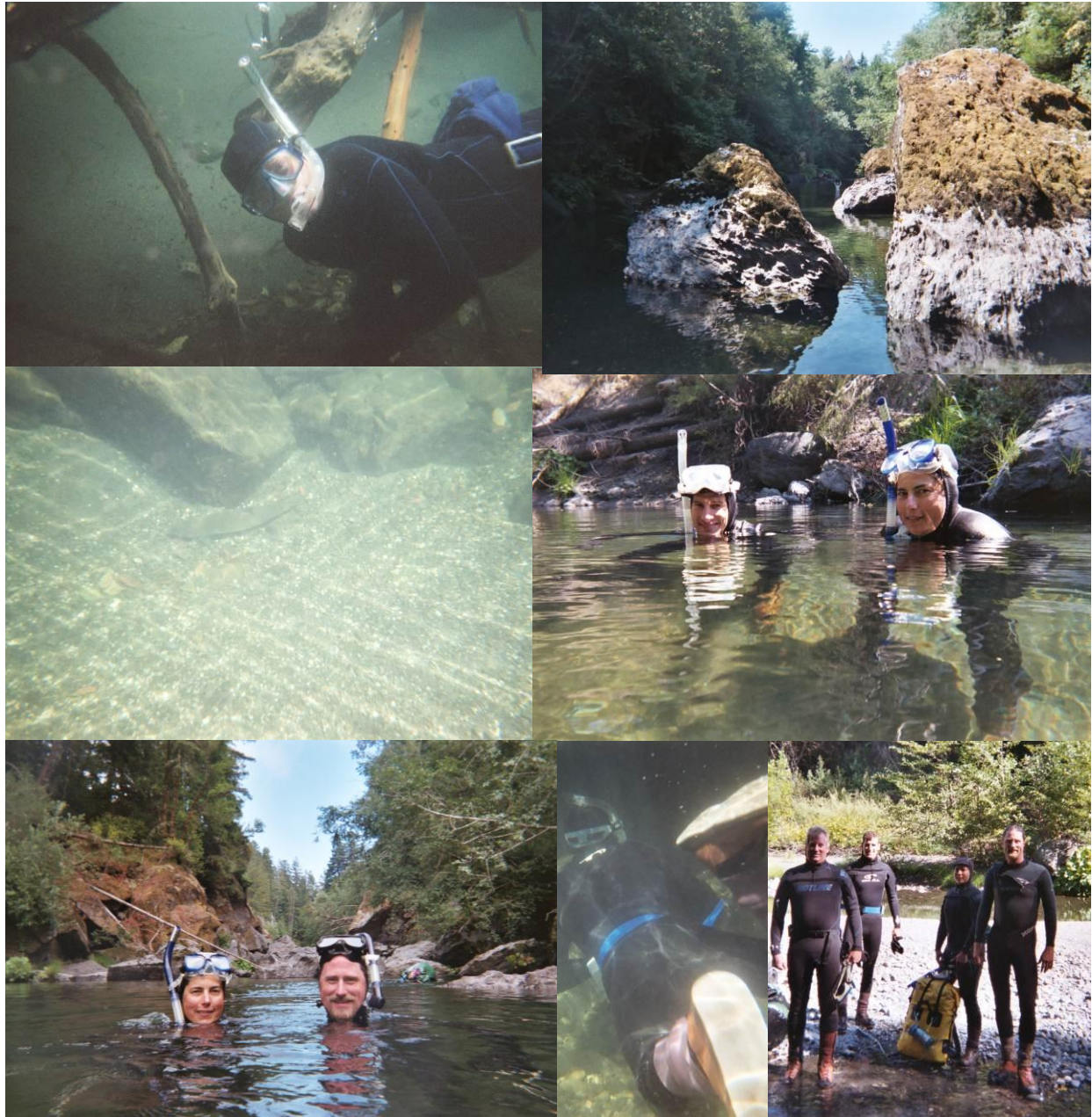


Redwood

National Park

National Park Service
US Department of the Interior

2007 REDWOOD CREEK SUMMER STEELHEAD SURVEY



Fish and Wildlife Branch
September 2015

Cover Photos: (Taken during 2007 Summer Steelhead Survey)
Top Left: NPS snorkeler on Redwood Creek
Top Right: Mainstem Redwood Creek pool
Middle Left: Summer Steelhead at Bottom of Pool
Middle Right: NPS snorkelers on Redwood Creek
Bottom: NPS snorkelers on Redwood Creek

2007 RNP REDWOOD CREEK SUMMER STEELHEAD SURVEY

DATES: July 24, 25, 26, 30, 31 (Tuesday – Thursday, Monday, Tuesday,) and August 1 (Wednesday), 2007

LOCATION: Redwood Creek, Humboldt County, California
Mainstem reach from Lacks Creek - river km 46.514 to downstream of Hayes Creek (Redwood National and State Parks) - river km 7.65.

DISTANCE: 38.9 km (24.1 miles) [36 % of the 108-km (67.1-mile) long Redwood Creek mainstem]

FLOWS: Gaging Station: Orick [ORK] Start of Survey: 49 cfs End of Survey: 36 cfs

DIVERS: David Anderson¹, Baker Holden¹, Terry Hines¹, Kyle Max¹, and Ben Littlefield (¹Person with prior summer steelhead diving experience on Redwood Creek). Recorders: Heather Brown, Kelley Breen, and Laura Bridy

METHOD: Visual observation by diving with mask and snorkel, and surf wetsuit (Roelofs 1983). Survey proceeded in the downstream direction with the flow.

ACCESS: Lacks Creek via Stover Ranch on Redwood Valley Road; Panther Creek via Green Diamond Resource Company K&K road; Coyote Creek via Green Diamond Resource Company K&K road and hike down Redwood Creek to Coyote Creek; hike/snorkel and camp on river three days/two nights to reach summer bridge downstream of Tom McDonald Creek at Tall Trees Grove, summer bridge in or out via trail to 44 horse camp and out via C-12/A9-9/West Side Access roads; Cloquet Creek in or out via A-9 road and hike road extension to Redwood Creek trail; and downstream of Hayes Creek intercept Redwood Creek trail and hike to lower trailhead parking lot.

