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ANNUAL REPORT
IRON GATE SALMON AND STEELHEAD HATCHERY, 1987-88

by

Curtis A. Hiser
Region 1, Inland Fisheries

Inland Fisheries
Administrative Report No. 91-5
1991

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ABSTRACT

This report describes the operation of the Hatchery from July 1, 1987 through June 30, 1988. Appendix tables present daily records of water temperatures, weekly numbers of salmonids entering the Hatchery, total numbers of salmonids reared and released, and historical records.

There were 15,189 fall-run chinook salmon, Oncorhynchus tshawytscha, trapped, which produced 19,322,680 eggs. No spring-run chinook salmon were taken. The 2,581 adult coho salmon, O. kitsutch, produced 1,923,902 eggs. A total of 3,770 (2,771 fall-run and 999 spring-run) steelhead trout, O. mykiss, produced 1,309,009 eggs.

A total of 11,360,000 fingerling and 1,055,000 yearling chinook salmon, 135,000 yearling coho salmon, and 335,000 yearling steelhead was planted in FY 1987-88.

^{1/} Inland Fisheries Administrative Report No. 91-5.
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Department of Fish and Game, 1416 Ninth Street, Sacramento,
CA 95814.

INTRODUCTION

This report covers the 25th year of operation of the trapping facilities at Iron Gate Hatchery. These facilities were completed by the Pacific Power and Light Company in February 1962 and have been operated by the Department of Fish and Game during the spring and fall of each year.

The Hatchery was constructed by the Pacific Power and Light Company to compensate for spawning and nursery areas blocked by the Iron Gate Project. This is the 21st report since the Hatchery was completed in February 1966. The Department of Fish and Game under agreement with the Pacific Power and Light Company, began operation of the Hatchery in March 1966. The trapping facilities and Hatchery are located on the Klamath River 8 miles east of Hornbrook, Siskiyou County.

