating out of Willow Creek in the spring, and to estimate overwinter growth of juvenile hatchery coho salmon released in the fall. PIT tag

California Fish Passage Forum

Barrier Removal Effectiveness Monitoring

PROJECT AT-A-GLANCE

Project Title: Willow Creek Fish Passage Project

Project Applicant: California State Parks

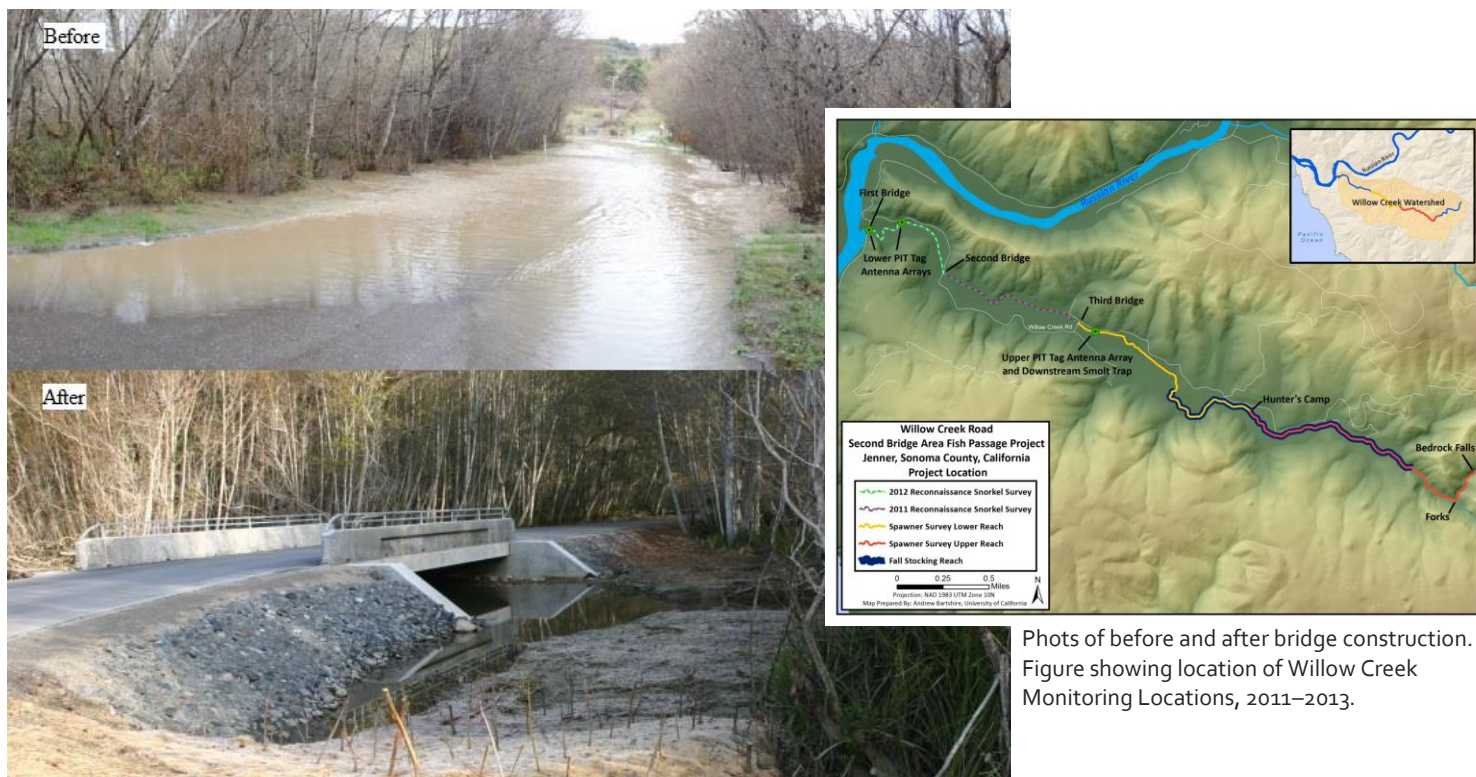
Partners: NOAA Restoration Center, California State Parks, Stewards of the Coast and Redwoods, California Department of Fish and Wildlife, Sonoma County Water Agency, Sonoma County Department of Public Works, Trout Unlimited, Mendocino Redwoods Company, Prunuske Chatham, Inc.

