

Redwood Creek Basin 2000-2001 Spawning and Carcass Survey

Annual Progress Report

Fish and Wildlife Branch
Division of Resource Management and Science
Redwood National and State Parks



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Collection

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Introduction

The Redwood Creek winter spawning and carcass survey is a long-term monitoring project, which began, in the early **1980's**. The survey is used to determine presence or absence of adult salmonids in index streams, to determine timing of runs, distribution of spawning salmonids within the streams and any migrational barriers, size and sex ratio of returning spawners, and obtain information on redds characteristics.

Study Location

The seven creeks surveyed were Mainstem Redwood Creek, Lost Man Creek, Little Lost Man Creek, Bridge Creek, Prairie Creek, Mainstem Mill Creek tributary to the Smith River and West Fork Mill Creek tributary of Mill Creek for the **2000-2001** spawning season.

Redwood Creek

Redwood Creek, located in northwestern California, drains a **720 km²** watershed and contains **74** tributaries of second or higher order (Figure 3). For much of its **108 km** length, Redwood Creek flows along the trace of the Grogan Fault. The highest elevations at the headwaters are over **1525m**. Large scale logging of the coniferous trees in the Redwood Creek Basin began in the early **1950's** and the tractor yarding method accounted for **85** percent of all logging and by **1978** eighty-one percent of the entire watershed had been logged. Redwood Creek ~~was~~ broken into two reaches the Upper Redwood Creek reach and the Lower Redwood Creek. The Upper Redwood Creek reach begins at Bridge Creek and ends at Bond Creek. The Lower Redwood Creek reach begins at Bond Creek and end at Hayes Creek.

Lost Man Creek

Lost Man Creek is a sixth order tributary, which flows into Prairie Creek approximately five road kilometers north of the town of Orick, California in Humboldt County (Figure 4). It is located within the National Park unit of Redwood National and State Parks. The **32.1 km²** basin has an average stream gradient of 0.01 on the lower portion of the creek. Lost Man Creek was surveyed in two reaches, an Upper Lost Man reach and a Lower Lost Man reach. The Lower Lost Man reach begins at the confluence of Prairie Creek mouth and continues **2.7 km** to the second of the double bridges where Holter Road/bike-hike trail crosses Lost Man Creek. The Upper Lost Man reach begins at the double bridge and continues 2 km to an extremely large logjam.

Little Lost Man Creek

Little Lost Man Creek flows into Prairie Creek approximately five kilometers north of the town of Orick, California (Figure 4). Little Lost Man Creek is the most intact watershed within the original Redwood National Park boundary. The **9.45 km²** fourth order basin is a low gradient stream. The survey reach begins at the **101** box culvert and ends at the park's gaging station.

Bridge Creek

Bridge Creek a fourth order tributary is the fourth largest tributary of Redwood Creek, and it is **12.9 km** in length with a **29.52km²** watershed. The watershed is entirely within the Redwood National Park unit of RNSP. Most hillsides adjacent to the creek channel were logged prior to **1978**, with the exception of the lower quarter mile of creek. The remaining parts of the Bridge Creek Log Jam (BCLJ), located **1.3 km** upstream **from** the confluence of Redwood Creek, **was** removed by natural means during very high winter flows in **1998-99**. The reach surveyed in **1998-99** was from the confluence at Redwood Creek to cross-section **126**, a total distance of **1.8km** (Figure 5).

Prairie Creek

Prairie Creek a seventh order tributary largest tributary to Redwood Creek has an area of **104km²**, Prairie Creek exhibits gentler hillslope gradients and a regolith that is less susceptible to erosive processes **as** the rest of the Redwood Creek watershed. Humboldt State University Fisheries Department graduates students and technicians monitored Prairie Creek within Prairie Creek Redwoods State Park, including spawning surveys. The surveys were part of a coho study funded by the National Marine Fisheries Services under the direction of **Dr.** Walt Duffy.

Mill Creek

The Mill Creek drainage is a major tributary to the Smith River (Figure 6). It cover **99.7 km²** and is located approximately **4 km** east **of** Crescent City (CDFG, **1993**). Seventy percent (**60.7km²**) of the basin is held under private ownership. The remaining **thirty** percent (**39km²**) is managed by Redwood National and State Parks and the U.S. Forest Service and is located primarily in the western portion of the drainage (CDFG, **1993**). Mill Creek watershed is comprised of **two** sub-drainages the East Branch and the West Branch. The East Branch of Mill Creek is entirely owned by Stimpson, however, the West Branch's ownership is like a checkerboard, partially owned by Redwood National **Parks**, the California Department of Beaches and Parks and Stimpson. Together, both tributaries **drain** a **25** square mile watershed, which ranges in elevation **from 200ft** to **2,300ft**. The East Branch is a fourth-order stream from its confluence with Bummer Lake Creek to **main** stem Mill Creek. West Branch is a second-order stream until its confluence **with** East Branch where both merge to become the fourth-order Mainstem Mill Creek (Rellim Redwood **1994**).