ITINERARY:	Date	Survey Reaches	Distance	SSHD No.
	8/01	Lacks Creek to Panther Creek <i>Anderson, Hines, Littlefield, Recorder -Bridy</i>	6.02 km	3
	8/01	Panther Creek to Coyote Creek <i>Holden, Max, Recorder - Brown</i>	3.76 km	2
	7/24	Coyote Creek to Copper Creek <i>Anderson, Hines, Max, and Littlefield</i>	4 .62 km	4
	7/25	Copper Cr to upstrm of G Cr <i>Anderson, Hines, Max, and Littlefield</i>	5.26 km	2
	7/26	Upstrm of G Cr to Tall Trees Summer Bridge <i>Anderson, Hines, Max, and Littlefield</i>	7.55 km	0
	7/30	Tall Trees Summer Bridge to UNWS13.806 <i>Anderson, Holden, Max, Littlefield, Recorder - Brown</i>	5.49 km	0
	7/31	UNWS13.806 to downstream of Hayes Creek <i>Anderson, Holden, Hines, Littlefield, Recorder -Breen</i>	6.16 km	2

TOTAL NUMBER OF ADULT SUMMER STEELHEAD TROUT OBSERVED IN 2007: 13

(Number of Adult Summer Steelhead Trout Observed within the Original Index Section-Lacks Creek to Tom McDonald Creek - 16.1 miles: 11)

SUMMER STEELHEAD TROUT

Summer steelhead, (*Oncorhynchus mykiss*), are an anadromous race of rainbow trout. Their life cycle differs from that of the more numerous winter-run steelhead. Adult summer steelhead ascend the rivers in spring, hold over in deep pools in the summer, and then spawn in winter. Because adult summer steelhead hold in freshwater 8 - 10 months (Roelofs 1983), they are vulnerable to detrimental environmental and human-caused factors including higher water temperatures, low summer flows, decreasing pool depths, and poaching. Steelhead within the Northern California coastal steelhead ESU (evolutionary significant unit), which includes Redwood Creek, were federally listed by NOAA Fisheries as threatened in June 2000 and relisted in January 2006.

Summer 2007 was the 27th consecutive summer steelhead trout survey of Redwood Creek, the first being 1981. The survey reach began at Lacks Creek at Stover Ranch and proceeded 38.9 kilometers downstream through Green Diamond Resource Company timber lands into Redwood National and State Parks at a location downstream of Hayes Creek. Originally, the survey was from Lacks Creek to Tom McDonald Creek, but it was expanded downstream to downstream of Hayes Creek in 1992.

In 2007, thirteen adult summer steelhead (steelhead ≥ 16 inches), three 'half-pounder' steelhead (smaller immature sea-run steelhead returning after less than one year in the ocean), and 92 coastal cutthroat trout (*O. clarki*) (cutthroat ≥ 10 inches) were observed in the mainstem survey reach (Table 1).

The 13 adult summer steelhead were observed in 12 pools (Table 2). Two of the pools, accounting for three fish, were associated with tributaries, westside tributary McArthur Creek and eastside tributary Garrett Creek. Past data from Redwood Creek show the majority of summer steelhead are observed in pools, and pools associated with the inflow of cooler water from tributaries (Anderson 1993). For the 13 fish observations, 11 were solitary fish, and the other observation was a group of two fish. Estimated fish lengths ranged from 16 to 26 inches.

Most all fish were found in the upper half of the survey upstream of the 'gorge'. From just downstream of Copper Creek, only two summer steelhead were seen in lower Redwood Creek downstream of McArthur Creek (Figure 1).

Summer steelhead numbers over time are presented in Figure 2 and Appendix I.

Table 1. Numbers of adult summer steelhead ($\geq 16''$), 'half-pounder' steelhead, and coastal cutthroat trout, and aquatic and other wildlife observed during the 2007 summer steelhead survey of mainstem Redwood Creek, Humboldt County, California. Survey conducted on six days, July 24 to August 1, 2007 from Lacks Creek to downstream of Hayes Creek, 38.9 km of Redwood Creek mainstem. (Stream reaches are broken out to reflect past reported reaches. These original reaches were based on access points, the majority of which are no longer accessible by vehicle.)

	Redwood Creek Mainstem Stream Reach	No. of Summer Steelhead Adults ($\geq 16''$)	No. of Steelhead Half Pounders	No. of Cutthroat Trout ($\geq 10''$)	Aquatic and Other Wildlife Observed
O R I G I N A L I N D E X R E A C H	Lacks to Panther Creek 8/1/2007	3	0	4	Resident steelhead, Rough-skinned Newt, Pacific Giant Salamander (1 dead), Western Toad, Tadpoles, Aquatic Garter Snake, Common Merganser (6), Belted Kingfisher, American Dipper, Stellars Jay, Grasshoppers, Bumblebees, Beaver sign (stripped branches); Deer, Bear, and Otter Tracks
	Panther to Coyote Creek 8/1/2007	2	0	6	Threespine Stickleback, Juvenile Sucker, Yellow-legged frogs and tadpoles, Pacific Giant Salamanders (2 dead), Garter Snake, Otter and Deer Tracks, Chestnut-backed Chickadee, Winter Wren, Wrenit, Belted Kingfisher, Song Sparrow, Pacific Slope Flycatcher, Stellars Jay, Downy Woodpecker, American Dipper, Huttons Vireo, Spotted Sandpiper, Common Merganser, and Turkey Vulture
	Coyote to Copper Creek 7/24/2007	4	2	2	<i>Juga</i> Snails, Limniphilid caddisfly larvae, Glossomatidae, Beaver sign (stripped branches), Beaver sign, Spotted Sandpipers, Bats, American Dipper, and Belted Kingfisher
	Copper to Pig Pen Prairie (Slide Cr) 7/25/2007	2	1	6	Resident Steelhead, Threespine Stickleback, Suckers, Marbled Murrelets (4-6 birds at 05:46), Common Mergansers (7), Belted Kingfisher, Coopers Hawk, American Dipper, and Spotted Sandpiper
	Pig Pen Prairie(Slide Cr) to Bridge Creek 7/25 & 26/2007	0	0	12	Threespine Stickleback and Campers (3)
	Bridge to Tom McDonald Creek 7/26/2007	0	0	3	Suckers, Freshwater Mussels, and Sculpin

