

Redwood

National and State Parks

National Park Service
US Department of the Interior

Department of Parks and Recreation
State of California

2004 REDWOOD CREEK SUMMER STEELHEAD TROUT SURVEY



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February 2004

2004 RNSP REDWOOD CREEK SUMMER STEELHEAD TROUT SURVEY

DATES: July 27, 28, 29 (Tues – Thurs), and August 3, 4, 5 (Tues - Thurs), 2004

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 7.50.

DISTANCE: 39 km (24.2 miles) [36.1 % of the 108-km (67.1-mile) long Redwood Creek mainstem]

FLOWS: Gaging Station: Orick [ORK] (<http://cdec.water.ca.gov/>)
Start of Survey: 30cfs End of Survey: 26cfs

DIVERS: David Anderson¹, Baker Holden¹, Terry Hines¹, Kyle Max¹, Keith Bensen¹, and Grant Alban. (¹Person with prior summer steelhead diving experience on Redwood Creek).
Recorders: Jeanne Mayer and Kim McFarland.

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

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

ITINERARY:	Date	Survey Reach	Distance	SSHD No.
	7/29	Lacks Creek to Panther Creek <i>Anderson, Hines, Max, and McFarland (notes)</i>	6.02 km	2
	7/29	Panther Creek to Coyote Creek <i>Holden, Bensen, Alban, and Mayer (notes)</i>	3.76 km	3
	8/03	Coyote Creek to Copper Creek <i>Anderson, Hines, Max, and Alban</i>	4.62 km	2
	8/04	Copper Creek to upstream of Dolason Creek <i>Anderson, Hines, Max, and Alban</i>	5.46 km	1 + 1 Dead
	8/05	Upstream of Dolason Cr to Tom McDonald Cr <i>Anderson, Hines, Max, and Alban</i>	6.05 km	0
	7/27	Tom McDonald Creek to Cloquet Creek <i>Anderson, Holden, Hines, Max, Alban, and Mayer (notes)</i>	6.04 km	1
	7/28	Cloquet Creek to downstrm of Hayes Creek <i>Anderson, Holden, Hines, Max, Alban, and Mayer (notes)</i>	7.07 km	6

TOTAL NUMBER OF ADULT SUMMER STEELHEAD TROUT OBSERVED IN 2004: 15 + 1 dead
(NUMBER OF ADULT SUMMER STEELHEAD TROUT OBSERVED WITHIN THE INDEX SECTION
(LACKS CREEK TO TOM McDONALD CREEK - 16.1 miles): 8 + 1 dead

SUMMER STEELHEAD TROUT (*Oncorhynchus mykiss*)

Year 2004 was the 24th consecutive summer steelhead trout survey of Redwood Creek, the first being 1981. Fifteen live and one dead adult summer steelhead (steelhead ≥ 16.5 inches), five ‘half-pounder’ steelhead (smaller immature sea-run steelhead returning after less than one year in the ocean), and 127 coastal cutthroat trout (*O. clarki*) (cutthroat ≥ 10 inches) were observed in a mainstem survey reach from Lacks Creek to just downstream of Hayes Creek (Table 1 and Figure 2). The survey reach began at Stover Ranch and proceeded downstream through Green Diamond Resource Company (formerly called Simpson Timber Company) lands into Redwood National and State Parks land. Eight of the 15 live summer steelhead were within the index reach, Lacks to Tom McDonald Creeks. The number of adult steelhead within the index reach has declined over time, but in 2004, though still low, the numbers increased slightly (Figure 1 and Appendix I). 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.

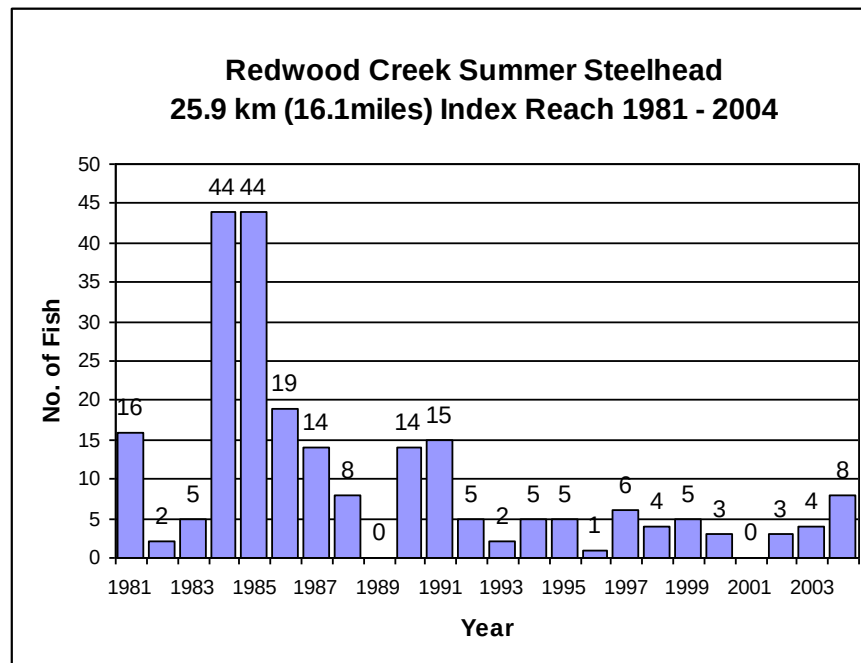


Figure 1. Numbers of summer steelhead observed each summer since 1981 on a 25.9 km (16.1 mile) **index reach** of Redwood Creek (Lacks Creek to Tom McDonald Creek), Humboldt County, California.

