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**SUMMARY OF REPORTS RELATING TO STEELHEAD
(ONCORHYNCHUS MYKISS)
IN THE REDWOOD CREEK BASIN.**

References

- Anderson, D. 1982. Anadromous salmonid nursery habitat in the Redwood Creek watershed. Proceedings of the First Biennial Conference of Research in California's National Parks. pp 225-229.**
Extent and quality of anadromous salmonid nursery habitat for steelhead trout in the Redwood Creek watershed.
- Anderson, D. 1988. Juvenile salmonid habitat of the Redwood Creek basin, Humboldt County, California. M.S. Thesis. Humboldt State University.**
General stream survey of the Redwood Creek basin in the summer of 1980 and 1981 which chronicles water quality, fish distribution (including steelhead trout) and numbers, and benthic invertebrates.
- Anderson, D. 1992. 1992 Redwood Creek Summer Steelhead (Oncorhynchus mykiss) Survey.**
Results of 1992 summer steelhead snorkel survey of Redwood Creek. Water quality was poor (warm water temperatures) and the numbers of fish observed were low indicating that the run is not improving.
- Anderson, D. 1993. Status of Summer Steelhead Trout in Redwood Creek, Redwood National Park, California. Proceedings of the Fourth Conference on Research in California's National Parks. pp 1-8.**
Summer Steelhead monitoring data from 1981 - 1991 for Redwood Creek index reach. Chronicles declining trends in population and problems facing the run.
- Anderson, D., and H. McGuire. 1994. Redwood Creek Basin 1991-1992 spawning and carcass survey: Annual progress report. Fish and Wildlife, Research and Resource Management Division, Redwood National Park, Orick, California.**
Includes numbers, lengths, survey dates, etc. for adult steelhead trout on index streams within Redwood National and State Parks for the 1991-1992 spawning season.
- Brown, R. 1988. Physical rearing habitat for anadromous salmonids in the Redwood Creek basin, Humboldt County, California. M.S. Thesis. Humboldt State University.**
General stream survey of the Redwood Creek basin in the summer of 1980 and 1981 which chronicles fish distribution and numbers (including steelhead trout), numbers and types of barriers to migration, and areas by stream order accessible to anadromous fish.

Fish Production of Prairie Creek Hatchery, Humboldt County, California (No date).

Summary of fish production from 1972 through 1980, releases, egg take, and sources of eggs for steelhead trout. Prairie Creek Hatchery was run by the County of Humboldt.

Hendrickson, G. L., and A. Carleton, D. Manzer. 1989. Geographic and seasonal distribution of the infective stage of Ceratomyxa shasta (Myxozoa) in Northern California. Diseases of Aquatic Organisms. 7: 165-169.

Geographic distribution of Ceratomyxa shasta in Northern California. Negative occurrence for Redwood Creek.

Keller, E. A., and T. Hofstra. 1982. Summer "Cold Pools" in Redwood Creek near Orick, California and their importance as habitat for anadromous salmonids. Proceedings of the First Biennial Conference of Research in California's National Parks. pp. 221-224.

Occurrence of cold pools in Redwood Creek and their potential for refugia in a warm water regime for rearing salmonids, including steelhead.

Larson, J., J. McKeon, T. Salamunovich, and T. Hofstra. 1989. Water Quality and Productivity of the Redwood Creek Estuary. Proceedings of the First Biennial Conference of Research in California's National Parks. pp. 190-199.

Levee construction and sedimentation decreased the productivity of Redwood Creek estuary. Steelhead utilization limited by the availability of estuarine habitat when the mouth is open in summer.

Redwood National Park. 1993. 1993 Redwood Creek Estuary Annual Monitoring Report.

Report details the 1993 estuary resource management activities and monitoring for Redwood Creek estuary. Includes growth and estimated numbers of juvenile steelhead utilizing the estuary during the Summer/Fall 1993. Includes draft of alternative solutions and proposed management strategies to restore the degraded Redwood Creek estuary.

Redwood National Park. 1994. Spawning and Carcass Surveys on Lost Man Creek:1984-85 through 1991-92. (Table)

Summary table of Lost Man Creek spawning and carcass surveys relating to steelhead trout during the period of 1984-85 to 1991-92.

Redwood National Park. 1994. Timing of Steelhead Runs in Lost Man Creek, 1972-73 through 1982-83. (Table)

Summary table of Prairie Creek Hatchery trapping records for steelhead from 1972-73 through 1982-83. Includes number of steelhead trout trapped, range of occurrence (dates), and date and number of peak occurrence.

Ridenhour, R. and T. Hofstra. 1994. Fishery Resources of the Redwood Creek Basin. DRAFT.

Report details fish species (including steelhead trout) occurring in Redwood Creek, habitat, and the impacts to the fishery resource.

