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The Resources Agency
DEPARTMENT OF FISH AND GAME

ANNUAL REPORT
MERCED RIVER FISH FACILITY, 1988-89

by

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Region 4, Inland Fisheries

Inland Fisheries
Administrative Report No. 91-10

1991

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ABSTRACT

This report summarizes the operation of the Merced River Fish Facility (MRFF) from July 1, 1988 through June 30, 1989. The facility was constructed to rehabilitate the fall-run chinook salmon, Oncorhynchus tshawytscha, in the Merced River.

A total of 143,635 chinook salmon yearlings (1987 brood year) was produced and 1,456,303 chinook salmon smolts (1987 brood year) was produced and released into the San Joaquin River system.

In the fall of 1988, 457 adult chinook salmon (195 males, 262 females) entered the facility. Of the females, 204 were artificially spawned. They yielded 1,069,258 eggs in 14 spawnings. An additional egg take station was constructed at the Los Banos Wildlife Area on the San Luis Canal. A total of 1,176 chinook salmon (569 males, 607 females) was spawned. They yielded 2,148,245 eggs in 19 spawnings.

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Department of Fish and Game, 1416 Ninth Street, Sacramento,
CA 95814.

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 2,700,000 chinook salmon eggs. Twelve nursery tanks, 2 with the capacity of starting feed on approximately 100,000 swim-up size chinook salmon each and 10 that will handle 90,000 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 Merced River Fish Facility trap began operation on October 24, 1988. The first chinook salmon entered the trap on October 25, 1988. Trapping was terminated for the season on December 16, 1988. A total of 457 fish was counted (Appendix Table 1).

The Los Banos Wildlife Area salmon trap began operation on October 27, 1988. Trapping was terminated for the season on December 12, 1988. A total of 1,176 fish was counted (Appendix Table 2). The combined production of chinook salmon for MRFF is summarized in Table 1. Number of returning chinook salmon since 1970 are shown in Appendix Table 3. The Merced Facility produced 143,635 chinook yearlings (1987 BY) which were planted into the Merced River at Fisherman's Bend in the fall of 1987 (Table 2). Production of 1988 BY fingerlings was 588,545 chinook salmon smolts which were planted into the Old River and the Tuolumne, and San Joaquin rivers in the spring of 1989, (Table 3). Coded wire tags (CWT) were applied to 479,512 of the released 1988 BY smolts (Table 2).

Table 1. Production Summary, Merced River Fish Facility, 1988-89

| Species | Number Trapped | Number Females Spawned | Eggs Taken | Number Fingerlings Planted | Number Yearlings Planted | Pounds Planted | On Hand June 30 1989 |
|----------------------------|----------------|------------------------|------------|----------------------------|--------------------------|----------------|----------------------|
| Chinook 1987 BY MRFF | | | | | 143,635 | 15,660 | 330,000 |
| Chinook 1988 BY MRFF | 457 | 206 | 1,069,258 | | | | |
| | | | | 588,603 | | 7,128 | |
| Chinook 1988 BY LBWA | 1161 | 383 | 2,148,245 | | | | |
| Chinook 1988 BY TRFF | | | | 867,700 | | 14,500 | |
| TOTAL | 1618 | 589 | 3,217,503 | 1,456,303 | 143,635 | 37,288 | 330,000 |

Table 2. Yearling Merced River Strain Chinook Salmon (1987 BY)
Planted From Merced River Fish Facility, 1988-89

| <u>Date released</u> | <u>Size/lb</u> | <u>Total released</u> | <u>Location</u> |
|----------------------|----------------|-----------------------|-----------------|
| 10-17-88 | 9.1 | 12,740 | Fisherman Bend |
| | 9.3 | 8,360 | Merced River |
| | 9.3 | 10,224 | |
| | 9.1 | 8,186 | " " |
| 10-18-88 | 9.3 | 20,915 | " " |
| | 9.3 | 13,005 | " " |
| | 9.1 | 8,185 | " " |
| 10-19-88 | 9.1 | 22,270 | " " |
| | 9.1 | 18,180 | " " |
| 10-20-88 | 9.1 | 20,445 | " " |
| 10-24-88 | 9.1 | 1,000 | MRFF ponds to |
| | | | Merced River |
| TOTAL | | 143,510 | |