Redwood Creek Mainstem Stream Reach		No. of Summer Steelhead Adults (≥16")	No. of Steelhead Half Pounders	No. of Cutthroat Trout (≥ 10")	Aquatic and Other Wildlife Observed
	Tom McDonald to Bond Creek 7/26 & 30/2007	0	0	22	Resident Steelhead, Suckers, Threespine Stickleback, Sculpins (1 dead), Yellow-legged and Western Toad Tadpoles, Adult and Juveniles Western Toads, Damsel Fly; Deer, Otter and Elk Tracks; Pacificslope Flycatcher, Belted Kingfisher, Stellars Jay, Common Raven, American Robin, Winter Wren, American Dipper, Vauxs Swift, Song Sparrow, Chestnut-backed Chickadee, Huttons Vireo, Bandtailed Pigeon, Spotted Sandpiper, Brown Creeper, Red Crossbill, Golden-crowned Kinglet, Northern Flicker, Common Merganser, Mallard, and Campers (2)
	Bond Creek to Hayes Creek 7/30 & 31/2007	2	0	37	Suckers, Threespine Stickleback, Yellow-legged Frog, Pacific Tree Frog, Western Toads, Western Garter Snake, Damsel Flies, Gull, Belted Kingfisher, Common Mergansers (27), Osprey, Bandtailed Pigeons, Common Raven, Great Blue Heron, Wrentit, Spotted Sandpiper, Stellars Jay, American Dipper, Elk Tracks,
Total		13	3	92	

Table 2. Date, location (river kilometer and UTM coordinates), number and estimated fork length (inches) and habitat description of adult summer steelhead trout observed in the 2007 snorkel survey of mainstem Redwood Creek. (Letters in parentheses in the river km refer to locations on Figure 1 map).

Date	River KM	No. of SSHD	Est. Length (inches)	Habitat Description
8/01/2007	43.65 (a)	1	22"	In rocky boulder cave. Pool dimensions: 150m L x 25m W x 6ft D. Redwood Creek water temperature 20.0°C at 11:46 am. (UTM 425965E 4547895N)
8/01/2007	43.375 (b)	1	17"	In persistent pool at confluence of Garrett Creek. Pool dimensions: 80m L x 35m W x 8ft D. Redwood Creek water temperature 21.0°C and Garrett Creek water temperature 18.0°C at 12:30 pm. Air temperature 28°C. (UTM 426080E 4548115N)
8/01/2007	42.95 (c)	1	18"	Fish out in open above riffle. Pool dimensions: 100m L x 25m W x 5ft D. Redwood Creek water temperature 22.0°C at 2:55 pm. (UTM 425660E 4548075N)
8/01/2007	37.65 (d)	1	21"	Pool dimensions: 120m L x 10m W x 6ft D. Redwood Creek water temperature 21.0° at 11:51 am. (UTM 4423275E 551275N)
7/24/2007	40.5 to 36.7 (e)	1	---	An additional summer steelhead was seen in the Panther to Coyote reach when hiking to Coyote Creek.
7/24/2007	35.75 (f)	1	19"	Fish in open area. Pool dimensions: 70m L x 25m W x 8ft D. Redwood Creek water temperature 22.0°C at 3:53 pm. (UTM 422580E 4552900N)
7/24/2007	35.35 (g)	1	24"	Fish under rock on bottom substrate in pool with boulders and redwood logs. Pool dimensions: 140m L x 20m W x 7ft D. Redwood Creek water temperature 23.0°C at 4:19 pm. (UTM 422250E 4553110N)
7/24/2007	34.30 (h)	1	20"	Fish under boulder when first spooked in boulder filled pool. Pool dimensions: 80m L x 20m W x 9ft D. Redwood Creek water temperature 23.0°C at 5:30 pm. (UTM 412925E 4553775N)
7/24/2007	33.60 (i)	1	26"	Fish was in open when spooked and then went under a boulder crack in boulder filled pool. Pool dimensions: 60m L x 15m W x 6ft D. Redwood Creek water temperature 22.0°C at 6:30 pm. (UTM 4421850E 554415N)
7/25/2007	31.95 (j)	1	16"	In first pool below confluence of Copper Creek. Half-pounder steelhead also present in rock/boulder pool. Pool dimensions: 120m L x 30m W x 4ft D. Redwood Creek water temperature 19.0°C 30 minutes before at 9:15 am. (UTM 421680E 4555910N)

7/25/2007	31.20 (k)	1	24"	In Queen's Hole, a persistent pool, under at large boulder at 15ft depth. Pool dimensions: 150m L x 30m W x 15ft D. Redwood Creek water temperature 19.5°C at 10:45 am. (UTM 421310E 4556425N)
7/31/2007	9.75 (l)	2	22" 18"	Fish under small woody debris and under rock ledge, respectively. Pool located below confluence of MacArthur Creek. Pool dimensions: 120m L x 40m W x 12ft D. (UTM 4413730E 570165N)
Summer Steelhead Total		13		



Breaking camp and suiting up in the morning along Redwood Creek (RNP 2007).