The 15 adult summer steelhead were observed in 12 pools, three pools which were associated with westside tributaries (Elam and Forty-four Creeks, and an unnamed tributary at river km 39.9) (Table 2). Ten were solitary observations, and the other two observations were groups of two and three fish. 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). Also, unrelated to the survey, the CDFG lower rotary screw trap (located upstream of the confluence of Prairie Creek at river km 6) caught one female 61 cm summer steelhead on June 24. When released she swam upstream (Sparkman, personal communication).

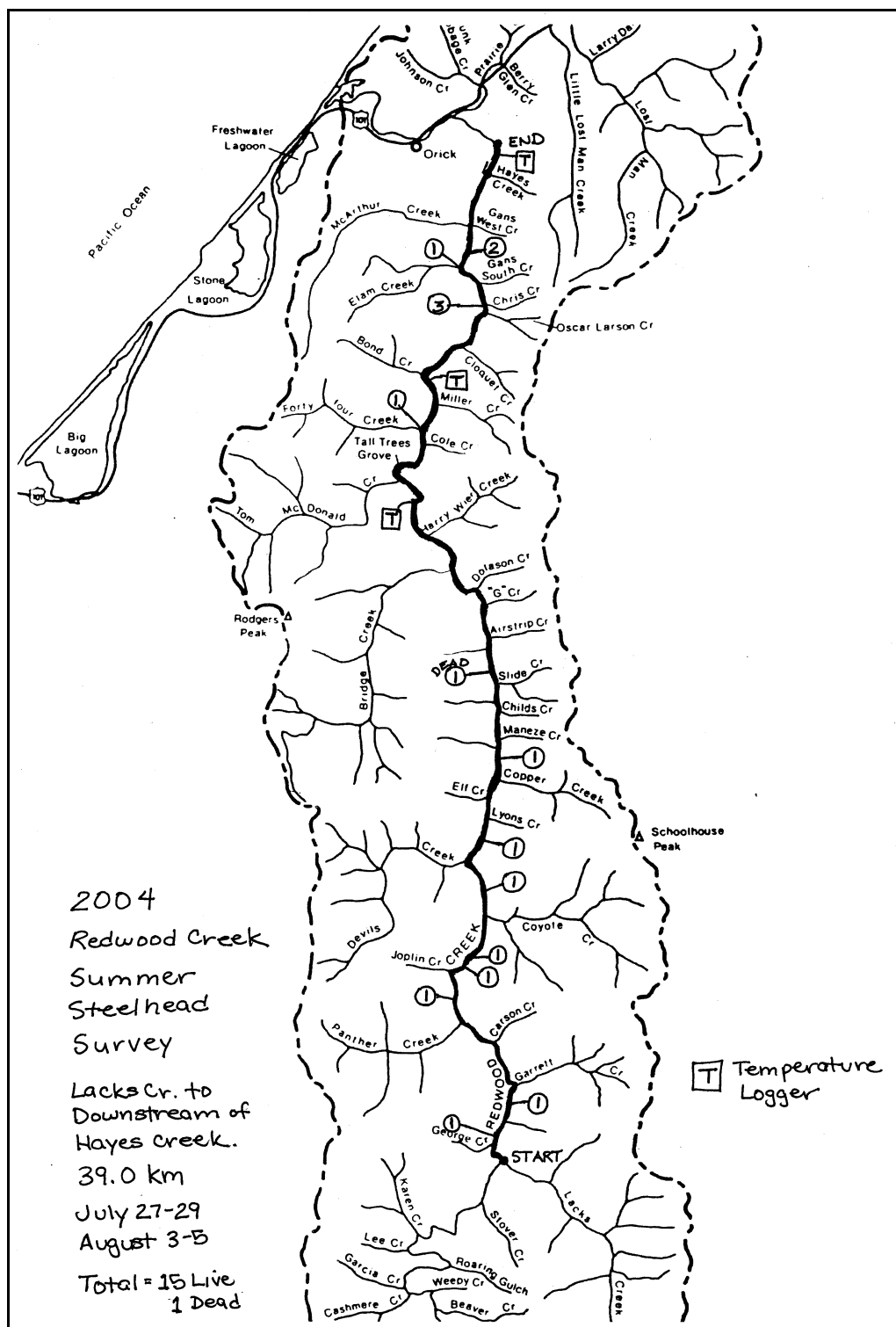


Figure 2. Location of the sixteen adult summer steelhead observed during the 2004 snorkel survey of Redwood Creek, Humboldt County, California. Survey was between Lacks Creek to downstream of Hayes Creek from July 27 to 29 and August 3 to 5, 2004.

Table 1. Numbers of adult summer steelhead ($\geq 16.5''$), 'half-pounder' steelhead, and coastal cutthroat trout, and aquatic wildlife noted during the 2004 summer steelhead survey of mainstem Redwood Creek, Humboldt County, California. Survey conducted on six days, July 27 through August 5, 2004 from Lacks Creek to downstream of Hayes Creek and covered 39 km (24.24 miles) 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 no longer accessible by vehicle.)

