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ANNUAL REPORT
WARM SPRINGS SALMON AND STEELHEAD HATCHERY, 1987-88

by

E. Royce Gunter, Jr.
Region 3, Inland Fisheries

Inland Fisheries
Administrative Report No. 90-4

1990

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ABSTRACT

This report describes the operation of Warm Springs Salmon and Steelhead Hatchery from July 1, 1987, through June 30, 1988. 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.

Three hundred four chinook salmon, Oncorhynchus tshawytscha, 576 coho salmon, O. kisutch, and 1,045 steelhead trout, O. mykiss were trapped at the Hatchery this season. There were 44,726 fingerling and 34,440 advanced fingerling chinook salmon and 137,300 fingerling, 52,911 advanced fingerling, and 104,324 yearling coho salmon planted. Also transferred or planted were 707,454 fingerling, 102,750 advanced fingerling, and 224,963 yearling steelhead.

^{1/} Inland Fisheries Administrative Report No. 90-4.

Submitted December 1988. Edited by K. A. Hashagen, California Department of Fish and Game, 1416 Ninth St., Sacramento, CA 95814.

INTRODUCTION

This is the 8th annual report for operation of the Warm Springs Salmon and Steelhead Hatchery. It describes operation of the Hatchery from July 1, 1987, through June 30, 1988. 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, 1987, through June 30, 1988.

PRODUCTION SUMMARY

The ladder was opened September 21, 1987. The flows in Dry Creek were maintained between 75 to 150 cfs through most of the year. There were two periods when the water flow was increased: July 6 - August 12, 1987, to 300 cfs and January 17 - 25, 1988, to 2,000 cfs. Three hundred four chinook and 576 coho salmon, and 1,045 steelhead were trapped; and 329,287 yearlings and 1,079,581 fingerlings were transferred or planted during the 1987-88 season (Table 1 and Appendix Table 1). Daily maximum and minimum temperatures were recorded (Appendix Figure 1)

All fish were started on Bio-Diet and then fed Oregon Moist Pellets. A total of 86,326 lb of fish was produced using 124,506 lb of feed, giving a conversion rate (pounds of feed to produce one pound of fish) of 1.44.

TABLE 1. Warm Springs Hatchery Production Summary, 1987-88

Species	Adults trapped	Females spawned	Dry Creek eggs taken	Other eggs taken	Eggs shipped	Fingerlings transferred or planted	Yearlings planted	Total pounds released
<hr/>								
Chinook salmon								
1987 BY	180	3	10,533	140,216		79,166	-0-	1,666
<hr/>								
Coho salmon								
1986 BY					424,878		104,324	17,875
1987 BY	319	69	164,741	973,437		190,211		2,550
<hr/>								
Steelhead								
1987 BY					155,480	163,925	224,963	63,615
1988 BY	1,035	257	1,362,631			646,279		620
<hr/>								
Totals	1,534	329	1,537,905	1,113,653	580,358	1,079,581	329,287	86,326

WATER QUALITY

This is the 3rd season of propagation and rearing since Lake Sonoma filled. The turbidity of the incoming water decreased steadily July through October 1987, when the winter storms had an influence on the water quality. The highest turbidity reading was 76 nephelometric turbidity units (N.T.U.'s), beginning in January 1988; a measurement of 10 N.T.U.s was taken in June 1988. The lowest turbidity recorded was 2.0 N.T.U.s, taken on October 16, 1987.

During January, modifications in the piping system made it possible to use clean well water in the incubators and start tanks. As a result, the turbidity had a minimal impact on hatchery operations, compared with previous years.

DISEASE

Prior to the use of well water in the egg incubation system, the high turbidities restrained the effects of the chemical treatments administered to control the fungal growth (Saprolegnia parasitica). This parasite caused mortalities as high as 50% on various chinook and coho salmon egg lots.

