

State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

ANNUAL REPORT
MERCED RIVER FISH FACILITY, 1989-90

by

Michael D. Cozart
Region 4, Inland Fisheries

Inland Fisheries
Administrative Report No. 92-3

1992

ANNUAL REPORT
MERCED RIVER FISH FACILITY, 1989-90^{1/}

by

Michael D. Cozart
Region 4, Inland Fisheries

ABSTRACT

This report summarizes the operation of the Merced River Fish Facility (MRFF) from July 1, 1989 through June 30, 1990. The facility was constructed to rehabilitate the fall-run chinook salmon, Oncorhynchus tshawytscha, in the Merced River.

A total of 179,182 chinook salmon yearlings (1988 brood year) was produced and 185,211 chinook salmon smolts (1989 brood year) was produced and released into the San Joaquin River system.

In the fall of 1989, 82 adult chinook salmon (47 males, 35 females) entered the facility. Of the females, 32 were artificially spawned. They yielded 172,053 eggs in 11 spawnings. The egg taking station established at the Los Banos Wildlife Area trapped a total of 155 chinook salmon (73 males, 82 females). Of the females, 68 were spawned. They yielded 331,497 eggs in 15 spawnings.

^{1/} Inland Fisheries Administrative Report No. 92-3.
Submitted November 1991. Edited by K. A. Hashagen, California
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 30 double stacks of Heath type incubator trays, capable of incubating and hatching approximately 4,500,000 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 23, 1989. The first chinook salmon entered the trap on November 5, 1989. Trapping was terminated for the season on December 22, 1989. A total of 82 fish was counted (Appendix Table 1). The Los Banos Wildlife Area salmon trap began operation on November 2, 1989. Trapping was terminated for the season on December 8, 1989. A total of 155 fish was counted (Appendix Table 2). Numbers of returning chinook salmon since 1970 are shown in Appendix Table 3. Appendix Figure 1 provides water temperatures for the production year.

The Merced Facility produced 185,182 chinook yearlings (1988 BY); 179,182 were planted directly into the Merced River at Merced River Fish Facility in the fall of 1989 (Table 2). Six thousand were used in a PKD study by U.C. Davis at the facility (Table 1). Production of 1989 BY fingerlings was 185,101 chinook salmon smolts which were planted into the Tuolumne River and the San Joaquin River in the spring of 1990, (Table 3 and 4). Coded wire tags (CWT) were applied to 101,599 smolts from MRFF and 81,342 from TRFF 1989 BY smolts (Table 3 and 4). Fish provided for net efficiency and vulnerability tests totaled 2,160 (Table 3).

TABLE 1. Production Summary, Merced River Fish Facility, 1989-90

Species	Number trapped	Number females spawned	Eggs taken	Number fingerlings planted	Number yearlings planted	Pounds planted	On hand June 30, 1990
Chinook 1988 BY MRFF					6,000 ^{1/} 179,182	500 ^{1/} 20,000	
Chinook 1989 BY MRFF	82	32	172,053	103,769		1,418	
Chinook 1989 BY LBWA ^{2/}	155	68	331,497				
Chinook 1989 BY TRFF ^{3/}				81,442		860	143,000
TOTAL	237	100	503,550	185,211	185,182	22,778	143,000

^{1/} 6,000 post smolts BY 1988 were used in a proliferative kidney disease study by U.C. Davis. Remaining fish after termination of study were destroyed.

^{2/} LBWA = Los Banos Wildlife Area

^{3/} TRFF = Tuolumne River Fish Facility

TABLE 2. Yearling Merced River Strain Chinook Salmon (1988 BY)
Planted From Merced River Fish Facility, 1989-90

Released	CWT code	Tagged	Untagged	Size/lb	Total released	Location
10-06-89			41,184	9.6	41,184	Merced River
			44,865	9.0	44,865	at MRFF
			10,285	12.1	10,285	" "
10-07-89			46,175	7.9	46,175	" "
			36,673	9.1	36,673	" "
TOTAL			179,182		179,182	" "

TABLE 3. 1989 BY Merced River Strain Chinook Salmon Smolts
Planted From Merced River Fish Facilities, 1990.