Methods

Methods used are detailed in the **1991-1992 annual** spawning report (Anderson and McGuire **1994**). Briefly, while walking upstream, the surveyors visually inspect the stream for live salmonid spawners, salmonid carcasses, and redds. Survey conditions; water visibility, estimated stream flow, and water and air temperature are recorded (Figure 1). The location of each fish, carcass, and redds are recorded along with other pertinent information on data sheets. Species, sex, fork length in centimeters, location, spawning condition, presence of tags or fin clips recorded for carcasses, scale samples taken, and the carcasses flagged with biodegradable flagging (Figure 2-3). Species, sex, estimated fork length, and location are recorded for all adult live **fish, as well as**

spawning behavior. Redds dimensions are measured, length and width in meters, enumerated, and location recorded. Redds locations are flagged to avoid recounting on subsequent surveys. Also noted are any apparent barriers to fish migration and new landslides.

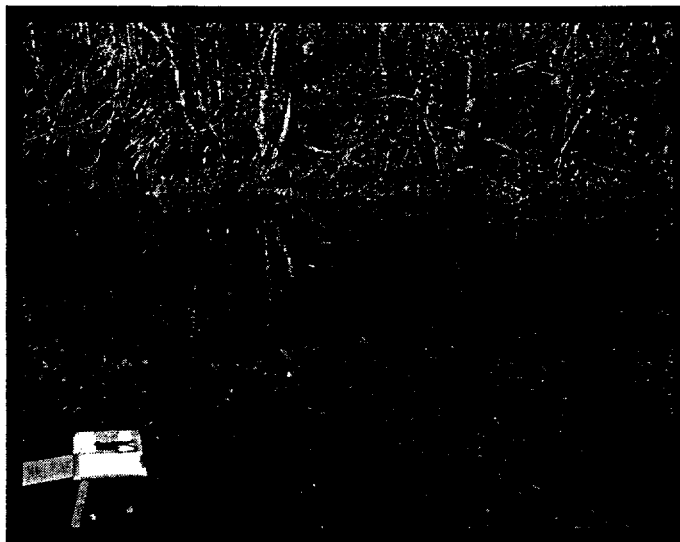


Figure 1.

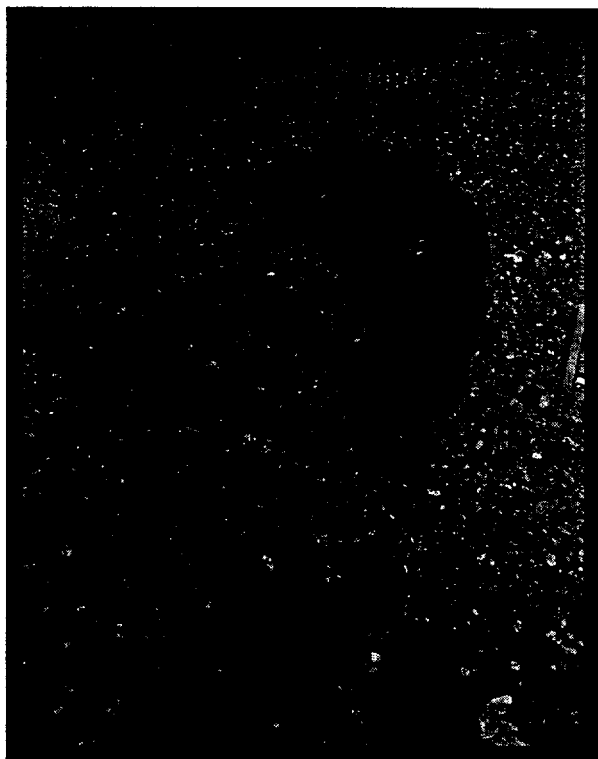


Figure 2.

