

2003 Snorkel Monitoring Activities
Redwood National and State Parks-Fish and Wildlife Branch,

1. 2003 RNSP REDWOOD CREEK SUMMER STEELHEAD TROUT SURVEY

Appendix I. Numbers of Summer Steelhead Trout observed 1981 through 2003 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.

Appendix II. Water and air temperatures (°C) measured during the 2003 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 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.

Appendix III. Numbers of camp fire rings or camp fire remains, campsites and campers, and backpackers and day hikers observed on the 2003 summer steelhead survey of Redwood Creek within RNSP between July 29 and August 5, 2003.

Appendix IV. Wildlife observed during the 2003 summer steelhead survey of Redwood Creek, Humboldt County, California.

Appendix V. Location (river km) and water temperatures (°C) where juvenile coho and chinook salmon were observed during the 2003 summer steelhead snorkel survey of mainstem Redwood Creek.

2. 2003 RNSP Smith River Summer Steelhead Trout Survey

2003 RNSP REDWOOD CREEK SUMMER STEELHEAD TROUT SURVEY

DATES: July 29, 30, 31 (Tues – Thurs), and August 4, 5, 6 (Mon – Wed), 2003

LOCATION: Redwood Creek, Humboldt County, California
Mainstem reach from Lacks Creek - river km 46.525 to downstream of Hayes Creek (Redwood National and State Parks) - river km 7.70.

DISTANCE: 38.8 km (24.1 miles) [35.9 % of the 108-km (67.2-mile) long Redwood Creek mainstem]

FLOWS: Gaging Station: Orick [ORK] (<http://cdec.water.ca.gov/>)
Start of Survey: 58cfs End of Survey: 65cfs

DIVERS: David Anderson¹, Baker Holden¹, Kyle Max¹, Terry Hines¹, Ben Littlefield¹, Jeanne Mayer¹, Van Hare, and Chris Currens. (¹Person with prior summer steelhead diving experience on Redwood Creek). Recorders: Beverly Shaw and Katie Moriarty.

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 Simpson Timber 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 two nights between Coyote Creek and Tom McDonald Creek, out via Tall Trees Trail to C-Line Road to Bald Hills Road; Tom McDonald in via Bald Hills Road to C-Line Road to Tall Trees Trail; Bond Creek in via A-9 road and hike road extension to Redwood Creek trail; and downstream of Hayes Creek out Redwood Creek trail to Redwood Creek lower trailhead parking lot.

ITINERARY:	Date	Survey Reach	Distance	SSHD No.
	8/06	Lacks Creek to Panther Creek <i>Anderson, Hines, Mayer, Shaw (notes)</i>	6.02 km	0
	8/06	Panther Creek to Coyote Creek <i>Holden, Littlefield, Currens, Moriarty (notes)</i>	3.76 km	0
	7/29	Coyote Creek to Copper Creek <i>Anderson, Holden, Max, Hines, Hare</i>	4.62 km	2
	7/30	Copper Creek to downstrm of Dolason Creek <i>Anderson, Holden, Max, Hines, Hare,</i>	6.46 km	1
	7/31	Downstream of Dolason Cr to Tom McDonald Cr <i>Anderson, Holden, Max, Hines, Hare</i>	5.05 km	1
	8/04	Tom McDonald Creek to Bond Creek <i>Anderson, Holden, Hines, Littlefield, Shaw (notes)</i>	4.47 km	0
	8/05	Bond Creek to downstrm of Hayes Creek <i>Anderson, Holden, Hines, Littlefield, Currens, Moriarty (notes)</i>	8.43 km	2

TOTAL NUMBER OF ADULT SUMMER STEELHEAD TROUT OBSERVED IN 2003: 6
(NUMBER OF ADULT SUMMER STEELHEAD TROUT (SSHD) OBSERVED WITHIN THE INDEX SECTION (LACKS CREEK TO TOM McDONALD CREEK - 16.1 miles): 4.

SUMMER STEELHEAD TROUT (*Oncorhynchus mykiss*)

Year 2003 was the 23rd consecutive summer steelhead trout survey of Redwood Creek, the first was 1981. Six adult summer steelhead (steelhead ≥ 16.5 inches), three ‘half-pounder’ steelhead (smaller immature sea-run steelhead returning after less than one year in the ocean), and 63 coastal cutthroat trout (*O. clarki*) (cutthroat ≥ 10 inches) were observed in a mainstem survey reach from Lacks Creek to just downstream of Hayes Creek (Figure 2 and Table 1). The survey reach begins on Simpson Timber Company lands and progresses downstream through Redwood National and State Parks land. Four of the six summer steelhead were within the index reach. The number of adult steelhead within the index reach has declined over time (Figure 1 and Appendix I). Steelhead within the Northern California coastal steelhead ESU (evolutionary significant unit), which includes Redwood Creek, were federally listed by the National Marine Fisheries Service as threatened in June 2000.

