

MOKELUMNE RIVER FISH INSTALLATION
ANNUAL REPORT FOR 1978-79 SEASON^{1/}

by

Philo F. Jewett
Region 2, Inland Fisheries

ABSTRACT

This report describes the operation of the Mokelumne River Fish Installation from July 1, 1978 through June 30, 1979. The installation consists of a hatchery, rearing ponds, and spawning channel for chinook salmon, Oncorhynchus tshawytscha, and steelhead trout, Salmo gairdneri gairdneri.

We received 834,925 chinook salmon fingerlings and 1,655,400 eyed chinook salmon eggs from Nimbus and Feather River hatcheries. We released 742,718 salmon fingerlings and yearlings during the 1978-79 season.

We received 100,700 eyed steelhead trout eggs from the Nimbus Hatchery, and released 10,559 steelhead yearlings in the Mokelumne River on a catchable trout basis.

^{1/} Anadromous Fisheries Branch Administrative Report No. 82-5.
Submitted January 1981.

INTRODUCTION

This is the 15th annual report of the Mokelumne River Fish Installation. It covers the period of operation from July 1, 1978, through June 30, 1979. 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 about 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.

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 winter of 1978 the first loop of the spawning channel was converted to three, 500-ft rearing ponds as part of the new Salmon Enhancement Program; operational costs for this portion are funded by monies from the Salmon Stamp. 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 15.0°C (59°F) and 8.9°C (48°F), respectively (Appendix I).

COPPER AND ZINC ANALYSIS

Copper and zinc concentrations have become high enough to cause significant mortalities in only 3 of the 15 years of operation. Considerable remedial work has been done at the source of pollution.

This season the highest zinc concentrations reached 0.18 ppm on July 8, 1978, 1.18 ppm on November 22, 1978, and 0.19 ppm on January 30, 1979. With the exception of the above concentrations, zinc levels ranged from <0.01 ppm to 0.15 for the remainder of the year. We assume that the higher concentrations were probably contaminated samples (Appendix I).

DISEASE

We had no significant mortalities from disease this season.

PUBLIC RELATIONS

During the 1978-79 season, an estimated 14,000 people visited the facility. Tours were conducted for special interest groups and talks were given to sportsman and civic organizations.

PRODUCTION SUMMARY

A total of 2,898,525 chinook salmon eggs and fingerlings and steelhead eggs was received for rearing (Table 1).

TABLE 1. Production Summary, Mokelumne River Fish Installation, 1978-79

Species	Number of adults trapped	Number of eggs received	Number of fingerlings received	Number of fingerlings planted	Number of yearlings planted	On hand 6/30/79
Chinook salmon	484	1,962,900	834,925	415,314	327,404	1,884,250
Steelhead	0	100,700	0	0	10,559	80,250
TOTALS	484	2,063,600	834,925	415,314	337,963	1,964,500

CHINOOK SALMON MAINTENANCE

History of the 1978 Mokelumne River Run

Four hundred eighty-four adult salmon entered the installation from October 2, to December 16, 1978. There were 161 males, 180 grilse, and 143 females. Ten males and 16 females with the adipose fin removed were recovered.

Seventy-five females were spawned, producing 307,500 eggs, for an average of 4,106 eggs/female. The resulting fingerlings were released into channels three and four for rearing. These fingerlings receive no artificial feed and will be enumerated and released during the 1979-80 season.

Production

The 501,500 fingerlings from the 1977 brood year (BY) on hand July 1, 1978 were supplemented by 118,625 additional 1977 BY fingerlings from Nimbus and 206,500 fingerlings from the 1977 BY from Feather River Hatchery. In addition we received 509,800 1978 BY fingerlings from the Feather River Hatchery.

We received 1,655,400 1978 BY eyed eggs from Nimbus, and spawned 307,500 eggs from Mokelumne River females. On June 30, 1979 we had 500,000 1978 BY Feather River; 1,192,250 1978 BY Nimbus; and 192,000 1978 BY Mokelumne River fingerlings on hand (Table 2).

