

MOKELUMNE RIVER FISH INSTALLATION
ANNUAL REPORT FOR 1979-80 SEASON^{1/}

by

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ABSTRACT

This report describes the operation of the Mokelumne River Fish Installation from July 1, 1979 through June 30, 1980. The installation consists of a hatchery, rearing ponds, and spawning channel for chinook salmon, Oncorhynchus tshawytscha, and steelhead trout, Salmo gairdneri.

We received 1,507,190 salmon fingerlings from the Feather River Hatchery. We released 932,374 salmon fingerlings and yearlings during the 1979-80 season. There were 99,900, 1980 eyed steelhead trout eggs received from Nimbus Hatchery. We released 36,170 steelhead yearlings in the Mokelumne River and 20,000 in Lake Merced in San Francisco, as catchable trout.

^{1/} Anadromous Fisheries Branch Administrative Report No. 82-9.
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INTRODUCTION

This is the 17th annual report of the Mokelumne River Fish Installation. It covers the period of operation from July 1, 1979, through June 30, 1980. Copies of previous annual reports are available upon request from the Anadromous Fisheries Branch, Rancho Cordova.

The Mokelumne River Fish Installation is located on the south bank of the Mokelumne River at the base of Camanche Dam in San Joaquin County. Camanche Dam is presently the upper limit of anadromous fish migration in the river. The Mokelumne River enters the San Joaquin River about 98 km (61 miles) downstream from the dam.

The Installation was constructed to compensate for the loss of fall-run chinook salmon and steelhead trout spawning and rearing areas inundated by Camanche Dam. It is operated by the California Department of Fish and Game. The East Bay Municipal Utility District paid construction costs and also pays the annual operation and maintenance costs for the mitigation portion.

The Installation is made up of two parts: 1) a spawning channel for natural spawning and rearing of fall-run chinook salmon, and 2) hatchery and rearing pond facilities for artificial spawning of salmon and steelhead. A detailed description of the original facility appears in the first annual report (Groh 1965).

During the spring of 1979 the first loop of the spawning channel was modified to form two 250-ft and two 500-ft rearing ponds to accommodate the Salmon Enhancement Program. The operational costs for this portion is funded by the Salmon Stamp Project. This section is scheduled to rear 1 million yearling chinook salmon each year.

WATER TEMPERATURES

Water temperatures were recorded continuously, except from August 3 through August 29. Maximum and minimum recorded temperatures were 13.9°C (59°F) and 8.9°C (48°F), respectively (Appendix 1).

COPPER AND ZINC ANALYSIS

In only 3 of the 17 years of operation have copper and zinc concentrations become high enough to cause significant mortalities. Considerable remedial work has been done at the source of pollution.

This season the highest zinc concentrations were 0.46 ppm on October 25, 1979, 1.09 ppm on December 23, 1979, 0.53 ppm on January 22, 1980, and 0.24 ppm on March 30, 1980. With the exception of the preceding high concentrations, zinc values ranged from less than 0.01 to 0.16 ppm. In my opinion, the four high values were contaminated samples. Copper analyses were made from January 4 through 19, 1980. The range was from 0.003 to 0.007 ppm (Appendix 1).

DISEASE

There were no significant mortalities caused by disease this season.

PUBLIC RELATIONS

During the 1979-80 season, an estimated 16,500 persons visited the facility. Tours were conducted for special interest groups and talks were given to sportsmen and civic organizations.

PRODUCTION SUMMARY

A total of 1,865,816 chinook salmon and steelhead eggs and fingerlings was received for rearing (Table 1).

TABLE 1. Production Summary, Mokolumne River Fish Installation, 1979-80

Species	Number of adults received	Number of eggs received	Number of fingerlings received	Number of fingerlings planted	Number of yearlings planted	On hand 6/30/80
Chinook salmon	507	258,726	1,507,190	425,849	506,525	1,366,500
Steelhead	0	99,900	0	0	56,170	79,270

CHINOOK SALMON MAINTENANCE

Five hundred-seven adult salmon entered the installation from October 16, 1979 to November 24, 1979. There were 181 males, 262 grilse, and 64 females. Four males and 11 grilse were recovered with an adipose fin clip. Fifty-five females were spawned for 258,726 1979 BY eggs, an average of 4,704 eggs/female. The resulting fingerlings were released into the rearing ponds. These fingerlings received artificial feed and were released in June 1980.