Released	CWT code	Tagged	Untagged	Size/lb	Total released	Location
4-30-90	H6-1-11-1-14 H6-1-11-1-15 H6-1-11-2-1 H6-1-11-2-2	101,609		73.1	101,599	La Grange Tuol. R.
-- Net Efficiency and Vulnerability Test --						
5-11-90	Blue Dye upper caudal		1,104	92.0	1,104	Mossdale S.J.R.
5-18-90	Blue Dye dorsal		1,056	64.0	1,056	Mossdale crossing S.J.R. Hwy 205
TOTAL		101,609	2,160		103,759	

HATCHERY OPERATIONS

All BY 1988 fish were reared on a diet of Oregon Moist Pellets and salmon formula dry pellets. A total of 22,000 lb of food produced 20,000 lb of fish, yielding a conversion rate of 1.10. Heavy losses from proliferative kidney disease (PKD), a feed ration reduced by half, and high water temperatures were major contributors to this food conversion ratio. All BY 1989 fish were reared on a diet of Oregon Moist Pellets. A total of 3,250 lb of food produced 2,430 lb of fish yielding a conversion rate of 1.34. On May 11, 1990 all remaining fish were moved to the Tuolumne River Rearing Facility awaiting pond construction at Merced River Fish Facility.

From July through September, MRFF supplied 6,000 chinook salmon post smolts and personnel for an on-site PKD study. Dr. Ron Hedrick, School of Veterinary Medicine, Department of Medicine, University of California, Davis, conducted a preliminary study testing the effects of the drug Fumagillin DCH to control PKD in Chinook Salmon. Results were not available at the time this annual report was prepared.

Merced River Fish Facility provided eyed salmon eggs and technical assistance to four Merced County elementary schools participating in the classroom incubator program. The classroom incubator program, using a volunteer network, has been used successfully from the north coast to the Monterey Bay area. These were the first projects in the San Joaquin Valley.

The facility had 927 visitors in fiscal year 1989-90. Tours were provided for organized groups and schools.

CHINOOK SALMON MAINTENANCE PROGRAM History of the 1989 Run

The first chinook salmon entered the MRFF trap on November 5, 1989. Of the 82 salmon trapped, 35 were females and 47 males; 16 grilse were trapped. A total of 172,053 eggs was taken from 32 females during 11 spawnings, for an average fecundity of 5,377 eggs. The average fertility of eggs was 66%. Spawning was terminated December 14, 1989.

The Los Banos Wildlife Area salmon trap began operation on November 2, 1989. The first salmon entered the trap on November 7, 1989; a total of 155 fish was trapped, 82 females, 73 males, and 9 grilse (Appendix Table 2). A total of 331,497 eggs was taken from 68 females during 15 spawnings, for an average fecundity of 4,875 eggs. The average fertility of eggs was 41.3%. Spawning was terminated December 27, 1989.

Marked Chinook Salmon Recoveries

No adipose fin-clipped chinook salmon entered the MRFF trap during the 1989 season. Twenty adipose fin-clipped chinook salmon were trapped at the Los Banos Wildlife Area trap during the 1989 season (Appendix Table 4). Heads were removed from all adipose fin-clipped fish for recovery of coded wire tags (Appendix Table 5).

LOS BANOS WILDLIFE AREA CHINOOK SALMON TRAP PROGRAM 1989

Drought conditions again 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. The ladder and trap was 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 into the San Luis Canal and the trap facility. Chinook salmon trapped or rescued (82 females, 64 males, and 9 grilse) were held and spawned at the trap site and the eggs were transported to M.R.F.F. for incubation. A total of 331,497 eggs was taken from 68 females (Table 1). On-site spawning corresponded with the California Wildlands Program Narrative at the Los Banos Wildlife Area. Primary funding for this on-going program was provided by the California Commercial Salmon Trollers Stamp Committee.

