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DEPARTMENT OF FISH AND GAME

ANNUAL REPORT
WARM SPRINGS SALMON AND STEELHEAD HATCHERY, 1988-89

by

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

Inland Fisheries
Administrative Report No. 90-8

1990

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ABSTRACT

This report describes the operations of Warm Springs Salmon and Steelhead Hatchery from July 2, 1988, through June 30, 1989. 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.

Two hundred thirty-three chinook salmon, Oncorhynchus tshawytscha, 534 coho salmon, O. kisutch, and 891 steelhead trout, O. mykiss, were trapped at the Hatchery this season. There were 237,450 advanced fingerling chinook salmon; 100,680 yearling coho salmon; and 578,780 fingerling and 233,979 yearling steelhead planted.

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INTRODUCTION

This is the 9th annual report for operation of the Warm Springs Salmon and Steelhead Hatchery. It describes operation of the Hatchery from July 1, 1988, through June 30, 1989. 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, 1988 through June 30, 1989.

PRODUCTION SUMMARY

The ladder was opened September 16, 1988. The flows in Dry Creek were maintained between 80 to 175 cfs through most of the year. Two hundred thirty-three chinook and 534 coho salmon, and 891 steelhead were trapped; and 334,659 yearlings and 816,230 fingerlings were planted during the 1988-89 season (Table 1 and Appendix Table 1).

All fish were started on Bio-Diet and then fed Oregon Moist pellets. A total of 79,545 lb of fish was produced using 106,014 lb of feed, giving a conversion rate (pounds of feed to produce 1 lb of fish) of 1.33.

TABLE 1. Warm Springs Hatchery Production Summary

Species	Adults trapped	Females spawned	Dry Creek eggs taken	Other eggs taken	Eggs shipped	Fingerlings planted	Yearlings planted	Total pounds release
Chinook salmon								
1988 BY	212	57	254,061	61,162		237,450		6,800
Coho salmon								
1987 BY								
1988 BY	358	103	228,166	28,364			100,680	13,083
Steelhead								
1988 BY						74,300	233,979	59,260
1989 BY	874	212	1,178,899		203,500	504,480		402
Totals	1,444	372	1,661,126	89,526	203,500	816,230	334,659	79,545

WATER QUALITY

This is the 4th season of propagation and rearing since Lake Sonoma has filled. The turbidity of the incoming water decreased steadily July 1988 through March 1989, until water was taken from a lower intake for water temperature control. The high recording was 10.0 nephelometric turbidity units (N.T.U.s), beginning in June 1988 and ending with a measurement of 6.2 N.T.U.s in June 1989. The lowest turbidity recorded was 1.0 N.T.U.s, taken on March 15, 1989.

DISEASE

The use of well water in the egg incubation system, lighter tray densities, and the use of salt and formaldehyde treatments effectively controlled fungal growth (*Saprolegnia parasitica*). During September, the coho salmon sub-yearlings were diagnosed as having bacterial kidney disease. Terramycin and Romet administered in the feed kept mortalities at less than 1% until release time. Minor outbreaks of *Columnaris* were controlled by administering Terramycin feed and Hyamine flushes.

CHINOOK SALMON PROGRAM

History of the 1988-89 Season

There were 233 chinook salmon trapped at the Hatchery this season: 151 adult male, 61 adult female, and 21 grilse. The 57

females spawned produced 254,061 eggs, at an average of 4,457 eggs per female. The average fertility was 96%; and the fry dropout was 2%, leaving 94% survival to fingerling. These fingerling produced 237,450 fish, which were released in Dry Creek (Table 2).

TABLE 2. Chinook Salmon Plants, 1988-89

Date	Strain	Release site	Average size/lb	Number
05-05-89	Dry Creek	Dry Creek (Hatchery Well Field)	36	73,800
05-05-89	Dry Creek	Dry Creek (Hatchery Well Field)	31	83,700
05-05-89	Dry Creek	Dry Creek (Hatchery Well Field)	39	79,950
Total				237,450

Twenty adult fish (11 males and 9 females) were trucked in from Outlet Creek. The six females spawned produced 26,737 eggs, for an average of 4,456 eggs per female. A total of 34,425 was received from Hollow Tree Creek. These two lots of eggs produced 52,250 fish, which are being retained for release as yearlings during the 1989-90 production year (24,080 Outlet Creek chinook-right ventral clip and 28,170 Hollow Tree Creek-left ventral clip).