Redwood Creek Mainstem Stream Reach		No. of Summer Steelhead Adults ($\geq 16.5''$)	No. of Steelhead Half Pounders	No. of Cutthroat Trout ($\geq 10''$)	Aquatic Wildlife Observed
I N D E X R E A C H	Lacks to Panther Creek 7/29/2004	2	1	6	Steelhead juveniles and residents, threespine stickleback, suckers, <i>Juga</i> (snail), tadpoles, tree frogs, yellow-legged frogs, garter snake, roughskin newt, pacific giant salamander larvae, caddisfly larvae, and water striders.
	Panther to Coyote Creek 7/29/2004	3	0	8	Threespine stickleback, yellow-legged frog, <i>Juga</i> snail, and caddisfly larvae.
	Coyote to Copper Creek 8/03/2004	2	2	5	Steelhead juveniles and residents, threespine stickleback, ammocoete, suckers, yellow-legged frogs, pacific giant salamander larvae, garter snake, <i>Juga</i> snail, pebble and wood case caddisfly larvae, damselflies, and dragonflies.
	Copper to Pig Pen Prairie (Slide Cr) - 8/04/2004	1	0	6	Steelhead juveniles, yellow-legged frogs, <i>Juga</i> snails, and pebble and wood case limniphilid caddisfly nymphs.
	Pig Pen Prairie (Slide Cr) to Bridge Creek -8/04 & 05/2004	[1 dead ^a]	0	18	Threespine stickleback, suckers, and sculpin.
	Bridge to Tom McDonald Creek 8/05/2004	0	1	15	Sculpin, suckers, and western toad.
	Tom McDonald to Bond Creek 7/27/2004	1	1	19	Steelhead juveniles, threespine stickleback, suckers, sculpin, yellow-legged frog, western toad, <i>Juga</i> snail, and limniphilid caddisfly larvae. Coho salmon juveniles in side pool and in pool associated with Cole Creek, not connected to Redwood Creek.
	Bond Creek to downstream of Hayes Creek 7/28/2004	6	0	50	Steelhead juveniles, coho salmon juveniles, suckers, ammocoete, threespine stickleback, yellow-legged frog, <i>Juga</i> snail, and caddisfly larvae.
Total Live		15	5	127	
a. Caudal fin and some attached flesh					

Table 2. Results of the 2004 Redwood Creek summer steelhead survey, including date observed, number of adult steelhead, estimated length of fish (inches), habitat description, and river kilometer and UTM coordinates.

2004 Date	River KM	No. of SSHD	Est. Length (inches)	Summer Steelhead Habitat Description
7/29	44.45	1	20"	Fish in pool sitting on bottom at base of large rock in shade of rock overhang. Woody debris present. Pool in shade in am. Pool dimensions: 5' D x 50m L x 15m W. Water temperature: 20.0°C at ~10:30 am. (UTM 4546995N 426250E)
7/29	44.30	1	20"	Fish in pool between two rocks. Pool dimensions: 3' D x 150m L x 10m W. Water temperature: 20.0°C at 11:23 am. (UTM 4547120N 426260E)
7/29	39.90	1	22"	Fish in pool with confluence of unnamed westside 39.90km tributary. 90% canopy cover. No large woody debris (LWD) but rocks and boulders present. Pool dimensions: 4' D x 200m L x 8m W. (UTM 4549250N 423400E)
7/29	38.10	1	21"	In pool with 0% canopy cover. Substrate of pebbles, boulders, and cobble. Pool dimensions: 1m D x 50m L x 5m W. Water temperature: 20.0°C at 12:18 pm. (UTM 4550690N 423180E)
7/29	37.4	1	18"	In pool with boulder, gravel, and bedrock substrate. Canopy cover 75%. Pool dimensions: 15' D x 120m L x 6m W. (UTM 4551310N 423320E)
8/03	36.05	1	22"	In long shallow pool, swimming in the open away from divers. Pool dimensions: 5' D x 150m L. (UTM 4552465N 422810E)
8/03	34.25	1	17"	In pool. Swam above divers then swam back to head of pool. Pool 300m L. Water temperature: 20.5°C at 4:40 pm. (UTM 4553615N 422050E)
8/04	31.10	1	20"	Fish at head of a large deep pool known as Queen's Hole. Pool is at a sharp bend in the creek with very very large boulders. Pool dimensions: 17' D x 150m L x 30m W. Water temperature: 19.0°C at 11:30 pm. (UTM 4556370N 421340E)
8/04	28.31	1	>16"	Dead - only a large steelhead tail and caudal peduncle found. (UTM 4558390N 420150 E)
7/27	18.09	1	26"	In pool at confluence of Forty-four Creek and Redwood Creek. Fish swam upstream, but was initially observed within 20' of mouth in 3ft of water. Pool dimensions: 9' D x 50m L x 25m W. (UTM 4563585N 415250E)
7/28	12.95	3	18" 20" 22"	All steelhead in shallow pool hiding in woody debris. One was alone and the other two together, but all three within 20ft of each other. Much canopy shade over the pool. Pool dimensions: 3' D x 120m L x 15m W. (UTM 4567750N 415390E)
7/28	11.5	1	24"	Steelhead in side pool separated from Redwood Creek by gravel bar at confluence of Elam Creek. Fish resting on substrate at base of bedrock ledge. Pool dimensions: 8' D x 40m L x 10m W. Water temperature: Pool 17.0°C, Redwood Creek 18.0°C. (UTM 4568340N 414200E)
7/28	11.20	2	23" 25"	Steelhead in pool underneath a stump with 11 cutthroat > 10" in length. Much LWD in pool. About 60% canopy cover. Pool dimensions: 8' D x 120m L x 30m W. Water temperature: 20.0°C. (UTM 4568640N 414250E)
Total		15 live	1 Dead	

COHO SALMON

Juvenile coho salmon (*Oncorhynchus kisutch*) observations were incidental to the survey for summer steelhead (i.e. we did not specifically look for coho in locations where the probability of finding them is high and where adult summer steelhead would not be). All three observations were downstream of the Tall Trees Grove. We observed coho in a small pool at the mouth of Cole Creek (18.57km). Cole Creek was not connected to Redwood Creek. The water in the isolated pool was 15°C, while Redwood Creek was 20°C. At river km 16.75, coho juveniles were observed in a cold, deep pool partially separated by a bar from the main flow of Redwood Creek. An eastside tributary at 11°C entered the side pool. Redwood Creek was 18°C. A third observation of coho juveniles was at river km 9.9.

