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ANNUAL REPORT  
WARM SPRINGS SALMON AND STEELHEAD HATCHERY, 1986-87

by

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Region 3, Inland Fisheries

Inland Fisheries

Administrative Report No. 88-5

1988

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ABSTRACT

This report describes the operation of Warm Springs Salmon and Steelhead Hatchery from July 1, 1986, through June 30, 1987. Tables and Appendices present daily records of water temperatures, daily numbers of salmon and steelhead entering the Hatchery, and total number of salmonids reared and released.

One hundred eleven chinook salmon, Oncorhynchus tshawytscha, 472 coho salmon, O. kisutch, and 1,251 steelhead trout, Salmo gairdneri, were trapped at the Hatchery this season. There were 92,765 advanced fingerling and 34,592 yearling chinook salmon and 40,809 fingerling and 123,570 yearling coho salmon planted. Also transferred or planted were 213,194 fingerling, 204,225 advanced fingerling, and 237,753 yearling steelhead.

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<sup>1/</sup> Inland Fisheries Administrative Report No. 88-5 .  
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## INTRODUCTION

This is the seventh annual report for operation of the Warm Springs Salmon and Steelhead Hatchery. It describes operation of the Hatchery from July 1, 1986, through June 30, 1987. Copies of previous annual reports are available upon request from the Inland Fisheries Division, Rancho Cordova.

Warm Springs Hatchery is located on Dry Creek, 14 miles upstream from its confluence with the Russian River, 2 miles south of Healdsburg, Sonoma County. The Hatchery was constructed by the Department of the Army, Corps of Engineers, to compensate for spawning and nursery areas blocked by the Warm Springs Dam - Lake Sonoma Project. The Department of Fish and Game, under agreement with the Department of the Army, operates the fish hatchery and related facilities.

This report summarizes the number of fish trapped and spawned, production of eggs and fish, and water temperatures from July 1, 1986, through June 30, 1987.

## PRODUCTION SUMMARY

The ladder was opened September 30, 1986. The flows in Dry Creek were maintained between 80 to 120 cfs through most of the year. There were three periods when the water flow was increased: November 3 to December 5 (to 500 cfs), March 5 to 31 (to 1,000 cfs), and June 1 to 30 (to 225 cfs). One hundred eleven chinook, 472 coho salmon, and 1,251 steelhead were trapped and 395,915 yearlings and 1,550,993 fingerlings were transferred or planted during the 1986-87 season (Table 1 and Appendix Table 1).

All fish were started on Bio-Diet and then fed Oregon Moist Pellets. A total of 98,711 lb. of fish was produced using 134,960 lb. of feed, giving a conversion rate (pounds of feed to produce 1 lb. of fish) of 1.37.

## WATER QUALITY

This is the second season of propagation and rearing since Lake Sonoma has filled. The turbidity of the incoming water has decreased steadily through the year with the high being 47 nephelometric turbidity units (N.T.U.s) in July 1986, and 3.4 N.T.U.s in June 1987. The lowest turbidity recorded was 2.6 N.T.U.s on December 11, 1986.

The turbidity had a minimal impact on the hatchery operations, compared with the previous year.

## DISEASE

Minor outbreaks of columnaris occurred when water temperatures reached the high 50's; they were controlled with the use of a salt flush, Hyamine drip, and feeding Terramycin.

The Hatchery experienced many outbreaks of furunculosis throughout the year, which was controlled by milling or mixing Terramycin, Furox 100, Sulfamethazine, or Romet into the feed. Romet proved to be very effective in controlling the disease, and there was no recurrence after its use.

