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SUMMARY OF **REPORTS** RELATING TO COHO SALMON
(ONCORHYNCHUS KISUTCH)
IN THE REDWOOD CREEK BASIN.

3342

References

- W 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 and numbers, and benthic invertebrates.
- a 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 coho salmon on index streams within Redwood National and State Parks for the 1991-1992 spawning season.
- H 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, numbers and types of barriers to migration, and areas by stream order accessible to anadromous fish.
- W Farro, **M. 1990**. PCF'FA Trinidad Fishermen's Salmon Enhancement: Prairie Creek Project, **1989 - 1990**.
Summary of fish (number, dates, and lengths) trapped on Prairie Creek, and hatchbox fish reared and released into Prairie Creek and its tributaries. **Also**, electrofishing data for selected streams in the Prairie Creek watershed. This project is mitigation for the effects of sediment input during construction of the **U.S. 101 Bypass**.
- W Farro, M. **1991**. PCF'FA Trinidad Fishermen's Salmon Enhancement: Prairie Creek Project, **1990 - 1991**.
Summary of fish (number, dates, and lengths) trapped on Prairie Creek, and hatchbox fish reared and released into Prairie Creek and its tributaries. This project **is** mitigation for the effects of sediment input during construction of the **U.S. 101 Bypass**.
- W Farro, M. **1993**. PCFFA Trinidad Fishermen's Salmon Enhancement: **Prairie Creek Project, 1992 - 1993**.
Summary of fish (number, dates, and lengths) trapped on Prairie Creek, and hatchbox fish reared and released into Prairie Creek and its tributaries. This project is mitigation for the effects of sediment input during construction of the **U.S. 101 Bypass**.

NOTE: THE LOST MAN CK CARCASS
SURVEY 1984-1991 TABLE
ALSO EXISTS AS CALL # 3338

- W Fish Production of Prairie Creek Hatchery, Humboldt County, California (No date). 4
Summary of fish production from 1961 through 1980, releases, and sources of eggs.
- HH Haux, S., and D. Anderson. 1992. Redwood Creek Basin 1990-1991 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 coho salmon on index streams within Redwood National and State Parks for the 1990-1991 spawning season.
- W Prairie Creek hatchery coho salmon plantings NW
Additional information on fish production 1981 through 1983, and last plants in 1993 after the hatchery closed.
- W Potter, S., V. Ozaki, D. Best, D. Hagans. 1987. Data Release: Redwood Creek channel cross section changes, 1985-1986. Redwood National Park Research and Development Technical Report Number 22. Redwood National Park, Arcata Office, Arcata, California.
Channel changes of the mainstem of Redwood Creek, which are indicative of habitat for coho salmon.
- W Redwood National Park. 1994. Map of coho observations on Redwood Creek, California. W
Map of locations where coho salmon (juveniles/adults/carcasses) have been observed or electrofished.
- W Redwood National Park. 1994. Spawning/survey spreadsheet for Prairie Creek: 1983-84 through 1989-90.
Spreadsheet includes carcasses (D) and live fish (L) of coho salmon observed on Prairie Creek.
- HH Redwood National Park. 1994. Spawning and Carcass Surveys on Lost Man Creek: 1984-85 through 1991-92. L
Table of Lost Man Creek spawning and carcass surveys relating to coho salmon during the period of 1984-85 to 1991-92.
- W Redwood National Park. 1994. Timing of Coho Salmon Runs in Lost Man Creek, 1972-73 through 1982-83. C
Table of Prairie Creek Hatchery trapping records for coho salmon from 1972-73 through 1982-83. Includes range of occurrence, number of coho trapped, and date of peak occurrence.
- W Ridenhour, R. and T. Hofstra. 1994. Fishery Resources of the Redwood Creek Basin. DRAFT.
Report details fish species in Redwood Creek, habitat, and impacts to fishery resource.

X **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. Includes oral interviews with long-time residents of the upper basin of Redwood Creek.

W **Varnum, N., and v. 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.**

Report chronicles channel changes of Redwood Creek, (ie. downcutting or aggradation), which is indicative of fish habitat and the loss of pools.

HATCHERY INFLUENCES ON REDWOOD CREEK

Record of 1963 through 1983 - From fish production data of the Prairie Creek Hatchery, Humboldt County, California, for 20 years of operation, 1963-64 through 1982-83, the numbers of coho salmon raised ranged from 7,872 (1963-64 season) to 521,800 (1973-74 season). In that period, production averaged 148,690 coho salmon per year (std. dev. = 133,033), for a total of 2,973,807 fish raised (Fish Production no date).

Sources of eggs and years introduced are:

Lost Man Creek:	1972 through 1983 (<i>local</i> source within the Prairie Creek basin)
Trask River:	1972-73
Klaskanine River:	1973-74
Noyo River:	1975-76
Skaggit River:	1976-77
Trinity River:	1977-78
Soos River:	1978-79
Sandy River:	1979-80

The hatchery continued to produce coho until it closed in December of 1992. The last coho from Prairie Creek were planted in Spring of 1993 in Prairie Creek (13,777) and Tom McDonald Creek (800), a tributary to Redwood Creek in the middle basin.

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 (Farro 1990, 1991, 1993).

