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MOKELUMNE RIVER FISH INSTALLATION
ANNUAL REPORT FOR 1982-83 SEASON

by

Philo F. Jewett
Region 2, Inland Fisheries

Anadromous Fisheries Branch

Administrative Report No. 83-9

1983

MOKELUMNE RIVER FISH INSTALLATION
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ABSTRACT

This report describes the operation of the Mokelumne River Fish Installation from July 1, 1982 through June 30, 1983. The installation consists of a hatchery, rearing ponds, and spawning channel for chinook salmon, Oncorhynchus tshawtscha, and steelhead trout, Salmo gairdneri.

We received 1,556,900 fingerlings from the Feather River Hatchery. An estimated 1,560,600 eggs were deposited in the spawning channels. We released 1,315,601 salmon fingerlings and yearlings during the 1982-83 season.

There were 101,152 eyed steelhead trout eggs (1983 BY) received from Nimbus Hatchery. We released 22,493 steelhead yearlings in the Mokelumne River, and 21,000 in Lake Merced in San Francisco, on a catchable trout basis.

1/ Anadromous Fisheries Branch Administrative Report No.
Submitted October 1983

INTRODUCTION

This is the 20th annual report of the Mokelumne River Fish Installation. It covers the period of operation from July 1, 1982, through June 30, 1983. 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 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 cost 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 two 250-ft. and two 500-ft. rearing ponds to accommodate the Salmon Enhancement Program. The operational cost of this portion is funded by the Salmon Stamp Project. This section is scheduled to rear 1,000,000 yearling chinook salmon each year.

WATER TEMPERATURES

Water temperatures were recorded continuously. Maximum and minimum recorded temperatures were 58°F and 44°F, respectively (Appendix Table 1).

COPPER AND ZINC ANALYSIS

In only three of the 20 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 zinc concentrations ranged from 0.01 to 0.08 ppm.

DISEASE

There were no significant mortalities caused by disease this season.

PUBLIC RELATIONS

During the 1982-83 season an estimated 16,000 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 1,661,752 chinook salmon and steelhead eggs was received for rearing (Table 1).

TABLE 1. Production Summary, Mokelumne River Fish Installation, 1982-83.

Species	Number of adults received	Number of eggs received	Number of fingerlings received	Number of fingerlings planted	Number of yearlings planted	On hand 6/30/83
Chinook	2,677	1,560,600	1,556,900	554,498	761,103	1,142,501
Steelhead	-0-	101,152	-0-	-0-	43,493	104,240

CHINOOK SALMON MAINTENANCE

A total of 2,677 adult salmon entered the installation from October 6, 1982, to December 22, 1982. This is the largest number of adults that have ever entered this facility. There were 830 males, 895 grilse, and 952 females. Sixty-five males, 21 grilse, and 69 females marked with an adipose clip were trapped.

Estimated Egg Deposition

Length-fecundity data from 18 females sampled were used to estimate the number of eggs deposited in the gravel. Data were fitted to the linear model $y=a+bx$ by the least squares method, where y = number of eggs, x = fork length in inches, and a and b are constants. The regression line which represented this sample was $\hat{y} = -4,983.99 + 350.24x$. This equation was applied to the 300 females that spawned in the channels and resulted in an estimated potential of 1,560,600 eggs deposited in the gravel. Using 29.1%, a 10-year average of outmigrants to egg deposition, gave an estimated production of 454,134 fingerlings from the spawning channel.

PRODUCTION

On July 1, 1982 we had 1,198,750 Nimbus fingerlings (1981 BY) on hand. We received 1,556,900 fingerlings (1982 BY) from the Feather River Hatchery. On June 30, 1983 we had 1,142,501 Feather River fingerlings (1982 BY) on hand.

Planting 1982-83 Chinook Salmon

We planted 554,498 1982 BY fingerlings and 761,103 1981 BY yearlings, for a total of 1,315,601 chinook salmon (Table 2).

TABLE 2. Chinook Salmon Planting Summary, Mokelumne River Fish Installation, 1982-83.