TABLE 1. Warm Springs Hatchery Production Summary, 1986-87

Species	Adults trapped	Females spawned	Eggs taken or received	Fingerlings received	Fingerlings transferred or planted	Yearlings transferred or planted	Total pounds released
Chinook salmon							
1986 BY	75	18	143,262	6,622	92,765	34,765	5,060
Coho salmon							
1985 BY						123,570	16,250
1986 BY	144	1	179,090		40,809		704
Steelhead							
1986 BY					408,363	237,753	76,168
1987 BY	1,215	276	1,544,785		1,009,056		529
Totals	1,434	295	1,867,137	6,622	1,550,993	395,915	98,711

CHINOOK SALMON PROGRAM  
History of the 1986-87 Season

There were 111 chinook salmon trapped at the Hatchery this season: 50 adult male, 25 adult female, and 36 grilse. Eighteen females were spawned and produced 75,798 eggs, for an average of 4,211 eggs per female. The average fertility was 84%, and the fry dropout was 20% leaving 64% survival to fingerling. This high loss was caused by coagulated-yolk disease (white-spot disease) that was probably brought on by the trauma of the warm water temperatures (70-75 degrees F.) the fish were exposed to in the Russian River during September. These fingerling produced 47,940 fish which were released in Dry Creek and the Russian River.

Forty-eight adult chinook (31 males and 17 females) were received from the Outlet Creek Trap. Fifteen females were spawned and produced 50,673 eggs for an average of 3,378 eggs per female. Eleven adult fish (5 males and 6 females) were received from Hollow Tree Creek. The 4 females spawned produced 16,791 eggs for an average of 4,197 eggs per female. These eggs produced 59,245 fish, which were released in the Russian River (44,825 Outlet Creek with a right ventral clip and 14,420 with a left ventral clip).

A total of 27,767 Wisconsin strain was retained from the 1985-86 production year and released as yearlings in the Russian River estuary at Jenner (Table 2).

COHO SALMON PROGRAM  
History of the 1986-87 Season

There were 472 coho salmon trapped at the Hatchery this season: 139 males, 5 females, and 328 grilse. The 1 female spawned produced 3,667 eggs. Thirty adult fish (12 males and 18 females) were received in from the Hollow Tree Creek

trap. The 14 females spawned produced 30,605 eggs for an average of 2,186 eggs per female. Thirteen adult fish (7 males and 6 females) were received from the Noyo River Station. The 1 female spawned produced 2,408 eggs.

TABLE 2. Chinook Salmon Plants, 1986-87

Date	Strain	Release site	Average Size/lb	Number
07-07-86	Wisconsin	Russian River (Jenner)	18.0	9,000
07-08-86	Wisconsin	Russian River (Jenner)	16.0	8,000
09-26-86	Wisconsin	Russian River (Jenner)	7.3	7,847
09-26-86	Wisconsin	Dry Creek (Yoakim Bridge)	7.3	2,920
10-24-86	Outlet Creek	Dry Creek (Hatchery)	9.1	6,825 <sup>1/</sup>
Total Total Yearlings				34,592
04-15-87	Dry Creek	Russian River (Jenner)	47.0	18,800
04-15-87	Dry Creek	Dry Creek (Yoakim Bridge)	47.0	18,800
04-16-87	Dry Creek	Russian River (Jenner)	47.0	10,340
05-28-87	Outlet Creek	Russian River (Jenner)	55.0	44,825 <sup>1/</sup>
Total advanced fingerlings				92,765

<sup>1/</sup> RV mark

We received 75,200 Klamath River strain and 67,210 Prairie Creek eggs from Mad River Hatchery.

A total of 40,809 advanced fingerling (coded wire tagged - "CWT") and 123,570 yearlings was planted from the Hatchery. Approximately 105,000 fish (two groups of approximately 40,000 each are CWT, 12,610 Hollow Tree Creek with a right ventral mark, 2,430 Dry Creek/Noyo River with a left ventral mark, and 4,544 Prairie Creek) are being held for later release (Table 3).

#### STEELHEAD TROUT PROGRAM History of the 1986-87 Season

The first steelhead entered the trap on October 11, 1986, and the last on April 4, 1987. A total of 1,250 fish was trapped: 519 males, 696 females, and 35 half-pounders. The 276 females spawned produced 1,544,785 eggs for an average of 5,597 eggs per female. All surplus adult fish were trucked in the Russian River and released above the mouth of Dry Creek.