TUOLUMNE RIVER REARING FACILITY MAINTENANCE PROGRAM History of the 1990 by Chinook Salmon

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

Approximately 1,200 ft. of the upper channel was utilized. Water control and pond screen structures were constructed, providing a potential rearing area for 1.5 million smolts. Fishery biologists fyke netted approximately 120,000 emergent fry from the Tuolumne River in late February and transported them to Tuolumne River Rearing Facility (TRFF). Of these fish, 81,342 were coded-wire tagged and released into the lower Tuolumne River (Table 4). Over 118,000 chinook salmon (1989 BY) from Merced River Fish Facility were moved to TRRF May 11, 1990, in preparation for construction of new raceways and a water line at Merced River Fish Facility. Fish combined from both rivers totaled 143,000 as of June 30, 1990. They will be reared to yearlings and released into the Merced River in the fall of 1990.

Water temperature during the period of production ranged from 48 to 55°F. The Tuolumne River water temperature below the rearing facility ranged between 65 to 70°F. The chinook salmon BY 1989 at the Tuolumne River Rearing Facility were reared on a diet of Oregon Moist Pellets and salmon formula dry pellets. A total of 21,925 lb of food produced 12,165 lb of fish, yielding a conversion rate of 1.80.

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 during this report period. Bacterial kidney disease was present in a subclinical grade of infection. With low water temperatures and Terramycin-treated food, only minor losses were sustained.

TABLE 4. Tuolumne River Strain Chinook Salmon Smolts (1989 BY)
Planted From Tuolumne River Fish Facility In 1990

Released	CWT Code	Tagged	Untagged	Size/lb	Total released	Location
5-1-90	H6-1-11-2-3 H6-1-11-2-4 H6-1-11-2-5	81,442		94.7	81,342	Mapes Ranch Tuolumne R.
TOTAL		81,442			81,342	

APPENDIX TABLE 1. Weekly Adult Chinook Salmon Trapping Data For Merced River Fish Facility, 1989-90.

<u>Week</u>	<u>Adults</u>	<u>Grilse</u>	<u>Total</u>
Oct. 29- Nov. 4	0	0	0
Nov. 4-11	20	4	24
Nov. 12-18	9	4	13
Nov. 19-25	14	4	18
Nov. 26- Dec. 2	17	3	20
Dec. 3- 9	2	1	3
Dec. 10-16	4	0	4
<u>TOTAL</u>	<u>66</u>	<u>16</u>	<u>82</u>

APPENDIX TABLE 2. Weekly Adult Chinook Salmon Trapping Data For Los Banos Wildlife Area Trap, 1989-90.

<u>Week</u>	<u>Adults</u>	<u>Grilse</u>	<u>Total</u>
Nov. 5-11	27	1	28
Nov. 12-18	15	3	18
Nov. 19-25	17	4	21
Nov. 26- Dec. 2	7	0	7
Dec. 3- 9	80 ^{1/}	1	81
<hr/> TOTAL	146	9	155

Salvaged from lowered San Luis Canal.

APPENDIX TABLE 3. Historical 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		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
1988-89	165	250	42	457
1989-90	33	33	16	82

^{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 fork length or less to 22 inches less in 1983-84, to 23 inches or less in 1984-85, and to 24 inches or less in 1985-86.

Appendix Table 4. Fork Length (to Nearest Inch) Of Marked Chinook Salmon Trapped For Merced River Fish Facility and Los Banos Wildlife Area Traps, 1989-90.

Fork Length	Males		Females	
	MRFF	Los Banos	MRFF	Los Banos
20				
21				
22				
23				
24				3
25				
26				1
27				
28				
29		1		3
30				3
31		1		1
32				3
33		1		1
34		2		
35				
36				
37				
38				
39				1
TOTAL		5		15