WATER DISCHARGE

Water flow (measured at the Orick gaging station located downstream of the confluence of Prairie Creek at Redwood Creek) between July 27 and August 5 ranged between 25 and 30 cfs. (This flow data is provisional and subject to revision.). There was no measurable precipitation measured at the Orick gaging station during this period.

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. Temperature loggers also recorded Redwood Creek mainstem water temperature at three sites.

Mainstem Redwood Creek - Redwood Creek water temperatures measured during the 2004 survey ranged from 15°C (downstream of Cloquet Creek at 9:45 am and 10:10 am on July 28) to 22°C (upstream of Coyote Creek at 1:30 pm on July 29) (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 three locations. They recorded temperature at one-hour intervals from June 1 to October 18, 2004.

A temperature logger (Tidbit S/N 552819) was located upstream of Tom McDonald Creek/Tall Trees Grove (UTM 4561424N 416033E). Maximum and minimum water temperatures recorded were 23.8°C and 13.7°C, respectively (Figure 3). The average water temperature was 18.6°C (Std. dev. 2.3°C). For the period July 1 through August 31, the warmer period of the summer, the average water temperature was 20.6°C, the maximum, 23.8°C; the minimum, 17.6°C; and the maximum diurnal range, 4.8°C.

A second temperature logger (Tidbit S/N 552817) was located upstream of Bond Creek (UTM 4564923N 414736E). This was the first season at this location. Maximum and minimum water temperatures recorded were 24.1°C and 14.2°C, respectively (Figure 4). The mean water temperature was 18.9°C (Std. dev. 2.1°C). For the period July 1 through August 31, the warmer period of the summer, the average water temperature was 20.5°C, the maximum 24.2°C, the minimum, 17.5°C, and the maximum diurnal range 5.9°C.

The third temperature logger (TempPro S/N 761046) was located in lower Redwood Creek upstream of the Redwood Creek trailhead (UTM 4572011N 413706E). Maximum and minimum water temperatures recorded were 22.6°C and 14.0°C, respectively (Figure 4). The average water temperature was 17.9°C (Std. dev. 1.6°C). For the period July 1 through August 31, the warmer period of the summer, the average water temperature was 18.6°C; the maximum, 22.6°C; the minimum, 15.7°C, and the maximum daily diurnal range, 6.0°C.

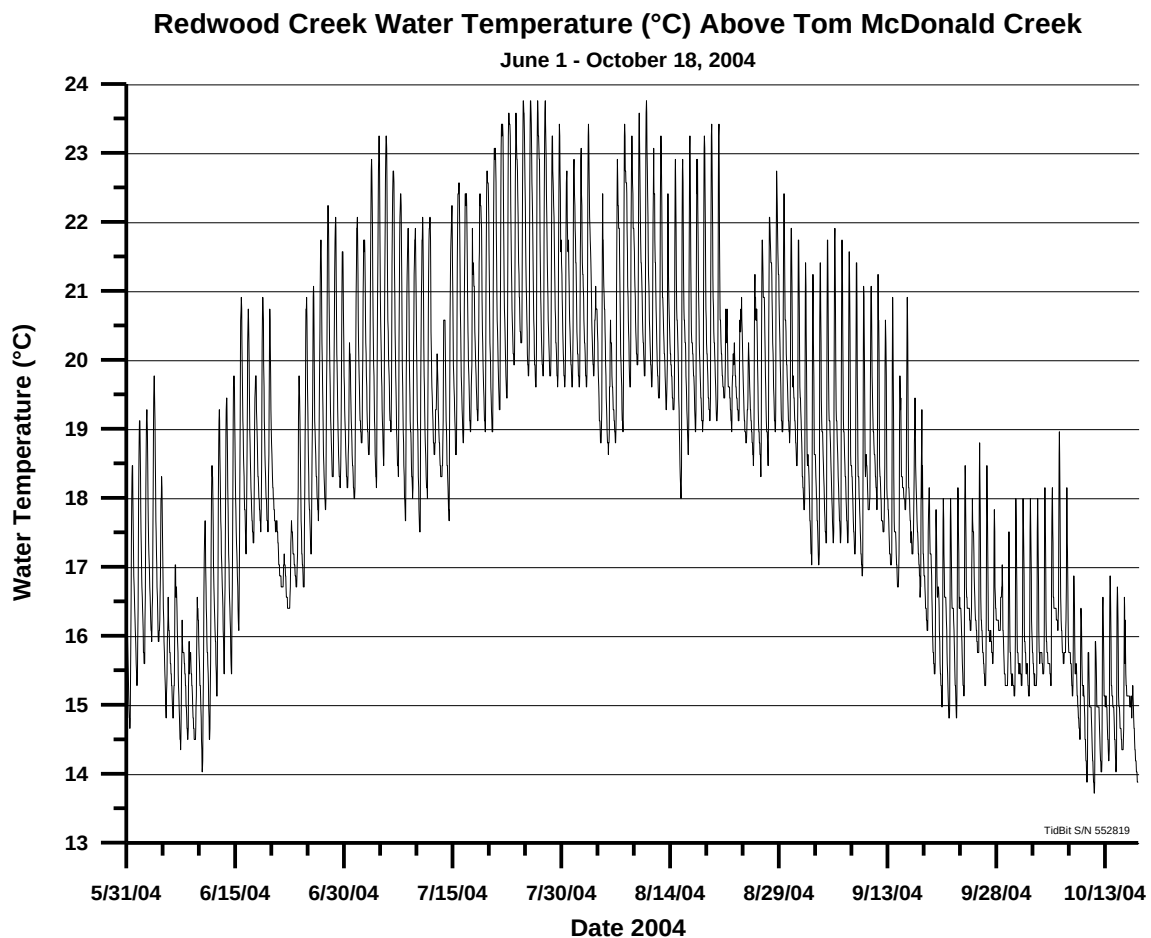


Figure 3. Mainstem Redwood Creek water temperatures (°C) from Onset TidBit temperature logger located upstream of Tom McDonald Creek/Tall Trees Grove. The logger recorded water temperature every 1-hour in the current below the surface of the water from June 1 through October 18, 2004.