Surplus eggs were taken because of the low egg fertility and high fry mortality experienced during the 1985-86 season and to spread the spawning period as long as possible. Surplus fingerlings were planted in Dry Creek, the Russian River, and transferred to Talmage Rearing Ponds (Table 4).

TABLE 3. Coho Salmon Plants, 1986-87

Date	Strain	Release site	Average size/lb	Number	Mark
11-14-86	Klamath	Dry Creek	9.0	40,399	AD-CWT 06-51-09 06-51-10
11-14-86	Klamath	Dry Creek	9.0	20,801	--
2-24-87	Klamath	Dry Creek	6.6	41,701	AD-CWT 06-51-11 06-51-12
2-25-87	Klamath	Dry Creek	6.6	20,669	--
Total yearlings				123,570	
5-28-87	Klamath	Dry Creek	58.0	40,809	AD-CWT 06-51-13 06-51-14
Total advanced fingerlings				40,809	

TABLE 4. Fingerling Steelhead Trout Plants and Transfers, 1986-87

Date	Strain	Release site	Average size/lb	Number
07-02-86	Dry Creek-86	Dry Creek(Yoakim Bridge)	742	9,646
07-11-86	Dry Creek-86	Dry Creek(Yoakim Bridge)	197	75,057
07-14-86	Dry Creek-86	Russian River(Coyote Dam)	96	38,400
07-15-86	Dry Creek-86	Russian River(Jenner)	69	31,050
07-28-86	Dry Creek-86	Dry Creek(Yoakim Bridge)	50	50,000
07-29-86	Dry Creek-86	Dry Creek(Well Field)	65	49,985
09-22-86	Dry Creek-86	Talmage Rearing Ponds	30	30,000
09-23-86	Dry Creek-86	Talmage Rearing Ponds	27	49,950
09-24-86	Dry Creek-86	Talmage Rearing Ponds	35	21,000
09-26-86	Dry Creek-86	Dry Creek(Yoakim Bridge)	31	17,825
10-02-86	Dry Creek-86	Dry Creek(Well Field)	25	5,000
10-24-86	Dry Creek-86	Dry Creek(Well Field)	58	30,450
03-13-87	Dry Creek-87	Russian River(Coyote Dam)	1,920	38,400
03-17-87	Dry Creek-87	Dry Creek(Yoakim Bridge)	1,784	44,600
03-18-87	Dry Creek-87	Russian River(Coyote Dam)	2,100	27,300
03-20-87	Dry Creek-87	Dry Creek(Yoakim Bridge)	2,120	53,000
03-30-87	Dry Creek-87	Dry Creek(Yoakim Bridge)	2,100	144,900
04-01-87	Dry Creek-87	Russian River(Coyote Dam)	2,150	47,300
04-01-87	Dry Creek-87	Dry Creek(Yoakim Bridge)	2,150	55,900
04-14-87	Dry Creek-87	Dry Creek(Yoakim Bridge)	2,150	86,000
04-20-87	Dry Creek-87	Dry Creek(Well Field)	2,100	147,000
04-25-87	Dry Creek-87	Dry Creek(Well Field)	2,000	36,216
05-01-87	Dry Creek-87	Dry Creek(Yoakim Bridge)	536	21,440
05-01-87	Dry Creek-87	Russian River(Coyote Dam)	2,100	94,500
05-05-87	Dry Creek-87	Dry Creek(Well Field)	2,100	100,800
05-12-87	Dry Creek-87	Dry Creek(Well Field)	2,100	42,000
05-15-87	Dry Creek-87	Dry Creek(Well Field)	475	9,500
Total				1,417,419

A total of 235,413 steelhead yearlings was released into Dry Creek and 2,340 were transferred to Napa Steelhead Association (Table 5).