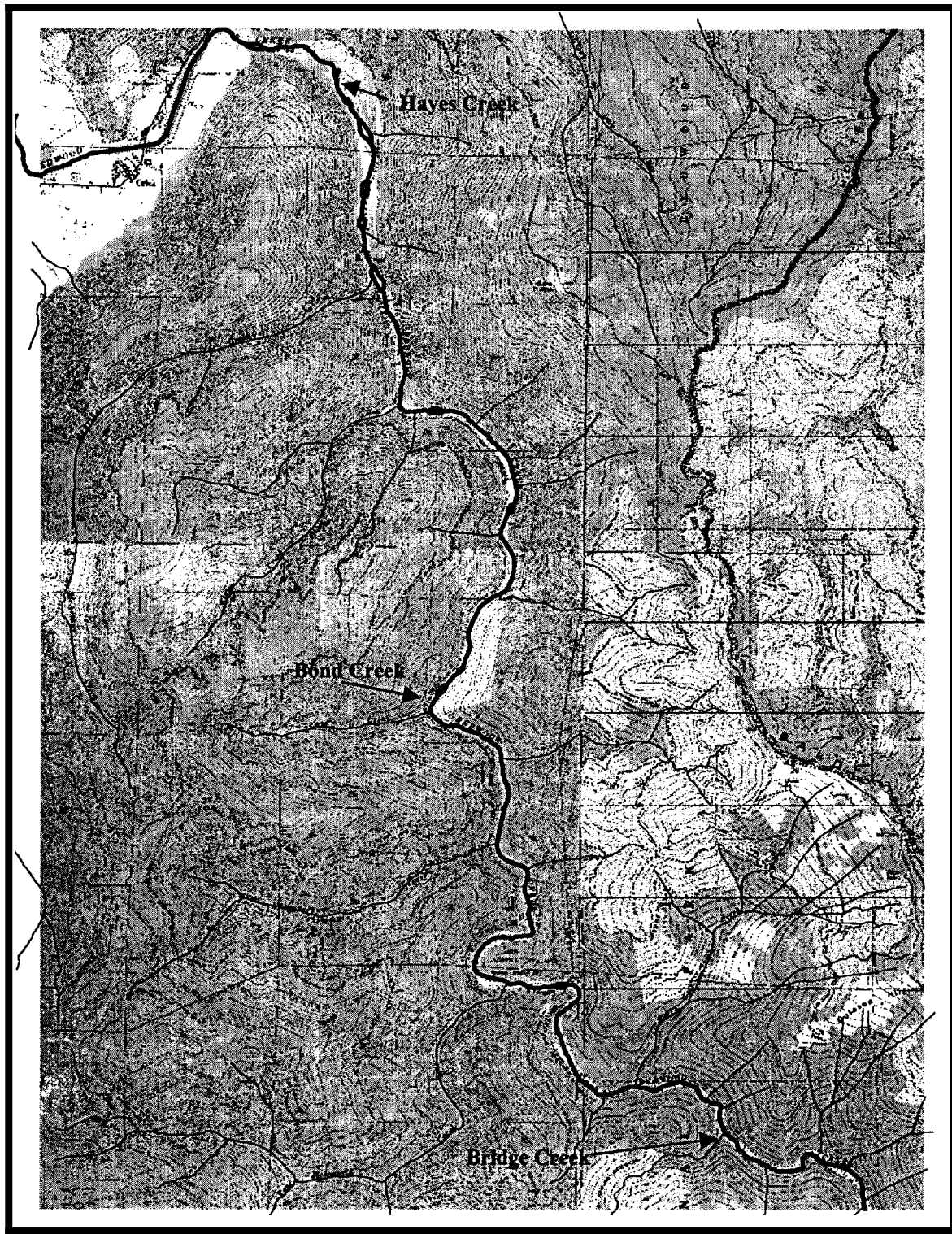


Figure 3. Redwood Creek Spawning Reaches in Redwood National & State Parks, Humboldt County, California.