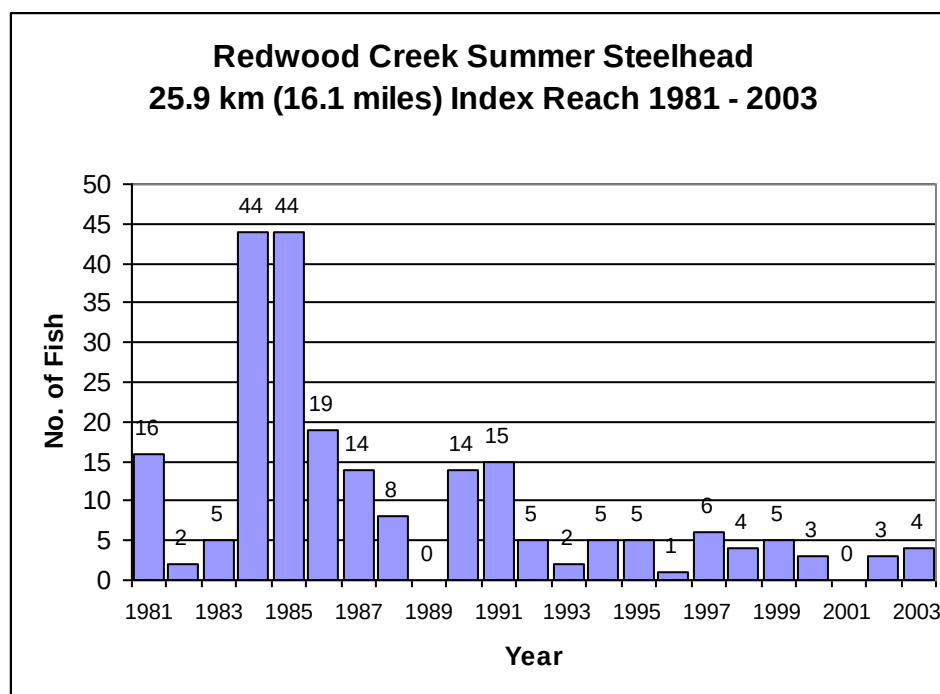


Figure 1. Numbers of summer steelhead observed each summer since 1981 on a 25.9 km (16.1 mile) *index reach* of Redwood Creek (Lacks Creek to Tom McDonald Creek), Humboldt County, California.

All six adult summer steelhead were observed in pools, two pools which are associated with westside tributaries (Devils and Elam Creeks) (Table 2). 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).