Project funding provided by: NOAA, California Department of Fish and Wildlife, Trout Unlimited, Sonoma County Water Agency

Groups Conducting Monitoring: Russian River Coho Monitoring Program

Project Location: Willow Creek, a tributary to the lower Russian River in the estuary near Jenner in Sonoma County, California

antennas and transceivers were installed and operated in Willow Creek to document movement patterns, survival and abundance of PIT-tagged coho salmon released into the watershed as part of the broodstock program.

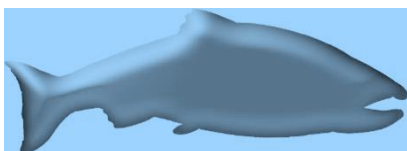


Photos of before and after bridge construction. Figure showing location of Willow Creek Monitoring Locations, 2011–2013.

Monitoring Results

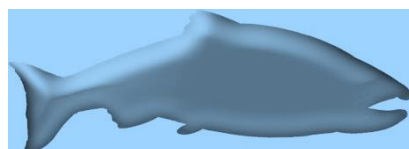
Table 1. Summary of spawning and snorkel survey observations.

	2011	2012	2013
	Adult Spawner/Redd Surveys		
Number of surveys	3	5	8
Adult salmonids	0	4	3
Redds (complete)	0	1	1
Redds (partial or under construction)	0	2	1
Salmonid jacks	0	8	1
	Juvenile Presence/Absence Surveys		
Number of pools surveyed (above third bridge)	63	119*	115
Frequency of pools sampled	Random	Every third pool	Every third pool
Coho salmon yoy	0	0	221
Coho salmon parr	0	1	7
Steelhead yoy	99	424	100
Steelhead parr/resident	53	343	22
Chinook salmon parr	0	0	2
	Summary Statistics		
Average number of steelhead yoy observed per pool	1.43	3.56	0.87
Range of steelhead yoy observed per pool	0–10	0–43	0–10
Average number of coho salmon yoy observed per pool	-	-	1.92
Range of coho salmon yoy observed per pool	-	-	0–26



*In 2012, 60 pools were surveyed between 3rd bridge and Hunter's Camp and 59 pools between Hunter's Camp and the bedrock falls. In 2013, 57 and 58 pools were sampled in the same reaches.

Table 2. Number of individuals captured in Willow Creek downstream migrant trap during spring 2012 and 2013.



	Trap Count	
	5/4/2012–6/14/2012	3/7/2013–6/14/2013
<i>Wild coho salmon smolts</i>	0	12
<i>Hatchery coho smolts</i>	864	3,385
<i>Coho smolts unknown origin</i>	0	8
<i>Hatchery steelhead adults</i>	0	1
<i>Steelhead smolts</i>	5	25
<i>Steelhead yoy/parr</i>	26	142
<i>Sculpin sp.</i>	339	4,206
<i>Threespine stickleback</i>	383	268
<i>Sacramento sucker</i>	1	24
<i>Sacramento pikeminnow</i>	0	219
<i>California roach</i>	0	1
<i>California red-legged frog</i>	1	1
<i>California giant salamander</i>	0	1
<i>Rough skinned newt</i>	0	3

	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Number of surveys	3	5	8	16	20	26
Adult coho observed	4	0	32	16	9	25
<i>Adult Steelhead Observed</i>	3	4	3	11	0	0
<i>Unidentified Adult Salmonids Observed</i>	3	0	1	3	0	2
<i>Redds (coho)</i>	0	0	7	5	11	8
<i>Redds (unknown)</i>	NA	NA	NA	2	8	2
<i>Redds (steelhead)</i>	NA	NA	NA	9	4	1
Juvenile Presence/Absence Surveys						
	2012	2013	2014	2015	2016	2017
<i>Number of pools surveyed (above 3rd bridge)</i>	63	119*	115	91	117	122
<i>Frequency of pools sampled</i>	Random	Every 3rd pool	Every 3 rd pool	Every 3rd pool	Every 2 nd pool	Every 2nd Pool
<i>Coho salmon yoy</i>	0	0	221	1139	8	575
<i>Coho salmon parr</i>	0	1	7	119	9	54
<i>Steelhead yoy</i>	99	424	100	72	185	249
<i>Steelhead parr/resident</i>	53	343	22	72	18	26
<i>Chinook salmon parr</i>	0	0	2	0	0	0
Downstream Migrants Trap counts						
	2012	2013	2014	2015	2016	2017
<i>Wild coho salmon smolts</i>	0	12	331	20	429	43
<i>Hatchery coho smolts</i>	863	3,385	583	680	1,579	1684
<i>Coho smolts unknown origin</i>	1	8	2	7	22	2
<i>Steelhead smolts</i>	5	25	11	22	8	5
<i>Steelhead yoy/parr</i>	26	142	866	462	603	77