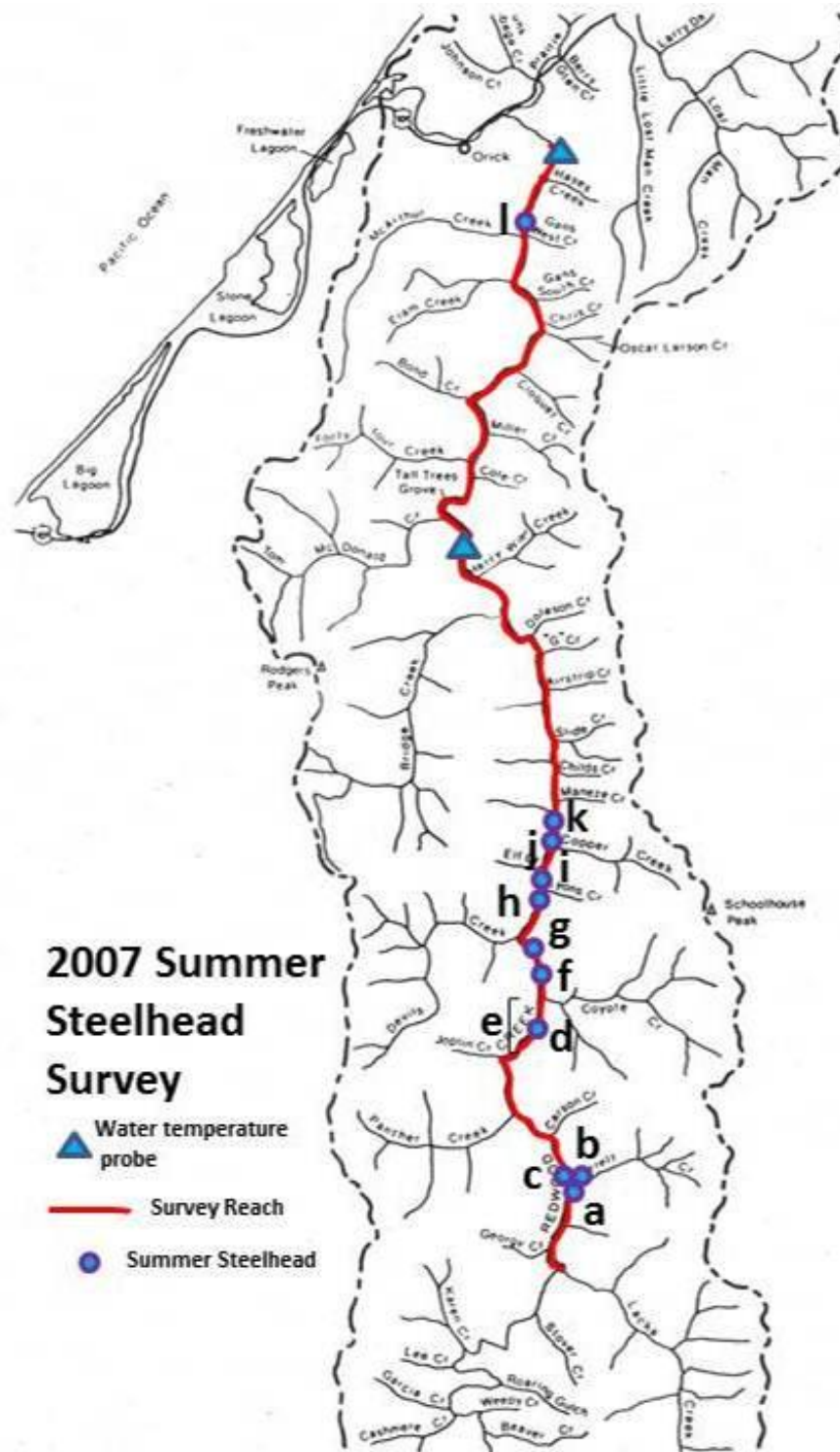


Figure 1. Location of adult summer steelhead observed during the 2006 snorkel survey of Redwood Creek, Humboldt County, California. Survey was between Lacks Creek to downstream of Hayes Creek from July 24 to 31 and August 1, 2007.

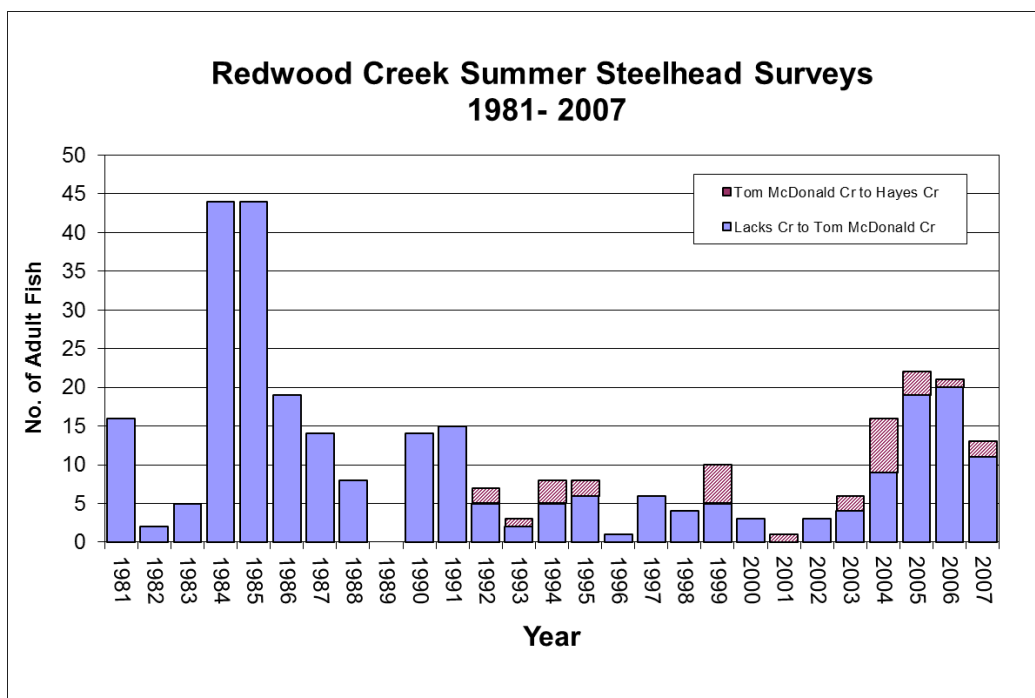


Figure 2. Numbers of summer steelhead observed each summer since 1981 on Redwood Creek. Blue represents the original 25.9 km index reach from Lacks Creek to Tom McDonald Creek. Red represents the expanded 13.0 km reach, Tom McDonald Creek to Hayes Creek. The summer steelhead survey reach was expanded in 1992.

Though not seen during the survey, Trevor Tollefson a fisheries biologist with the California Department of Fish and Wildlife, during a backpacking trip observed a single adult sockeye salmon holding in the water downstream of Bridge Creek on August 4th (Email forwarded by Michelle Gilroy- CDFW) (Figure 3).



Figure 3. Sockeye salmon downstream of Bridge Creek on August 4, 2007 (CDFG 2007).

WATER DISCHARGE

Water flow measured at the Orick gaging station located downstream of the confluence of Prairie Creek at Redwood Creek between July 24 and August 1 ranged between 49 and 36 cfs. These flows were similar to what is normally experienced during the annual sampling period (last week of July/first week of August).

WATER TEMPERATURE

Water temperature (°C) was measured with a hand held thermometer below the water surface in the main current of Redwood Creek and tributaries. At each tributary, the mainstem Redwood Creek temperature was measured upstream of the tributary confluence. Temperature loggers also recorded Redwood Creek mainstem water temperature at two sites.

Mainstem Redwood Creek - Redwood Creek water temperatures measured during the 2007 survey ranged from 17.5°C (at 10:06am) to 23.5°C (5:35 pm) (Appendix II).

Onset™ recording temperature loggers were placed mid-depth in the current of mainstem Redwood Creek within the park (and the snorkel survey reach) at two locations. They recorded temperature at one-hour intervals from July to October 2007.

A temperature logger (TempPro S/N 1150626) was located upstream of Tom McDonald Creek/Tall Trees Grove at 22.05 river kilometer (UTM 416034E 4561458N) between July 3 and October 25. Maximum and minimum water temperatures were 23.6°C and 10.1°C, respectively (Figure 4). The average water temperature was 17.8°C (Std. dev. 3.2°C). For the period July 1 through August 31, the warmer period of the summer, the average water temperature was 20.0°C, the maximum 23.6°C, and the minimum 16.8°C. During the July 1 - August 31 period, the water temperature was at or greater than 18°C 93.9 percent of the time. The average water temperature for July (3-31), 20.1°C; for August, 19.8°C; for September, 17.7°C; and for October (1-25), 12.9°C.