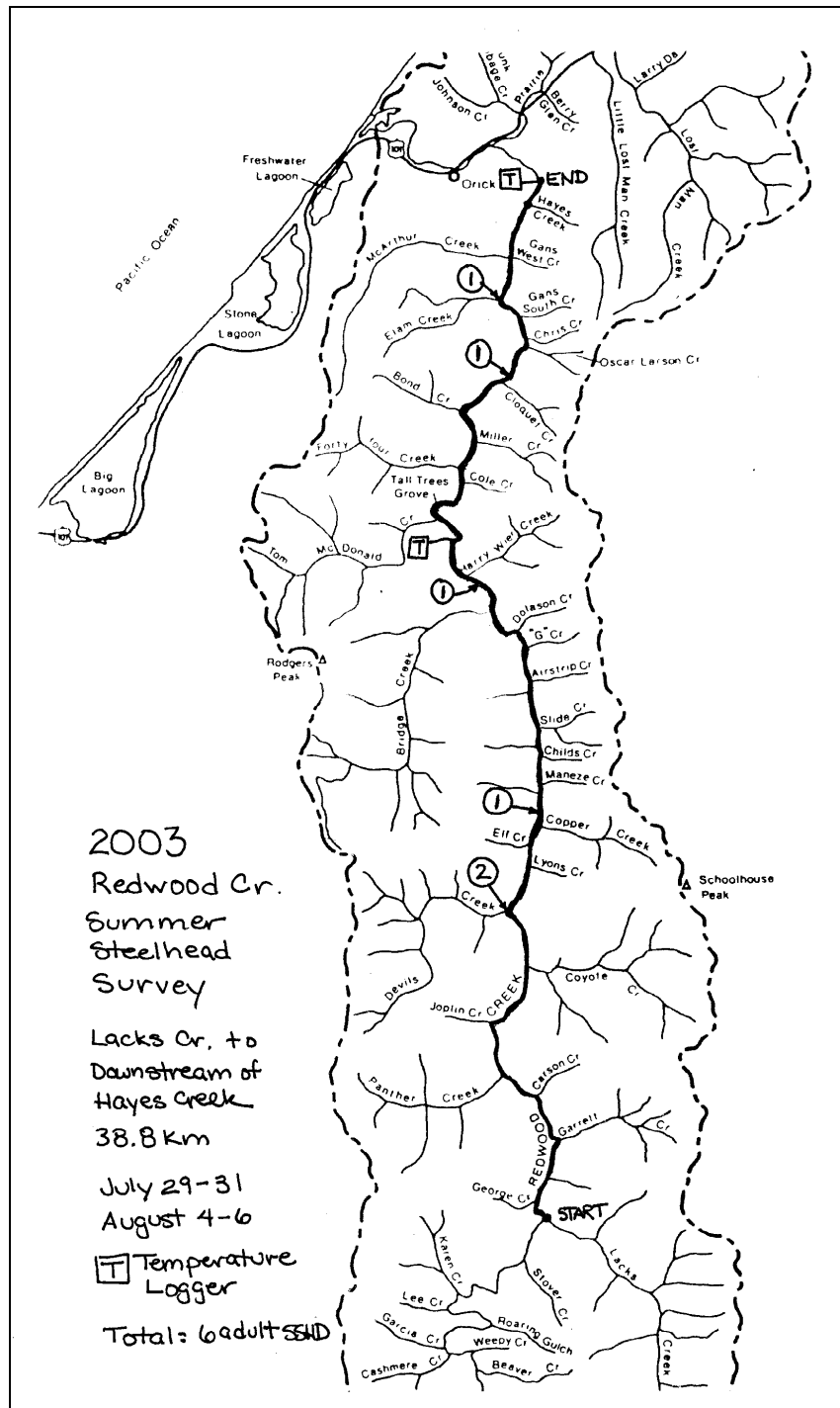


Figure 2. Location of the six adult summer steelhead observed during the 2003 snorkel survey of Redwood Creek, Humboldt County, California. Survey was between Lacks Creek and Hayes Creek from July 29 to 31 and August 4 to 6, 2003.

Table 1. Numbers of adult summer steelhead ($\geq 16.5"$), 'half-pounder' steelhead, and coastal cutthroat trout observed, and aquatic wildlife noted during the 2003 summer steelhead survey of mainstem Redwood Creek, Humboldt County, California. Survey conducted July 29 through August 6, 2003 by Redwood National and State Parks and covered 38.8 km (24.1 miles) [35.9 % of the 108 km (67.1 mile) long 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 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 8/06/03	0	0	2	Juvenile steelhead, three spine stickleback, suckers, lamprey redds, Pacific giant salamander (dead), yellow legged frogs and tadpoles, American dipper, Hooded merganser
	Panther to Coyote Creek 8/06/03	0	1	4	Juvenile steelhead, sucker, Pacific giant salamanders (aquatic phase), yellow legged frog tadpoles, <i>Juga</i> snails, American dipper
	Coyote to Copper Creek 7/29/03	2	0	4	Juvenile steelhead, sculpin, three spine stickleback, Pacific giant salamander (aquatic phase), <i>Juga</i> snails, Limniphilid larvae, glossosomatid larvae, American dipper
	Copper to Pig Pen Prairie (Slide Cr) - 7/30/03	1	0	4	Juvenile steelhead, western toad, yellow legged frog, three spine stickleback, Pteronarcys larvae, <i>Juga</i> snails, Limniphilid larvae, glossosomatid larvae
	Pig Pen Prairie (Slide Cr) to Bridge Creek -7/30-31/03	0	0	5	Juvenile steelhead, sculpin, three spine stickleback, garter snake, <i>Juga</i> snails, Limniphilid larvae, glossosomatid larvae beaver, river otter (2)
	Bridge to Tom McDonald Creek 7/31/03	1	0	3	Steelhead juveniles, three spined stickleback, sculpin, suckers, Pacific giant salamander (dead), coho in Bridge Cr, <i>Juga</i> snails, Limniphilid and Glossosomatid caddisfly larvae, American dipper, fishing gear
	Tom McDonald to Bond Creek 8/04/03	0	0	6	Juvenile steelhead, coho, and chinook, three spine stickleback, sucker, sculpin, Pacific giant salamander (dead), rough skinned newt, Western toads and tadpoles, <i>Juga</i> snails, American dipper
	Bond Creek to Hayes Creek 8/05/03	2	2	35	Juvenile steelhead, chinook, and coho, three spine stickleback, suckers, sculpin, yellow legged frogs, rough skinned newt, western toads and tadpoles, American dipper
Total		6	3	63	

Additional information: One adult steelhead was seen by the park spotted owl crew on July 14, 2003 on the mainstem of Redwood Creek downstream from the confluence of Cloquet Creek (in the Bond to Hayes reach). Its tail was tattered and skinned up (white in color), fish was silver, and was swimming up a riffle.

Table 2. Results of the 2003 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.

