

State of California
THE RESOURCES AGENCY
Department of Fish and Game

MERCED RIVER FISH FACILITY ANNUAL REPORT
1972-73

by

Chester O. Chase
Region 4 - Anadromous Fisheries

Anadromous Fisheries Branch
Administrative Report No. 74-9

1974

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ABSTRACT

This report describes the operation of the Merced River Fish Facility from July 1, 1972 through June 30, 1973. The facility consists of a spawning channel and two rearing ponds.

Fifty-one 1972 brood year fall-run female king salmon (Oncorhynchus tshawytscha) spawned in the channel, and an estimated 256,000 eggs were deposited. An estimated 232,000 1971 brood year yearling king salmon were produced and released into the Merced River.

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INTRODUCTION

The Merced River Fish Facility is located immediately downstream from Crocker-Huffman Dam on the Merced River (a tributary to the San Joaquin River) about 24 km (15 miles) northeast of Merced (Figure 1). It is the terminal point for salmon migrating up the Merced River.

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

The facility is comprised of a 1,333 m- (4,372 ft-) long spawning channel (The Reuben E. Schmidt Spawning Channel) and two 84 x 9 m (275 x 30 ft) rearing ponds (Figure 2). Each rearing pond has the capacity for approximately 150,000 king salmon yearlings.

The installation is now operated by the California Department of Fish and Game with operating assistance and maintenance costs provided by the MID. Prior to August 1972, it was operated by MID personnel plus California Department of Fish and Game Seasonal Aid personnel.

Production Summary

Production for the three years of operation is summarized as follows:

| Season | Estimated spawning females | Female prespawning mortality | Estimated egg deposition | Number of channel outmigrants | Number yearlings released | Fingerlings on hand June 30 |
|---------|----------------------------|------------------------------|--------------------------|-------------------------------|---------------------------|-----------------------------|
| 1970-71 | 40 | 2 | 152,722 | 59,127 | 0 | 100,000* |
| 1971-72 | 94 | 0 | 476,623 | No estimate | 86,000* | 319,000* |
| 1972-73 | 51 | 0 | 256,326 | No estimate | 232,000** | 325,000* |

* Stanislaus River strain fish.

** Comprised of 202,000 Stanislaus River strain fish from the rearing ponds, plus 30,000 Merced River fish which had been held in the spawning channel.

SPAWNING CHANNEL PROGRAM

1971-72 Season

February 7, 1972 a cobble dam was built across the lower end of the spawning channel to retain 1971 brood year fingerlings that had not migrated. These fish were held in the channel through the summer and released as yearlings in the fall of 1972. These fish were not fed. We estimated that there were about 30,000.