CHINOOK SALMON PROGRAM History of the 1987-88 Season

There were 304 chinook salmon trapped at the Hatchery this season: 176 adult male, 4 adult female, and 124 grilse. The three females spawned produced 10,533 eggs, for an average of 3,511 eggs per female. The average fertility was 70%; and the fry dropout was 14%, leaving 56% 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 (72-78°F) in the Russian River during September when the adults were migrating. These fingerling produced 1,500 fish, which were released in the Russian River.

Eighty-six adult fish (37 males and 49 females) were trucked in from Outlet Creek. The 32 females spawned produced 133,416 eggs, at an average of 4,169 eggs per female. Fourteen adult fish (6 males and 8 females) were trucked in from Hollow Tree Creek. The 2 females spawned produced 6,800 eggs, at an average of 3,400 eggs per female. These eggs produced 63,246 fish, which were released in the Russian River (33,520 Outlet Creek chinook-right ventral clip and 4,710 Hollow Tree Creek-left ventral clip) and Eel River (25,016 Outlet Creek chinook-CWT).

A total of 14,420 Hollow Tree Creek strain was retained from the 1986-87 production year and released as advanced fingerlings in the Russian River estuary at Jenner (Table 2).

TABLE 2. Chinook Salmon Plants, 1987-88

<u>Date</u>	<u>Strain</u>	<u>Release site</u>	<u>Average size/lb</u>	<u>Number</u>
61 8/6 07-23-87	Hollow Tree Creek	Russian River (Jenner)	28	14,420
05-12-88	Dry Creek	Russian River (Jenner)	25	1,500
05-13-88	Outlet Creek	Outlet Creek (at confluence of Long Valley Creek)	64	25,016
06-14-88	Outlet Creek	Russian River (Jenner)	37	18,520
06-14-88	Outlet Creek	Russian River (Jenner)	111	15,000
06-14-88	Hollow Tree Creek	Russian River (Jenner)	72	4,710
			TOTAL	79,166

COHO SALMON PROGRAM
History of the 1987-88 Season

There were 576 coho salmon trapped at the Hatchery this season: 164 male, 155 female, and 257 grilse. The 69 females spawned produced 164,741 eggs. Six hundred thirty-seven adult fish (173 males and 464 females) were trucked in from Noyo River Egg Taking Station. The 397 females spawned produced 973,437 eggs for an average of 2,452 eggs per female. A total of 424,878 green Noyo eggs was shipped to Mad River Hatchery (248,710) and Silverado Fisheries Base (176,168).

A total of 137,300 fingerling, 52,911 advanced fingerling (42,331 coded wire tagged - CWT), and 104,324 yearling (84,510 - CWT) was planted from the Hatchery. Approximately 83,000 fish (two groups of 40,000 each are CWT) are being held for later release (Table 3).

TABLE 3. Coho Salmon Plants, 1987-88

<u>Date</u>	<u>Strain</u>	<u>Release site</u>	<u>Average size/lb</u>	<u>Number</u>	<u>Mark</u>
05-12-88	Noyo	Gualala River	100.0	30,000	--
05-16-88	Noyo	S.F. Garcia River	100.0	30,000	--
		Little N.F.			
05-23-88	Noyo	Gualala River	80.0	24,000	--
05-24-88	Noyo	S.F. Garcia River	80.0	24,000	--
05-25-88	Noyo	Howard Creek	80.0	6,640	--
05-25-88	Noyo	DeHaven Creek	80.0	6,640	--
05-25-88	Noyo	Wages Creek	80.0	6,720	--
06-15-88	Dry Creek	Russian River	93.0	9,300	--
Total Fingerling				137,300	
					AD CWT
<i>sk</i> 06-06-88	Noyo	Dry Creek	55.0	42,331	06-51-18
06-15-88	Noyo	Russian River	46.0	10,580	06-51-19
					--
Total Advanced Fingerling				52,911	
					AD CWT
11-17-87	Klamath	Dry Creek	7.2	13,134	06-51-17
					AD CWT
11-17-87	Hollow Tree Creek	Dry Creek	7.2	4,614	06-51-17
				1,774	AD CWT
<i>sk</i> 11-17-87	Prairie Creek	Dry Creek	7.2	25,665	6B-13-04
11-17-87	Hollow Tree Creek	Dry Creek	7.2	12,500	RV
11-17-87	Noyo/Dry Creek	Dry Creek	7.2	2,400	LV
11-17-87	Prairie Creek	Dry Creek	7.2	4,914	--
02-29-88	Klamath/Prairie Creek	Dry Creek	4.5	41,097	06-51-15
				<i>AD CWT Total = 20,235, 10 F 7</i>	
Total yearling				104,324	