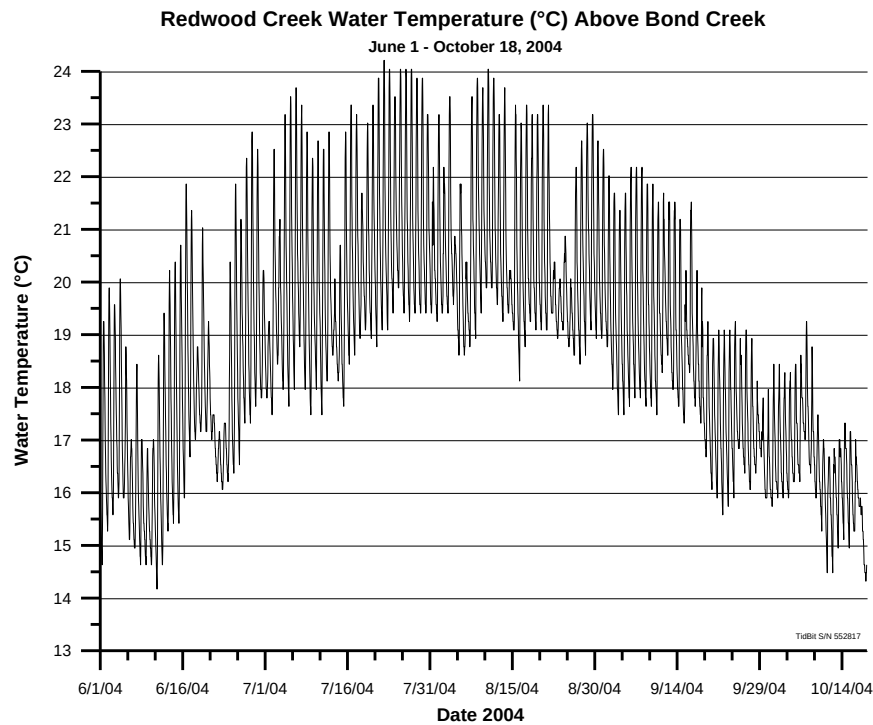


Figure 4. Mainstem Redwood Creek water temperatures (°C) from Onset TidBit temperature logger located upstream of Bond Creek. The logger recorded water temperature every 1-hour in the current below the surface of the water from June 1 through October 18, 2004.

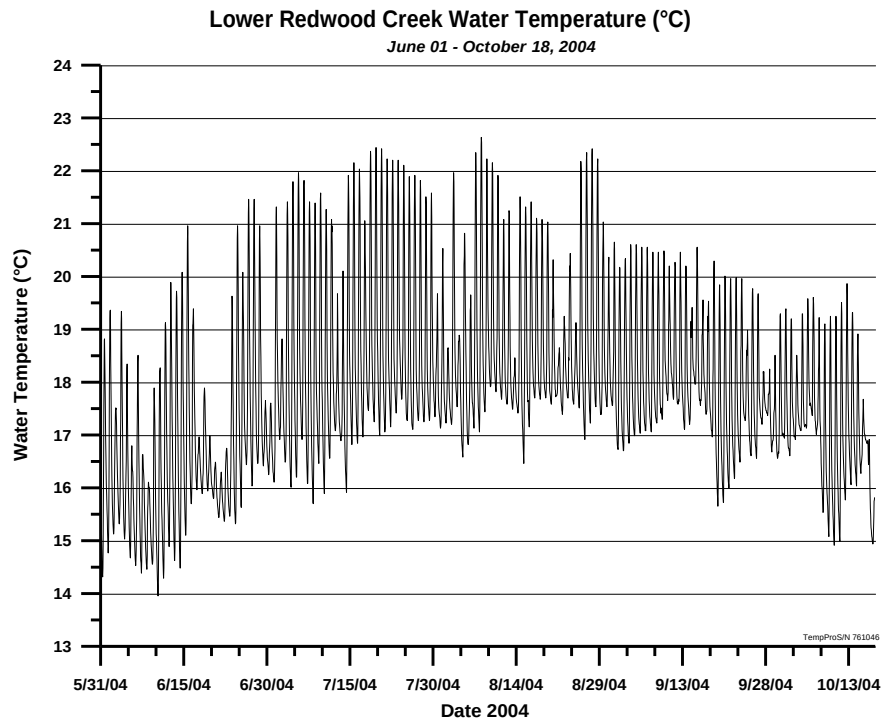


Figure 5. Mainstem Redwood Creek water temperatures (°C) from Onset TempPro temperature logger located upstream of the lower Redwood Creek trailhead parking lot. The logger recorded water temperature every 1-hour in the current below the surface of the water from June 1 through October 18, 2004.

Tributaries - Temperatures of 41 east and westside tributaries entering Redwood Creek measured during the survey ranged from 11°C to 16°C (Appendix II). Water temperatures of all tributaries were cooler than the corresponding temperature of mainstem Redwood Creek measured at the same time.

Westside tributaries were generally cooler than eastside tributaries; a pattern repeated in all past summer steelhead surveys. The mean water temperature of westside tributaries was 13.8°C (n = 23, std. dev. = 1.4°C) and temperatures ranged from 11°C (three tributaries) to 15.5°C (three tributaries). The mean water temperature of eastside tributaries was 14.2°C (n = 18, std. dev. = 1.5°C) and temperatures ranged from 11°C (two tributaries) to 16°C (three tributaries).