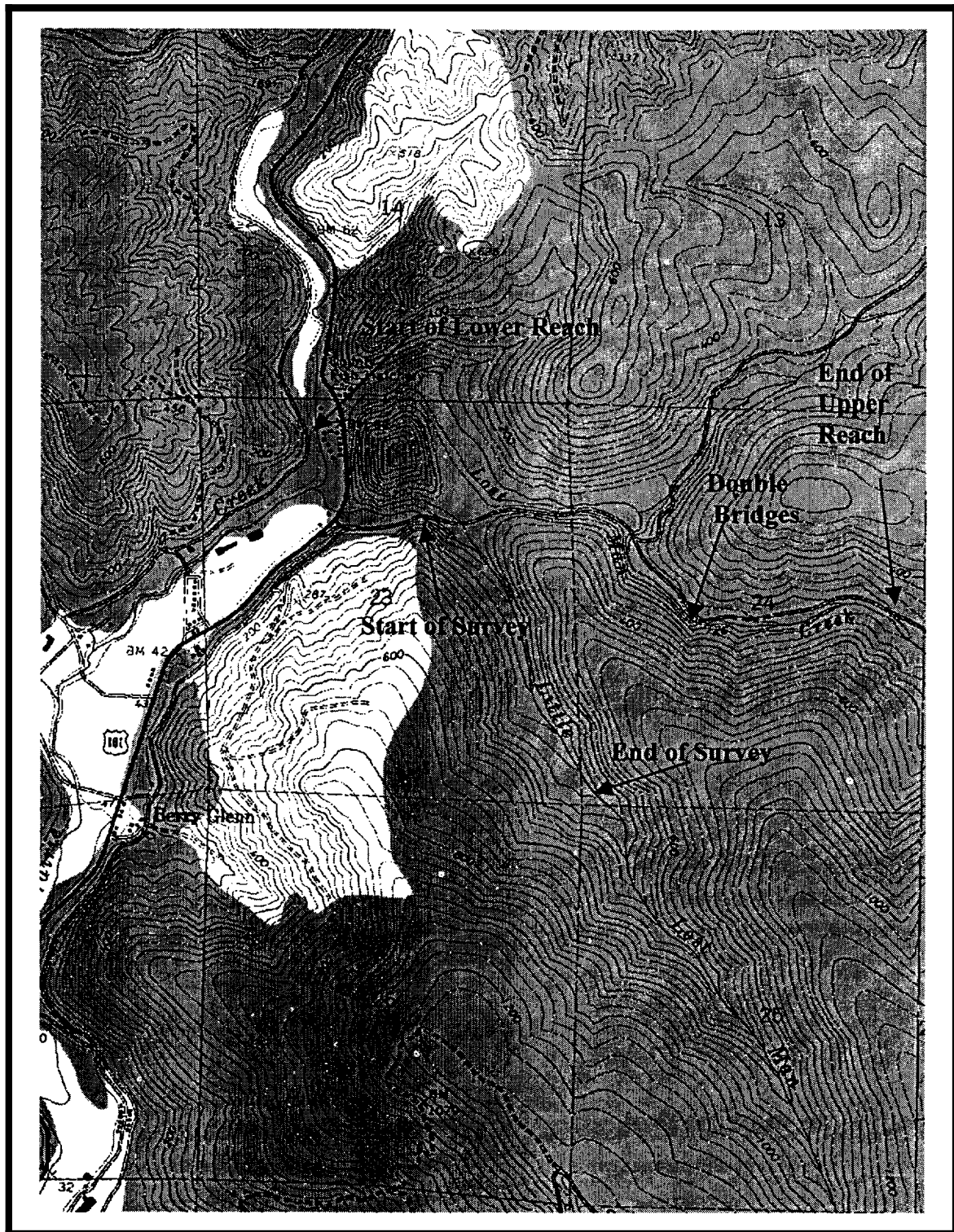


Figure 4. Lost Man Creek and Little Lost Man Creek, Spawning Reaches in Redwood National & State Parks, Humboldt County, California.