Hatchbox HWY 101 Bypass Mitigation Coho Releases

1989-90 -	37,285
1990-91 -	24,880
1991-92 -	(did not have data)
1992-93 -	17,430

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, 160,000 Redwood Creek salmon were planted in Redwood Creek. 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.

RUN TIMING

From 11 years of Prairie Creek Hatchery trapping records from Lost Man Creek/Prairie Creek weirs, 1972-73 to 1982-83, the coho salmon run ranged between early September and mid-February, but generally began in late October/early November and ended in February. The **peak** of the **run** occurred in early November (RNP 1994 - Prairie Creek Hatchery Trapping Records).

Though not as precise, carcass surveys on Lost Man Creek from the 1984-85 through the 1991-92 spawning season show run timing between early December and mid-February (RNP 1994 - Lost Man Creek Spawning and Carcass Surveys). However, the run may have been earlier as no surveys were conducted in November. Also, the years of drought the area experienced in the 1980's, and the lack of significant storm events that prevented flows sufficient for upstream migration or failed to open the mouth of Redwood Creek at the *ocean* and prevented fish access to Redwood Creek until later in the fall, probably delayed the onset of adult upward migration some fall years.

Run timing data of coho salmon from the Prairie Creek weir of the Hatchbox HWY 101 mitigation project was: for 1989-90, 11/26/89 to 03/13/90, for 1990-91 11/25/90 to 01/18/91, and for 1992-93 11/18/92 to 01/93, a slightly later run time.

However, for all this data, the weir was there to capture fish for propagation and not to count the run. Generally when enough fish were captured, the weir was removed. Also, the weirs were not always fishing, they were removed in high flows or had their trapping regulated (eg. every other day) to allow some fish to pass and spawn upstream.

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 coho 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 coho 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 coho will probably be seen.

KNOWN DISTRIBUTION OF COHO SALMON IN THE REDWOOD CREEK BASIN (sources: map, Anderson, Brown, Farro, RNP)

Coho salmon primarily occur in the Prairie Creek system, both its tributaries and the mainstem (Anderson 1988, Brown 1988). 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). Salmonid distribution and abundance in tributaries were related to stream order (Brown 1988). Coho salmon occur in few of the Redwood Creek tributaries outside of the Prairie Creek system.

REDWOOD CREEK

(Tributaries of Redwood Creek)

Prairie Creek

(tributaries of Prairie Creek)

Hope Creek

CREA Creek

Ten ~~Tapo~~ Creek

Brown Creek

Big Tree Creek

Boyes Creek

Godwood Creek

May Creek

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

Lost Man Creek

Larry Damm Creek

Little Lost Man Creek

Skunk Cabbage Creek

mainstem Prairie Creek

Strawberry Creek

Unnamed Creek

McArthur Creek

Tom McDonald Creek

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

Bridge Creek

Coyote Creek

Karen Creek

Pilchuck Creek

Upper, Middle, and Lower Redwood Creek mainstem

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 (from Potter, et. al. 1987). In general, the upstream third of the channel of Redwood Creek is degrading while the lower 20 km is severely aggraded (Varnum and Ozaki 1986). A 'wave' of sediment is moving downstream.

This relates to coho 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)

Because coho rear in streams for one year, the poor habitat conditions that occur in the Redwood Creek Basin, have probably affected coho salmon production and survival, and are one of the reasons for the low numbers and poor distribution of coho salmon.

NOTE:

THIS PAGE IS AKA
CALL # 3338

COHO SALMON - (Oncorhynchus kisutch)

Lost Man Creek

Spawning and Carcass Surveys

Redwood National Park

Length of survey section: 2,400 meters

Watershed: 31.1 km²

← CONFLUENCE TO
RIVER KM 2.4

YEAR SPAWNING SEASON	SURVEY DATE	COHO SALMON		SEASON COHO TOTAL	
		Live Fish	carcasses	Live Fish	carcasses
1984-85	02/25/85	0	0	0	0
1985-86	12/18/85	0	0	0	0
1987-88	01/26/88	108			
	02/10/88	28	23	136	36
1988-89	12/06/88	36	1		
	01/25/89	64	19	103	41
	02/15/89	3	21		
1989-90	12/05/89	0	0		
	01/23/90	28	18	28	18
	03/22/90	0	0		
1990-91	01/16/91	2	0		
	01/31/91	2	13		
	02/27/91	0	9	4	22
	03/18/91	0	0		
1991-92	01/02/92	1	0		
	01/29/92	26	4		
	02/13/92*	19	13	46	17
	03/03/92*				
	03/24/92	0	0		
* Two days to complete survey					

PRAIRIE CREEK HATCHERY COHO SALMON PLANTINGS

Additional Information

YEAR	NO. OF FISH	POUNDS
1980-81	19,427	1,984
1981-82	137,119	7,212
1982-83	115,311	5,588

The Prairie Creek hatchery closed in December of 1992. Run by the County of Humboldt, county budget problems finally forced the closure of the hatchery.

The last fish (steelhead, coho, and chinook) hatched at the hatchery were planted in **several** places. Chinook were released into Lost Man Creek, coho and steelhead into Big Lagoon, and coho were transferred to the waste water aquaculture facility in Arcata. Some of the coho were returned from the waste water aquaculture facility and 13,777 were planted in Prairie Creek, and 800 into Tom McDonald Creek (tributary to Redwood Creek).

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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

Assumed
TYPO?

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