COHO SALMON PROGRAM
History of the 1988-89 Season

There were 534 coho salmon trapped at the Hatchery this season: 219 male, 139 female, and 176 grilse. The 103 females spawned produced 228,166 eggs, for an average of 2,215 eggs per female. The average fertility was 62%; and the fry dropout was 5%, leaving 57% survival to fingerling. These fingerling (approximately 130,000) will be retained for release as yearlings during the 1989-90 production year.

A total of 28,364 green eggs was received from Hollow Tree Creek. High fry dropout and outbreaks of Columnaris decreased the number to 8,000 (28%) survival to fingerling. These fingerlings are all fin clipped with an RV mark and are scheduled for release next year. Twenty thousand surplus Noyo River advanced fingerlings were received from Silverado Fisheries Base during January and released in Dry Creek as yearlings during May.

A total of 100,680 yearling (80,660 - CWT) was planted from the Hatchery (Table 3).

TABLE 3. Coho Salmon Plants, 1988-89

Date	Strain	Release site	Average size/lb	Number	Mark
12-05-88	Dry Creek	Dry Creek	8.0	40,000	AD-CWT 06-51-20 06-51-20
03-06-89	Dry Creek and Noyo River	Dry Creek	7.0	21,000	AD-CWT 06-51-20
03-07-89	Dry Creek and Noyo River	Dry Creek	7.0	19,660	AD-CWT 06-51-20
05-01-89	Noyo River	Dry Creek	8.8	20,020	
Total				100,680	

STEELEHAD TROUT PROGRAM
History of the 1988-89

The first steelhead entered the trap on November 22, 1988, and the last on May 6, 1989. A total of 891 fish was trapped: 453 male, 421 female, and 17 half-pounders. The 212 females spawned produced 1,178,899 eggs, an average of 5,560 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 as long as possible. A total of 203,500 eyed eggs was shipped to Mad River Hatchery for the Talmage Rearing Ponds. The surplus fingerlings were planted in Dry Creek and the Russian River (Table 4).

TABLE 4. Fingerling Steelhead Trout Plants, 1988-89

Date	Strain	Release site	Average size/lb	Number
07-14-88	Dry Creek	Russian River	188	49,820
07-14-88	Dry Creek	Dry Creek	544	24,480
04-27-89	Dry Creek	Dry Creek	1,500	123,000
05-04-89	Dry Creek	Dry Creek	1,500	33,000
05-04-89	Dry Creek	Dry Creek	2,000	80,000
05-12-89	Dry Creek	Dry Creek	2,000	182,000
06-01-89	Dry Creek	Dry Creek	375	12,000

Date	Strain	Release site	Average size/lb	Number
06-01-89	Dry Creek	Dry Creek	450	16,200
06-01-89	Dry Creek	Dry Creek	1,000	28,000
06-06-89	Dry Creek	Dry Creek	430	13,000
06-16-89	Dry Creek	Russian River	432	17,280
Total				578,780

A total of 233,979 steelhead yearlings was released into Dry Creek (Table 5).

TABLE 5. Yearling Steelhead Trout Plants, 1988-89

Date	Strain	Release site	Average size/lb	Number
01-04-89	Dry Creek	Dry Creek	4.0	22,100
01-05-89	Dry Creek	Dry Creek	4.0	20,400
02-01-89	Dry Creek	Dry Creek	3.8	14,250
02-02-89	Dry Creek	Dry Creek	3.8	15,770
02-02-89	Dry Creek	Dry Creek	4.0	11,500
02-03-89	Dry Creek	Dry Creek	4.0	12,000
02-03-89	Dry Creek	Dry Creek	4.0	8,000
02-07-89	Dry Creek	Dry Creek	4.0	11,800
03-06-89	Dry Creek	Dry Creek	4.0	10,200
04-06-89	Dry Creek	Dry Creek	3.9	22,327
04-07-89	Dry Creek	Dry Creek	3.9	27,982
05-01-89	Dry Creek	Dry Creek	4.0	17,400
05-03-89	Dry Creek	Dry Creek	4.5	19,350
05-03-89	Dry Creek	Dry Creek	3.8	20,900
Total				233,979

PUBLIC RELATIONS

All visitors to the Hatchery must enter through the Visitor Center where they are counted. During the 1988-89 season, 104,242 people visited the Hatchery (Table 6). This is a 10% decrease over the previous report period.