2003 Date	No. of SSHD	Est. Length (inches)	Habitat Description
7/29	2	~24"	In mainstem pool associated with the confluence of Devils Creek. Devils Creek flowing into pool at 14.5°C at 1516. Pool dimensions: 200'L x 30' W x 8'D. (River km 34.92, UTM 4552980N 421930E)
7/30	1	18"	In mainstem pool associated with large rock outcrop at river bend (commonly called "Queens Bath" by geo rehabbers). Pool dimensions: 300'L x 60' W x 18'D. Pool temperature 20°C. (River km 31.25, UTM 4556250N 421450E)
7/31	1	20"	In long narrow mainstem pool. Fish was between submerged logs. Pool dimensions: 450'L x 25'W x 6'D. Pool temperature 18.0°C at 1129. (River km 23.60, UTM 4560960N 417360E)
8/05	1	~16-17"	In pool. Pool dimensions: 225'L x 18'W x 10'D. Pool temperature 18.0°C at 1130. (River km 14.20, UTM 4566750N 415400E)
8/05	1	24"	In large pool at confluence of Elam Creek. Pool dimensions: 90'L x 60' W x 15'D. Pool temperature of 19.0°C (Elam Creek temperature 13.0°C). (River km 11.50, UTM 4568300N 414200E)

WATER DISCHARGE

Water flow (measured at Orick gaging station located downstream of the confluence of Prairie Creek at Redwood Creek) during the six day survey ranged from 52 to 77 cfs. It was 58cfs on July 29 and 65cfs at the end of the survey on August 6, 2003. (This flow data is provisional and subject to revision.). It rained a total of 0.44" between the 29th and 6th in two events, 0.20" on August 2nd and 0.24" on August 5th.

WATER TEMPERATURE

Water temperatures (°C) were 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 two sites.

Mainstem Redwood Creek - Water temperatures measured during the 2003 survey in Redwood Creek ranged from 15.5°C (upstream of Panther Creek at 9 am on August 6) to 23.5°C (upstream of Copper Creek at 6:40 pm on August 29) (Appendix II).

Two Onset TidBit recording temperature loggers were placed mid-depth in the current of mainstem Redwood Creek within the park. They recorded temperature at one-hour intervals.

One temperature logger was located upstream of Tom McDonald Creek/Tall Trees Grove (UTM 416042E 4561378N). It recorded water temperature from June 11 to October 16, 2003 (Figure 3). Maximum, minimum and mean water temperatures recorded were 23.5°C, 12.7°C, and 18.67°C, respectively. The maximum 7-day moving average of daily average temperatures (MWAT) for the period July through August was 21.2°C.

The other temperature logger site was located in lower Redwood Creek upstream of the Redwood Creek trailhead (UTM 4136390E 4572013N). It recorded temperature June 12 through October 16, 2003 (Figure 4). Maximum, minimum, and mean water temperatures were 22.2°C, 13.9°C, and 17.7°C, respectively. The MWAT for the period July through August was 18.7°C.

Tributaries - Temperatures of water entering Redwood Creek from the east and westside tributaries during the survey ranged from 11°C (unnamed eastside creek UN ES 38.5814 on August 6) to 18°C (the eastside tributary Copper Creek at 6:40 pm on July 29) (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 13.98°C (n = 23, std. dev. = 1.14°C) and temperatures ranged from 11.5 to 17°C. The mean water temperature of eastside tributaries was 14.64°C (n = 18, std. dev. = 1.67 °C) and temperatures ranged from 11 to 18°C.

Notes - The 2003 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 Redwood Creek are high for salmonid fish, above the preferred temperature range reported by Reiser and Bjornn (1979) for steelhead of 7.3 to 14.6°C.

This year, campfire remains were counted during the survey to measure human use on mainstem Redwood Creek within the park (Appendix III). Camping does not begin until downstream of the end of the 'gorge' area. Most of the use is downstream of Tom McDonald Creek. Twenty campfire sites were counted between Tom McDonald and McArthur Creeks, and 10 were counted between the end of the gorge and Tom McDonald Creek. The three campfires below the lower summer bridge are illegal campsites.

Other wildlife observed is noted in Appendix IV.

In coordination with the thermal infrared and color videography aerial survey of Redwood Creek (aka FLIR project), divers noted the location and water temperature where coho and chinook juveniles found (Appendix V). Divers saw the project helicopter over Redwood Creek during the survey. Steelhead juveniles and cutthroat trout were present along the entire Redwood Creek reach surveyed. Coho (juveniles) did not show up until downstream of Tom McDonald Creek.

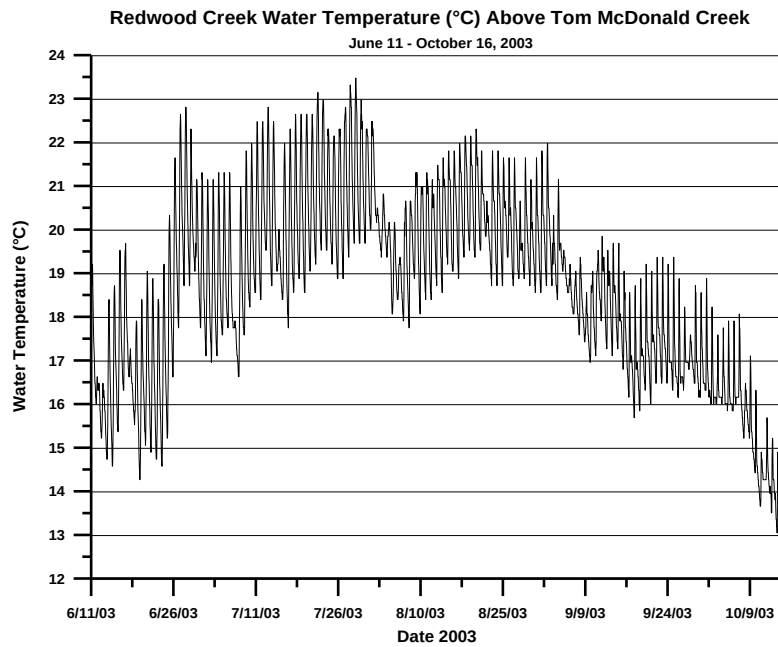


Figure 3. Mainstem Redwood Creek water temperatures (°C) from Onset TidBit temperature logger located upstream of Tom McDonald Creek. The logger recorded water temperature every 1-hour in the current below the surface of the water from June 11 through October 16, 2003.