TABLE 5. Yearling Steelhead Trout Plants and Transfers, 1986-87

Date	Strain	Release site	Average size/lb	Number
12-26-86	Dry Creek	Dry Creek(Well Field)	3.7	20,350
01-29-87	Dry Creek	Dry Creek(Yoakim Bridge)	3.8	28,120
02-02-87	Dry Creek	Dry Creek(Yoakim Bridge)	3.9	29,601
02-04-87	Dry Creek	Dry Creek(Yoakim Bridge)	3.8	28,367
02-10-87	Dry Creek	Dry Creek(Yoakim Bridge)	3.7	22,570
NO 02-20-87	Dry Creek	Napa Steelhead Association	5.2	2,340
03-23-87	Dry Creek	Dry Creek(Yoakim Bridge)	3.4	15,130
03-24-87	Dry Creek	Dry Creek(Yoakim Bridge)	3.3	12,210
03-24-87	Dry Creek	Dry Creek(Yoakim Bridge)	3.7	18,500
04-20-87	Dry Creek	Dry Creek(Yoakim Bridge)	3.1	17,670
04-21-87	Dry Creek	Dry Creek(Yoakim Bridge)	3.0	17,850
04-21-87	Dry Creek	Dry Creek(Yoakim Bridge)	2.8	13,300
04-22-87	Dry Creek	Dry Creek(Yoakim Bridge)	2.7	11,745
Total				237,753

PUBLIC RELATIONS

All visitors to the Hatchery must enter through the Visitor Center where they are counted. During the 1986-87 season, 159,392 people visited the Hatchery (Table 6). This is a 29% decrease over the previous report period.

TABLE 6. Warm Springs Hatchery Monthly Visitation Data, 1986-87

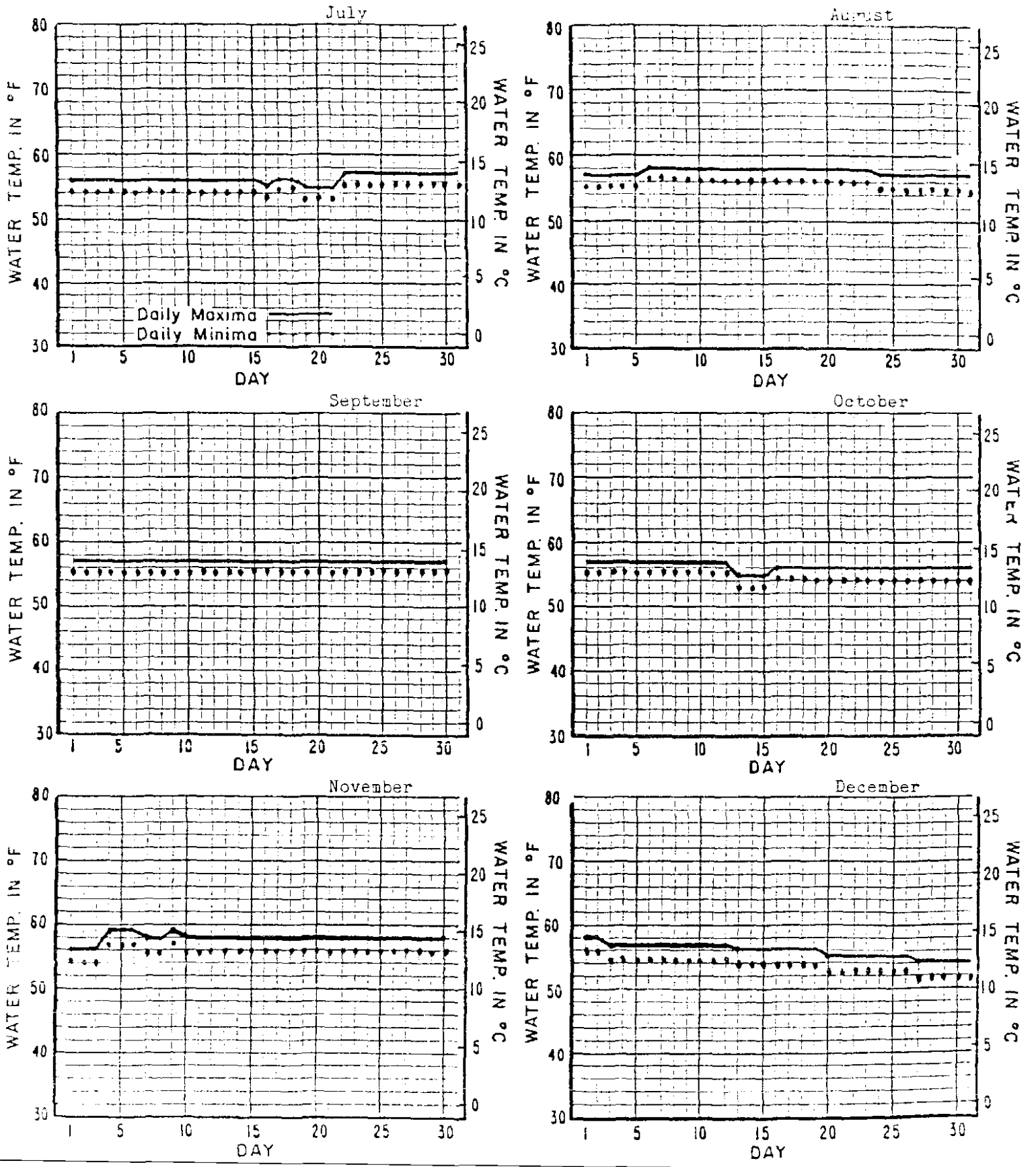
Month	Number of visitors
July	11,566
August	21,932
September	10,100
October	4,423
November	18,554
December	30,069
January	8,087
February	10,822
March	9,026
April	10,014
May	11,906
June	12,893
Total	159,392