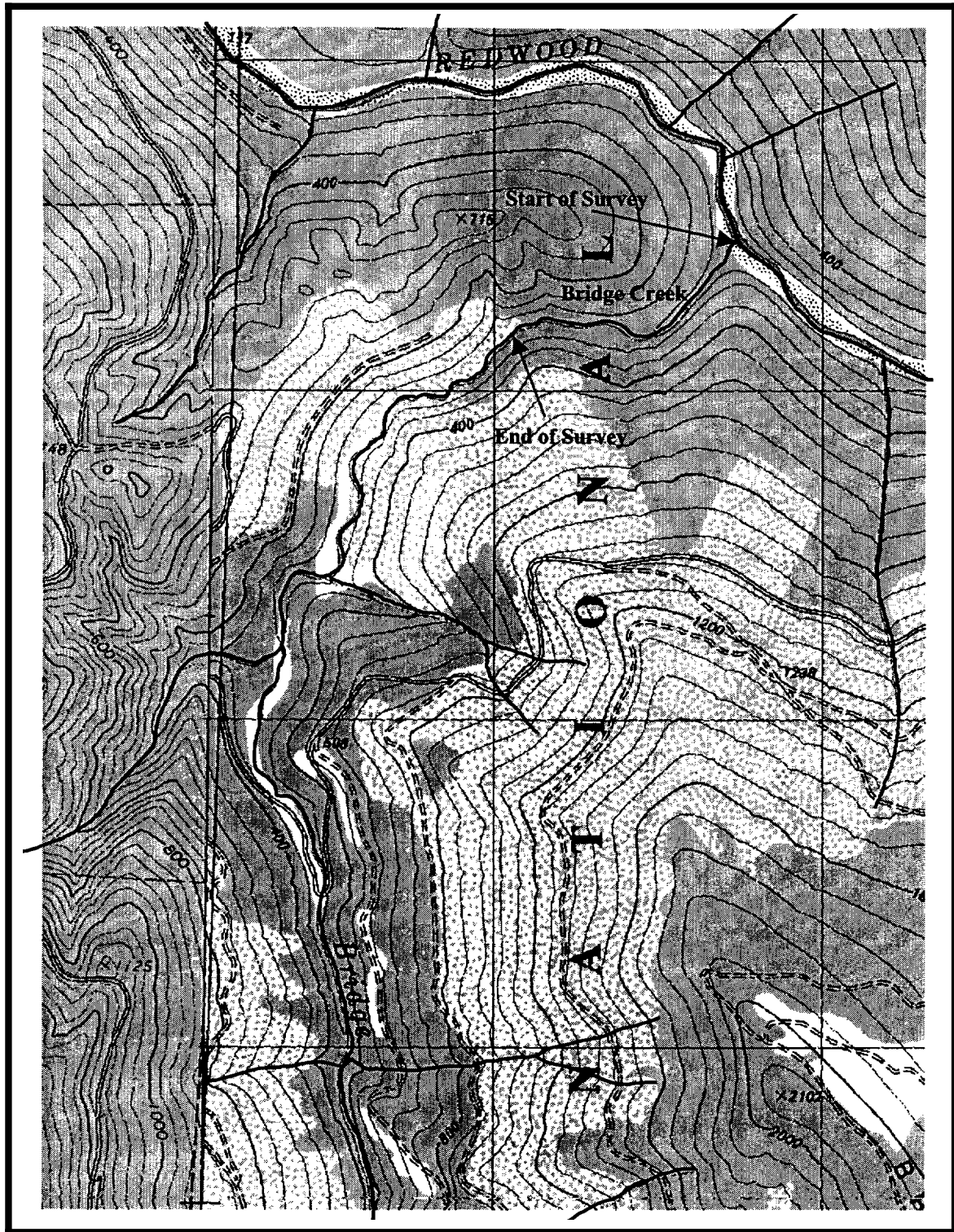


Figure 5. Bridge Creek Spawning Reach in Redwood National & State Parks, Humboldt County, California.