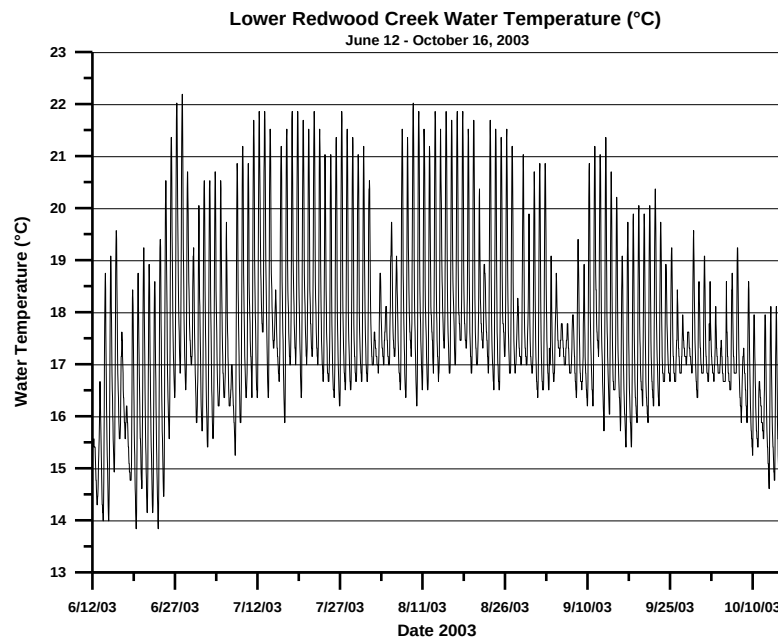


Figure 4. Mainstem Redwood Creek water temperatures (°C) from Onset TidBit temperature logger located upstream of the lower Redwood Creek trailhead parking lot. The logger recorded water temperature every 1-hour in the current below the surface of the water from June 12 through October 16, 2003.

Juvenile coho and for the most part, chinook juveniles were located in isolated backwater pools. The isolated backwater pools were cooler than mainstem Redwood Creek

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Report Prepared by: David G. Anderson - RNSP Fishery Biologist
(707) 464-6101 x 5271 david_g_anderson@nps.gov
Redwood National and State Parks
121200 Highway 101, P.O. Box 7
Orick, California 95555
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Appendix I. Numbers of Summer Steelhead Trout observed 1981 through 2003 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	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
^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 and air temperatures (°C) measured during the 2003 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 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.

Location	Alignment	Date	Time	Water Temperature (°C)
Redwood Creek (upstream)	REDW	8/6/2003	8:40 AM	18.0
Lacks Creek	East	8/6/2003	8:40 AM	16.0
Redwood Creek (upstream)	REDW	8/6/2003	9:20 AM	17.5
George Creek	West	8/6/2003	9:20 AM	13.5
Redwood Creek (upstream)	REDW	8/6/2003	10:50 AM	18.0
UN ES 44.381	East	8/6/2003	10:50 AM	13.5
Redwood Creek (upstream)	REDW	8/6/2003	11:00 AM	18.0
UN WS 44.2514	West	8/6/2003	11:00 AM	14.5
Redwood Creek (upstream)	REDW	8/6/2003	12:40 PM	18.0
Garrett Creek	East	8/6/2003	12:40 PM	15.0
Redwood Creek (upstream)	REDW	8/6/2003	2:10 PM	18.5
UN ES 42.10	East	8/6/2003	2:10 PM	14.0
Redwood Creek (upstream)	REDW	8/6/2003	2:30 PM	18.0
Carson Creek	East	8/6/2003	2:30 PM	14.0
Redwood Creek (upstream)	REDW	8/6/2003	2:55 PM	18.0
UN WS 41.372	West	8/6/2003	2:55 PM	14.0
Redwood Creek (upstream)	REDW	8/6/2003	3:05 PM	18.5
UN ES 41.244	East	8/6/2003	3:05 PM	14.0
Redwood Creek (upstream)	REDW	8/6/2003	3:45 PM	18.0
Panther Creek	West	8/6/2003	3:45 AM	14.0
Redwood Creek (upstream)	REDW	8/6/2003	9:00 AM	15.5
Panther Creek	West	8/6/2003	9:00 AM	14.5
Redwood Creek (upstream)	REDW	8/6/2003		18.0
UN WS 39.90	West	8/6/2003		11.5
Redwood Creek (upstream)	REDW	8/6/2003		18.0
UN WS 39.1638	West	8/6/2003		14.0
Redwood Creek (upstream)	REDW	8/6/2003	10:45 AM	18.0
Joplin Creek	West	8/6/2003	10:45 AM	14.0
Redwood Creek (upstream)	REDW	8/6/2003		18.0
UN ES 38.5814	East	8/6/2003		11.0
Redwood Creek (upstream)	REDW	8/6/2003	12:15 PM	18.0
Coyote Creek	East	8/6/2003	12:45 PM	16.0
Redwood Creek (upstream)	REDW	7/29/2003	12:30 PM	21.5
Coyote Creek	East	7/29/2003	12:30 PM	16.5
Redwood Creek (upstream)	REDW	7/29/2003	3:16 PM	22.5
Devils Creek	West	7/29/2003	3:16 PM	14.5