Table 3. 1988 BY Merced River Strain Chinook Salmon Smolts Planted From Merced River Fish Facility, 1989.

| Date released | CWT code | Tagged | Untagged | Size/lb. | Total released | Location |
|--|--|---------|----------|----------|----------------|-----------------------------------|
| 4-19-89 | B6-01-01 B6-14-11 | 79,809 | | 71.9 | 79,804 | American Trails Stan. R. |
| 4-20-89 | B6-14-09 B6-14-10 | 107,160 | | 76.0 | 107,150 | Knight's Ferry Stan. R. |
| 4-21-89 | 06-01-11-01-01 06-01-11-01-02 06-01-11-01-03 | 79,980 | 70,425 | 111.0 | 150,402 | Hills Ferry Sports Club Merced R. |
| 5-2-89 | 06-01-11-01-07 06-01-11-01-08 06-01-11-01-13 | 79,950 | | 75.0 | 79,940 | Dos Reis Park S.J.R. |
| 5-3-89 | 06-01-11-01-04 06-01-11-01-05 06-01-11-01-06 | 81,106 | | 75.8 | 81,096 | Down Stream From S.J.R Old River. |
| 5-3-89 | B6-14-12 | 51,507 | 21,930 | 74.8 | 73,437 | American Trails Stan. R |
| 6-16-89 | | | 2,890 | | 2,890 | U C Davis Pathology Lab |
| SUB TOTAL | | 479,512 | 95,245 | | 574,719 | |
| --- Net Efficiency And Vulnerability Test--- | | | | | | |
| 4-20-89 | Blue Dye Dorsal | 9,996 | | 119.0 | 9,996 | Dos Reis Rch Tuol.R. |
| 5-2-89 | Red Dye Caudal | 1,300 | | 113.0 | 1,300 | Mossdale Co. Park Ramp |
| 5-4-89 | Blue Dye Anal | 2,550 | | 113.0 | 2,550 | Mossdale Co. Park Ramp |
| SUB TOTAL | | 13,846 | | | 13,846 | |
| TOTAL | | 493,358 | 95,245 | | 588,565 | |

HATCHERY OPERATION

All BY 1987 fish were reared on a diet of Oregon Moist Pellet and salmon formula dry pellets. A total of 17,580 lb of food produced 15,660 lb of fish, yielding a conversion rate 1.12. Heavy losses from Proliferative Kidney Disease (PKD), a food ration reduced by half, and high water temperatures were major contributors to this food conversion ratio. All BY 1988 fish were reared on a diet of Oregon Moist Pellets. A total of 25,600 lb of food produced 18,800 lb of fish, yielding a conversion rate of 1.36.

The facility had 917 visitors in fiscal year 1988-89. Tours were provided for organized groups and schools.

CHINOOK SALMON MAINTENANCE PROGRAM

History of the 1988 Run

The first chinook salmon entered the MRFF trap on October 25, 1988. Of the 457 salmon trapped, 255 were females, 164 males, and 38 grilse. A total of 1,069,258 eggs was taken from 206 females during 14 spawnings, for an average of 5,241 eggs/female. The average fertility of eggs was 66%. Spawning was terminated December 16, 1988.

The Los Banos Wildlife Area salmon trap began operation on October 27, 1988. The first salmon entered the trap on October 28, 1988. The number of fish collected was 1,161: 603 females, 503 males, and 70 grilse (Appendix Table 2). A total of 2,148,245 eggs was taken from 383 females during 19 spawnings, for an average fecundity of 5,580 eggs. The average fertility of eggs was 63%. Spawning was terminated December 14, 1988.

Disease

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. MRFF water temperatures ranged from a low of 56°F to a high of 70°F during the yearling program (Appendix Figure 1). Treatments were primarily for secondary diseases. Fish were alternately treated by mixing Terramycin and Romet B with the feed; this provided the best levels of control. All minor infections of bacteria and external parasites were controlled with standard treatments.

Marked Chinook Salmon Recoveries

Thirty-one chinook salmon, marked with an adipose fin-clip which indicated the fish had been tagged with a coded wire tag, entered the MRFF trap during the 1988 season (Appendix Table 4). One hundred sixty adipose fin-clipped chinook salmon were trapped at the Los Banos Wildlife Area trap during the 1988 season (Appendix Table 4). Heads were removed from all adipose fin-clipped fish for recovery of coded-wire tags (see Appendix Tables 5 and 6 for tag recovery results).