Date	Area	Number	Size/lb	Mark
Oct. '82	Rio Vista	29,370	11	AD-CWT 06-48-19
Oct. '82	Carquinez Strait	48,410	10.3	AD-CWT 06-48-18
Nov. '82	Rio Vista	19,580	11	A -CWT 06-48-19
Nov. '82	Rio Vista	6,050	11	
Nov. '82	Rio Vista	170,765	7	
Nov. '82	Rio Vista	186,450	10	
Nov. '82	Rio Vista	152,880	8	
Nov. '82	Mokelumne River	29,700	10	
Nov. '82	Mokelumne River	60,298	7	
Dec. '82	Rio Vista	40,000	8	
Dec. '82	Mokelumne River	17,600	8	
May '83	Mokelumne River	454,134	60	
June '83	Carquinez Strait	49,324	59	AD-CWT 06-48-20
June '83	Mokelumne River	51,040	58	AD-CWT 06-48-21

Chinook Salmon Tagging Program

Four groups of AD-CWT marked fish were released during the 1982-83 season. The first group, from the 1981 BY, was released on Oct. 27 and 28, 1982, in the Carquinez Strait (CWT 06-48-18). The second group, also from the 1981 BY, was released on Oct. 29 and Nov. 1, 1982 in the Sacramento River at Rio Vista (CWT 06-48-19). The third group, from the 1982 BY, was released on June 3, 1983, in the Mokelumne River at Woodbridge (CWT 06-48-21). The fourth group, 1982 BY, was released on June 6 and 8, 1983, in Carquinez Strait (CWT 06-48-20).

STEELHEAD PROGRAM

On July 1, 1982 we had 20,580 from the 1981 BY and 78,880 from the 1982 BY on hand. In February 1983 we received 101,152 eyed eggs (1983 BY) from the Nimbus Hatchery. We released into the Mokelumne River 3,743 fish from the 1981 BY, and 18,750 fish from the 1982 BY, on a catchable trout basis. In addition, we released 21,000 1982 BY in Lake Merced in San Francisco. On June 30, 1983 we had 29,740 (1982 BY) and 74,500 (1983 BY) fish on hand.

REFERENCES

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

APPENDIX TABLE 1. Water Temperatures and Zinc Concentrations, Mokelumne River Fish Installation, 1982-83 Season.

Date	Water temperature (C) Max.	Min.	Zinc ppm a.m.	Date	Water temperature (C) Max.	Min.	Zinc ppm a.m.
July				Aug.			
1	13.9	13.3		1	15.0	14.4	
2	13.9	13.3		2	15.0	14.4	
3	13.9	13.3		3	15.0	14.4	
4	13.9	13.3		4	15.0	14.4	
5	13.9	13.3		5	15.6	14.4	
6	14.4	13.9		6	15.6	15.0	
7	14.4	13.9		7	15.6	15.0	
8	14.4	13.9		8	15.6	14.4	
9	14.4	13.9		9	15.6	14.4	
10	14.4	13.9		10	15.6	14.4	
11	14.4	13.9		11	15.6	14.4	
12	14.4	13.9		12	15.6	15.0	
13	14.4	13.9		13	15.6	15.0	
14	14.4	13.9		14	15.6	15.0	
15	14.4	13.9		15	15.6	15.0	
16	14.4	13.9		16	15.6	15.0	
17	14.4	13.9		17	15.6	15.6	
18	14.4	13.9		18	16.1	15.0	
19	15.0	14.4		19	16.1	15.0	
20	15.0	14.4		20	16.7	15.6	
21	15.0	14.4		21	16.7	15.6	
22	15.0	14.4		22	16.7	15.6	
23	15.0	14.4		23	16.7	15.6	
24	15.0	14.4		24	16.7	15.6	
25	15.0	14.4		25	16.7	15.6	
26	15.0	14.4		26	16.7	15.6	
27	15.0	14.4		27	16.7	15.6	
28	15.0	14.4		28	16.7	15.6	
29	15.0	14.4		29	16.7	15.6	
30	15.0	14.4		30	16.7	15.6	
31	15.0	14.4		31	16.7	15.6	