The second temperature logger (TempPro S/N 1150635) was located in lower Redwood Creek upstream of the Redwood Creek trailhead at 7.65 river kilometer (UTM 413702E 4572010N) between July 3 and October 9. Maximum and minimum water temperatures recorded were 24.0°C and 12.9°C, respectively (Figure 5). The average water temperature was 18.1°C (Std. dev. 1.9°C). For the period July 3 through August 31, the warmer period of the summer, the average water temperature was 18.6°C, the maximum 24.0°C, and the minimum 15.4°C. During the July 3 - August 31 period, the water temperature was at or greater than 18°C 51.4 percent of the time. The average water temperature for July (3-31) was 18.5°C; for August, 18.6°C; for September, 17.9°C; and for October (1-9), 15.4°C.

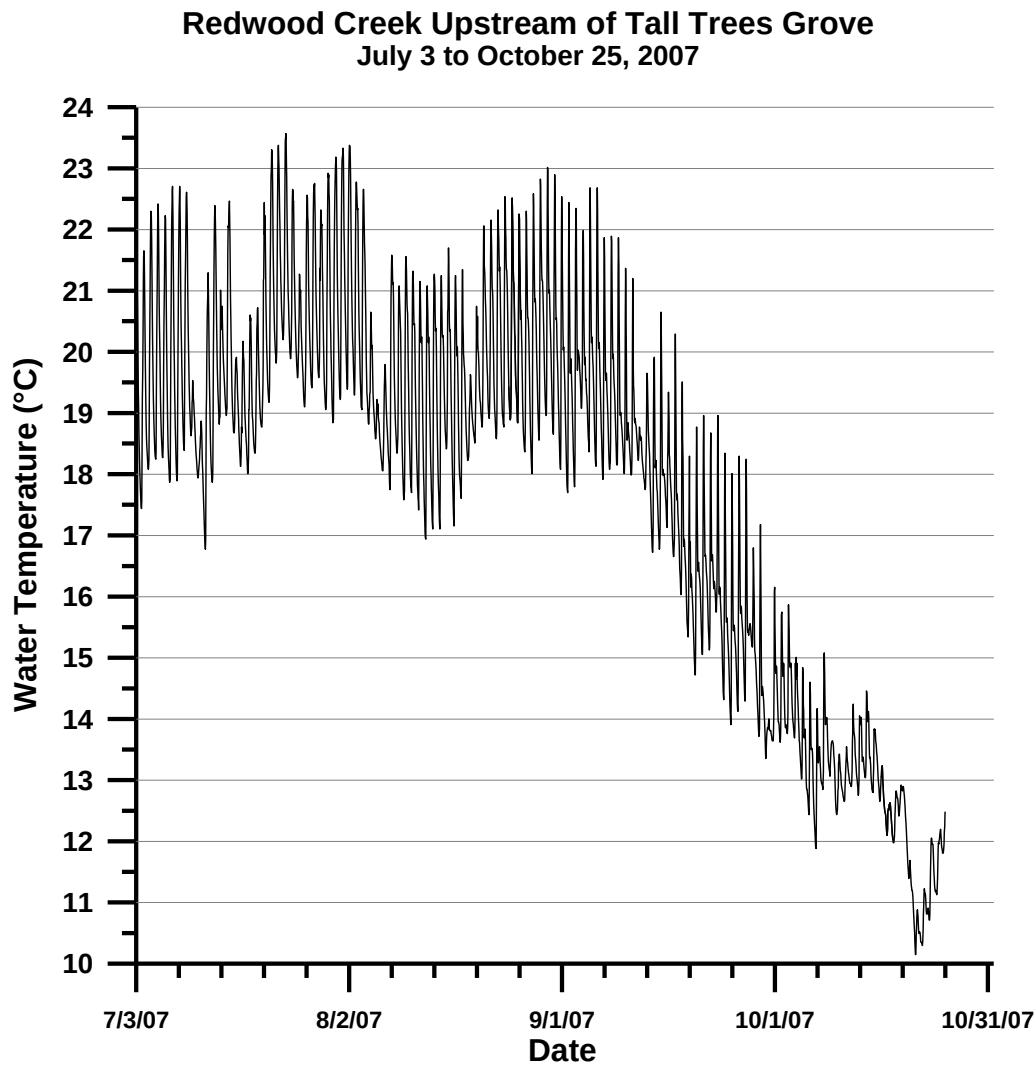


Figure 4. Mainstem Redwood Creek water temperatures (°C) from Onset TempPro temperature logger located at 22.05 river km, upstream of Tom McDonald Creek/Tall Trees Grove. The logger recorded water temperature every 1-hour in the current below the surface of the water from July 3 through October 25, 2007.