LOS BANOS WILDLIFE AREA CHINOOK SALMON TRAP PROGRAM 1988

Drought conditions resulted in reduced flows and warmer water down the Merced River. Chinook salmon migrating back to the Merced River were attracted by the larger flows from west side irrigation drain waters down the San Joaquin River. A ladder and trap were installed on an existing weir this year adjacent to the Los Banos Wildlife Area, on the Grasslands Irrigation District's San Luis Canal. Electrical cables were suspended across the mouth of Salt and Mud sloughs to divert salmon migration into the San Luis Canal and to the trap facility. Chinook salmon trapped or rescued (603 females, 503 males, and 70 grilse) at the facility were transported to MRFF for egg collection. A total of 2,148,245 eggs from 383 females was taken (Table 1). On site spawning was conducted on November 15 and 16 to correspond with the California Wildlands Program narrative at the Los Banos Wildlife Area. A final rescue and spawning was conducted on December 12, 1988. Initial funding for this on-going program was provided by the California Commercial Salmon Trollers Committee.

Tuolumne River Rearing Facility Maintenance Program History of the 1988 by Chinook Salmon Run

Under an agreement with the Turlock Irrigation District and the Modesto Irrigation District, the Department of Fish and Game was able to utilize a section of the abandoned (MID) irrigation canal and divert a portion of annual flow release for fish production. The two primary objectives were:

1. Provide additional rearing area for Merced River Fish Facility fish.
2. Obtain background data for a proposed anadromous hatchery on the Tuolumne River.

Approximately 1,200 feet of the upper channel was utilized. Water control and pond screen structures were constructed, providing a potential rearing area for 1.5 million smolts. A total of 926,000 excess salmon fingerlings from Merced River Fish Facility was transferred to the new rearing ponds, named the Tuolumne River Rearing Facility, in March 1989.

On June 5, 1989, 867,700 smolts (14,500 lb) were released at Berkeley Marina (Table 4). Water temperature during the period of production ranged from 48 to 53°F. The Tuolumne River water temperature below the rearing facility ranged between 60 and 65°F during this time period. Based on a high river water temperature and anticipated reduced river release below La Grange Dam, the fish were trucked to the Berkeley Marina which should result in a much higher survival rate. The BY 1988 chinook salmon at the Tuolumne River Rearing Facility were reared on a diet of Oregon Moist Pellets. A total of 17,250 lb of food produced 14,500 lb of fish, yielding a conversion rate of 1.19.

Disease Information

No disease problems were experienced during the production period at Tuolumne River Rearing Facility. Studies were carried out during and after production to monitor for the occurrence and course of Proliferative Kidney Disease (PKD) at this facility. Additional studies were simultaneously carried on in the Tuolumne River below the facility for PKD. No PKD organisms were found at either site through this report period.

Table 4. 1988 Merced River Strain Chinook Salmon Smolts Planted From Tuolumne River Fish Facility

| Released | CWT | Tagged | Untagged | Size/lb | Total released | Location |
|----------|------|--------|----------|---------|----------------|-----------------|
| 6-5-89 | None | 0 | 183,600 | 54.0 | 183,600 | Berkeley Marina |
| 6-6-89 | None | 0 | 240,000 | 60.0 | 240,000 | Berkeley Marina |
| 6-7-89 | None | 0 | 245,700 | 63.0 | 245,700 | Berkeley Marina |
| 6-8-89 | None | 0 | 198,400 | 62.0 | 198,400 | Berkeley Marina |
| TOTAL | | | 867,700 | | 867,700 | |

Appendix Table 1. Weekly Adult Chinook Salmon Trapping Data For Merced River Fish Facility, 1988-89.

| <u>Week</u> | <u>Adults</u> | <u>Grilse</u> | <u>Total</u> |
|---------------|---------------|---------------|--------------|
| Oct 23-29 | 3 | 0 | 3 |
| Oct 30- Nov 5 | 26 | 5 | 31 |
| Nov 6-12 | 63 | 4 | 67 |
| Nov 13-19 | 134 | 7 | 141 |
| Nov 20-26 | 102 | 15 | 117 |
| Nov 27-Dec 3 | 72 | 5 | 77 |
| Dec 4 -10 | 9 | 2 | 11 |
| Dec 11-17 | 6 | 4 | 10 |
| <hr/> TOTAL | 415 | 42 | 457 |