Van Kirk, S. 1994. Historical Information on Redwood Creek. Redwood National Park, Arcata, California. 32 pp.

Summary of newspaper articles, and other sources relating to the fisheries of Redwood Creek. Accounts of fish abundance and intra-basin stock introduction show a decline in the fishery resources and the extensive planting that occurred in the past. Includes recent oral interviews with long-time residents of the upper basin of Redwood Creek.

HATCHERY INFLUENCES ON REDWOOD CREEK

Record of 1972 through 1980 - From fish production data of the Prairie Creek Hatchery, Humboldt County, California, for 8 years, the numbers of steelhead trout salmon raised ranged from 40,979 (1976-77 season) to 122,171 (1974-75 season). In the eight year period, production averaged 78,988 fish (std. dev. = 35,102), for a total of 631,900 fish raised (ref: Prairie Creek Hatchery Fish Production, no date).

Sources of eggs and years of introduction steelhead stock originating outside of the Redwood Creek Basin are:

Trinity River (CA)	1972-73
Washougal River (WA)	1973-74
Mad River (CA)	1974-75
Washougal River (WA)	1975-76
Mad River (CA)	1977-78
Mad River (CA)	1978-79

The hatchery continued to produce steelhead trout until it closed in December of 1992. Some of the last steelhead were planted in Spring of 1993 into Big Lagoon, Humboldt County.

As part of the U.S. Highway 101 Bypass mitigation project, coho and chinook salmon, and steelhead have been trapped on Prairie Creek, fish spawned, eggs hatched in streamside hatchboxes, and juveniles released into the Prairie Creek system, every year since the 1989-90 season.

Hatchbox HWY 101 Bypass Mitigation Steelhead Releases

1989-90 - 24,800
1990-91 - (do not have data)
1991-92 - 6,810
1992-93 - 0

Historical information - Newspaper articles cited by Van Kirk (1994) indicates that an egg taking station was established on Redwood Creek in 1890, and that by 1892, fish were planted in Redwood Creek. In 1922, 45,000 "spotted Lake Tahoe trout fry" were planted in the Creek as well as trout from the Eel River. The Prairie Creek Hatchery was established as temporary facilities in 1927. References indicate there was a substantial stocking program in the 1920's of fish from outside the basin from other areas.

NUMBERS

Redwood Creek runs were estimated to 5,000 chinook, 2,000 coho, and 10,000 steelhead (U.S. Department of the Interior. 1960. A preliminary survey of fish and wildlife resource of northwestern California. U.S. Fish and Wildlife Service, Pacific Southwest Committee). These estimates were made using information from studies conducted on the Eel River in 1955 through 1958 by the California Department of Fish and Game and are valid for those years (Ridenhour 1994).

The actual numbers of steelhead are difficult to estimate. Our spawning surveys have been used to determine long-term trends, but not all the data has been analyzed. Generally the annual numbers seen are low, except on Lost Man Creek, site of the hatchery. However, with the closure of the Prairie Creek Hatchery in 1992, the number of steelhead seen in the Prairie Creek system will probably decline. And once it has been determined Prairie Creek has recovered from the 1989 storm that transported large amounts of fine sediment from the HWY 101 construction project into adjacent tributaries and Prairie Creek, the hatchbox project that is mitigating for the damage will be ended. Even fewer steelhead will probably be seen.

KNOWN DISTRIBUTION OF STEELHEAD TROUT IN THE REDWOOD CREEK BASIN (sources: Anderson, Brown, RNP)

Juvenile steelhead are the most common and widely distributed salmonid in the Redwood Creek basin and occur in streams with summer flows greater than 0.1 cfs (Anderson 1988). They occurred in 57 of the 111 tributaries surveyed for fish in addition to the mainstem Redwood Creek. Salmonid distribution and abundance in tributaries were related to stream order (Brown 1988).

Table 1. Known distribution of steelhead trout in the Redwood Creek basin, Humboldt County, California.

REDWOOD CREEK

(Tributaries of Redwood Creek)

Prairie Creek

(tributaries of Prairie Creek)

Godwood Creek

Streelaw Creek (a.k.a. Wolf Creek)

Lost Man Creek/Larry Damm Creek

Little Lost Man Creek

mainstem Prairie Creek

Strawberry Creek

McArthur Creek

Elam Creek

Bond Creek

Miller Creek

Forty-four Creek

Tom McDonald Creek

Emerald Creek (a.k.a. Harry Weir Creek)

Bridge Creek

G Creek

Slide Creek

Unnamed 13

Unnamed 19

Copper Creek

Devils Creek

Coyote Creek

Panther Creek

Garrett Creek

Lacks Creek

Karen Creek

Lee Creek

Table 1. Known distribution of steelhead trout in the Redwood Creek basin, Humboldt County, California. (continued)