PRODUCTION

On July 1, 1979 we had on hand 500,000 1978 BY Feather River; 1,192,250 1978 BY Nimbus; and 192,000 1978 BY Mokolumne River chinook fingerlings. In addition, we received 1,507,190 1979 BY fingerlings from the Feather River Hatchery and spawned 258,726 eggs from Mokolumne River females (Table 2). On June 30, 1979 we had on hand 1,366,500 1979 BY Feather River fingerlings.

TABLE 2. Chinook Salmon Eggs and Fingerlings Received, Mokelumne River Fish Installation, 1979-80

	Brood Year	Date	Number received	Origin
Fingerlings	1979	May-1980	1,405,690	Feather River
Fingerlings	1979	June-1980	101,500	Feather River
Eggs (green)	1979	December-1979	258,726	Mokelumne River

Planting 1978-79 Chinook Salmon

We planted 320,799 1978 BY fingerlings; 506,525 1978 BY yearlings; and 105,050 1979 BY fingerlings, for a total of 932,374 chinook salmon (Table 3).

TABLE 3. Chinook Salmon Planting Summary, Mokelumne River Fish Installation, 1979-80

Date	Area	Number	Size/lb	Mark
<u>1979</u>				
July	Mokelumne	65,406	66	
August	Mokelumne River	106,568	88	
September	Mokelumne River	80,040	115	
September	Mokelumne River	22,968	88	
October	Mokelumne River	16,280	44	
October	Rio Vista	174,200	9.7	
October	Mokelumne River	10,035	9.0	
October	Rio Vista	43,370	10	Ad+CWT(6-48-12)
October	Mokelumne River	44,080	9.5	Ad+CWT(6-48-11)
November	Rio Vista	19,167	18.7	
November	Mokelumne River	10,370	58.8	
November	Mokelumne River	234,840	9.5	
<u>1980</u>				
June	Mokelumne River	105,050	55	

Chinook Salmon Tagging Program

Phase 2 of the yearling evaluation was completed this season with the release of two groups of Ad+CWT tagged fish to determine the difference in returns of upstream and downstream releases. The first group (43,370) was released on October 5, 9 and 11, 1979 in the Sacramento River at Rio Vista. The second group (44,080) was released on October 30, 1979 at the Mokelumne River Fish Installation.

STEELHEAD PROGRAM

On July 1, 1979 we had 1980 we received 99,900 1980 BY eyed eggs from Nimbus Hatchery. We released into the Mokelumne River 4,095 1978 BY, and 32,075 1979 BY, both on a catchable In January

trout basis. In addition, we released 20,000 1979 BY in Lake Merced in San Francisco. On June 30, 1980 we had on hand 5,520 1979 BY and 73,750 1980 BY.

REFERENCES

Groh, F. H. 1965 Annual report Mokelumne River Fish Installation from January 1, 1964 to June 30, 1965. Calif. Dep. Fish and Game, Inland Fish. Admin. Rep. 65-21. 28 p.

APPENDIX TABLE 1. Water Temperatures and Zinc Concentrations, Mokelumne River Fish Installation, 1979-80 Season

Date	Water temperature (C)		Zinc ppm		Date	Water temperature (C)		Zinc ppm	
	Max.	Min.	a.m.	p.m.		Max.	Min.	a.m.	p.m.
July					Aug.				
1	12.2	11.1			1	12.8	11.7	.02	
2	12.2	11.1			2	12.8	11.7	.02	
3	12.2	11.1			3	12.8	11.7	.02	
4	12.2	11.1			4	12.8	11.7	.06	
5	12.2	11.1			5	12.8	11.7	.02	
6	12.2	11.1			6	12.8	11.7	.02	
7	12.2	11.1			7	12.8	11.7	.01	
8	12.2	11.1			8	12.8	11.7	.03	
9	12.2	11.1			9	12.8	11.7	.05	
10	12.2	11.1			10	12.8	11.7	.02	
11	12.2	11.1			11	12.8	11.7	.02	
12	12.2	11.1			12	12.8	11.7	.03	
13	12.2	11.1			13	12.8	11.7	.02	
14	12.2	11.1			14	12.8	11.7	.02	
15	12.2	11.1			15	12.2	11.7	.02	
16	12.8	11.7			16	12.2	11.7	.02	
17	12.8	11.7			17	12.8	11.7	.02	
18	12.8	11.7			18	12.8	11.7	.02	
19	12.8	11.7			19	12.2	11.7	.05	
20	12.2	11.7			20	12.2	11.7	.02	
21	12.2	11.7			22	12.8	11.7	.02	
23	12.2	11.7			23	12.8	11.7	.02	
24	12.8	11.7			24	12.8	11.7	.02	
25	12.8	11.7			25	12.8	11.7	.02	
26	12.8	11.7			26	12.8	11.7	.03	
27	12.2	11.7			27	12.8	11.7	.02	
28	12.2	11.7	.03		28	12.8	11.7	.02	
29	12.3	11.7	.02		29	12.8	11.7	.02	
30	12.8	11.7	.04		30	12.8	11.7	.02	
31	12.8	11.7	.02		31	12.8	11.7	.02	