TABLE 6. Warm Springs Hatchery Monthly
Visitation Data, 1988-89

<u>Month</u>	<u>Number of visitors</u>
July	12,450
August	13,254
September	8,423
October	7,231
November	6,290
December	6,849
January	5,484
February	7,952
March	8,599
April	8,575
May	9,418
June	9,717
<hr/> Total	<hr/> 104,242

APPENDIX TABLE 1. Weekly Adult Salmon and Steelhead Trapping Data for Warm Springs Salmon and Steelhead Hatchery, 1988-89

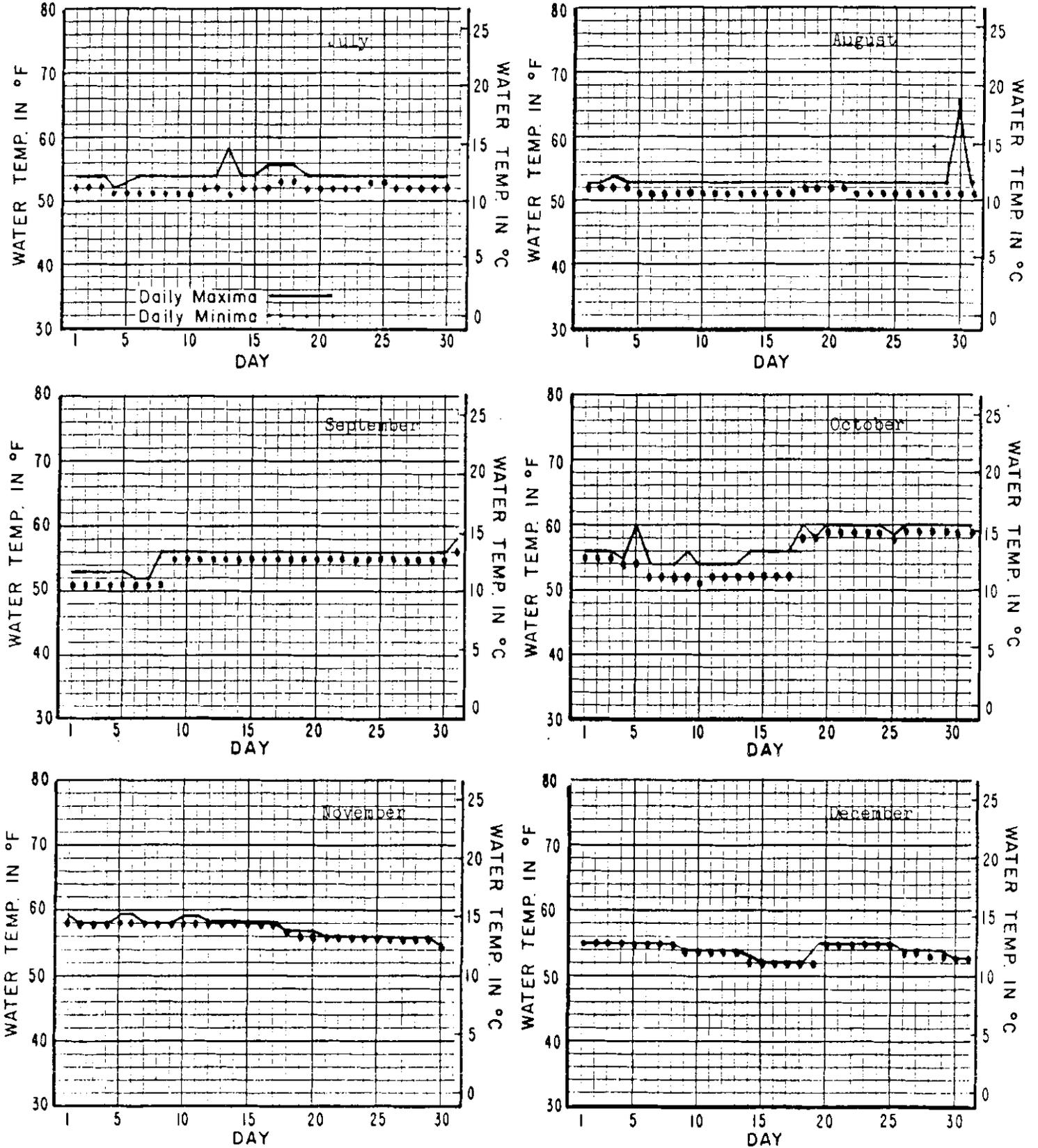
Week	<u>Chinook salmon</u>		<u>Coho salmon</u>		<u>Steelhead trout</u>	
	<u>Adult</u>	<u>Grilse</u>	<u>Adults</u>	<u>Grilse</u>	<u>Males</u>	<u>Females</u>
09/18/88 - 09/24/88	1					
09/25/88 - 10/01/88	5	1				
10/02/88 - 10/08/88	25					
10/09/88 - 10/15/88	119	1				
10/16/88 - 10/22/88	54	3				
10/23/88 - 10/29/88	2	1				
10/30/88 - 11/05/88	3	1				
11/06/88 - 11/12/88			1			
11/13/88 - 11/19/88				4		
11/20/88 - 11/26/88	1	10	70	47	4	
11/27/88 - 12/03/88	1	1	30	23	4	
12/04/88 - 12/10/88	1		15	4	2	
12/11/88 - 12/17/88			12	6	1	
12/18/88 - 12/24/88			84	41	11	3
12/25/88 - 12/31/88			68	26	23	6
01/01/89 - 01/07/89			18	8	6	
01/08/89 - 01/14/89		2	10		4	1
01/15/89 - 01/21/89			2	1	10	
01/22/89 - 01/28/89			4	2	22	7
01/29/89 - 02/04/89		1	6		26	4
02/05/89 - 02/11/89			5	5	18	8
