

State of California  
The Resources Agency  
DEPARTMENT OF FISH AND GAME

ANNUAL REPORT  
MERCED RIVER FISH FACILITY, 1987-88

by

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Region 4, Inland Fisheries

Inland Fisheries  
Administrative Report No. 91-4

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ABSTRACT

This report summarizes the operation of the Merced River Fish Facility (MRFF) from July 1, 1987 through June 30, 1988. The facility was constructed to rehabilitate the fall-run chinook salmon, Oncorhynchus tshawytscha, in the Merced River.

A total of 254,842 chinook salmon yearlings (1986 brood year) and 363,572 chinook salmon smolts and pre-smolts (1987 brood year) was produced and released into the San Joaquin River system.

In the fall of 1987, a total of 958 adult chinook salmon (779 males, 179 females) entered the facility. Of the females, 156 were artificially spawned. They yielded 609,130 eggs in 16 spawnings. Surplus adult salmon (85 males, 14 females) were released to spawn in the channel this year, depositing an estimated 54,670 eggs. Based on data collected from previous spawning channel recoveries of 40% to outmigrants, this would be a production of 21,868 fingerlings (presmolts and smolts).

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## INTRODUCTION

The Merced River Fish Facility (MRFF) is located immediately downstream from Crocker-Huffman Dam on the Merced River (a tributary to the San Joaquin River) about 15 miles northeast of Merced. It is the terminal point for salmon spawning on the Merced River.

The facility was built by the Merced Irrigation District (MID) with Davis-Grunsky Act funds. Operation began in the fall of 1970.

The facility is comprised of a 4,372-foot spawning channel (the Reuben E. Schmidt Spawning Channel), three 275 x 30-ft rearing ponds and one effluent settling basin. A permanent hatchery building houses 18 double stacks of Heath type incubator trays, capable of incubating and hatching approximately 2,500,000 chinook salmon eggs. Eleven nursery tanks, six with the capacity for approximately 50,000 swim-up size chinook salmon each and five that will handle approximately 85,000 fingerlings each, are located near the hatchery building. The adult salmon trapping facility is located in the fish ladder of the spawning channel. The trapping facility consists of a fyke trap entrance, two basket hoists, anaesthetic tank, sorting table, and holding pens. The installation is operated by the California Department of Fish and Game with operating assistance and partial funding of maintenance costs provided by MID.

## PRODUCTION SUMMARY

The fish trap began operating on October 1, 1987. The first chinook salmon entered the trap on October 14. Trapping was terminated for the season on December 18. A total of 958 fish was counted (Appendix Table 1). The total production of chinook salmon for MRFF 1987-88 is summarized in Table 1. Numbers of returning chinook salmon since 1970 are shown in Appendix Table 2. The Merced Facility produced 254,837 chinook salmon yearlings (1986 BY) which were planted into the Merced River adjacent to the Merced River Fish Facility in the fall of 1987 (Table 2). Production of the 1987 BY fingerlings was 363,572 fish, with CWT applied to 358,290 of the released smolts (Table 3).

TABLE 1. Production Summary, Merced River Fish Facility, 1987-88

Species	Number trapped	Number females spawned	Eggs taken	Number Fingerlings planted	Number yearlings planted	Total pounds planted	On hand June 30, 1988
<u>Chinook</u>							
1986 BY							
MRFF					254,842	47,155	0
Chinook							
1987 BY							
MRFF	958	156	609,130	157,202		1,971	212,680
Chinook 1987 BY Stan R.				206,370		430	
Totals	958	156	609,130	363,572	254,842	49,556	212,680

TABLE 2. Yearling Merced River Strain Chinook Salmon (1986 BY) Planted from Merced River Fish Facility, 1987-88

Released	CWT code	Tagged	Untagged	Size/lb	Total released	Release location
10-19-87			38,080	7.0	38,080	MRFF Pond #2
10-19-87			56,000	5.6	56,000	MRFF Pond #1
10-19-87			56,862	5.2	56,862	MRFF Pond #1
10-19-87			51,450	5.0	51,450	MRFF Pond #3
10-19-87			<u>52,450</u>	5.0	<u>52,450</u>	MRFF Pond #3
TOTAL			254,842		254,842	

Table 3. 1987 BY Merced River Strain Chinook Salmon Fingerlings and Smolts Planted from Merced River Fish Facility, 1988