all AD CWT total returned w/ 06-51-17 same mark

STEELHEAD TROUT PROGRAM
History of the 1987-88 Season

The first steelhead entered the trap on November 19, 1987, and the last on April 18, 1988. A total of 1,045 fish was trapped: 660 male, 375 female, and 10 half-pounders. The 257 females spawned produced 1,362,631 eggs, for an average of 5,302 eggs per female. All surplus adult fish were trucked to the Russian River and released above the mouth of Dry Creek.

Surplus eggs were taken because of the high turbidity and high fry mortality being experienced and to spread the spawning period over as wide a period as possible. A total of 155,480 eyed eggs was shipped to Mad River Hatchery for the Talmage Rearing Ponds. The surplus fingerlings were planted in Dry Creek, the Russian River, and transferred to Silverado Fisheries Base and Talmage Rearing Ponds (Table 4).

TABLE 4. Fingerling Steelhead Trout Plants and Transfers, 1987-88

<u>Date</u>	<u>Strain</u>	<u>Release site</u>	<u>Average size/lb</u>	<u>Number</u>
8-17-87	Dry Creek	Talmage Ponds	33	18,150
8-17-87	Dry Creek	Talmage Ponds	70	30,100
8-19-87	Dry Creek	Talmage Ponds	113	31,075
9-29-87	Dry Creek	Silverado Fisheries Base	47	84,600
3-21-88	Dry Creek	Dry Creek	1,500	52,500
4-28-88	Dry Creek	Russian River	1,350	53,640
4-28-88	Dry Creek	Dry Creek	1,111	30,000
4-29-88	Dry Creek	Russian River	712	21,360
5-02-88	Dry Creek	Dry Creek	776	59,752
5-04-88	Dry Creek	Dry Creek	567	69,175
5-05-88	Dry Creek	Dry Creek	1,492	96,980
5-05-88	Dry Creek	Dry Creek	629	30,192
5-06-88	Dry Creek	Russian River	456	13,680
5-13-88	Dry Creek	Dry Creek	1,500	126,000
5-19-88	Dry Creek	Dry Creek	1,500	93,000
Total				810,204

A total of 224,963 steelhead yearlings was released into Dry Creek and the Russian River (Table 5).