Appendix Table 2. Weekly Adult Chinook Salmon Trapping Data For Los Banos Wildlife Area Trap, 1988-89.

| <u>Week</u> | <u>Adults</u> | <u>Grilse</u> | <u>Total</u> |
|---------------|---------------|---------------|--------------|
| Oct 23-29 | 245* | 0 | 245* |
| Oct 30- Nov 5 | 150 | 8 | 158 |
| Nov 6-12 | 167 | 18 | 185 |
| Nov 13-19 | 163 | 15 | 178 |
| Nov 20-26 | 183 | 17 | 200 |
| Nov 27- Dec 3 | 116 | 11 | 127 |
| Dec 4 -10 | 2 | 1 | 3 |
| Dec 11-17 | 80* | 0 | 80* |
| TOTALS | 1,106* | 70 | 1,176* |

* 294 adults were rescued from the San Luis bypass at Los Banos Wildlife Area and included in the weekly totals.

Appendix Table 3. Summary Of Chinook Salmon Runs To Merced River Fish Facility 1/

| <u>Fiscal Year</u> | <u>Males</u> | <u>Females</u> | <u>Grilse 2/</u> | <u>Total</u> |
|--------------------|--------------|----------------|------------------|--------------|
| 1970-71 | 59 | 40 | * | 99 |
| 1971-72 | 54 | 94 | * | 143 |
| 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 |
| 1988-89 | 165 | 250 | 42 | 457 |

1/ 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 has been operated at the facility throughout each spawning season and actual counts are made. There are no records of number of grilse prior to 1978.

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

Appendix Table 4. Fork Length (to Nearest Inch) Of Marked Chinook Salmon Trapped at Merced River Fish Facility and Los Banos Wildlife Area Traps, 1988-89.

| Fork Length | Males | | Females | |
|-------------|-------|-----------|---------|-----------|
| | MRFF | Los Banos | MRFF | Los Banos |
| 20 | | | | 4 |
| 21 | 1 | | | |
| 22 | 2 | 2 | 1 | |
| 23 | 1 | 2 | | |
| 24 | | 7 | 3 | 2 |
| 25 | 1 | 4 | 1 | 6 |
| 26 | 1 | 3 | | 8 |
| 27 | 1 | 1 | 2 | 13 |
| 28 | | 4 | 3 | 8 |
| 29 | 1 | 4 | 1 | 13 |
| 30 | 1 | 9 | 3 | 13 |
| 31 | | 9 | 3 | 11 |
| 32 | 1 | 6 | 1 | 8 |
| 33 | 1 | 3 | | 4 |
| 34 | | 5 | 1 | |
| 35 | | 6 | | |
| 36 | 1 | 1 | | |
| 37 | | | | |
| 38 | | 1 | | |
| 39 | | | | 1 |
| TOTAL | 12 | 67 | 19 | 93 |

Appendix Table 5. Chinook Salmon Coded Wire Tag Recoveries, Merced River Fish Facility, 1988-89

| CWT Code | Number recovered | Brood year | Hatchery | Release site | Release Date |
|----------|------------------|------------|-----------|-----------------------|--------------|
| 06-46-46 | 1 | 85 | Merced R. | Amer Trail Stan. R. | 4-29-86 |
| 06-46-47 | 1 | 85 | Merced R. | Amer Trail Stan. R. | 4-29-86 |
| 06-46-54 | 1 | 85 | Merced R. | La Grange Tuol. R. | 4-14-86 |
| 06-46-55 | 1 | 85 | Merced R. | La Grange Tuol. R. | 4-14-86 |
| 06-46-56 | 1 | 85 | Merced R. | Mapes Ranch Tuol. R. | 4-14-86 |
| 06-46-57 | 2 | 85 | Merced R. | Mapes Ranch Tuol. R. | 4-14-86 |
| 06-46-58 | 1 | 85 | Merced R. | Dos Reis S.J.R. | 5-29-86 |
| 06-45-03 | 1 | 86 | Merced R. | Mouth of Stan. R. | 4-27-87 |
| 06-45-04 | 2 | 86 | Merced R. | Mouth of Stan. R. | 4-27-87 |
| 06-45-05 | 1 | 86 | Merced R. | Knight's Fry Stan. R. | 4-27-87 |
| 06-45-07 | 2 | 86 | Merced R. | Dos Reis S.J.R. | 4-27-87 |
| 06-45-08 | 1 | 86 | Merced R. | Dos Reis S.J.R. | 4-27-87 |
| B6-11-01 | 4 | 85 | Merced R. | Dos Reis S.J.R. | 5-29-86 |
| B6-11-02 | 4 | 85 | Merced R. | Stewart Rd Old R. | 5-30-86 |
| 06-54-06 | 1 | 85 | Nimbus | Benicia | |
| 10-00-00 | <u>7</u> | No Tag | | | |
| TOTAL | 31 | | | | |