<u>Released</u>	<u>CWT code</u>	<u>Tagged</u>	<u>Untagged</u>	<u>Size/lb</u>	<u>Total released</u>	<u>Release location</u>
3-10-88			1,082	456	1,082	USFWS, Los Banos
3-23-88			800	800	800	USFWS, Los Banos
4-18-88			200	700	200	UC Davis
4-18-88			3,200	800	3,200	MRFF Spawning Channel
4-26-88	B6-11-05 B6-11-06	75,200		75.2	75,200	Knights Landing Stan R.
4-26-88	B6-11-03 B6-11-04	75,620		79.6	75,620	American Trails Camp, Stan R.
6-20-88			<u>1,100</u>	90.0	<u>1,100</u>	UC Davis
TOTAL		150,820	6,382		157,202	

#### HATCHERY OPERATION

All 1986 BY fish were reared on a diet of Oregon Moist Pellet and salmon formula dry pellets. A total of 35,500 lb of food produced 47,155 lb of fish yielding a conversion rate 0.75. Heavy losses from Proliferative Kidney Disease, and high water temperatures were major contributors to this food conversion ratio. All 1987 BY fish were reared on a diet of Oregon Moist Pellets. A total of 10,562 lb of food produced 7,364 lb of fish yielding a conversion rate of 1.43.

The facility had 1,113 visitors during this report period. Tours were provided for organized groups and schools. Mt. Bullion Youth Correction Center provided 2,820 man hours of grounds maintenance labor for the facility.

#### CHINOOK SALMON MAINTENANCE PROGRAM

##### History of the 1987 Run

Proliferative Kidney Disease (PKD) was a major problem this year with the chinook salmon yearlings. PKD is associated with the

warm water temperatures, 60°F and above, at Merced River Fish Facility. Primary treatment is for secondary diseases associated with PKD. Fish were treated by mixing Terramycin with the feed; this provided acceptable levels of fish losses.

The first adult chinook salmon entered the trap on October 14, 1987. Of the 958 adult salmon trapped, 179 were females and 779 were males. The number of grilse trapped was 467. Anadromous Fisheries Branch designated 24 inches or less in fork length for grilse identification during the 1987 season for the Merced and Tuolumne rivers.

A total of 609,130 eggs was taken from 156 females during 16 spawnings, for an average of 3,905 eggs. The average fertility of eggs was 73.2%. Spawning was terminated December 18, 1987. Surplus adult salmon, 14 females and 85 males, were released into the spawning channel this year. Based on average fecundity at MRFF, an estimated 54,670 eggs were deposited in the channel. Based on data collected from previous spawning channel recoveries of 40% to outmigrants, this would be a production of 21,868 pre-smolt fingerlings and smolts.

Approximately 1,000 pre-smolts and smolts were made available to A.A. Rich and Associates for stress survival studies in relation to the San Joaquin Chinook Salmon Study. Approximately 2,000 fry and pre-smolts chinook salmon were supplied to the United States Fish and Wildlife Service (USFWS) Field Research Station in Los Banos, California. These fish were used in an on-site selenium toxicity study of San Luis Drain ad Kesterson Reservoir for effects on early life stages of chinook salmon and striped bass. The on-site field verification tests are intended to complement and verify laboratory results presently in progress at the USFWS research station at Yankton, South Dakota.

Approximately 300 chinook salmon smolt were supplied for a feasibility study on the use of encapsulated transmitters for telemetry tracking of CWT smolts during outmigration through the South Delta.

#### Marked Chinook Salmon Return

Forty-six chinook salmon marked with an adipose clip, indicating the fish had been tagged with a coded wire tag, entered the facility during the 1987 season (Appendix Table 3). Heads were removed from all adipose fin-clipped fish for recovery of coded wire tags (see Appendix Table 4 for tag recovery results).

Planting 1986 Brood Year Chinook Salmon

A total of 254,842 chinook salmon yearling was produced and released into the Merced River from MRFF rearing ponds.

1987 Brood Year Stanislaus River Chinook Salmon Program

Approximately 235,000 post-emergent chinook salmon 1987 BY were fyke netted from the Stanislaus River for rearing at Merced River Fish Facility to provide additional fish for the South Delta Chinook Outmigrant Study. Pathology identified Infectious Hematoporetic Necrosis (IHN) in this group of fingerlings so management chose to release the group back into the lower Stanislaus River, to prevent the risk of further disease problems.