TABLE 5. Yearling Steelhead Trout Plants, 1987-88

<u>Date</u>	<u>Strain</u>	<u>Release site</u>	<u>Average size/lb</u>	<u>Number</u>
12-14-87	Dry Creek	Dry Creek (Yoakim Bridge)	4.0	11,400
12-15-87	Dry Creek	Dry Creek (Yoakim Bridge)	4.0	17,500
12-15-87	Dry Creek	Dry Creek (Yoakim Bridge)	3.4	20,145
12-16-87	Dry Creek	Dry Creek (Yoakim Bridge)	4.0	8,000
12-17-87	Dry Creek	Dry Creek (Yoakim Bridge)	3.8	11,400
01-19-88	Dry Creek	Dry Creek (Yoakim Bridge)	3.8	17,575
01-20-88	Dry Creek	Dry Creek (Yoakim Bridge)	4.0	18,240
01-21-88	Dry Creek	Dry Creek (Yoakim Bridge)	4.0	10,000
02-16-88	Dry Creek	Dry Creek (Yoakim Bridge)	3.8	3,800
02-16-88	Dry Creek	Russian River (Monte Rio)	3.8	3,800
02-17-88	Dry Creek	Dry Creek (Yoakim Bridge)	3.8	8,360
03-16-88	Dry Creek	Dry Creek (Well Field)	3.5	3,850
03-16-88	Dry Creek	Russian River (Monte Rio)	3.5	7,262
03-17-88	Dry Creek	Russian River (Monte Rio)	3.5	7,262
03-18-88	Dry Creek	Russian River (Monte Rio)	3.7	7,585
03-21-88	Dry Creek	Russian River (Monte Rio)	3.7	3,792
03-22-88	Dry Creek	Russian River (Monte Rio)	3.7	7,400
04-12-88	Dry Creek	Russian River (Monte Rio)	3.7	3,700
04-13-88	Dry Creek	Russian River (Monte Rio)	3.7	3,792
04-14-88	Dry Creek	Russian River (Monte Rio)	3.7	11,655
04-14-88	Dry Creek	Russian River (Monte Rio)	3.8	15,675
04-15-88	Dry Creek	Russian River (Monte Rio)	3.3	19,800
04-18-88	Dry Creek	Dry Creek (Well Field)	3.3	2,970
Total				224,963

PUBLIC RELATIONS

All visitors to the Hatchery must enter through the Visitor Center where they are counted. During the 1987-88 season, 115,352 people visited the Hatchery (Table 6). This is a 28% decrease over the previous report period.

TABLE 6. Warm Springs Hatchery Monthly Visitation Data, 1987-88

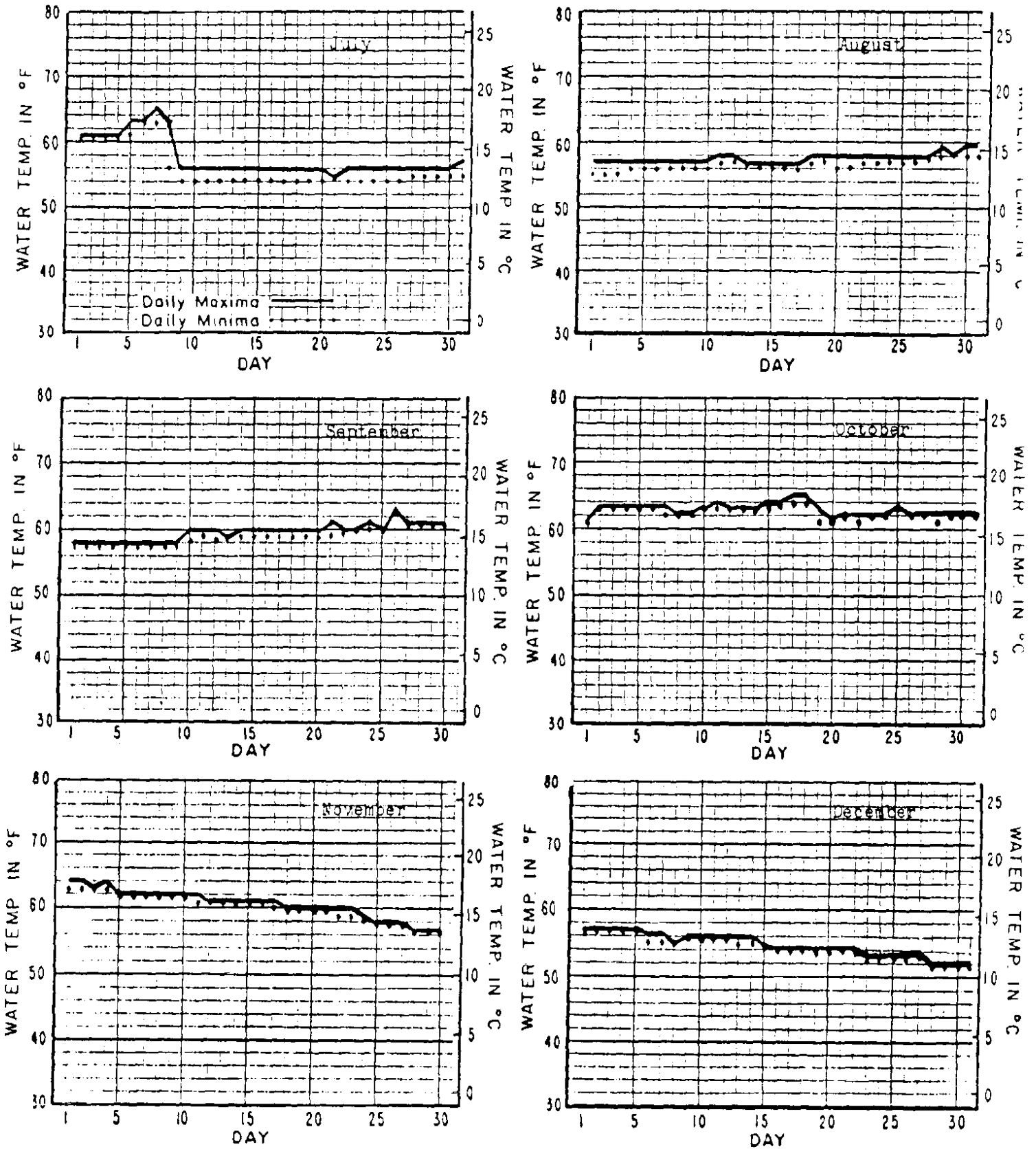
<u>Month</u>	<u>Number of visitors</u>
July	16,274
August	15,983
September	7,562
October	6,838
November	7,978
December	3,899
January	7,980
February	8,972
March	10,334
April	8,893
May	9,500
June	11,139
Total	115,352