The 2004 year summer water temperatures are not an anomaly. Similar temperatures and trends have been recorded in past summer steelhead surveys and temperature monitoring. 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.

CAMPFIRES/CAMPING

For the second year, campfire rings/campfire remains, tents, and hikers were counted during the survey to measure human use and distribution on mainstem Redwood Creek within the park (Appendix III). The park compendium allows camping on gravel bars (upstream from the summer footbridge creek/trail crossing) of Redwood Creek to the eastern park boundary. Camping is prohibited within a ¼ mile radius of the Tall Trees Grove.

Except for one fire ring between Coyote and Copper Creek, all other campfires were downstream of the end of the 'gorge' area. Most of the use is downstream and upstream of Tom McDonald Creek. Ten campfires were found between Emerald and Tom McDonald Creek and 13 were found between Tom McDonald and Forty four Creek. Three campfires were found downstream of the summer footbridge creek/trail crossing, illegal campsites. A total of 45 campfires, 3 tents, and 12 hikers were observed.

Except for one summer steelhead at the confluence of Forty four Creek, no summer steelhead were observed in the heavy usage area between Emerald and Forty four Creeks or in the upstream reach between Emerald and Bridge Creeks that had another five fire rings. Redwood Creek is much wider and shallower below the gorge area, including the reach downstream of Bridge Creek, which may affect summer steelhead distribution. However, six fish were observed between Bond and Hayes Creek, an area of Redwood Creek that is wide and shallow, but also where the number of fire rings were lower. In this reach, not a full day's hike from the lower trailhead, people would be hiking on Redwood Creek trail situated away from the channel on their way upstream to camp. Most summer steelhead in California are found in remote canyons not readily accessible to people (P.B. Moyle and M.D. Morford, California Fish and Game Commission, unpublished data). Ward (1988) reported on the Middle Fork Eel River that repeated dives in one day (ie. human disturbance) caused fish to migrate out of pools 18 to 24 hours after disturbance in June and July. In August and September, they did not migrate out of the pools, likely due to decreased flow. The implication is that summer steelhead distribution may be affected in early summer by repeated and continual disturbance from humans (e.g.

swimming in the few pools available, wading, and fishing), causing fish to move out of optimum pools, the general area, and into less desirable habitat.

Other wildlife noted is listed in Appendix IV.

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.
- Ward, M.B. 1988. Adult summer steelhead trout utilization of summer hold pools, Middle Fork, Eel River, California. In Western Proceedings; 68th Annual Conference of the Western Association of Fish and Wildlife Agencies, Albuquerque, New Mexico.

Personal Communication Michael Sparkman, CDFG

"Michael Sparkman"
To: <David_G_Anderson@nps.gov>
Subject: summer steelhead caught by lowertrap
06/29/2004 04:44 PM MST
yesterday we caught a 61 cm female summer steelhead in the lower
rst..The crew took scales, and let her go, she went upstream...
mike
Michael D. Sparkman
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Appendix I. Numbers of Summer Steelhead Trout observed 1981 through 2004 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.

	Index Reach (Lacks Creek to Tom McDonald Creek) No. of Summer Steelhead	Total Reach Surveyed		Survey Dates
		Total No. of Summer Steelhead	Begin to End Creeks 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 (44.4)	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	1mile downstream of Snow Camp Cr to Tom McDonald Cr (72.7)	7/14 – 16/87
1988	8	8 & (6 Spring	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	HWY299 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 (con't.)	Index Reach (Lacks Creek to Tom McDonald Creek) No. of Summer Steelhead	Total Reach Surveyed		Survey Dates
		Total No. of Summer Steelhead	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 Downstrm of Hayes Cr (38.8)	7/29-31, 8/4-6/2003
2004	8 (+ 1 dead)	15 (+ 1 dead)	Lacks Cr to Downstrm of Hayes Cr (39.0)	7/27-29, 8/3-5/2004
^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 2004 Redwood Creek summer steelhead trout survey. Locations are listed south to north. Redwood Creek (upstream) refers to water temperature measurement taken upstream of the tributary listed below. UN ES or WS refers to unnamed eastside or westside tributary, and number is river kilometer (measured from the mouth of Redwood Creek). Alignment refers to tributary watershed position: East = Eastside, West = Westside, and REDW = mainstem Redwood Creek.