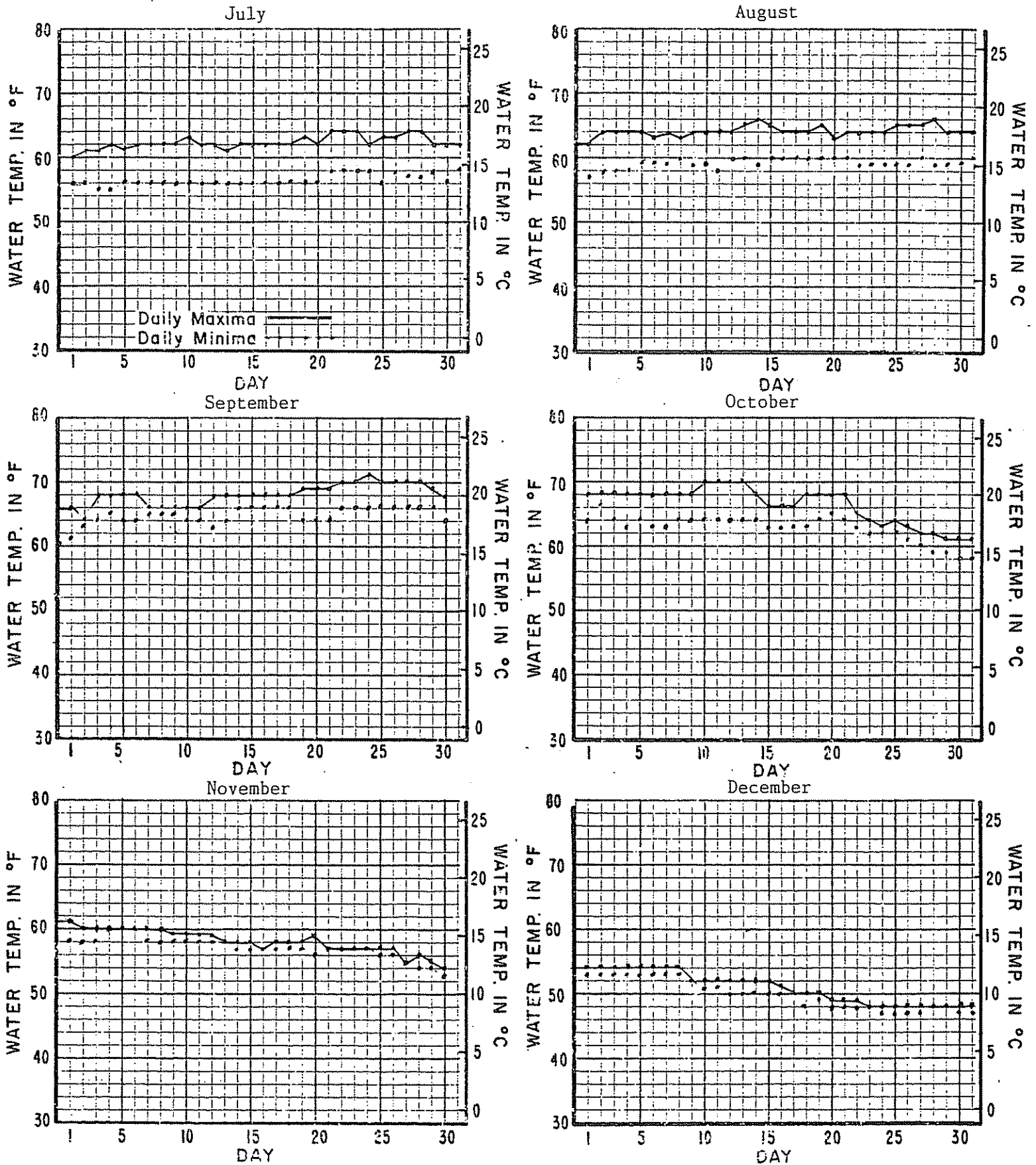
APPENDIX TABLE 5. Chinook Salmon Coded Wire Tag Recoveries, Los Banos Wildlife Area Salmon Trap, 1989-90.