APPENDIX TABLE 1. Weekly Adult Salmon and Steelhead Trapping Data for Warm Springs Salmon and Steelhead Hatchery, 1986-87.

<u>Week</u>	<u>Chinook salmon</u>		<u>Coho salmon</u>		<u>Steelhead trout</u>	
	<u>Adults</u>	<u>Grilse</u>	<u>Adults</u>	<u>Grilse</u>	<u>Males</u>	<u>Females</u>
09/28/86 - 10/04/86	2					
10/05/86 - 10/11/86	10	13			1	
10/12/86 - 10/18/86	39	17				
10/19/86 - 10/25/86	23	3		1	1	
10/26/86 - 11/01/86	1		1	5		
11/02/86 - 11/08/86			11	38	9	
11/09/86 - 11/15/86		1	47	91	10	1
11/16/86 - 11/22/86			3	12	3	1
11/23/86 - 11/29/86		1	3	7	2	
11/30/86 - 12/06/86			7	9	1	
12/07/86 - 12/13/86			4	6	1	
12/14/86 - 12/20/86			6	6	2	1
12/21/86 - 12/27/86			35	20	15	5
12/28/86 - 01/03/87			22	48	6	2
01/04/87 - 01/10/87			4	54	52	35
01/11/87 - 01/17/87			1	16	28	13
01/18/87 - 01/24/87				11	25	11
01/25/87 - 01/31/87		1		2	208	235
02/01/87 - 02/07/87				2	78	141
02/08/87 - 02/14/87					43	95
02/15/87 - 02/21/87					19	72
02/22/87 - 02/28/87					7	14
03/01/87 - 03/07/87					20	26
03/08/87 - 03/14/87					8	38
03/15/87 - 03/21/87					7	5
03/22/87 - 03/28/87					6	1
03/29/87 - 04/04/87					3	
<b>Season Totals</b>	<b>75</b>	<b>36</b>	<b>144</b>	<b>328</b>	<b>555</b>	<b>696</b>



APPENDIX FIGURE 1. Daily Water Temperatures for Warm Springs Salmon and Steelhead Hatchery, 1986-87



APPENDIX FIGURE 1. (Continued)