TABLE 4. 1987 BY Stanislaus River Chinook Salmon Fingerlings Planted from Merced River Fish Facility, 1988

<u>Released</u>	<u>CWT code</u>	<u>Tagged</u>	<u>Untagged</u>	<u>Size/lb</u>	<u>Total released</u>	<u>Release location</u>
3-17-88			36,200	362	36,200	American Trails Camp, Stan R.
3-17-88			39,820	362	39,820	"
3-17-88			66,550	609	66,550	"
3-17-88			<u>63,800</u>	580	<u>63,800</u>	"
TOTAL			206,370		206,370	

APPENDIX TABLE 1. Weekly Adult Chinook Salmon Trapping Data, for Merced River Fish Facility 1987/88

<u>Week</u>	<u>Adult</u>	<u>Grilse</u>	<u>Total</u>
Oct. 11-17	1	1	2
Oct. 18-24	5	13	18
Oct. 25-31	13	41	54
Nov. 1-7	54	67	121
Nov. 8-14	40	47	87
Nov. 15-21	216	160	376
Nov. 22-28	95	85	180
Nov. 29-Dec. 5	59	46	105
Dec. 6-12	6	6	12
Dec. 13-19	<u>2</u>	<u>1</u>	<u>3</u>
TOTALS	491	467	958



APPENDIX TABLE 2. Summary of Chinook Salmon Run to Merced River Fish Facility<sup>1/</sup>

<u>Fiscal Year</u>	<u>Males</u>	<u>Females</u>	<u>Grilse<sup>2/</sup></u>	<u>Total</u>
1970-71	59	40	*	99
1971-72	54	94	*	148
1972-73	14	51	*	65
1973-74	13	150	*	163
1974-75	24	400	*	424
1975-76	99	300	*	399
1976-77	86	260	*	346
1977-78	44	200	*	244
1978-79	14	45	*	61
1979-80	143	86	120	349
1980-81	43	106	8	157
1981-82	326	278	319	923
1982-83	90	67	32	189
1983-84	30	178	1,587	1,795
1984-85	713	858	167	1,738
1985-86	514	610	87	1,211
1986-87	271	217	162	650
1987-88	401	90	467	958

<sup>1/</sup> From 1970-71 through 1978-79, the annual run of adult female chinook salmon was estimated by using redd counts and carcass recoveries in the spawning channel. The number of male salmon shown are actual counts of recovered carcasses. Beginning in Fiscal Year 1979-80, an adult trap was operated at the facility throughout each spawning season and actual counts were made. There are no records of numbers of grilse until 1978.

<sup>2/</sup> The criteria for grilse was changed from 21 inches FL and less to 22 inches FL and less in 1983-84, to 23 inches FL and less in 1984-85, and to 24 inches FL and less in 1985-86.

APPENDIX TABLE 3. Fork Lengths (to nearest inch) of Marked Chinook Salmon Trapped at Merced River Fish Facility, 1987-88