REDWOOD CREEK

Roaring Gulch Creek
Garcia Creek
Cashmere Creek
Weepy Creek
Beaver Creek
Pilchuck Creek
Mill Creek
Molasses Creek
Tossup Creek
Wiregrass Creek
Minor Creek
Loin Creek
Santa Fe Creek
Sweathouse Creek
Captain Creek
Lupton Creek
Windy Creek
Jena Creek
Noisy Creek
Squirrel Creek
Emmy Lou Creek
Cutoff Meander Creek
Six Rivers Creek
Gunrack Creek
Simon Creek
High Prairie Creek
Minon Creek
Lake Prairie Creek
Upper Panther/Bradford Creek
Pardee Creek
Last Gasp Creek
Twin Lakes Creek
Upper, Middle, and Lower Redwood Creek mainstem and Estuary

Habitat

High summer water temperatures are a problem in the summer. During the summer of 1980 and 1981, maximum measured water temperatures ranged from 10.5°C to 23.0°C for the tributaries, and 14.0°C to 26.0 °C for mainstem Redwood Creek. The same patterns are still measured today.

Extensive sedimentation in the mainstem and tributaries exacerbated the reduced quality of rearing habitat for juvenile salmonids during summer low-flow conditions. Pool depth and cover at all sample sites in 1981 were rated low in quality (Brown 1988).

A series of major floods and the advent of widespread timber harvest are recognized as causes of major channel changes: increase in stored sediment, channel widening, increased stream bed elevation, increased channel braiding, and decreased streambed material size. In general, the upstream third of the channel of Redwood Creek is degrading while the lower 20 km is severely aggraded. A 'wave' of sediment is moving downstream.

This relates to steelhead habitat in that pools have filled in, water temperatures are less than optimum, redds are subject to greater scouring because of the decreased streambed material size and shifting channels. Also, decreased gravel size affects egg survival in redds.

"Extensive aggradation, bank erosion and streamside landsliding caused infilled pools, siltation, loss of streamside canopy, increased water temperature, loss of streamside shelter for fish and decreased summer flows."

(From Varnum and Ozaki, 1986. Recent channel adjustments in Redwood Creek, California. Redwood National Park Research and Development Technical Report Number 18. Redwood National Park, Arcata Office, Arcata, California)

Because steelhead rear in streams for one or more years, the poor habitat conditions that occur in the Redwood Creek Basin, have probably affected steelhead trout production and survival, and are one of the reasons for their low numbers and distribution when compared with historical accounts.

STEELHEAD (Oncorhynchus mykiss) - Prairie Creek Hatchery Trapping Records

Location: Prairie Creek Hatchery
 Humboldt County, California
 Weir on Lost Man Creek, tributary to Prairie Creek, which is a tributary to
 Redwood Creek.

YEAR Spawning Season	No. of Steelhead Trapped	Range of Occurrence Dates	Peak Occurrence Date (No.)
1972-73	25	01/18/72 - 04/04/73	03/10/73 (5)
1973-74	12	09/28/73 - 02/19/74	10/02/73 (3)
1974-75	5	12/27/74 - 03/04/75	03/04/75 (2)
1975-76	25	01/21/76 - 04/05/76	02/13/76 (6)
1976-77	104	01/05/77 - 03/12/77	02/21/77 (17)
1977-78	70	09/18/77 - 04/03/78	03/08/78 (11)
1978-79	38	10/31/78 - 03/14/79	02/11/79 (5)
1979-80	44	10/25/79 - 03/14/80	02/23/80 (4)
1980-81	88	12/10/80 - 03/27/81	01/21/81 (14)
1981-82	42	12/13/81 - 03/21/82	01/26/82 (4)
1982-83	70	11/23/82 - 03/10/94	01/24/94 (8)

COHO SALMON (Oncorhynchus kisutch) - Prairie Creek Hatchery Trapping Records

Location: Prairie Creek Hatchery
 Humboldt County, California
 Weir on Lost Man Creek, tributary to Prairie Creek, which is a tributary to
 Redwood Creek.

YEAR Spawning Season	No. of Coho Salmon Trapped	Range of Occurrence (Dates)	Peak Occurrence (Date)
1972-73	184	11/12/72 - 12/24/72	11/04/72
1973-74	82	09/28/73 - 01/12/74	11/05/73
1974-75	33	11/06/74 - 11/29/74	11/07/74
1975-76	125	10/10/75 - 02/14/76	11/07/75
1976-77	49	11/16/78 - 03/11/77	02/26/77
1977-78	22	09/02/77 - 01/13/78	11/22/77
1978-79	69	10/31/78 - 02/27/79	01/10/79
1979-80	98	10/15/79 - 02/18/80	12/19/79
1980-81	41	11/03/80 - 02/13/81	11/26/80
1981-82	30	10/27/81 - 02/09/82	11/04/81
1982-83	84	10/27/82 - 02/09/83	01/18/83