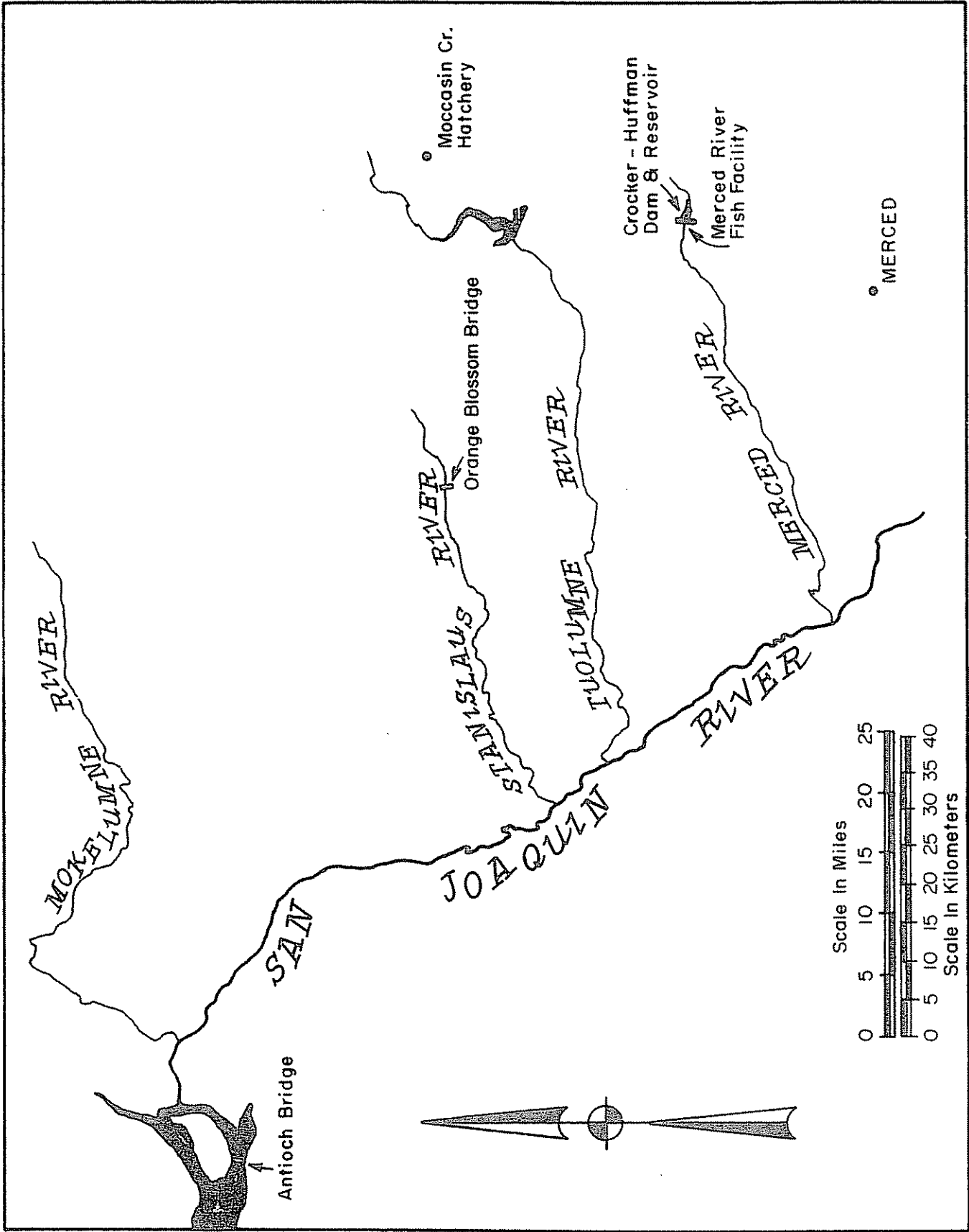


Figure 1. Map showing location of Merced River Fish Facility.