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Date	Water temperature (C) Max.	Min.	Zinc ppm a.m.	Date	Water temperature (C) Max.	Min.	Zinc ppm a.m.
Sept.				Oct.			
1	16.7	15.6		1	16.7	15.6	
2	16.7	15.6		2	16.7	15.6	
3	16.7	15.6		3	16.7	15.6	
4	16.7	15.6		4	16.7	15.6	
5	16.7	15.6		5	16.7	15.6	
6	16.7	15.6		6	16.7	15.6	
7	16.7	15.6		7	16.1	16.1	
8	16.7	15.6		8	16.1	16.1	
9	16.7	15.6		9	16.1	16.1	
10	16.7	15.6		10	16.7	16.1	
11	16.7	15.6		11	16.7	16.1	
12	16.7	15.6		12	16.7	15.8	
13	16.7	15.6		13	16.7	15.8	
14	16.7	15.6		14	16.7	15.8	
15	16.7	15.6		15	16.7	15.8	
16	16.7	15.6		16	16.7	15.8	
17	16.7	15.6		17	16.7	15.8	
18	16.7	15.6		18	16.7	15.8	
19	16.7	15.6		19	16.7	15.8	
20	16.7	15.6		20	16.7	15.8	
21	16.7	15.6		21	16.7	15.8	
22	16.7	15.6		22	16.7	15.8	
23	16.7	15.6		23	16.7	15.8	
24	16.7	15.6		24	16.7	15.8	
25	16.7	15.6		25	16.7	15.8	
26	16.7	15.6		26	16.7	16.1	
27	16.7	15.6		27	16.7	16.7	
28	16.7	15.6		28	16.7	16.7	
29	16.7	15.6		29	16.7	16.1	
30	16.7	15.6		30	16.7	16.1	
				31	16.7	16.1	

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Date	Water temperature (C) Max.	Min.	Zinc ppm a.m.	Date	Water temperature (C) Max.	Min.	Zinc ppm a.m.
Nov.				Dec.			
1	16.7	16.1		1	12.2	12.1	
2	16.7	16.1		2	11.7	11.7	
3	16.7	16.1		3	11.7	11.7	
4	16.7	16.1		4	11.7	11.7	
5	16.7	16.1		5	11.7	11.7	
6	16.7	16.1		6	11.7	11.7	
7	16.7	16.1		7	11.7	11.7	
8	16.7	16.1		8	11.1	10.6	
9	16.7	16.1		9	11.1	10.6	
10	15.0	14.4		10	11.1	10.6	
11	15.0	14.4		11	11.1	10.6	
12	15.0	14.4		12	11.1	10.6	
13	15.0	14.4		13	11.1	10.6	
14	14.4	13.9		14	11.1	10.6	
15	14.4	13.9		15	10.6	10.6	
16	14.4	13.9		16	10.0	9.4	
17	14.4	13.9		17	10.0	9.4	
18	13.3	13.3		18	10.0	9.4	
19	13.3	13.3		19	10.0	9.4	
20	13.3	12.8		20	10.0	9.4	
21	12.8	12.8		21	10.0	9.4	
22	12.8	12.8		22	10.0	9.4	
23	12.8	12.8		23	10.0	9.4	
24	12.8	12.8		24	10.0	9.4	
25	12.8	12.8		25	10.0	9.4	
26	12.8	12.8		26	10.0	9.4	
27	12.8	12.8		27	10.0	9.4	
28	12.8	12.8		28	10.0	9.4	
29	12.8	12.8		29	9.4	9.4	
30	12.8	12.8		30	8.3	8.3	
				31	8.3	8.3	

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Date	Water temperature (C) Max.	Min.	Zinc ppm a.m.	Date	Water temperature (C) Max.	Min.	Zinc ppm a.m.
Jan.				Feb.			
1	8.3	7.8		1	7.8	7.8	
2	7.8	7.8		2	7.8	7.8	
3	7.8	7.8		3	7.8	7.8	
4	7.8	7.8		4	7.8	7.8	
5	7.8	7.8		5	7.8	7.8	
6	7.2	7.2		6	8.3	8.3	
7	7.2	7.2		7	8.3	8.3	
8	7.2	7.2		8	8.3	8.3	
9	7.2	7.2		9	8.3	7.6	
10	7.2	7.2		10	8.3	7.6	
11	7.2	7.2		11	8.3	7.6	
12	7.2	7.2		12	8.3	7.6	
13	7.2	7.2		13	8.3	7.6	
14	7.2	7.2		14	8.3	7.6	
15	7.2	7.2		15	8.3	7.8	
16	7.2	7.2		16	7.8	7.8	
17	7.2	6.7		17	7.8	7.8	
18	7.2	6.7		18	7.8	7.8	
19	7.2	6.7		19	7.8	7.8	
20	7.2	6.7		20	7.8	7.8	
21	7.2	6.7		21	7.8	7.8	
22	7.2	6.7		22	7.8	7.8	
23	7.2	6.7		23	7.8	7.8	
24	7.2	6.7		24	7.8	7.8	
25	7.2	6.7		25	8.3	8.3	
26	7.8	7.8		26	8.3	8.3	
27	7.8	7.8		27	9.4	8.3	
28	7.8	7.8		28	9.4	8.9	
29	7.8	7.8					
30	7.8	7.8					
31	7.8	7.8					