TABLE 2. Chinook Salmon Eggs and Fingerlings Received, Mokelumne River Fish Installation, 1978-79

Stage	Broodyear	Date	Number received	Origin
Fingerlings	1977	July 1978	118,625	Nimbus Hatchery
Fingerlings	1977	July 1978	206,500	Feather River Hatchery
Fingerlings	1978	June 1979	509,800	Feather River Hatchery
Eggs (eyed)	1978	January 1979	1,655,400	Nimbus Hatchery
Eggs (green)	1978	January 1979	307,500	Mokelumne River

Planting 1977 BY Chinook Salmon

We planted 415,314 fingerlings and 327,404 yearlings, for a total of 742,718 1977 BY chinook salmon (Table 3).

TABLE 3. Chinook Salmon Planting Summary, Mokelumne River Fish Installation, 1978-79

Date	Area	Number	Size (No./lb)	Mark
October 1978	Mokelumne River	27,600	40	
	Mokelumne River	44,287	11.4	Ad+CWT (6-48-9)
	Mokelumne River	5,308	11.4	
November 1978	Rio Vista	44,284	10.3	Ad+CWT (6-48-10)
	Rio Vista	9,076	10.3	
	Red Bluff	26,424	10.3	
	Red Bluff	20,880	29	
	Rio Vista	93,000	30	
	Mokelumne River	20,134	43	
	December 1978	Mokelumne River	10,000	4
December 1978	Red Bluff	70,000	5	
	Red Bluff	25,600	4	
	Red Bluff	84,600	20	
	Red Bluff	11,600	29	
	January 1979	Red Bluff	32,200	5
January 1979	Red Bluff	19,500	30	
	Mokelumne River	15,225	3	
	Rio Vista	30,000	30	
	Mokelumne River	108,000	30	
	Rio Vista	45,000	5	

Chinook Salmon Tagging Program

Phase 2 of the yearling evaluation was continued this season with the release of two groups of fish marked with an adipose clip and a coded wire nose tag (CWT) to determine the difference in returns of upstream and downstream releases. The first group (44,287) was released on October 30, 1978 in the Mokelumne River at the installation. The second group (44,284) was released on November 1, 1978 in the Sacramento River at Rio Vista.

STEELHEAD PROGRAM

On July 1, 1978 we had 19,000 1978 BY fingerlings on hand. In March 1979 we received 100,700 1979 BY eyed eggs from the Nimbus Hatchery. We released into the Mokelumne River 10,559, 1978 BY (Feather River) on a catchable trout basis. On June 30, 1979 we had 7,121 1978 BY and 73,150 1979 BY on hand.

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 I. Water Temperatures and Zinc Concentrations, Mokelumne River
Fish Installation, 1978-79 Season

Date	Water temperature (°C)		Zinc ppm ^{1/}		Date	Water temperature (°C)		Zinc ppm ^{1/}	
	Max.	Min.	a.m.	p.m.		Max.	Min.	a.m.	p.m.
July					Aug.				
1	13.3	12.2	.09	.04	1	13.9	12.8		
2	12.8	12.2	.04	.05	2				
3	13.3	12.2	.03	.05	3				
4	13.3	12.2	.04	.04	4				
5	13.3	12.2	.04	.08	5				
6	13.3	12.2	.05	.04	6				
7	13.3	12.2	.03	.04	7				
8	13.9	12.8	.18	.04	8				
9	13.9	12.8	.04	.03	9				
10	13.3	12.2	.04	.04	10				
11	13.3	12.2	.03	.03	11				
12	13.3	12.2	.04	.04	12				
13	13.3	12.2	.03		13				
14	13.9	12.8			14				
15	13.3	12.2			15				
16	13.3	12.2			16				
17	13.9	12.8			17				
18	13.9	12.8			18				
19	13.9	12.8			19				
20	13.9	12.8			20				
21	13.9	12.8			21				
22	12.9	12.8			22				
23	13.9	12.8			23				
24	13.9	12.8			24				
25	13.9	12.8			25				
26	13.9	12.8			26				
27	13.9	12.8			27				
28	13.9	12.8			28				
29	13.9	12.8			29				
30	13.9	12.8			30	14.4	13.3		
31	13.9	12.8			31	14.4	13.3		

^{1/} No zinc samples were taken from July 13 through August 31.