APPENDIX TABLE 1. Weekly Adult Salmon and Steelhead Trapping Data for Warm Springs Salmon and Steelhead Hatchery, 1987-88

<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>
09/20/87 - 09/26/87		1				
09/27/87 - 10/03/87						
10/04/87 - 10/10/87	16	6				
10/11/87 - 10/17/87	43	30				
10/18/87 - 10/24/87	78	49				
10/25/87 - 10/31/87	37	30		16		
11/01/87 - 11/07/87	4	2	1	17		
11/08/87 - 11/14/87	2	5	5	27		
11/15/87 - 11/21/87			10	25	4	1
11/22/87 - 11/28/87			17	13	3	1
11/29/87 - 12/05/87			203	104	13	2
12/06/87 - 12/12/87		1	42	37	18	9
12/13/87 - 12/19/87			14	7	9	4
12/20/87 - 12/26/87			13	6	9	8
12/27/87 - 01/02/88			7	4	3	6
01/03/88 - 01/09/88			6	1	47	35
01/10/88 - 01/16/88					17	24
01/17/88 - 01/23/88			1	0	26	24
01/24/88 - 01/30/88					19	24
01/31/88 - 02/06/88					13	9
02/07/88 - 02/13/88					13	9
02/14/88 - 02/20/88					47	13
02/12/88 - 02/27/88					34	15
02/28/88 - 03/05/88					86	32
03/06/88 - 03/12/88					93	37
03/13/88 - 03/19/88					74	27
03/20/88 - 03/26/88					64	42
03/27/88 - 04/02/88					34	18
04/03/88 - 04/09/88					17	17
04/10/88 - 04/16/88					20	14
04/17/88 - 04/23/88					7	4
Season Totals	180	124	319	257	670	375

APPENDIX FIGURE 1. Daily Water Temperatures for Warm Springs Salmon and Steelhead Hatchery from July 1, 1987, Through June 30, 1988.

DAILY WATER TEMPERATURES BY MONTH



DAILY WATER TEMPERATURES BY MONTH