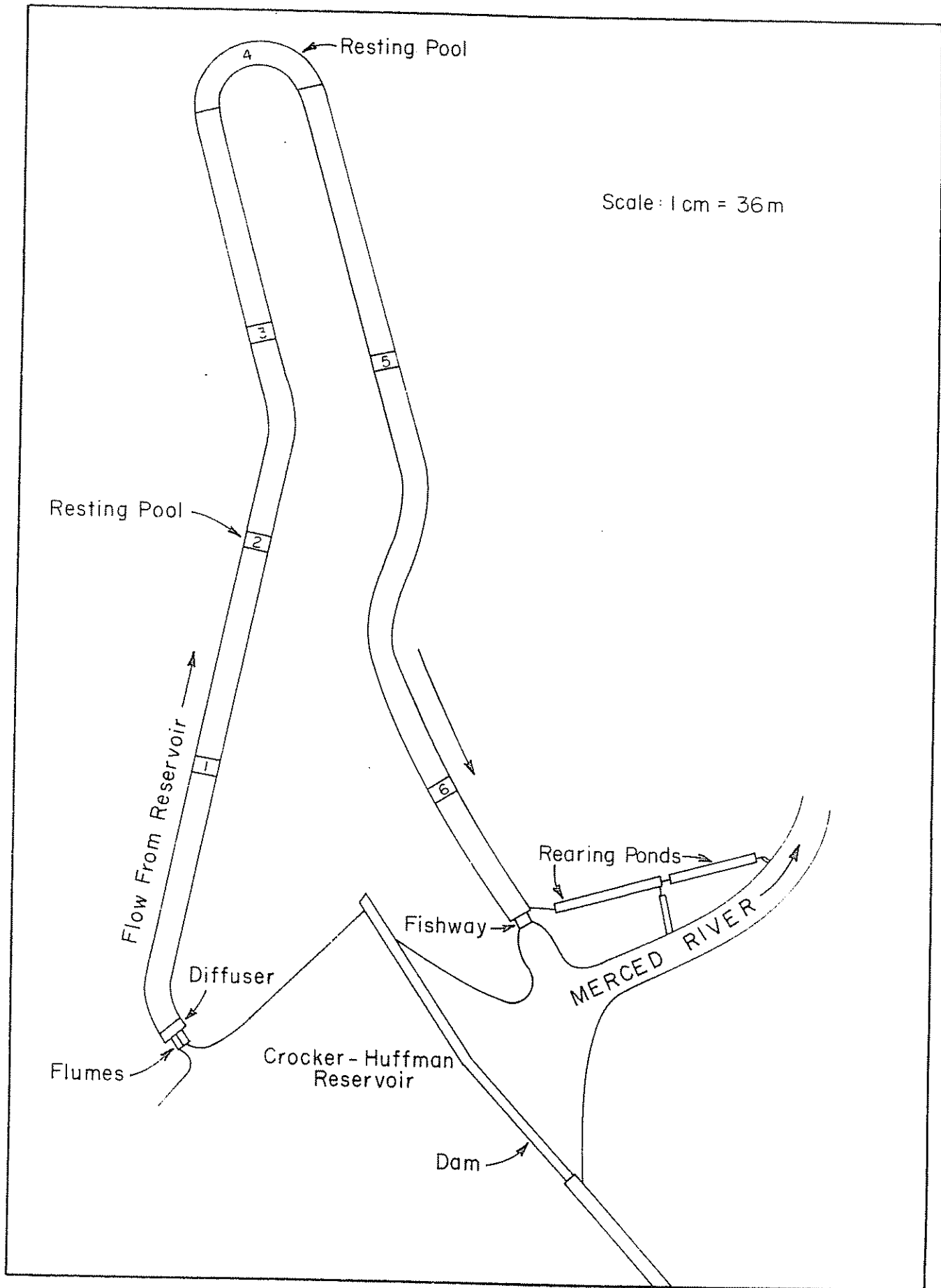


Figure 2. Merced River Fish Facility.

1972-73 Season

On October 10, 1972, the cobble dam was removed and the flow in the channel was increased from 2.0 m³/sec (70 cfs) to 4.6 m³/sec (165 cfs). This allowed the 1971 brood year yearlings to migrate from the channel, and it allowed 1972 fall-run adults access to the channel.

All adult salmon received in the channel entered voluntarily. No attempt was made to trap and count the fish as they entered. The number of spawners using the channel was estimated by recovering carcasses and counting redds. A higher percentage of fish die prior to spawning if the fish are handled and sorted; that is the reason for following the above procedure.

The first salmon was seen entering the channel October 20, and the first redd was started October 31. As expected, most of the salmon entered the channel in November. Spawning peaked in early November. The last fish had completed spawning by January 8, 1973.

On January 18, 1973, the flow in the channel was reduced to 1.1 m³/sec (40 cfs) where it was held until October 18, 1973 when outmigration was completed.

A daily record was kept of redd construction in the channel. Markers were used to locate each redd as it was being made. This information is being used to determine how successful gravel manipulation has been in places where salmon did not spawn in the past. For example, after the channel was completed in 1970, some of the spawning gravel was left with grooves running longitudinally to the channel. It is believed this reduced the percolation of water through the gravel and discouraged spawners from using these areas. Just before the 1971 spawning season started, the gravel was raked perpendicular to the length of the channel from pool #3 upstream to the headworks. The manipulation appeared to be successful, as several females spawned in parts of the improved section where none had spawned the previous season.

This season, most spawning took place in the following areas:

- a. Between 200 and 260 ft down channel from the diffuser.
- b. Between 300 and 330 ft down channel from the diffuser.
- c. Between 290 and 320 ft down channel from resting pool #1.
- d. Between 355 and 390 ft down channel from resting pool #1.
- e. Between 120 and 140 ft down channel from resting pool #3.
- f. Between 365 and 405 ft down channel from resting pool #3.
- g. Downstream edge of resting pool #6.
- h. Between 85 and 100 ft down channel from resting pool #6.