APPENDIX TABLE 1. Water Temperatures and Zinc Concentrations, Mokelumne River Fish Installation, 1979-80 Season (continued)

Date	Water temperature (C)		Zinc ppm		Date	Water temperature (C)		Zinc ppm	
	Max.	Min.	a.m.	p.m.		Max.	Min.	a.m.	p.m.
Sept. 1	12.8	11.7	.02		Oct. 1	13.3	12.2	.03	
2	12.8	11.7	.02		2	13.3	12.2	.01	
3	12.8	11.7	.02		3	12.8	12.2	.02	
4	12.8	11.7	.02		4	12.8	12.2	.01	
5	12.8	11.7	.02		5	12.8	12.2	.01	
6	12.8	11.7	.02		6	12.8	12.2	.01	
7	12.8	11.7	.02		7	12.8	12.2	.02	
8	12.8	11.7	.02		8	12.8	12.2	.02	
9	12.8	11.7	.02		9	12.8	12.2	.02	
10	12.8	11.7	.02		10	12.8	12.2	.02	
11	12.8	11.7	.02		11	12.8	12.2	.02	
12	13.3	11.7	.02		12	12.8	12.2	.03	
13	13.3	12.2	.02		13	12.8	12.2	.02	
14	13.3	12.2	.02		14	12.8	12.2	.01	
15	13.3	12.2	.01		15	12.8	12.2	.03	
16	13.3	12.2	.02		16	12.8	12.2	.01	
17	12.8	12.2	.02		17	12.8	12.2	.02	
18	12.8	12.2	.02		18	12.8	12.2	.02	
19	12.8	12.2	.02		19	12.8	12.2	.02	
20	12.8	12.2	.03		20	12.8	12.2	.02	
21	12.8	12.2	.01		21	12.8	12.2	.03	
22	12.8	12.2	.02		22	12.8	12.2	.05	
23	12.8	12.2	.02		23	12.8	12.2	.02	
24	12.8	12.2	.02		24	12.8	12.2	.02	
25	12.8	12.2	.01		25	12.8	12.2	.16	
26	12.8	12.2	.01		26	12.8	12.2	.01	
27	12.8	12.2	.01		27	12.8	12.2	.02	
28	12.8	12.2	.02		28	12.8	12.2	.02	
29	12.8	12.2	.02		29	12.8	12.2	.03	
30	12.8	12.2	.02		30	12.8	12.2	.02	
					31	12.8	12.2	.09	

APPENDIX TABLE 1. Water Temperatures and Zinc Concentrations, Mokelumne River Fish Installation, 1979-80 Season (continued)

Date	Water temperature (C)		Zinc ppm		Date	Water temperature (C)		Zinc ppm	
	Max.	Min.	a.m.	p.m.		Max.	Min.	a.m.	p.m.
Nov.					Dec.				
1	12.8	12.2	.02		1	13.9	13.3	.01	
2	12.8	12.2	.02		2	13.9	13.3	.01	
3	12.8	12.2	.02		3	13.9	13.3	.01	
4	12.8	12.2	.06		4	13.9	13.3	.01	
5	12.8	12.2	.06		5	13.9	13.3	.01	
6	12.8	12.8	.02		6	13.9	13.3	.01	
7	13.3	12.8	.02		7	13.9	13.3	.02	
8	13.3	12.8	.03		8	13.9	13.3	.01	
9	13.3	12.8	.03		9	13.9	13.3	.12	
10	13.3	12.8	.02		10	13.9	13.3	.01	
11	13.3	12.8	.02		11	13.9	13.3	.02	
12	13.3	12.8	.02		12	13.9	13.3	.02	
13	13.3	12.8	.02		13	13.9	13.3	.03	
14	13.3	12.8	.02		14	13.9	13.3	.01	
15	13.3	12.8	.02		15	13.9	13.3	.05	
16	13.3	12.8	.03		16	13.9	13.3	.01	
17	13.3	12.8	.03		17	13.9	13.3	.01	
18	13.3	12.8	.02		18	13.9	13.3	.04	
19	13.3	12.8	.05		19	13.9	13.3	.01	
20	13.3	12.8	.03		20	12.8	12.2	.01	
21	13.3	12.8	.11		21	12.8	12.2	.01	
22	13.3	12.8	.02		22	12.8	12.2	.02	
23	13.3	13.3	.02		23	12.8	12.2	1.09	
24	13.3	13.3	.02		24	12.8	12.2	.01	
25	13.3	13.3	.02		25	12.8	12.2	.01	
26	13.3	13.3	.01		26	12.8	12.2	.01	
27	13.9	13.3	.01		27	12.8	12.2	.01	
28	13.9	13.3	.01		28	12.8	12.2	.01	
29	13.9	13.3	.01		29	12.8	12.2	.01	
30	13.9	13.3	.01		30	12.8	12.2	.03	
31	13.9	13.3	.01		31	12.2	12.7	.01	