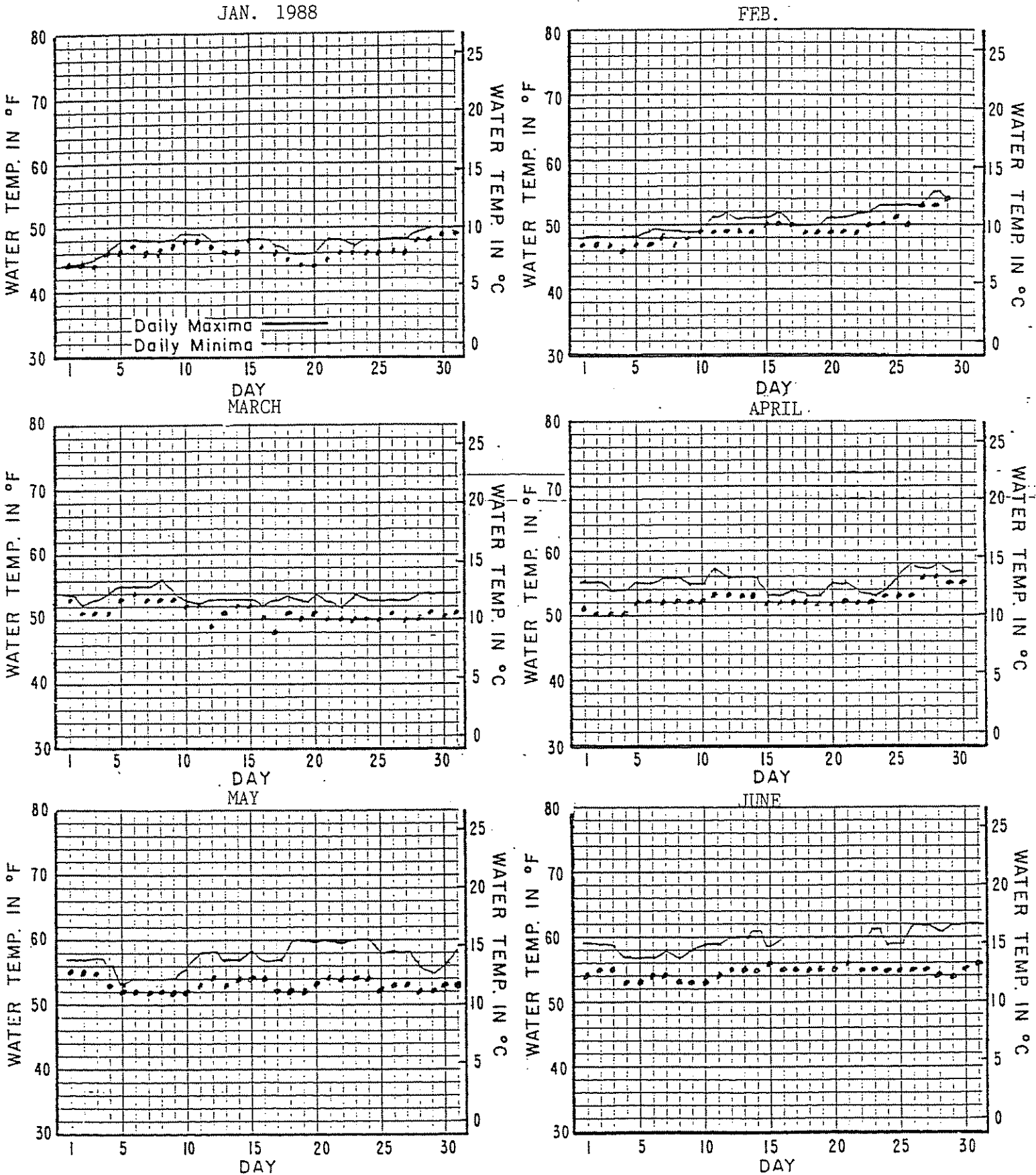
<u>Fork Length</u>	<u>Male</u>	<u>Female</u>
1		
17		
18		
19		
20		
21	4	
22	3	1
23	3	3
24	6	1
25	2	2
26	3	2
27	1	3
28	3	4
29		1
30		1
31		1
32		2
33		2
34		
35		
36		
37		
38		
39		
40		
Totals	<u>24</u>	<u>23</u>

APPENDIX TABLE 4. Chinook Salmon Coded-Wire Tag Recoveries,  
Merced River Fish Facility, 1987-88

<u>CWT code</u>	<u>Number recovered</u>	<u>Brood year</u>	<u>Hatchery</u>	<u>Release site</u>	<u>Release date</u>
06-46-38	2	83	Merced River	Galleo Ranch, Merced R.	10-19-84
06-46-43	2	84	Merced River	Benicia	10-15-85
06-46-44	13	84	Merced River	Galleo Ranch, Merced R.	10-17-85
06-46-47	2	85	Merced River	American Trails, Stan R.	4-29-86
06-46-58	8	85	Merced River	Dos Reis, San Joaquin R.	5-29-86
06-46-59	1	85	Merced River	Steward Rd., Old River	5-30-86
B6-11-01	1	85	Merced River	Dos Reis	5-29-86
B6-11-02	1	85	Merced River	San Joaquin R. Stewart Rd., Old River	5-30-86
10-00-00	<u>16</u>		NO TAG		
TOTAL	46				

APPENDIX FIGURE 1. Daily Water Temperatures for Merced River Fish Facility from July 1, 1987 through June 30, 1988

### DAILY WATER TEMPERATURES BY MONTH



APPENDIX FIGURE 1. (Continued)

### DAILY WATER TEMPERATURES BY MONTH