Location	Alignment	Date	Time	Water Temperature (°C)
Redwood Creek (upstream)	REDW	7/29/2003	4:50 PM	22.5
Lyons Creek	East	7/29/2003	4:50 PM	17.0
Redwood Creek (upstream)	REDW	7/29/2003	6:15 PM	23.5
UN WS 32.527	West	7/29/2003	6:15 PM	15.0
Redwood Creek (upstream)	REDW	7/29/2003	6:40 PM	23.5
Copper Creek	East	7/29/2003	6:40 PM	18.0
Redwood Creek	REDW	7/30/2003	9:45 AM	19.0
Redwood Creek (upstream)	REDW	7/30/2003	2:30 PM	22.0
UN WS 29.066	West	7/30/2003	2:30 PM	17.0
Redwood Creek (upstream)	REDW	7/30/2003	3:00 PM	22.0
Slide Creek	East	7/30/2003	3:00 PM	16.5
Redwood Creek (upstream)	REDW	7/30/2003	3:42 PM	22.5
UN WS 28.243	West	7/30/2003	3:42 PM	15.0
Redwood Creek (upstream)	REDW	7/30/2003	5:41 PM	23.0
UN WS 26.912	West	7/30/2003	5:41 PM	15.0
Redwood Creek (upstream)	REDW	7/30/2003	6:28 PM	23.0
Dolason Creek	East	7/30/2003	6:28 PM	15.5
Redwood Creek 25.65	REDW	7/31/2003	9:30 AM	19.0
UN WS 25.112	West	7/31/2003		
Redwood Creek (upstream)	REDW	7/31/2003	10:24 AM	19.5
Bridge Creek	West	7/31/2003	10:24 AM	14.5
Redwood Creek (upstream)	REDW	7/31/2003	11:47 AM	20.0
Emerald Creek	East	7/31/2003	11:47 AM	14.0
Redwood Creek (upstream)	REDW	7/31/2003	12:07 PM	20.0
UN WS 22.861	West	7/31/2003	12:07 PM	13.0
Redwood Creek (upstream)	REDW	7/31/2003	2:48 PM	22.0
Tom McDonald Creek	West	7/31/2003	2:48 PM	15.0
Redwood Creek (upstream)	REDW	8/4/2003	10:00 AM	19.0
Tom McDonald Creek	West	8/4/2003	10:00 AM	14.5
Redwood Creek (upstream)	REDW	8/4/2003	12:00 PM	19.0
Cole Creek	East	8/4/2003	12:00 PM	13.5
Redwood Creek (upstream)	REDW	8/4/2003	1:15 PM	19.0
Fortyfour Creek	West	8/4/2003	1:15 PM	13.5
UN WS 17.9201.	West	8/4/2003		13.0
Redwood Creek (upstream)	REDW	8/4/2003	2:00 PM	19.0
Miller Creek	East	8/4/2003	2:00 PM	14.0
UN WS 16.2744	West	8/4/2003		13.0
Redwood Creek (upstream)	REDW	8/4/2003	2:45 PM	19.0
Bond Creek	West	8/4/2003	2:45 PM	13.0
Redwood Creek (upstream)	REDW	8/5/2003	9:55 AM	18.0
Bond Creek	West	8/5/2003	9:55 AM	13.0
Redwood Creek (upstream)	REDW	8/5/2003	~10:45 AM	18.0
UN WS 15.20	West	8/5/2003	~10:45 AM	13.0
Redwood Creek (upstream)	REDW	8/5/2003	11:00 AM	18.0
Cloquet Creek	East	8/5/2003	11:00 AM	14.0

Location	Alignment	Date	Time	Water Temperature (°C)
Redwood Creek (upstream)	REDW	8/5/2003	12:00 PM	18.0
UN WS 13.68	West	8/5/2003	12:00 PM	15.0
Redwood Creek (upstream)	REDW	8/5/2003		18.5
Oscar Larson Creek	East	8/5/2003		13.5
Redwood Creek (upstream)	REDW	8/5/2003		19.0
Chris Creek	East	8/5/2003		13.5
Redwood Creek (upstream)	REDW	8/5/2003		19.0
Elam Creek	West	8/5/2003		13.0
Redwood Creek (upstream)	REDW	8/5/2003		18.5
McArthur Creek	West	8/5/2003		13.0
Redwood Creek (9.3)	REDW	8/5/2003	3:30 PM	18.5

Appendix III. Numbers of camp fire rings or camp fire remains, campsites and campers, and backpackers and day hikers observed on the 2003 summer steelhead survey of Redwood Creek within RNSP between July 29 and August 5, 2003.