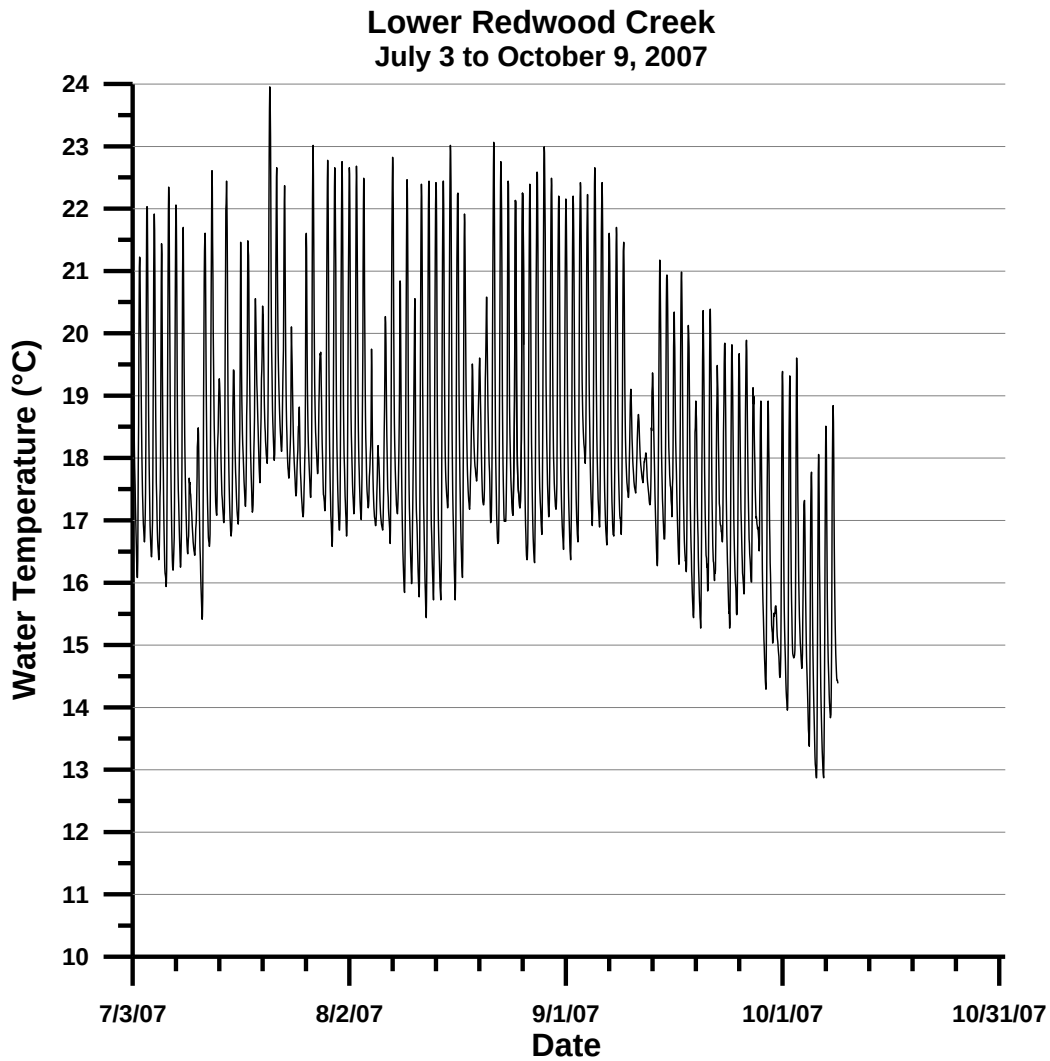


Figure 5. Mainstem Redwood Creek water temperatures (°C) from Onset TempPro temperature logger located at 7.65 river km, upstream of the lower Redwood Creek trailhead parking lot. The logger recorded water temperature every 1-hour in the current below the surface of the water from July 3 through October 9, 2007.

Tributaries - Water temperatures of 49 east and westside tributaries entering Redwood Creek measured during the survey ranged from 11.0°C to 18.0°C (Appendix II). Water temperatures of all tributaries were cooler than the corresponding temperature of mainstem Redwood Creek measured at the same time.

Mean temperature of the westside tributaries was slightly cooler than eastside tributaries; a pattern repeated in all past summer steelhead surveys. The mean water temperature of westside tributaries was 14.3°C (n = 32, std. dev. = 1.0°C) and temperatures ranged from 12°C (one unnamed tributary at 17.20 km) to 16.0°C (two unnamed tributaries at 29.853 and 29.066 km). The mean water temperature of eastside tributaries was 15.1°C (n = 17, std. dev. = 2.0°C) and temperatures ranged from 11.0°C (an unnamed tributary at 38.30 km) to 18.0°C (Garrett, Coyote, and Copper Creeks).

The 2007 year summer water temperatures are similar to temperatures and patterns have been recorded in all past summer steelhead surveys. Water temperatures in mainstem Redwood Creek are high for salmonid fish, above the preferred temperature range reported by Reiser and Bjornn (1979) for steelhead of 7.3°C to 14.6°C.

REFERENCES

- Anderson, D.G. 1993. Status of summer steelhead trout in Redwood Creek, Redwood National Park, California. pp. 1-8. In: Proceedings of the Fourth Conference on Research in California's National Parks, eds. S.D. Viers, T.J. Stohlgren, and C. Schonewald-Cox. Transactions and Proceedings NPS/NRUC/NRTP-93/9. U.S.D.I., National Park Service, Denver, Colorado.
- Reiser, D.W., and T.C. Bjornn. 1979. Influence of forest and rangeland management on anadromous fish habitat in western North America: Habitat requirements of anadromous salmonids. USDA, Forest Service General Technical Report. PNW-96. Pacific Northwest Forest and Range Experiment Station, Portland, Oregon. 54 pp.
- Roelofs, T.D. 1983. Current status of California summer steelhead (Salmo gairdneri) stocks and habitat, and recommendations for their management. Report to U.S. Department of Agriculture, Forest Service Region. 119 pp.
- Michelle Gilroy, Fishery Biologist, CDFG -Personal Communication

Report Prepared by: David G. Anderson - RNSP Fishery Biologist
Redwood National and State Parks
121200 Highway 101, P.O. Box 7
Orick, California 95555
(707) 465-7771
david_g_anderson@nps.gov

Appendix I. Numbers of summer steelhead trout observed 1981 through 2007 and annual survey dates in the 25.9-km (16.1-mile) index reach (Lacks Creek to Tom McDonald Creek) and expanded survey reaches of Redwood Creek, Humboldt County, California by Redwood National and State Parks personnel and others.

Year	Original Index Reach (Lacks Creek to Tom McDonald Creek) No. of Summer Steelhead	Total Reach Surveyed		Survey Dates
		Total No. of Summer Steelhead	Start to End Points and Distance (km)	
1981	16	16	Beaver Cr to Orick (51.5)	8/10 – 13/81
1982 ^a	2	2	Stover Cr to Emerald Cr (22.5)	10/12 & 14/82
1983	5	7	HWY 299 to Tom McDonald Cr	8/22 – 25/83
1984	44+	44+	Index Reach (25.9)	8/08 – 10/84
1985	44+	44+	Index Reach (25.9)	8/20 - 22, 9/4/85
1986	19	19	Index Reach (25.9)	8/25 – 27/86
1987	14	15	1 mile downstream of Snow Camp Cr to Tom McDonald Cr (72.7)	7/14 – 16/87
1988	8	8 (6 Spring Chinook)	Index Reach (25.9)	7/26 – 28/88
1989 ^b	0	0	Lacks Cr to Bridge Cr (17.9)	7/31, 8/01 – 02/89
1990	14	14	Index Reach (25.9)	7/31, 8/01-03/90
1991	15	15	Index Reach (25.9)	8/05 – 08/91
1992	5 (4 & 1 carcass)	7 (6 & 1 carcass)	Lacks Cr to Hayes Cr (37.8)	8/03 - 06, 10/92
1993	2	3	Lacks Cr to Hayes Cr (37.8)	8/02 - 05, 09/93
		2 ^c	Chezem Rd to Stover Cr (24.75)	8/18, 20, 27/93
		3 ^d	Ayres Cabin to Chezem Rd (14.3)	8/28 & 30/93
		8 Total	76.9 km	
1994	5	8	Lacks Cr to Hayes Cr (37.8)	8/01 – 04/94
		16 ^c	Chezem Rd to Stover Cr (24.8)	8/04-06/94
		3 ^e	HWY 299 to Chezem Rd (2.0)	8/15/94
		9 ^d	Bradford Cr to HWY 299 (20.1)	8/13-14/94
		36 Total	84.7 km	