Location	Alignment	Date	Time	Water Temperature (°C)
Redwood Creek (upstream)	REDW	7/29/04	8:54 AM	17.0
Lacks Creek	East	7/29/04	8:57 AM	13.5
Redwood Creek (upstream)	REDW	7/29/04	9:30 AM	19.0
George Creek	West	7/29/04	9:30 AM	13.5
Redwood Creek 44.45 km	REDW	7/29/04	---	20.0
Redwood Creek (upstream)	REDW	7/29/04	11:13 AM	20.0
UN ES 44.381	East	7/29/04	11:13 AM	14.0
Redwood Creek (upstream)	REDW	7/29/04	12:26 PM	21.0
Garrett Creek	East	7/29/04	12:34 PM	16.0
Redwood Creek (upstream)	REDW	7/29/04	3:18 PM	20.0
Carson Creek	East	7/29/04	3:18 PM	12.5
Redwood Creek (upstream)	REDW	7/29/04	4:35 PM	20.5
Panther Creek	West	7/29/04	4:39 PM	12.5
Redwood Creek (upstream)	REDW	7/29/04	9:34 AM	19.0 (Air 15.5)
Panther Creek	West	7/29/04	9:34 AM	13.0
Redwood Creek (upstream)	REDW	7/29/04	10:14 AM	18.0
UN WS 39.90	West	7/29/04	10:14 AM	11.0
Redwood Creek (upstream)	REDW	7/29/04	10:49 AM	19.0
UN WS 39.1638	West	7/29/04	10:49 AM	13.0
Redwood Creek (upstream)	REDW	7/29/04	--	20.0
Joplin Creek	West	7/29/04	--	15.5
Redwood Creek 38.10 km	REDW	7/29/04	12:18 PM	20.0
Redwood Creek 37.4 km	REDW	7/29/04	--	19.5
Redwood Creek (upstream)	REDW	7/29/04	1:30 PM	22.0
Coyote Creek	East	7/29/04	1:30 PM	16.0
Redwood Creek (upstream)	REDW	8/03/04	12:20 PM	20.0 (Air 19.0)
Coyote Creek	East	8/03/04	12:20 PM	16.0
Redwood Creek 36.05 km	REDW	8/03/04	1:31 PM	21.0
Redwood Creek (upstream)	REDW	8/03/04	2:15 PM	21.5
UN ES 35.714	East	8/03/04	2:15 PM	15.0
Redwood Creek 35.30 km	REDW	8/03/04	3:09 PM	21.0
Redwood Creek (upstream)	REDW	8/03/04	3:47 PM	20.5
Devils Creek	West	8/03/04	3:47 PM	14.5
Redwood Creek 34.35 km	REDW	8/03/04	4:40 PM	20.5
Redwood Creek (upstream)	REDW	8/03/04	5:26 PM	21.0
Lyons Creek	East	8/03/04	5:26 PM	15.0
Redwood Creek 33.3 km	REDW	8/03/04	6:22 PM	21.5

Location	Alignment	Date	Time	Water Temperature (°C)
Redwood Creek (upstream)	REDW	8/03/04	6:48 PM	21.5
UN WS 32.527	West	8/03/04	6:48 PM	14.5
Redwood Creek (upstream)	REDW	8/03/04	7:15 PM	21.5
Copper Creek	East	8/03/04	7:15 PM	subgravel
Redwood Creek (upstream)	REDW	8/04/04	10:06 AM	19.5 (Air 16.5)
Copper Creek	East	8/04/04	10:06 AM	15.0 (subgravel at mouth)
Redwood Creek 31.0 km	REDW	8/04/04	11:30 AM	19.0
Redwood Creek (upstream)	REDW	8/04/04	11:45 AM	19.0
UN WS 31.042	West	8/04/04	11:45 AM	14.5
Redwood Creek (upstream)	REDW	8/04/04	12:37 PM	20.0
UN WS 30.536	West	8/04/04	12:37 PM	15.0
Redwood Creek (upstream)	REDW	8/04/04	1:45 PM	20.0
UN WS 29.853	West	8/04/04	1:45 PM	14.5
Redwood Creek (upstream)	REDW	8/04/04	2:07 PM	20.5
UN WS 29.066	West	8/04/04	2:07 PM	15.5
Redwood Creek (upstream)	REDW	8/04/04	3:25 PM	20.5
Slide Creek	East	8/04/04	3:25 PM	16.0
Redwood Creek (upstream)	REDW	8/04/04	4:16 PM	20.5
UN WS 28.243	West	8/04/04	4:16 PM	14.5
Redwood Creek (upstream)	REDW	8/04/04	4:55 PM	20.5
UN WS 28.10	West	8/04/04	4:55 PM	14.5
Redwood Creek (upstream)	REDW	8/04/04	6:07 PM	20.5
UN ES 27.6	East	8/04/04	6:07 PM	14.0
Redwood Creek (upstream)	REDW	8/04/04	6:41 PM	20.5
UN WS 26.912	West	8/04/04	6:41 PM	15.0
Redwood Creek 26.65 km	REDW	8/04/04	7:00 PM	20.5
Redwood Creek 26.65 km	REDW	8/05/04	9:20 AM	18.0 (Air 13.0)
Redwood Creek (upstream)	REDW	8/05/04	10:16 AM	19.0
Dolason Creek	East	8/05/04	10:16 AM	14.0
Redwood Creek	REDW	8/05/04	10:52 AM	19.0
UN ES 25.112	West	8/05/04	10:52 AM	14.0
Redwood Creek (upstream)	REDW	8/05/04	11:25 AM	20.5
Bridge Creek	West	8/05/04	11:25 AM	15.0
Redwood Creek 23.75 km	REDW	8/05/04	12:27 PM	20.0
Redwood Creek (upstream)	REDW	8/05/04	12:55 PM	20.0
Emerald Creek	East	8/05/04	12:55 PM	15.0 (subgravel)
Redwood Creek (upstream)	REDW	8/05/04	2:33 PM	20.0
UN WS 22.861	West	8/04/04	2:33 PM	14.0
Redwood Creek (upstream)	REDW	8/05/04	4:05 PM	20.5
Tom McDonald Creek	West	8/05/04	4:05 PM	15.5
Redwood Creek (upstream)	REDW	7/27/04	9:45 AM	20.0 (Air 18.0)
Tom McDonald Creek	West	7/27/04	9:45 AM	13.0
Redwood Creek 19.60 km	REDW	7/27/04	10:45 AM	20.0
Redwood Creek (upstream)	REDW	7/27/04	11:03 AM	20.0