Appendix Table 6. Chinook Salmon Coded Wire Tag Recoveries,
Los Banos Wildlife Area Salmon Trap, 1988-89

| CWT code | Number recovered | Brood year | Hatchery | Release site | Release date |
|----------|------------------|------------|-----------|------------------------|--------------|
| 06-46-42 | 1 | 84 | MERCED R. | Above Old R. Mosssdale | 10-16-85 |
| 06-46-45 | 2 | 85 | Merced R. | Amer. Tr. Stan. R. | 4-29-86 |
| 06-46-46 | 6 | 85 | Merced R. | Amer. Tr. Stan. R. | 4-29-86 |
| 06-46-47 | 4 | 85 | Merced R. | Amer. Tr. Stan. R. | 4-29-86 |
| 06-46-52 | 1 | 85 | Merced R. | Amer. Tr. Stan. R. | 4-29-86 |
| 06-46-54 | 3 | 85 | Merced R. | La Grange Tuol. R. | 4-14-86 |
| 06-46-55 | 1 | 85 | Merced R. | La Grange Tuol. R. | 4-14-86 |
| 06-46-56 | 5 | 85 | Merced R. | Mapes Ranch Tuol. R. | 4-14-86 |
| 06-46-57 | 6 | 85 | Merced R. | Mapes Ranch Tuol. R. | 4-14-86 |
| 06-46-58 | 29 | 85 | Merced R. | Dos Reis S.J.R. | 5-29-86 |
| 06-46-59 | 8 | 85 | Merced R. | Stewart Rd. Old R. | 5-30-86 |
| 06-46-62 | 1 | 86 | Merced R. | La Grange Tuol. R. | 4-16-87 |
| 06-46-63 | 1 | 86 | Merced R. | Riverdale Prk Tuol. R. | 4-16-87 |
| 06-45-02 | 1 | 86 | Merced R. | Riverdale Prk Tuol. R. | 4-16-87 |
| 06-45-03 | 1 | 86 | Merced R. | Amer. Tr. Stan. R. | 4-27-87 |
| 06-45-04 | 2 | 86 | Merced R. | Amer. Tr. Stan. R. | 4-27-87 |
| 06-45-05 | 3 | 86 | Merced R. | Knight's Fry Stan. R. | 4-27-87 |
| 06-45-06 | 2 | 86 | Merced R. | Dos Reis S.J.R. | 4-27-87 |
| 06-45-07 | 7 | 86 | Merced R. | Dos Reis S.J.R. | 4-27-87 |
| 06-45-08 | 6 | 86 | Merced R. | Dos Reis S.J.R. | 4-27-87 |
| B6-11-01 | 28 | 85 | Merced R. | Dos Reis S.J.R. | 5-29-86 |
| B6-11-02 | 5 | 85 | Merced R. | Stewart Rd. Old R. | 5-30-86 |
| 06-54-05 | 2 | 85 | Nimbus | Berkeley | |