02/12/89 - 02/18/89			28	6	72	18
02/19/89 - 02/25/89			2	3	86	54
02/26/89 - 03/04/89			2		80	123
03/05/89 - 03/11/89					56	143
03/12/89 - 03/18/89					17	24
03/19/89 - 03/25/89					13	17
03/26/89 - 04/01/89					9	8
04/02/89 - 04/08/89					2	5
04/09/89 - 04/15/89					2	
04/16/89 - 04/22/89						
04/23/89 - 04/29/89						
04/30/89 - 05/06/89					2	
Season Totals	212	21	358	176	470	421

APPENDIX TABLE 2. Summary of Fish Runs to Warm Springs Salmon and Steelhead Hatchery

<u>Year</u>	<u>Chinook salmon</u>			<u>Coho salmon</u>			<u>Steelhead trout</u>		
	<u>Males</u>	<u>Females</u>	<u>Grilse</u>	<u>Males</u>	<u>Females</u>	<u>Grilse</u>	<u>Males</u>	<u>Females</u>	<u>Half-pounds</u>
1980-81							148	185	
1981-82				2	2		124	235	
1982-83	1		1	515	277	194	322	242	
1983-84	2	1	1		1	8	1,039	923	
1984-85	7	1		32	44		369	468	
1985-86	65						812	484	4
1986-87	50	25	36	139	5	328	519	696	36
1987-88	176	4	124	164	155	257	660	375	10
1988-89	151	61	21	219	139	176	453	421	17

APPENDIX FIGURE 1. Daily Water Temperatures for Warm Springs Salmon and Steelhead Hatchery from July 1, 1988, Through June 30, 1989.

DAILY WATER TEMPERATURES BY MONTH



APPENDIX FIGURE 1. (Continued)

DAILY WATER TEMPERATURES BY MONTH