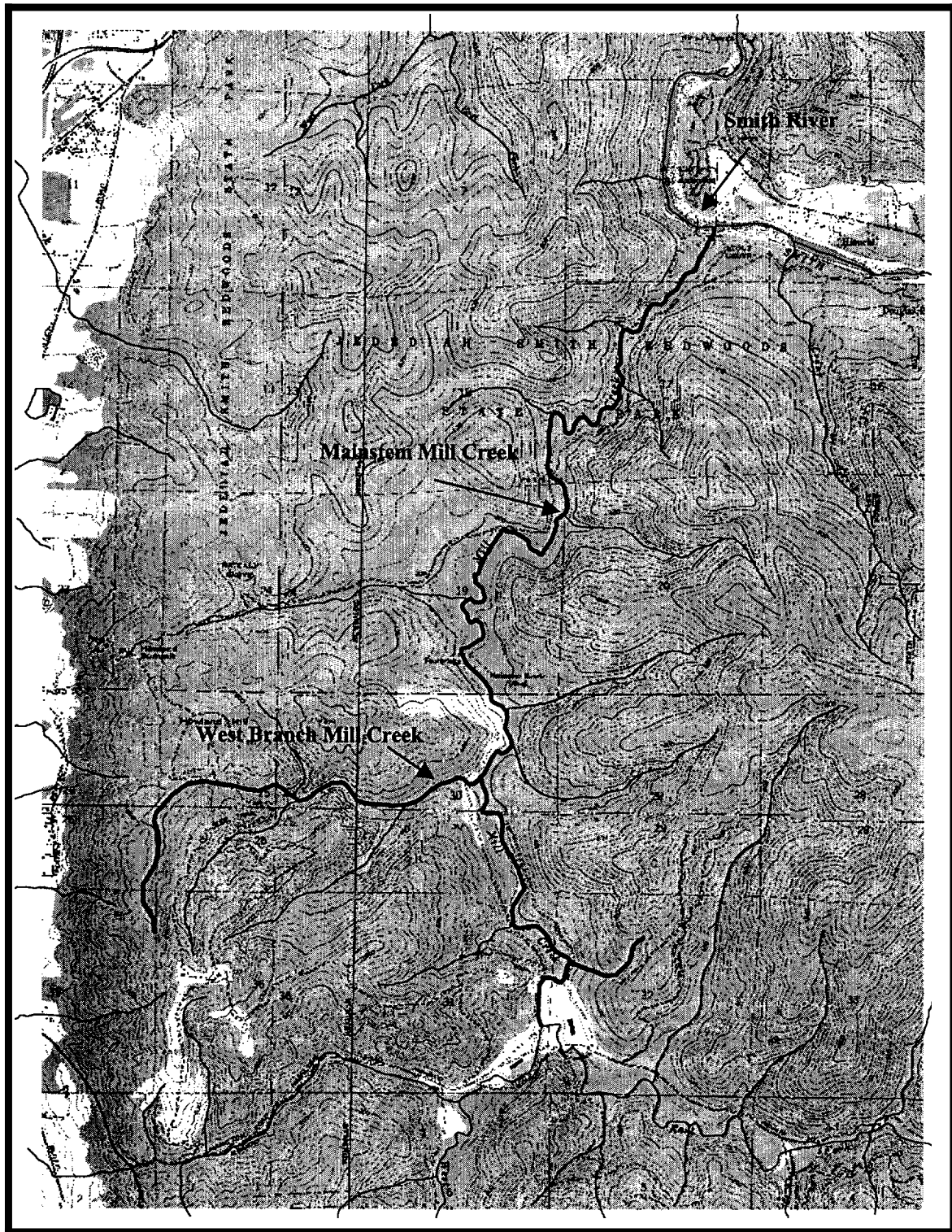


Figure 6. Mill Creek West Fork Branch Spawning Reach in Redwood National & State Parks, Humboldt County, California.

Results

Redwood Creek

A total of six surveys were completed on Redwood Creek, in the **2000-2001** spawning year. Ten live King salmon were counted. Forty-seven King salmon carcasses were counted. Ten live Steelheads were counted. Ten unknown species and three unknown carcasses were counted. Ninety-five definite redds were counted and measured. **An** additional thirty-three were double adjoining or superimposed redds. See Charts **1-4**.

Figure **7** is a graphic representation of the surveys conducted on Redwood Creek in relation to water flows. Surveys generally occurred after peak flows. It is not physically possible for surveyors to perform surveys during peak flows.

Chart **1**. Mean fork length (cm), standard deviation (Std. Dev.) of live and dead spawners Observed during **2000-2001** surveys of Redwood Creek within Redwood national Park, Humboldt County, California. Surveys were conducted from Bridge Creek to Bond Creek.

Bridge Creek to Bond Creek 2000-2001							
Live Fish				Carcasses			
Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)	Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)
0	M	0	0	5	M	93	9
3	F	63	6	27	F	85	11
3	Unk	43	4	8	UNK	76	17
0	unk	0	0	3	UNK	60	0

Chart **2**. Length and Widths (m) of single and multiple Salmonid redds observed during the **2000-2001** surveys of Bridge Creek to Bond Creek reach of Redwood Creek.

	Number	Mean Lengths L x W	Area m ²
King Salmon Single Redds	4	4.22x 3.50	14.77
King Salmon Multiple Redds	2	8.90x 3.90	34.71
Unknown Species Single Redds	52	3.71 x 1.67	6.20
Unknown Species Multiple Redds	17	10.49x 4.48	46.10

Chart 3. Mean fork length (cm), standard deviation (Std. Dev.) of live and dead spawners Observed during 2000-2001 surveys of Redwood Creek within Redwood national Park, Humboldt County, California. Surveys were conducted from Bond Creek to Hayes Creek.

Live Fish				Carcasses			
Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)	Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)
0	M	0	0	3	M	96	11
4	F	56	11	4	F	88	7
10	UNK	56	7	0	0	0	0
4	F	61	17	3	UNK	83	0
3	Unk	53	12	0	0	0	0

Chart 4. Length and Widths (m) of single and multiple Salmonid redds observed during the 2000-2001 surveys of Bridge Creek to Bond Creek reach of Redwood Creek.

	Number	Mean Lengths L x W	Area m ²
King Salmon Single Redds	2	5.00 x 1.50	75
King Salmon Multiple Redds	1	12.80 x 4.10	52.48
Unknown Species Single Redds	37	3.58 x 1.52	5.44
Unknown Species Multiple Redds	13	8.66 x 3.44	29.79

Lost Man Creek

A total of fifteen surveys were completed on Lost Man Creek, in the **2000-2001** spawning year. Thirty-four live King salmon were counted. Sixteen King salmon carcasses were counted. Forty-two live Coho were counted. One Coho carcass was counted. **Six** live Steelhead trout were counted. Four unknowns live fish were counted. One Steelhead carcasses and one skinsack were counted. Ninety-four definite redds were counted and measured. An additional seventeen were double adjoining or superimposed redds. See Charts **5-8**.