Carcass Recovery and Redd Count

The channel was inspected for carcasses 5 days each week. As many carcasses as possible were recovered by walking the full length of the channel. Thirty-six carcasses were recovered from the channel, of which 22 were females and 14 were males. All females recovered were fully spawned.

Fifty-one individual redds were counted. The fact that only 22 female carcasses were observed was probably due to some carcasses being removed by predators or the spent females drifting out of the channel at night or on weekends when no observations were made.

Estimated Egg Deposition

We have no information on the fecundity of Merced River salmon. The Stanislaus River is in the same system (San Joaquin River drainage) as the Merced, and we have found that female fish in the Stanislaus average 5,020 eggs (Moccasin Creek Hatchery files). Therefore, we multiplied this figure by the estimated number of females that spawned in the channel (51) and derived an estimated potential deposition of 256,020 eggs.

REARING POND PROGRAM

1971 Brood Year

Fish for the rearing pond program came from wild Stanislaus River stock. A portable trap was installed in the Stanislaus River near Orange Blossom Bridge in the fall of 1971. Adult king salmon migrants were trapped and spawned at the river. The fertilized eggs were taken to and hatched at Moccasin Creek Hatchery. The rearing ponds were stocked with the resulting fry in March 1972 after they commenced feeding. While in the ponds, they were fed both mechanically and by hand. As a result, the fish were uniform in size. A total of 202,000 1971 brood year yearlings were released into the Merced River October 26, 1972, at an estimated size of 47 g (9.7 fish/lb).

1972 Brood Year

During March 1973, 360,000 fry were brought from Moccasin Creek Hatchery and placed in the ponds. These fish will be released as yearlings in fall 1973.

AGE ANALYSIS

During the 1972-73 spawning season, scale samples were taken from adult king salmon both in the spawning channel and in the Merced River. The scales were examined for age and to determine if the first annulus was formed in fresh or salt water. Forty-one percent of the samples examined from river fish, and 42% of those from spawning channel fish had freshwater yearling annuli (see following table).

| | Age | | | | Combined |
|-----------------------------------|-----|----|----|-----|----------|
| | 2 | 3 | 4 | 5 | |
| Number spawning channel scales | 5 | 11 | 9 | 2 | 27 |
| Number freshwater yearling annuli | 2 | 3 | 4 | 2 | 11 |
| % freshwater yearling annuli | 40 | 27 | 44 | 100 | 41% |
| Number river scales | 9 | 18 | 9 | 0 | 36 |
| Number freshwater yearling annuli | 3 | 8 | 4 | 0 | 15 |
| % freshwater yearling annuli | 33 | 44 | 44 | 0 | 42% |
| Total scales | 14 | 29 | 18 | 2 | 63 |
| Number freshwater yearling annuli | 5 | 11 | 8 | 2 | 26 |
| % freshwater yearling annuli | 36 | 38 | 44 | 100 | 41% |

WATER TEMPERATURE

Water temperature in the channel was recorded with a 30-day recording thermometer located at the head of the channel. It was checked frequently with a hand thermometer to be certain the recorder was accurate.

Water temperatures were near optimum for salmon production again this year. For the months of July 1972 through June 1973 temperatures ranged from 8.3 to 17.2 C (47-63 F). Monthly water temperature ranges were as follows:

| Water temperatures (C)* Merced River King Salmon Facilities, 1972-73 Season | | | | | |
|---|------|------|---------------|------|------|
| Month | Max. | Min. | Month | Max. | Min. |
| July 1972 | 15.6 | 11.7 | January 1973 | 10.6 | 8.3 |
| August 1972 | 16.7 | 13.3 | February 1973 | 11.7 | 8.9 |
| September 1972 | 16.7 | 13.3 | March 1973 | 12.8 | 11.1 |
| October 1972 | 17.2 | 14.5 | April 1973 | 13.3 | 10.6 |
| November 1972 | 14.5 | 11.7 | May 1973 | 13.3 | 10.0 |
| December 1972 | 11.1 | 8.3 | June 1973 | 13.9 | 10.0 |

* Temperatures measured in F and later converted to C.