2003 Summer Steelhead Survey - Human Use of Redwood Creek -Camp Fires, Campers, and Hikers						
Date	Creek	River km	Fire Ring	Campers	Day Hikers	Backpackers
	Coyote Creek	36.734				
7/29/2003			0	0	0	
	Copper Creek	32.110				
7/30/2003			0	0	0	
	Pig Pen/Slide Cr	28.732				
7/30/2003			0	0	0	
	Bottom of Rocky Gap	27.250				
7/30/2003		26.800		2		
7/30/2003		25.650	1			
7/31/2003		25.100	1			
	Bridge Creek	24.519				
7/31/2003		24.500	1			
7/31/2003		24.150		2		
7/31/2003		23.600	1			
7/31/2003		23.650	1			
	Emerald Creek	23.221				
7/31/2003		23.050	1			
7/31/2003		22.850	1			
7/31/2003		21.500	1			
7/31/2003		21.850			2	
7/31/2003		20.850	1			
7/31/2003		20.700	1			
	Tom McDonald Creek	20.604				
8/4/2003		20.700	1			
8/4/2003		19.400				2
8/4/2003		19.200	1			
8/4/2003		19.150	1			
8/4/2003		19.000	1			
8/4/2003		18.850	1			
8/4/2003		18.350	2			
	Forty four Creek	18.086				
8/4/2003		18.100	1			
8/5/2003		16.150	1	2		
	Bond Creek	16.137				
8/5/2003		15.800	1			
8/5/2003		15.450	1			
8/5/2003		14.400	1			
8/5/2003		14.000	1	2		
8/5/2003		13.400	1			
8/5/2003		13.350	1			
8/5/2003		12.850	1			
8/5/2003		11.500	1			

2003 Summer Steelhead Survey - Human Use of Redwood Creek -Camp Fires, Campers, and Hikers						
Date	Creek	River km	Fire Ring	Campers	Day Hikers	Backpackers
8/5/2003	Elam Creek	11.508				
8/5/2003		11.400	1			
8/5/2003		11.100	2			
	McArthur Creek	9.876				
8/5/2003			0	0	0	0
	Summer Bridge	9.700				
8/5/2003		8.730	1			
8/5/2003		7.700	2			
8/5/2003	Hayes Creek	8.399				
Total			33 camp fires	8 people (4 camps)	2 day hikers	2 backpackers

Appendix IV. Wildlife observed during the 2003 summer steelhead survey of Redwood Creek, Humboldt County, California.

Redwood Creek Mainstem Stream Reach	Other Wildlife Observed
Lacks to Panther Creek 8/06/03	Spotted sandpiper, Piliated woodpecker, Belted kingfisher, Black phoebe, Winter wren, Wrentit, Stellars jay, Chestnut backed chickadees, Bandtailed pigeons, Redtailed hawk, Osprey, Deer tracks
Panther to Coyote Creek 8/06/03	Stellars jays, Bear and deer tracks, Belted kingfisher
Coyote to Copper Creek 7/29/03	Bull elk (3), Osprey (1 adult and two juveniles)
Copper to Pig Pen Prairie (Slide Cr) 7/30/03	Marbled murrelets, Belted kingfisher, Merganser, Spotted Owl (heard), Hawk, Bandtailed pigeons
Pig Pen Prairie (Slide Cr) to Bridge Creek 7/30-31/03	Marbled murrelets, 2 campers,
Bridge to Tom McDonald Creek 7/31/03	Fishing gear, Spotted sandpiper, 2 campers, 2 Hikers, Vaux swift
Tom McDonald to Bond Creek 8/04/03	Spotted sandpiper, Alligator lizard (dead), Osprey, Stellars jays, Deer tracks, 2 backpackers, 2 campers
Bond Creek to Hayes Creek 8/05/03	2 campers, Winter wren, Belted kingfisher, Common raven, Wilson warbler, Stellars jay, Spotted sandpipers, American dipper, Osprey nest

Appendix V. Location (river km) and water temperatures (°C) where juvenile coho and chinook salmon were observed during the 2003 summer steelhead snorkel survey of mainstem Redwood Creek.