APPENDIX I. Water Temperatures and Zinc Concentrations, Mokelumne River
Fish Installation, 1978-79 Season (continued)

Date	Water temperature (°C)		Zinc ppm ^{1/}		Date	Water temperature (°C)		Zinc ppm ^{1/}	
	Max.	Min.	a.m.	p.m.		Max.	Min.	a.m.	p.m.
Sept.					Oct.				
1	14.4	13.3			1	15.0	13.9		
2	14.4	13.3			2	15.0	13.9		
3	14.4	13.3			3	15.0	13.9		
4	14.4	13.3			4	14.4	13.9		
5	13.9	13.3			5	14.4	13.9		
6	14.4	13.3			6	14.4	13.9		
7	13.9	13.3			7	14.4	13.9		
8	13.9	13.3			8	14.4	13.9		
9	13.9	13.3			9	14.4	13.9		
10	13.9	13.3			10	14.4	13.9		
11	13.9	13.3			11	14.4	13.9		
12	14.4	13.3			12	14.4	13.9		.01
13	14.4	13.3			13	15.0	13.9		.02
14	13.9	13.3			14	15.0	13.9		.02
15	14.4	13.3			15	15.0	13.9		.01
16	14.4	13.3			16	14.4	13.9		.01
17	13.9	13.3			17	14.4	13.9		.01
18	13.9	13.3			18	14.4	13.9		.01
19	14.4	13.3			19	14.4	13.9		.04
20	14.4	13.3			20	14.4	13.9		.01
21	14.4	13.3			21	14.4	13.3		.02
22	14.4	13.3			22	14.4	13.3		.01
23	14.4	13.3			23	14.4	13.9		.02
24	14.4	13.3			24	14.4	13.9		.01
25	14.4	13.3			25	14.4	13.9		.01
26	14.4	13.3			26	14.4	13.9		.01
27	14.4	13.3			27	14.4	13.9		.01
28	14.4	13.3			28	14.4	13.9		.01
29	14.4	13.3			29	14.4	13.9		.01
30	14.4	13.3			30	14.4	13.9		.01
					31	14.4	13.9		.01

^{1/} No zinc samples were taken from July 13 through October 11.

APPENDIX I. Water Temperatures and Zinc Concentrations, Mokelumne River
Fish Installation, 1978-79 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	14.4	14.4	.01		1	13.3	13.3	.10	
2	14.4	14.4	.02		2	13.3	13.3	.04	
3	14.4	14.4	.01		3	13.3	12.8	.01	
4	15.0	14.4	.02		4	13.3	12.8	.02	
5	15.0	14.4	.02		5	13.3	12.8	.04	
6	15.0	14.4	.02		6	12.8	12.2	<.01	
7	15.0	14.4	.02		7	12.2	12.2	.01	
8	15.0	14.4	.02		8	12.2	11.7	.07	
9	15.0	14.4	.02		9	11.7	11.7	.02	
10	14.4	14.4	.01		10	11.7	11.7	.02	
11	14.4	13.9			11	11.7	11.7	.01	
12	14.4	14.4			12	11.7	11.7	.04	
13	14.4	14.4	.02		13	11.7	11.7	.02	
14	14.4	14.4	.01		14	11.7	11.7	.06	
15	14.4	14.4	.01		15	11.7	11.7	<.01	
16	14.4	14.4	.01		16	11.1	11.1	<.01	
17	15.0	14.4			17	11.1	11.1	.03	
18	15.0	14.4	.01		18	11.1	11.1	<.01	
19	14.4	14.4	.07		19	11.1	11.1	.01	
20	14.4	14.4	.01		20	11.1	11.1	.04	
21	14.4	14.4			21	10.6	10.6	.07	
22	14.4	14.4	.18		22	10.6	10.6	.02	
23	13.9	13.3	<.01		23	10.6	10.6	.05	
24	13.9	13.3	.15		24	10.6	10.6	<.01	
25	13.9	13.3	.01		25	10.6	10.6	.02	
26	13.3	13.3	.01		26	10.6	10.6	<.01	
27	13.9	13.3	.01		27	10.0	10.0	<.01	
28	13.9	13.3	<.01		28	10.0	10.0	.01	
29	13.9	13.3	.01		29	10.0	10.0	.03	
30	13.9	13.3	.12		30	10.0	10.0	.01	
					31	10.0	9.4		