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Date	Water temperature (C) Max.	Min.	Zinc ppm a.m.	Date	Water temperature (C) Max.	Min.	Zinc ppm a.m.
Mar.				April			
1	9.4	8.9		1	9.4	8.9	0.01
2	9.4	8.9		2	9.4	8.9	0.01
3	9.4	8.9		3	9.4	8.9	0.01
4	9.4	8.9		4	9.4	8.9	0.01
5	9.4	8.9		5	10.0	8.9	0.01
6	9.4	8.9		6	10.0	9.4	0.01
7	9.4	8.9		7	10.0	9.4	0.08
8	9.4	8.9		8	10.0	9.4	0.03
9	9.4	9.4		9	10.0	9.4	
10	9.4	9.4	0.03	10	10.0	9.4	
11	9.4	9.4	0.02	11	9.4	9.4	
12	9.4	9.4	0.01	12	9.4	9.4	
13	9.4	9.4	0.01	13	10.0	9.4	0.02
14	9.4	9.4	0.02	14	10.0	9.4	0.02
15	8.9	8.9	0.02	15	10.0	9.4	0.02
16	9.4	8.9	0.03	16	10.0	9.4	0.02
17	9.4	8.9	0.02	17	10.0	9.4	0.02
18	9.4	8.9	0.02	18	10.0	9.4	0.02
19	9.4	8.9	0.02	19	10.0	9.4	0.02
20	9.4	8.9	0.02	20	9.4	9.4	0.02
21	9.4	8.9	0.01	21	9.4	9.4	0.02
22	10.0	9.4	0.01	22	9.4	9.4	0.01
23	10.0	9.4	0.01	23	9.4	9.4	0.02
24	10.0	9.4	0.01	24	9.4	9.4	0.01
25	10.0	9.4	0.01	25	9.4	9.4	0.02
26	10.0	9.4	0.01	26	9.4	9.4	0.02
27	10.0	9.4	0.01	27	10.0	9.4	0.02
28	10.0	9.4	0.02	28	10.0	9.4	0.02
29	9.4	8.9	0.01	29	10.0	9.4	0.02
30	9.4	8.9	0.01	30	10.0	9.4	0.03
31	9.4	8.9	0.01				

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Date	Water temperature (C) Max.	Min.	Zinc ppm a.m.	Date	Water temperature (C) Max.	Min.	Zinc ppm a.m.
May				June			
1	10.0	9.4	N.S.	1	11.7	10.6	0.02
2	10.0	9.4	0.03	2	11.7	11.1	0.02
3	10.0	9.4	0.03	3	11.7	11.1	0.01
4	10.0	9.4	0.02	4	11.7	11.1	0.04
5	10.0	9.4	0.02	5	12.2	11.1	0.40 1/
6	10.0	9.4	0.02	6	12.2	11.1	0.01
7	10.0	9.4	0.04	7	12.2	11.1	0.01
8	10.0	9.4	0.02	8	12.2	11.1	0.01
9	10.6	10.0	0.02	9	12.2	11.7	0.01
10	10.6	10.0	0.02	10	12.2	11.7	0.01
11	10.6	10.0	0.02	11	12.2	11.7	0.01
12	10.6	10.0	0.02	12	12.8	11.7	0.01
13	11.1	10.0		13	14.4	13.3	0.01
14	11.1	10.6		14	14.4	13.3	0.01
15	11.1	10.6		15	14.4	13.3	0.01
16	11.1	10.6		16	14.4	13.3	0.01
17	11.1	10.6		17	14.4	13.3	0.01
18	10.0	10.0		18	14.4	13.3	0.02
19	10.6	10.6		19	14.4	13.3	0.02
20	11.1	10.6		20	14.4	13.3	0.01
21	11.1	10.6		21	14.4	13.3	0.01
22	11.1	10.6		22	14.4	13.3	0.06
23	11.1	10.6		23	14.4	13.3	0.01
24	11.1	10.6		24	14.4	13.3	0.01
25	11.7	10.6		25	14.4	13.3	0.02
26	11.7	10.6	0.02	26	14.4	13.3	0.04
27	11.7	10.6	0.02	27	14.4	13.3	0.01
28	11.7	10.6	0.01	28	14.4	13.3	0.01
29	11.7	10.6	0.02	29	14.4	13.9	0.01
30	11.7	10.6	0.05	30	15.0	14.4	0.01
31	11.7	10.6	0.02				

1/ Probable contaminated sample