Juvenile Coho and Chinook Salmon Survey of Main Stem Redwood Creek - 2003 Summer Steelhead Survey Dates: July 29, 30, 31 and August 4, 5, 6, 2003									
From Lacks Creek River (km 46.513) to downstream of Hayes Creek (River km 7.7).									
Date	River Km	Time	Water T °C	JUVENILES		Fish observed in association with Coho and Chinook			COMMENTS
				COHO	KS	SHD	CUT	OTHERS	
8/6/2003	46.500	8:40	18.0					STKL	downstream of Lacks Creek, first observance of three spine stickleback
8/6/2003	43.381	12:40	18.0			SHD		SUCKER	Mainstem pool at confluence of Garrett Creek, first observance of suckers
8/6/2003	42.400					SHD			Fish in distress, swimming erratically
7/29/2003	36.734	12:00	21.5					SCULPIN	Downstream of Coyote Creek , first observance of sculpin
8/4/2003	20.150		17.0	COHO			CUT	STKL	Juvenile school in dead end pool off the mainstem (backwater pool), STKL in 15°C water
8/4/2003	19.850		19.0		KS				Chinook juveniles associated with dead tanoak, root mass, and limbs
8/4/2003	19.550		19.0		KS		CUT	SUCKER	In pool associated with old growth stumps, school of 20+ suckers present
8/4/2003	19.350		19.0	COHO	KS	SHD			Coho, chinook, and steelhead juveniles intermixed in side pool with fallen dead tree, mainstem temp 19°C
8/4/2003	18.650		19.0		KS				Chinook juveniles in side channel with LWD (large woody debris)
8/4/2003	17.650		18.5	COHO	KS				Chinook and coho in isolated side channel, lots of aquatic snails on substrate
8/4/2003	17.500		15.0	COHO					Isolated pool 1m W x 2m L, feeder stream coming in under old-growth tree at 13°C
8/4/2003	17.100		19.0		KS		CUT		Chinook in mainstem with 2 cutthroat 10" long
8/4/2003	16.900		19.0		KS		CUT		Chinook in mainstem with 1 cutthroat 8" long
8/4/2003	16.650		19.0	COHO	KS			2+ Salmonids	Chinook, coho, and 2+ salmonids in side channel
8/5/2003	14.450		18.0		KS		CUT	SUCKER	Chinook juveniles under LWD with 1 cutthroat 11" long, suckers present, pool ~75' W x 100' L x 8'+ D, overhanging alder
8/5/2003	14.400		18.0		KS				Chinook juveniles in LWD "between bank and small gravel island" (side channel?)
8/5/2003	13.680		15.0	COHO					Coho juveniles in backwater pool on west bank with small tributary input and LWD (Redwood Creek 18°C)
8/5/2003	11.500		13.0	COHO		SHD	CUT		Coho juveniles at base of pool where Elam Creek enters pool. (Redwood Creek 19°C)
8/5/2003	11.350		19.0		KS				Chinook juveniles under rock ledge, LWD nearby, under LWD, East bank (Redwood Creek 19°C)
8/5/2003	11.100		19.0	COHO					Coho juveniles under alder, steep bank, near LWD
8/5/2003	9.700		18.5	COHO	KS		CUT		Coho and chinook juveniles in willow (at summer bridge)
8/5/2003	9.300		18.5		KS		CUT	SUCKER	Chinook juveniles under willow, suckers present and cutthroat trout
SOME TRIBUTARY DATA									
7/31/2003	24.519	10:24	14.5	COHO					In first pool of Bridge Creek
7/31/2003	23.221	11:47	14.0			SHD			In Emerald Creek

2003 RNSP Smith River Summer Steelhead Trout Survey

Date: August 20, 2003

Location: Smith River, Del Norte County, California
Mainstem from confluence of South and Middle Forks to Walker Hole

Distance: 5 miles (calculated by map wheel)

Time: In water; start at 9:30am and end at 6:05pm

Water Temp: Water temperature 19.0°C at 0930, 20.5°C at 1805

Flows: 285 cfs on August 20, 2003 at Jedediah Smith Redwoods State Park gage

Divers: Baker Holden, David Anderson, Terry Hines, and Kyle Max

Method: Visual observation by diving with mask and snorkel, and surf wet suit. Survey proceeded in the downstream direction with divers lined up in lanes.

Results:

<u>Steelhead (<i>Oncorhynchus mykiss</i>)</u>	
Resident Trout.....	1
Half-Pounders.....	1
Summer Steelhead adults (>16").....	0
<u>Cutthroat Trout (<i>O. clarki</i>).....</u>	.83 total
Less than 12"	(46)
Greater than 12"	(37)
<u>Spring Chinook (<i>O. tshawytscha</i>).....</u>	0
<u>Sculpin (<i>Cottus sp.</i>).....</u>	8 and 1 dead
<u>Suckers.....</u>	8
<u>Three spine Stickleback (<i>Gasterosteus aculeatus</i>).....</u>	10
Crayfish	37
<u>Newts.....</u>	2

Notes: No adult summer steelhead were observed.

Some pool depths along the survey reach were too deep to see the bottom or dive to the bottom especially at Hiouchi 199 Bridge. Visibility was impaired at times by suspended particles reflecting the sunlight which limited visibility in deep pools. The beach at Jed Smith campground had many swimmers and waders in the water. If the reach is repeated, it should be broken into 2 more manageable segments.