APPENDIX I. Water Temperatures and Zinc Concentrations, Mokelumne River
Fish Installation, 1978-79 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	10.0	9.4	<.01		1	8.9	8.9	<.01	
2	10.0	9.4	<.01		2	8.9	8.9	<.01	
3	9.4	9.4	<.01		3	8.9	8.9	.01	
4	9.4	9.4	.03		4	8.9	8.9	.01	
5	9.4	9.4	.02		5	8.9	8.9	<.01	
6	10.0	9.4			6	8.9	8.9	.03	
7	10.0	9.4	<.01		7	8.9	8.9	<.01	
8	10.0	9.4	<.01		8	8.9	8.9	.09	
9	10.0	9.4	.02		9	8.9	8.9	.03	
10	10.0	9.4	<.01		10	8.9	8.9	.04	
11	10.0	9.4	.04		11	8.9	8.9	.01	
12	10.0	9.4	<.01		12	8.9	8.9	.13	
13	10.0	9.4	.01		13	8.9	8.9	.04	
14	10.0	9.4	.01		14	9.4	8.9	<.01	
15	10.0	9.4	.01		15	9.4	8.9	<.01	
16	10.0	9.4	<.01		16	9.4	8.9		
17	10.0	9.4	<.01		17	9.4	8.9	<.01	
18	10.0	9.4	.01		18	8.9	8.9	.01	
19	10.0	9.4			19	8.9	8.9	.07	
20	10.0	9.4	<.01		20	9.4	8.9	.01	
21	10.0	9.4	.01		21	9.4	8.9	.01	
22	10.0	9.4	<.01		22	9.4	8.9	.01	
23	10.0	9.4	<.01		23	9.4	8.9	.02	
24	9.4	8.9	<.01		24	9.4	8.9	<.01	
25	9.4	8.9	<.01		25	9.4	8.9	.03	
26	9.4	8.9	<.01		26	9.4	8.9	.03	
27	9.4	8.9	<.01		27	9.4	8.9	.01	
28	9.4	8.9	<.01		28	8.9	8.9	.01	
29	9.4	8.9	<.01						
30	9.4	8.9	.19						
31	8.9	8.9	<.01						