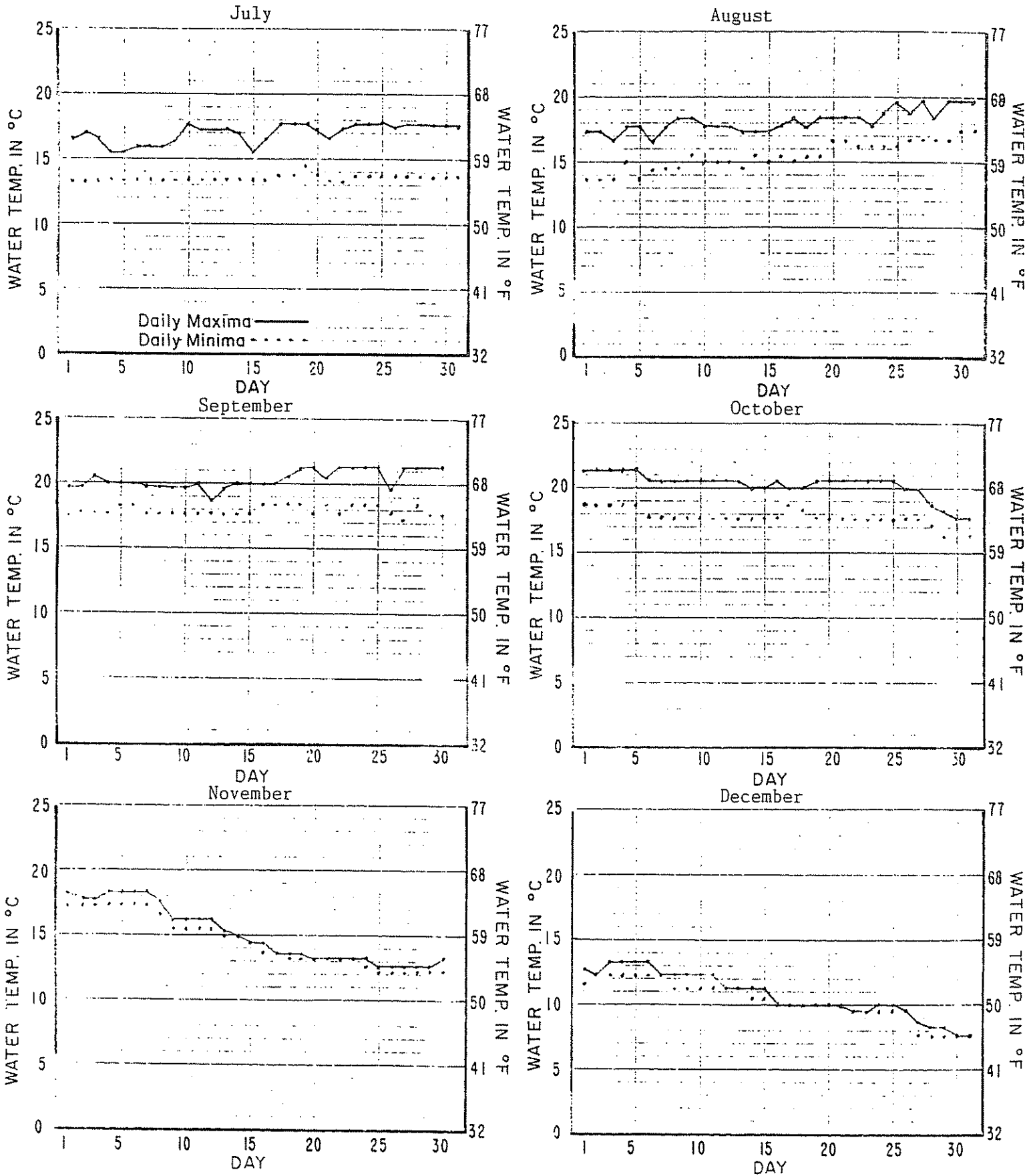
Appendix Table 6 Continued

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| | | | | |
|----------|-----|----|----------------|----------|
| 06-54-06 | 4 | 85 | Nimbus | Benicia |
| 06-54-07 | 1 | 86 | Nimbus | Berkeley |
| 06-62-47 | 2 | | | |
| 10-00-00 | 25 | | No Tag | |
| 40-00-00 | 3 | | CWT unreadable | |
| <hr/> | | | | |
| TOTAL | 160 | | | |

Appendix Figure 1. Daily Water Temperature for Merced River Fish Facility from July 1, 1988 through June 30, 1989

DAILY WATER TEMPERATURES BY MONTH



DAILY WATER TEMPERATURES BY MONTH