Chart **5**. Mean fork length (cm), standard deviation (Std. Dev.) of live and **dead** spawners Observed during **2000-2001** surveys of Lost Man Creek **within** Redwood national Park, Humboldt County, California. Surveys were conducted in the Lower Lost Man Creek reach.

Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)	Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)
14	M	64	16	2	M	85	0
13	F	71	11	8	F	87	9
2	Unk	65	21	6	Unk	60	11
8	M	53	7	0	M	0	0
6	F	56	4	1	F	46	0
8	Unk	51	8	0	Unk	0	0
Steelhead Trout							
0	M	0	0	0	M	0	0
2	F	38	4	0	F	0	0
0	Unk	0	0	0	Unk	0	0
Unknown Specices							
0	M	0	0	0	M	0	0
0	F	0	0	0	F	0	0
2	Unk	55	7	0	Unk	0	0

Chart 6. **Length** and Widths (m) of single and multiple Salmonid redds observed during the 2000-2001 surveys of Lower Lost Man Creek reach.

	Number	Mean Lengths L x W	Area m ²
King Salmon Single Redds	7	6.25 x 1.99	12.40
King Salmon Multiple Redds	5	7.16 x 2.16	18.30
Coho Salmon Single Redds	4	4.02 x 1.25	5.37
Coho Salmon Multiple Redds	0	N/A	N/A
Steelhead Trout Single Redds	1	3.50 x 1.50	5.2
Steelhead Trout Multiple Redds	0	0	0
Unknown Species Single Redds	47	2.94 x 1.25	4.72
Unknown Species Multiple Redds	7	4.88 x 1.35	17.1

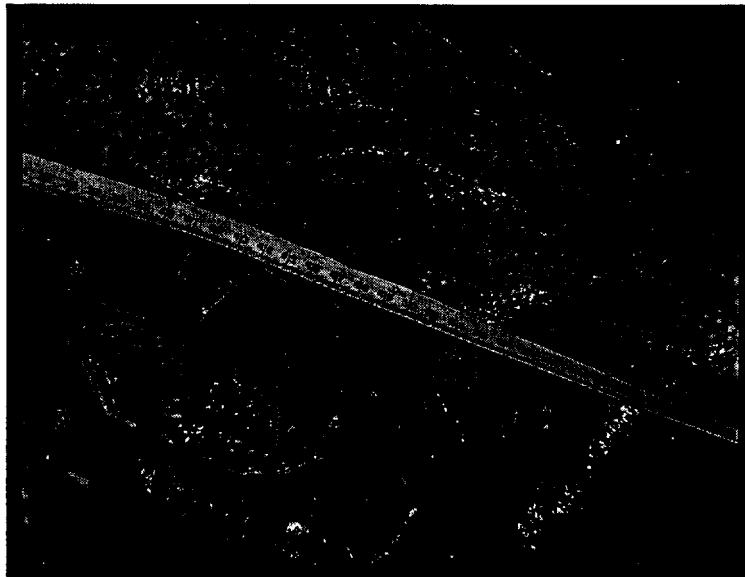


Figure 8.

Chart 7. Mean fork length (cm), standard deviation (Std. Dev.) of live and dead spawners Observed during **2000-2001** surveys of Lost Man Creek within Redwood national **Park**, Humboldt County, California. Surveys were conducted in the Upper Lost Man Creek reach.

Live Fish				Carcasses			
Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)	Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)
3	M	60	10	0	M	0	0
1	F	70	0	0	F	0	0
1	Unk	70	0	0	Unk	0	0
10	M	59	7	0	M	0	0
7	F	57	6	0	F	0	0
3	Unk	55	8	0	Unk	0	0
1	M	45	0	0	M	0	0
1	F	45	0	0	F	0	0
2	Unk	60	7	1	Unk	40	0
1	M	65	0	0	M	0	0
1	F	50	0	0	F	0	0
2	Unk	50	0	0	Unk	0	0

Chart 8. Length and Widths (m) of single and multiple Salmonid redds observed during the 2000-2001 surveys of Upper Lost Man Creek reach.

	Number	Mean Lengths L x W	Area m ²
King Salmon Single Redds	6	3.10 x 2.40	3.91
King Salmon Multiple Redds	1	8.50 x 2.40	20.40
Coho Salmon Single Redds	7	1.41 x 0.99	1.75
Coho Salmon Multiple Redds	2	6.37 x 1.62	18.1
Steelhead Trout Single Redds	0	0	0
Steelhead Trout Multiple Redds	1	1.00 x 0.75	0.75
Unknown Species Single Redds	22	2.16 x 0.48	2.25
Unknown Species Multiple Redds	1	4.50 x 2.60	11.70

Bridge Creek

A total of **six** surveys were completed on Bridge Creek, in the 2000-2001 spawning year. Two live King salmon were counted. Three King salmon carcasses were counted. Eight live Steelhead trout were counted. Eleven definite redds were counted and measured. See Charts 9 -10.