APPENDIX TABLE 1. Water Temperatures and Zinc Concentrations; Mokelumne River Fish Installation, 1979-80 Season (continued)

Date	Water temperature (C)		Zinc ppm		Date	Water temperature (C)		Zinc ppm	
	Max.	Min.	a.m.	p.m.		Max.	Min.	a.m.	p.m.
Jan.					Feb.				
1	12.2	11.7	.02		1	10.0	9.4	.01	.01
2	11.7	11.7	.01		2	10.0	10.0	.01	.01
3	11.1	11.1	.01		3	10.0	9.4	.02	.02
4	11.1	11.1	.03		4	10.0	9.4	.02	.01
5	11.1	11.1	.01	.01	5	10.0	9.4	.01	.01
6	11.1	11.1	.01	.01	6	9.4	8.9	.02	.03
7	11.1	11.1	.01	.01	7	9.4	8.9	.03	.03
8	11.1	11.1	.01	.01	8	10.0	9.4	.01	.02
9	11.1	11.1	.02		9	10.0	9.4	.02	.02
10	11.1	10.6	.01		10	10.0	9.4	.02	.02
11	11.7	11.1	.01	.01	11	9.4	8.9	.02	.03
12	11.7	11.1	.01	.01	12	9.4	8.9	.02	.03
13	11.7	11.1	.01	.07	13	9.4	8.9	.02	.03
14	11.7	11.1	.01	.01	14	9.4	8.9	.03	.03
15	11.7	11.1	.01	.01	15	9.4	8.9	.03	.02
16	11.7	11.1	.01	.01	16	11.1	11.1	.04	.02
17	11.1	10.6	.01	.01	17	11.1	11.1	No sample	
18	10.6	10.0	.01	.01	18	11.1	11.1	No sample	
19	10.6	10.0	.01	.01	19	11.1	11.1	.01	.01
20	10.6	10.0	.01	.01	20	11.1	11.1		.01
21	10.6	10.0	.01	.01	21	11.1	10.0	.01	.01
22	10.6	10.0	.01	.53	22	10.0	10.0	.01	.01
23	10.0	10.0	.01	.01	23	10.0	9.4	.01	.01
24	10.0	10.0	.01	.01	24	10.0	9.4	.01	.01
25	10.0	10.0	.01	.01	25	10.0	9.4	.01	.01
26	10.0	10.0	.01	.09	26	10.0	10.0	.01	.01
27	10.0	9.4	.01	.01	27	10.0	10.0	.01	.02
28	10.0	9.4	.01	.01	28	10.0	9.4	.01	.02
29	10.0	9.4	.01	.01	29	10.0	9.4	.01	.02
30	10.0	9.4	.01	.01					
31	10.0	9.4	.01	.01					

APPENDIX TABLE 1. Water Temperatures and Copper Concentrations, Mokelumne River Fish Installation, 1979-80 Season (continued)

		Copper ppm	
		a.m.	p.m.
Jan.	4	.004	.004
	6	.004	.004
	7	.005	.006
	8	.003	.004
	9	.007	.005
	10	.005	.006
	11	.006	.007
	12	.007	.007
	13	.007	.006
	14	.006	.006
	15	.006	.006
	16	.007	.006
	19	.004	

APPENDIX TABLE 1. Water Temperatures and Zinc Concentrations, Mokelumne River Fish Installation, 1979-80 Season (continued)