Year (cont.)	Index Reach (Lacks Creek to Tom McDonald Creek) No. of Summer Steelhead	Total Reach Surveyed		Survey Dates
		Total No. of Summer Steelhead in total reach	Begin to End Creeks and Distance (km)	
1995	6 (5 & 1 carcass)	8 (7 & 1 carcass) 8 ^c	Lacks Cr to Hayes Cr (37.8) Chezem Rd to Bair Rd (7.6)	7/24 – 27/95 8/28/95
		2 ^d	Bradford Cr to Ayres Cabin (7.85)	9/02/95
		18 Total	53.25 km	
1996	1	1 21 ^c 1 ^d	Lacks Cr to Hayes Cr (37.8) Chezem Rd to Stover Cr (24.8) Bradford Cr to Chezem Rd (22.1)	8/05 – 08/96 7/31, 8/1, 22/96 8/10-12/96
		23 Total	84.7 km	
1997	6	6 16 ^c 15 ^d	Lacks Cr to Hayes Cr (37.8) Chezem Rd to Stover Cr (24.8) Bradford Cr to Chezem Rd (22.1)	8/04 - 07/97 8/06 – 08/97 8/17, 24, 30/97
		37 Total	84.7 km	
1998	4	4 21 ^d	Lacks Cr to Hayes Cr (37.8) Bradford Cr to Stover Cr (46.9)	7/27 – 30/98 8/24-27, 31/98
		25 Total	84.7 km	
1999	5	10	Lacks Cr to Hayes Cr (38)	8/02-05, 09-10/99
2000	3	3	Lacks Cr to Hayes Cr (38)	8/01-03, 07-09/2000
2001	0	1	Lacks Cr to Hayes Cr (38.1)	7/31, 8/01-02, 07/2001
2002	3	3	Lacks Cr to Hayes Cr (38.1)	7/29-31, 8/ 1, 5, 7/2002
2003	4	6	Lacks Cr to Downstream of Hayes Cr (38.8)	7/29-31, 8/4-6/2003
2004	8 (+ 1 dead)	15 (+ 1 dead)	Lacks Cr to Downstream of Hayes Cr (39.0)	7/27-29, 8/3-5/2004
2005	19	22 (1 Sockeye Salmon)	Lacks Cr to Downstream of Hayes Cr (38.9)	7/26-28, 8/2-4/2005

2006	19 (+ 1 dead)	20 (+ 1 dead)	Lacks Cr to Downstream of Hayes Cr (38.9)	7/25-27 & 31, 8/1- 2/2006
2007	11	13 (1 Sockeye Salmon)	Lacks Cr to Downstream of Hayes Cr (38.9)	7/24-26, 30, 31, 8/1/2007
^a Survey from Stover Creek to Emerald Creek, 14 miles, covering most of index section and best pool habitat. ^b Survey from Lacks to Bridge Creek, minus Garret to Panther Creek, a total of 11.1 miles. Covered best pool habitat. ^c Tom Weseloh – California Trout ^d Matt Smith -North Coast Fisheries Restoration ^e Kirk Cohune				

Appendix II. Water temperatures (°C) measured during the 2007 Redwood Creek summer steelhead trout survey from July 24 to August 1. Locations are listed south to north. Redwood Creek (upstream) refers to water temperature measurement taken immediately upstream of the tributary confluence listed below. UN ES or WS refers to unnamed eastside or westside tributary, and the number refers to river kilometer (measured from the mouth of Redwood Creek). Alignment refers to tributary watershed position: East = Eastside, West = Westside, and REDW = mainstem Redwood Creek. SSHD = Temperatures at summer steelhead locations.

Mainstem and Tributaries	Alignment	Date	Time	Water Temperature (°C)
Redwood Creek (upstream)	REDW	8/01/2007	08:47	18.0
Lacks Creek	East	8/01/2007	08:47	17.0
Redwood Creek (upstream)	REDW	8/01/2007	09:36	19.5
George Creek	West	8/01/2007	09:36	14.0
Redwood Creek (upstream)	REDW	8/01/2007	11:15	20.0
UN ES 44.38	East	8/01/2007	11:15	14.0
Redwood Creek 43.65 km (SSHD)	REDW	8/01/2007	11:46	20.0
Redwood Creek (upstream) (SSHD)	REDW	8/01/2007	12:30	21.0
Garrett Creek	East	8/01/2007	12:30	18.0
Redwood Creek 42.95 km (SSHD)	REDW	8/01/2007	14:42	22.0
Redwood Creek (upstream)	REDW	8/01/2007	---	23.0
UN WS 41.372	West	8/01/2007	---	15.0
Redwood Creek (upstream)	REDW	8/01/2007	17:35	23.5
Panther Creek	West	8/01/2007	17:35	15.0
Panther Creek	West	8/01/2007	09:06	14.0
Redwood Creek (upstream)	REDW	8/01/2007	09:45	20.0
UN ES 39.80	East	8/01/2007	09:45	15.0
Redwood Creek (upstream)	REDW	8/01/2007	09:52	20.0
UN WS 39.67	West	8/01/2007	09:52	14.0
Redwood Creek (upstream)	REDW	8/01/2007	10:07	20.0
UN WS 39.57	West	8/01/2007	10:07	15.0
Redwood Creek (upstream)	REDW	8/01/2007	10:15	20.0
UN ES 39.40	East	8/01/2007	10:15	15.5
Redwood Creek (upstream)	REDW	8/01/2007	10:25	20.0
UN WS 39.15	West	8/01/2007	10:25	14.5
Redwood Creek (upstream)	REDW	8/01/2007	10:34	20.5
Joplin Creek	West	8/01/2007	10:34	15.5
Redwood Creek (upstream)	REDW	8/01/2007	11:13	20.0