Chart 9. Mean fork length (cm), standard deviation (Std. Dev.) of live and dead spawners Observed during 2000-2001 surveys of Bridge Creek within Redwood national **Park**, Humboldt County, California.

Live Fish				Carcasses			
Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)	Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)
2	F	68	18	3	F	78	0
8	unk	67	17	0	0	0	0

Chart **10**. Length and Widths (m) of single and multiple Salmonid redds observed during the **2000-2001** surveys of Bridge Creek reach.

	Number	Mean Lengths L x W	Area m ²
King Salmon Single Redds	2	3.35 x 1.35	4.46
Unknown Species Single Redds	9	2.82 x 1.32	4.15

Little Lost ~~Man~~ Creek Basin

A total of six surveys were completed on Little Lost Man Creek, in the 2000-2001 spawning year. Three live Coho were counted. One Coho carcass was counted. One live Steelhead trout was counted. One unknown live ~~fish~~ were counted. One Coho carcass was counted. ~~Thirty~~ seven definite redds were counted and measured. An additional three were double adjoining or superimposed redds. See Charts **11-12**.

Chart **11**. Mean fork length (cm), standard deviation (Std. Dev.) of live and dead spawners Observed during **2000-2001** surveys of Little Lost Man Creek within Redwood national Park, Humboldt County, California.

Live Fish				Carcasses			
Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)	Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)
2	F	48	4	1	F	0	0
1	Unk	20	0	0	0	0	0
1	Unk	40	0	0	Unk	0	0
1	unk	68	0	0	F	0	0

Chart 12. Length and Widths (m) of single and multiple Salmonid redds observed during the 2000-2001 surveys of Little Lost Man Creek.

	Number	Mean Lengths L x W	Area m ²
Coho Salmon Single Redds	1	7.60 x 2.00	15.20
Unknown Species Single Redds	36	2.25 x 0.89	2.33
Unknown Species Multiple Redds	3	5.46 x 2.53	15.99

Mill Creek West Fork

A total of six surveys were completed on Mill Creek, in the 2000-2001 spawning year. Eleven live King salmon were counted. Two King salmon carcasses were counted. Two live Coho were counted. One Coho carcass was counted. Two live Steelhead trout were counted. Twelve unknown live fish were counted. One Steelhead carcass was counted and one unknown carcass was counted. Forty-nine definite redds were counted and measured. **An** additional nine **redds** were double adjoining or superimposed redds. See Charts 13-14.

Chart 13. Length and Widths (m) of single and multiple Salmonid redds observed during the 2000-2001 surveys of Mill Creek West fork.

	Number	Mean Lengths L x W	Area m ²
King Salmon Single Redds	1	6.50 x 2.00	13.00
Unknown Species Single Redds	48	3.38 x 1.41	5.62
Unknown Species Multiple Redds	9	5.51 x 2.67	16.04

Chart 14. Mean fork length (cm), standard deviation (Std. Dev.) of live and dead spawners Observed during 2000-2001 surveys of Mill Creek within Redwood national Park, Humboldt County, California.

Mill Creek West Fork 2000-2001							
Live Fish				Carcasses			
Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)	Number	Sex	Est. Mean Fork Length (cm)	Std. Dev. (cm)
1	M	19	0	2	M	82	16
2	F	80	14	0	F	0	0
8	Unk	62	27	0	Unk	0	0
0	M	0	0		M	0	0
1	F	50	0	1	F	68	0
1	Unk	20	0		Unk	0	0
0	M	0	0	0	M	0	0
0	F	0	0	0	F	0	0
1	Unk	55	21	0	Unk	0	0
0	M	0	0	1	M	60	0
1	F	45	7	0	F	0	0
1	Unk	48	9	0	Unk	0	0

Discussion

King salmon and coho salmon, and steelhead are present in and spawning in the main stem of Redwood Creek, Little Lost Man Creek, Lost Man Creek, Bridge Creek, Prairie Creek, and Mill Creek. The recent hiring of new employees at Redwood National and State Parks has increased the survey effort, however, more systematic surveys at this new level of effort must be maintain over a number of seasons to make this study more meaningful,.

References

Anderson, D. and H. McGuire. 1994. Redwood Creek basin 1991-1992 spawning and carcass survey. Annual Progress Report. Redwood National Park, Orick, California 33pp.