APPENDIX I. Water Temperatures and Zinc Concentrations, Mokelumme River
Fish Installation, 1978-79 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.
Mar.					Apr.				
1	8.9	8.9	.01		1	10.0	9.4	.02	.01
2	8.9	8.9	.01	.01	2	10.0	9.4	.02	.10
3	8.9	8.9	.01	.01	3	10.0	9.4	.01	.02
4	8.9	8.9	.01	.01	4	10.0	9.4	.05	
5	8.9	8.9	.05	.01	5	10.0	9.4	.02	.02
6	8.9	8.9	.01	.01	6	10.0	9.4	.02	.02
7	8.9	8.9	.09	.01	7	10.0	9.4	.02	.02
8	8.9	8.9	.01	.01	8	10.0	9.4	.02	.02
9	8.9	8.9	.01	.01	9	10.0	9.4	.02	.02
10	8.9	8.9	.07	.01	10	10.0	9.4	.02	.02
11	8.9	8.9	.01	.01	11	10.0	9.4	.01	.02
12	8.9	8.9	.03	.01	12	10.0	9.4	.03	.01
13	8.9	8.9	.02	.01	13	10.0	9.4	.02	.01
14	8.9	8.9	.01	.01	14	10.0	9.4	.04	.02
15	8.9	8.9	.01	.01	15	10.0	9.4	.02	.02
16	8.9	8.9	.06	.01	16	10.0	9.4	.05	.02
17	8.9	8.9	.06	.01	17	10.0	9.4	.02	.02
18	8.0	8.9	.02	.02	18	10.0	9.4	.02	.01
19	8.9	8.9	.01	.02	19	10.6	10.0	.01	.02
20	8.9	8.9	.02	.01	20	10.6	10.0	.02	.02
21	8.9	8.9	.02	.02	21	10.6	10.0	.02	.02
22	8.9	8.9	.02	.02	22	10.6	10.0	.02	.03
23	9.4	8.9	.02	.02	23	10.6	10.0	.02	.02
24	9.4	8.9	.02	.03	24	10.6	10.0	.02	.02
25	9.4	8.9	.02	.02	25	10.6	10.0		
26	9.4	8.9	.02	.02	26	10.6	10.0	.06	.05
27	9.4	8.9	.07	.01	27	10.6	10.0	.01	.01
28	9.4	8.9	.01	.01	28	10.6	10.0	.01	
29	9.4	8.9	.04	.02	29	10.6	10.0	.02	
30	10.0	9.4	.04	.01	30	10.6	10.0	.03	
31	10.0	9.4	.01	.01					

APPENDIX I. Water Temperatures and Zinc Concentrations, Mokelumne River
Fish Installation, 1978-79 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	10.6	10.0	.01		1	11.7	10.6	.02	
2	10.6	10.0	.01		2	11.7	10.6	.02	
3	10.6	10.0	.01		3	11.7	10.6	.01	
4	10.6	10.0	<.01		4	11.7	10.6	.02	
5	10.6	10.0	.01		5	11.7	10.6	.02	
6	10.6	10.0	.02		6	11.7	10.6	.02	
7	10.6	10.0	.04		7	11.7	11.1	.02	
8	10.6	10.0	.05		8	12.2	11.1	.02	
9	10.6	10.0	.05		9	12.2	11.1	.02	
10	11.0	10.0	.01		10	12.2	11.1	.02	
11	11.0	10.0	.02		11	12.2	11.1	.02	
12	11.0	10.0	.02		12	12.2	11.1	.02	
13	11.0	10.0	.01		13	12.2	11.1	.02	
14	11.1	10.6	.01		14	12.2	11.1	.02	
15	11.1	10.0	.01		15	12.2	11.1	.02	
16	11.1	10.0	.01		16	12.2	11.1	.02	
17	11.1	10.0	.02		17	12.2	11.1	.01	
18	11.1	10.0	.01		18	12.2	11.1	.01	
19	11.1	10.0	.02		19	12.2	11.1	.01	
20	11.1	10.0	.01		20	12.2	11.1	.02	
21	11.1	10.0	.01		21	12.2	11.1	.07	
22	11.1	10.0	.03		22	12.2	11.1	.05	
23	11.1	10.0	.02		23	12.2	11.1	.02	
24	11.7	10.6	.01		24	12.2	11.1	.02	
25	11.7	10.6			25	12.2	11.1	.02	
26	11.7	10.6			26	12.2	11.1	.02	
27	11.7	10.6	.01		27	12.2	11.1	.02	
28	11.7	10.6	.02		28	12.2	11.1	.02	
29	11.7	10.6	.01		29	12.2	11.1	.02	
30	11.7	10.6	.02		30	12.2	11.1	.01	
31	11.7	10.6	.01						