Date	Water temperature (C)		Zinc ppm		Date	Water temperature (C)		Zinc ppm	
	Max.	Min.	a.m.	p.m.		Max.	Min.	a.m.	p.m.
March					April				
1	10.4	9.4	.01	.02	1	11.1	10.0	.04	
2	10.0	9.4	.02	.02	2	10.1	10.0	.04	
3	10.0	9.4	.02	.02	3	10.6	10.0	.03	
4	10.0	9.4	.02	.02	4	10.6	10.0	.03	
5	10.0	9.4	.01	.02	5	10.6	10.0	.03	
6	10.0	9.4	.03	.03	6	10.6	10.0	.16	
7	10.0	9.4	.03	.04	7	10.6	10.0	.04	
8	10.0	9.4	.04	.04	8	11.1	10.6	.04	
9	10.0	9.4	.04	.04	9	11.1	10.6	.03	
10	10.0	9.4	.04	.04	10	11.1	10.6	.02	
11	10.0	9.4	.05	.04	11	11.1	10.6	.02	
12	10.0	9.4	.05	.04	12	11.1	10.6	.02	
13	10.0	9.4	.04	.04	13	11.1	10.6	.03	
14	10.0	9.4	.05	.05	14	11.1	10.6	.03	
15	10.0	9.4	.05		15	11.1	10.6	.02	
16	10.0	9.4	.05	.05	16	11.1	10.6	.02	
17	10.0	9.4	.05	.05	17	11.1	10.6	.02	
18	10.0	9.4	.05	.05	18	11.1	10.6	.02	
19	10.0	9.4	.05	.04	19	11.1	10.6	.02	
20	10.0	9.4	.04	.04	20	11.1	10.6	.03	
21	10.0	9.4	.04	.07	21	11.1	10.6	.02	
22	10.0	9.4	.04	.04	22	11.1	10.6	.02	
23	10.0	9.4	.04		23	11.1	10.6	.02	
24	10.0	9.4	.04	.05	24	11.1	10.6	.02	
25	10.0	9.4	.04	.05	25	11.1	10.6	.02	
26	10.0	9.4	.04	.05	26	11.1	10.6	.02	
27	10.6	10.0	.04	.05	27	11.1	10.6	.03	
28	10.6	10.0	.06	.05	28	11.1	11.1	.02	
29	10.6	10.0	.04	.04	29	11.1	11.1	.02	
30	10.6	10.0	.04	.24	30	11.7	11.1	.02	
31	11.1	10.0	.03						

APPENDIX TABLE 1. Water Temperatures and Zinc Concentrations, Mokelumne River Fish Installation, 1979-80 Season (continued)

Date	Water temperature (C)		Zinc ppm		Date	Water temperature (C)		Zinc ppm	
	Max.	Min.	a.m.	p.m.		Max.	Min.	a.m.	p.m.
May					June				
1	12.8	11.7	.02		1	12.2	11.7		
2	12.8	11.7	.02		2	12.2	11.7		
3	12.8	11.7	.01		3	12.2	11.7		
4	12.8	11.7	.01		4	12.2	11.7		
5	12.8	11.7	.01		5	12.2	11.7		
6	12.8	12.2	.01		6	12.2	11.7		
7	11.7	11.1	.02		7	12.2	11.7		
8	11.7	11.1	.02		8	12.2	11.7		
9	11.7	11.1			9	12.2	11.7		
10	11.7	11.1			10	12.2	11.7		
11	11.7	11.1			11	12.2	11.7		
12	11.7	11.1			12	12.2	11.7		
13	11.7	11.1			13	12.2	11.7		
14	11.7	11.1			14	12.2	11.7		
15	11.7	11.1			15	12.2	11.7		
16	11.7	11.1			16	12.8	12.2		
17	11.7	11.1			17	12.8	12.2		
18	11.7	11.1			18	12.8	12.2		
19	12.2	11.1			19	12.8	12.2		
20	12.2	11.1			20	12.8	12.2		
21	12.2	11.7			21	12.8	12.2		
22	12.2	11.7			22	12.8	12.2		
23	12.2	11.7			23	12.8	12.2		
24	12.2	11.7			24	12.8	12.2		
25	12.2	11.7			25	12.8	12.2		
26	12.2	11.7			26	12.8	12.2		
27	12.2	11.7			27	12.8	12.2		
28	12.2	11.7			28	13.3	12.8		
29	12.2	11.7			29	13.3	12.8		
30	12.2	11.7			30	13.3	12.8		
31	12.2	11.7							