Mainstem and Tributaries	Alignment	Date	Time	Water Temperature (°C)
UN ES 38.30	East	8/01/2007	11:13	11.0
Redwood Creek 37.65 km (SSHD)	REDW	8/01/2007	11:51	21.0
Redwood Creek (upstream)	REDW	8/01/2007	12:26	20.5
UN WS 36.97 37.00	West	8/01/2007	12:26	15.0
Redwood Creek (upstream)	REDW	8/01/2007	12:43	21.0
Coyote Creek	East	8/01/2007	12:43	17.0
Redwood Creek (upstream)	REDW	7/24/2007	14:52	22.0
Coyote Creek	East	7/24/2007	14:52	18.0
Redwood Creek 35.75 km (SSHD)	REDW	7/24/2007	15:53	22.0
Redwood Creek 35.35 km (SSHD)	REDW	7/24/2007	16:19	23.0
Redwood Creek (upstream)	REDW	7/24/2007	17:15	23.0
Devils Creek	West	7/24/2007	17:15	15.0
Redwood Creek 34.30km (SSHD)	REDW	7/24/2007	17:30	23.0
Redwood Creek 33.60 km (SSHD)	REDW	7/24/2007	18:30	22.0
Redwood Creek (upstream)	REDW	7/24/2007	19:25	22.0
UN WS 32.527	West	7/24/2007	19:25	15.0
Redwood Creek (upstream)	REDW	7/24/2007	19:41	22.0
Copper Creek	East	7/24/2007	19:41	18.0
Redwood Creek at Copper Cr	REDW	7/25/2007	09:15	19.0
Redwood Creek 31.20 km (SSHD)	REDW	7/25/2007	10:45	19.5
Redwood Creek (upstream)	REDW	7/25/2007	11:58	20.0
UN WS xx.xx	West	7/25/2007	11:58	15.0
Redwood Creek (upstream)	REDW	7/25/2007	14:19	23.0
UN WS 29.853	West	7/25/2007	14:19	16.0
Redwood Creek (upstream)	REDW	7/25/2007	15:14	22.0
UN WS 29.066	West	7/25/2007	15:14	16.0
Redwood Creek (upstream)	REDW	7/25/2007	15:20	22.0
Slide Creek	East	7/25/2007	15:20	17.0
Redwood Creek (upstream)	REDW	7/25/2007	17:47	22.0
Airstrip Creek	East	7/25/2007	17:47	14.0
Redwood Creek 26.85 km	REDW	7/26/2007	09:16	19.5
Redwood Creek (upstream)	REDW	7/26/2007	10:00	19.5
Dolason Creek	East	7/26/2007	10:00	15.0
Redwood Creek (upstream)	REDW	7/26/2007	11:08	19.5
UN WS xx.xx	West	7/26/2007	11:08	15.0
Redwood Creek (upstream)	REDW	7/26/2007	11:30	19.0
Bridge Creek	West	7/26/2007	11:30	15.0
Redwood Creek (upstream)	REDW	7/26/2007	14:05	20.0

Mainstem and Tributaries	Alignment	Date	Time	Water Temperature (°C)
Emerald Creek	East	7/26/2007	14:05	16.0
Redwood Creek (upstream)	REDW	7/26/2007	14:22	22.0
UN WS 22.861	West	7/26/2007	14:22	14.0
Redwood Creek (upstream)	REDW	7/26/2007	14:33	20.0
UN WS 22.35	West	7/26/2007	14:33	14.5
Redwood Creek (upstream)	REDW	7/26/2007	15:51	20.0
Tom McDonald Creek	West	7/26/2007	15:31	14.5
Redwood Creek (summer bridge) 19.30 km	REDW	7/30/2007	09:21	19.0
UN ES 19.05	East	7/30/2007	09:55	13.5
Redwood Creek (upstream)	REDW	7/30/2007	10:08	19.0
UN WS 18.5	West	7/30/2007	10:08	12.5
Redwood Creek (upstream)	REDW	7/30/2007	10:13	19.0
Cole Creek	East	7/30/2007	10:13	13.0
Redwood Creek (upstream)	REDW	7/30/2007	10:34	19.0
Fortyfour Creek	West	7/30/2007	10:34	13.5
Redwood Creek (upstream)	REDW	7/30/2007	11:01	19.0
UN WS 17.20	West	7/30/2007	11:01	12.0
Redwood Creek (upstream)	REDW	7/30/2007	11:06	19.0
Miller Creek	East	7/30/2007	11:06	14.0
Redwood Creek (upstream)	REDW	7/30/2007	11:19	19.0
UN ES 16.95	East	7/30/2007	11:19	14.5
Redwood Creek (upstream)	REDW	7/30/2007	11:33	19.0
UN WS 16.60a	West	7/30/2007	11:33	14.5
Redwood Creek (upstream)	REDW	7/30/2007	11:34	19.0
UN WS 16.60b	West	7/30/2007	11:34	13.0
Redwood Creek (upstream)	REDW	7/30/2007	11:47	19.5
Bond Creek	West	7/30/2007	11:47	14.0
Redwood Creek (upstream)	REDW	7/30/2007	13:03	20.0
UN WS 15.75	West	7/30/2007	13:03	14.5
Redwood Creek (upstream)	REDW	7/30/2007	13:27	20.0
UN WS 14.90	West	7/30/2007	13:27	14.0
Redwood Creek (upstream)	REDW	7/30/2007	13:36	21.0
UN WS 14.75	West	7/30/2007	13:36	15.0
Redwood Creek (upstream)	REDW	7/30/2007	14:12	22.0
UN WS 13.806	West	7/30/2007	14:12	14.0
Redwood Creek (upstream)	REDW	7/31/2007	10:06	17.5
UN WS 13.806	West	7/31/2007	10:09	13.0

Mainstem and Tributaries	Alignment	Date	Time	Water Temperature (°C)
Redwood Creek (upstream)	REDW	7/31/2007	10:58	18.0
Oscar Larson Creek	East	7/31/2007	10:55	13.0
Redwood Creek (upstream)	REDW	7/31/2007	11:11	18.0
Chris Creek	East	7/31/2007	11:11	Dry
Redwood Creek (upstream)	REDW	7/31/2007	11:46	18.5
UN WS 11.70	West	7/31/2007	11:45	12.5
Redwood Creek (upstream)	REDW	7/31/2007	10:55	19.0
Elam Creek	West	7/31/2007	10:54	13.0
Redwood Creek (upstream)	REDW	7/31/2007	14:00	20.0
McArthur Creek	West	7/31/2007	13:59	13.0
Redwood Creek 9.75 km (SSHD)	REDW	7/31/2007	---	20.0