CWT Code	Number recovered	Brood year	Hatchery	Release site	Release Date
06-46-56	1	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	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
06-45-06	3	86	Merced R.	Dos Reis, S.J.R.	4-27-87
06-45-07	1	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	2	85	Merced R.	Dos Reis, S.J.R.	5-29-86
B6-11-03	1	87	Merced R.	Amer. Tr., Stan. R.	4-26-88
06-48-26	1	86	Mokelumne R.	Benicia, Rodeo Mare Island	June 87 July 87
10-00-00	1	No Tag			
TOTAL	20				

APPENDIX FIGURE 1. Daily Water Temperature for Merced River Fish Facility from July 1, 1989 through June 30, 1990.

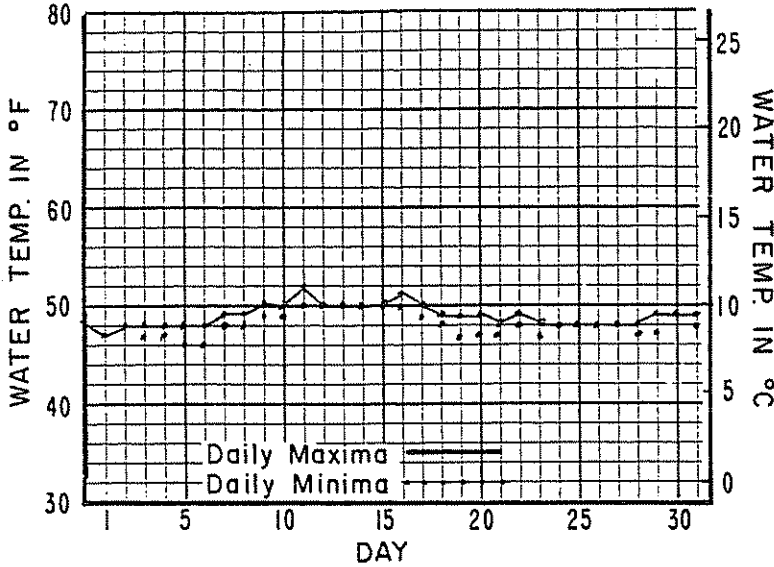
-13-

DAILY WATER TEMPERATURES BY MONTH

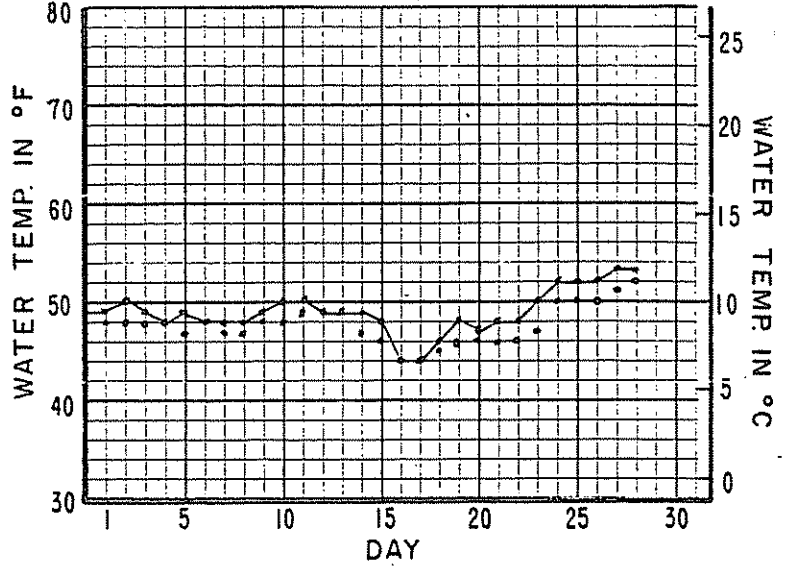


DAILY WATER TEMPERATURES BY MONTH

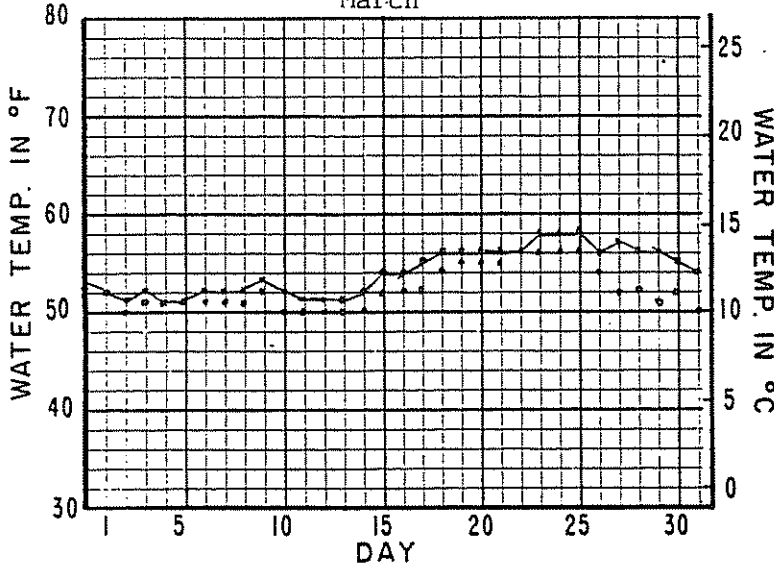
January



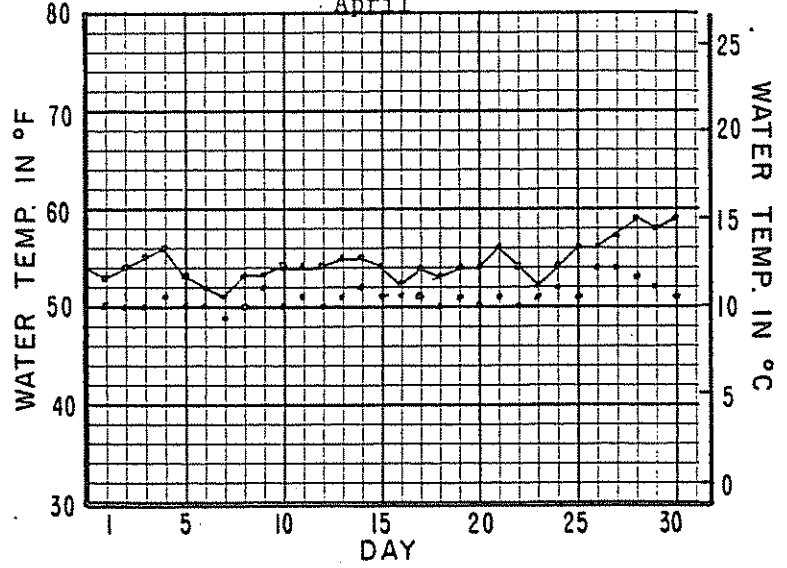
February



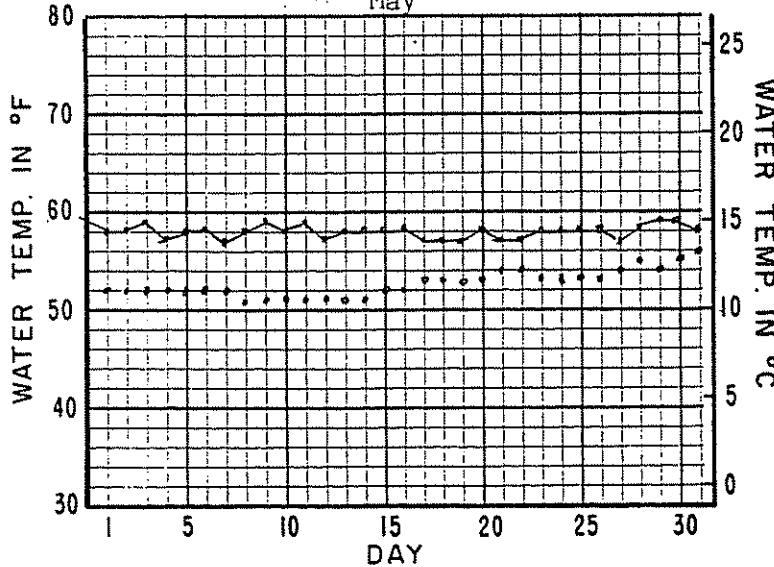
March



April



May



June