Location	Alignment	Date	Time	Water Temperature (°C)
UN ES 19.25	East	7/27/04	11:03 AM	14.0
Redwood Creek (upstream)	REDW	7/27/04	11:32 AM	20.0
Cole Creek	East	7/27/04	11:32 AM	14.0
Redwood Creek (upstream)	REDW	7/27/04	11:51 AM	20.0
Forty-four Creek	West	7/27/04	11:51 AM	12.5
Redwood Creek 18.10 km	REDW	7/27/04	--	20.0
Redwood Creek (upstream)	REDW	7/27/04	1:36 PM	19.0
Miller Creek	East	7/27/04	1:36 PM	14.0 (subgravel)
Redwood Creek (upstream)	REDW	7/27/04	2:10 PM	18.0
UN ES 16.7478	East	7/27/04	2:10 PM	11.0
Redwood Creek (upstream)	REDW	7/27/04	2:25 PM	20.0
Bond Creek	West	7/27/04	2:25 PM	13.0
Redwood Creek (upstream)	REDW	7/27/04	3:25 PM	20.0
Cloquet Creek	East	7/27/04	3:25 PM	15.0 (subgravel)
Redwood Creek 14.6 km	REDW	7/28/04	9:45 AM	15.0 (Air 14.0)
Redwood Creek (upstream)	REDW	7/28/04	10:10 AM	15.0
UN WS 13.806	West	7/28/04	10:10 AM	11.0
Redwood Creek	REDW	7/28/04	10:40 AM	16.0
Redwood Creek (upstream)	REDW	7/28/04	10:50 AM	16.5
Oscar Larson Creek	East	7/28/04	10:50 AM	11.0
Chris Creek	East	7/28/04	--	(subgravel)
Redwood Creek 12.95 km	REDW	7/28/04	11:21 AM	18.0
Redwood Creek (upstream)	REDW	7/28/04	--	18.0
Elam Creek	West	7/28/04	--	13.5
Redwood Creek (upstream)	REDW	7/28/04	2:16 PM	18.0
McArthur Creek	West	7/28/04	2:16 PM	11.0
Redwood Creek 7.5 km	REDW	7/28/04	3:44 PM	21.0

Appendix III. Numbers of camp fire rings or camp fire remains, campsites and campers, and hikers observed on the 2004 summer steelhead survey of Redwood Creek within RNSP between July 27 and August 9, 2004.

Creek	River km	Fire Ring	Campers	Hikers
Coyote Creek	36.734			
1	34.25	1		
Copper Creek	32.110			
0		0		
Pig Pen Prairie/Slide Cr	28.732			
		0		
Bottom of Rocky Gap	27.250			
	26.55	1		
	25.85	1		
3	25.00	1		
Bridge Creek	24.519			
	24.519	3		
	24.20	1		
5	23.75	1		
Emerald Creek	23.221			
	23.20	1		
	23.12	1	1 tent	
	23.00	1		
	22.85	1		
	21.80	2		
	21.30	3		
	20.75	1		
11	20.70	1		
Tom McDonald Creek	20.604			
	20.60	1		
	20.50	1		
	20.15	1	1 tent	
	19.95	1		
	19.75	3		
	19.60	1		
	19.50	2		
	19.10	1	1 tent	
	18.90	1		
13	18.75	1		
Forty four Creek	18.086			
1	17.5	1		
Bond Creek	16.137			
	15.40	1		
	13.90	1		
	13.80	1		
4	12.85	1		

Creek	River km	Fire Ring	Campers	Hikers
Elam Creek	11.508			
2	11.50	1		8
	10.5	1		
McArthur Creek	9.876			
1	9.55	1		4
Summer Bridge	9.700			
1	8.45	1		
Hayes Creek	8.399			
2	8.25	2		
(End of Survey at 7.5 km)	7.5	1		
Total		45	3 tents	12



Redwood Creek Cutthroat Trout (August 2004)

Appendix IV. Wildlife observed during the 2004 summer steelhead survey of Redwood Creek, Humboldt County, California, July through August 5.

Redwood Creek Mainstem Stream Reach	Other Wildlife Observed
Lacks to Panther Creek	Deer, bobcat (tracks), beaver (sign), raccoon, american dipper, stellers jay, bandtailed pigeon, chickadee, raven, red-tailed hawk, redbreasted merganser, kingfisher, spotted owl, coopers hawk, damselfly adults, butterflies - pacific fritillary, California sister, cabbage white, skipper, common buckeye, western tiger swallowtail, bumble bee (<i>Bombus sp.</i>), and grasshoppers.
Panther to Coyote Creek	American dipper, kingfisher, chestnut-backed chickadee, spotted sandpiper, butterflies - western tiger swallowtail, and California sister.
Coyote to Copper Creek	Mink, stellers jay, american dipper, pilated woodpecker, and kingfisher.
Copper to Pig Pen Prairie (Slide Cr)	Deer fawn carcass, beaver (sign), mergansers, sandpipers, kingfisher, stellers jay, and bandtailed pigeons.
Pig Pen Prairie (Slide Cr) to Bridge Creek	Turkey vulture, red-tailed hawk, stellers jay, american dipper, mergansers, sandpiper, and kingfisher.
Bridge to Tom McDonald Creek	Bull elk and mergansers.
Tom McDonald to Bond Creek	Spotted sandpipers, belted kingfisher, stellers jay, pacific slope flycatcher, common raven, american robin, hermit thrush, chestnut-backed chickadee, rough-winged swallow, killdeer, american dipper, common merganser, turkey vulture, greater yellowleg, butterflies - western tiger swallowtail, common branded skipper, cabbage white, Mylitta crescent, and California sister.
Bond Creek to Hayes Creek	River otter (subadult and adult), belted kingfisher, varied thrush, american dipper, swainsons thrush, stellers jay, pacific slope flycatcher, osprey, common raven, great blue heron, common merganser, spotted sandpiper, northern flicker, killdeer, winter wren, turkey vulture, green heron, butterflies - California sister, and cabbage white.