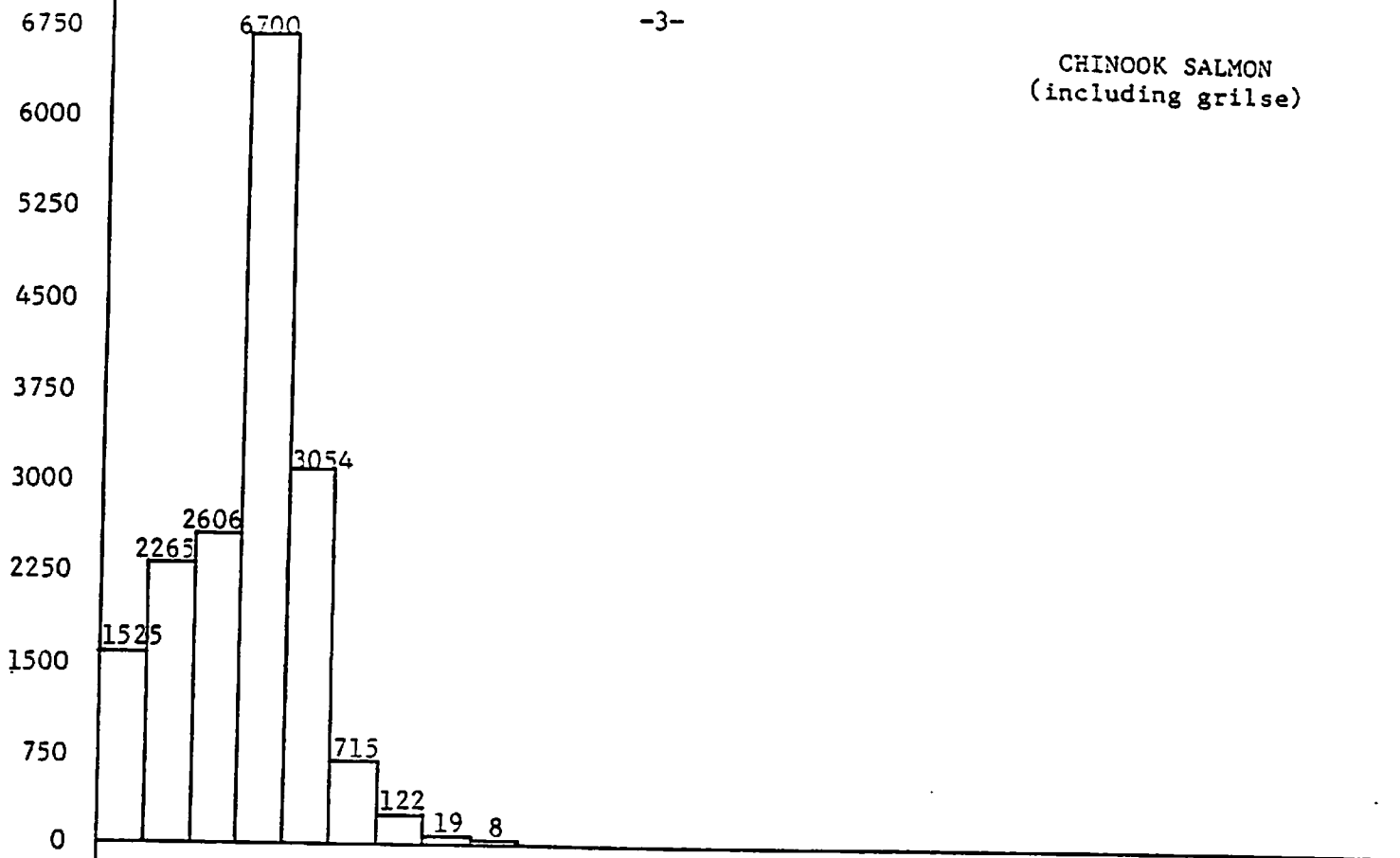
PRODUCTION SUMMARY

This report summarizes the numbers of fish trapped and spawned (Table 1 and Figure 1), production of eggs and fish (Table 1), and water temperatures (Appendix Figure 1) from July 1, 1987 through June 30, 1988.

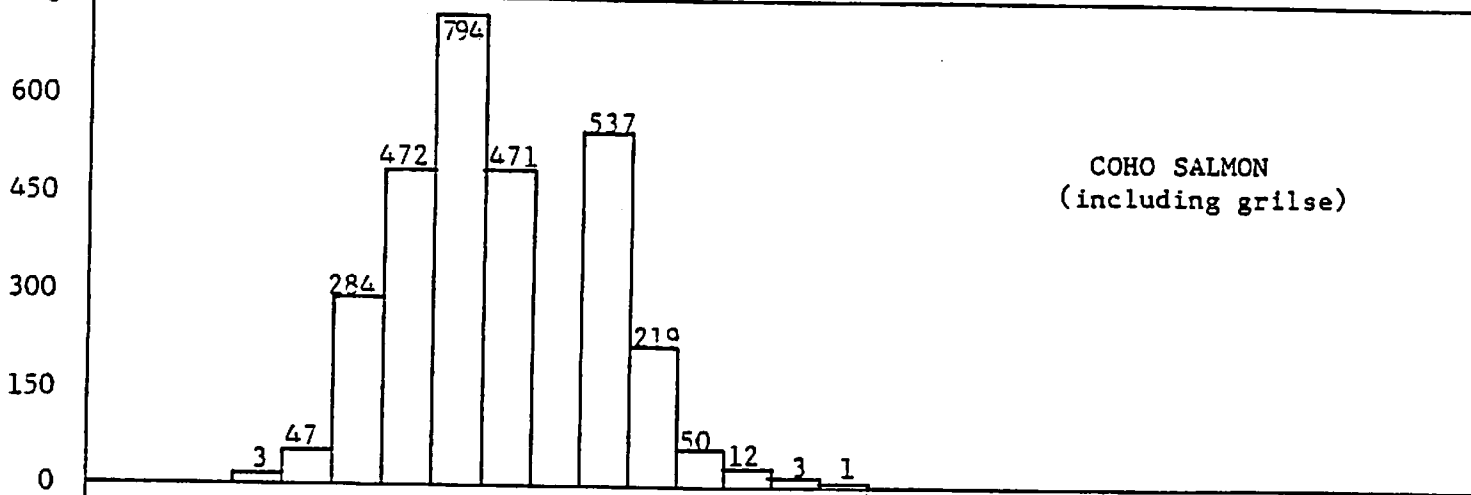
TABLE 1. Production Summary, Iron Gate Salmon and Steelhead Hatchery, 1987-88

	Adults trapped	Eggs taken or received	Eggs transferred	Fingerlings planted and transferred	Yearlings planted	Total pounds planted and transferred
<u>Chinook salmon</u>						
1986 BY				25,000	1,055,000	91,389
1987 BY	15,189	19,322,680	90,000	11,656,560		72,789
<u>Coho salmon</u>						
1986 BY						
1987 BY	2,581	1,923,902	852,462		135,000	9,167
<u>Steelhead</u>						
1987 BY						
1988 BY	3,770	1,309,009			335,460	21,167

CHINOOK SALMON
(including grilse)



COHO SALMON
(including grilse)



STEELHEAD

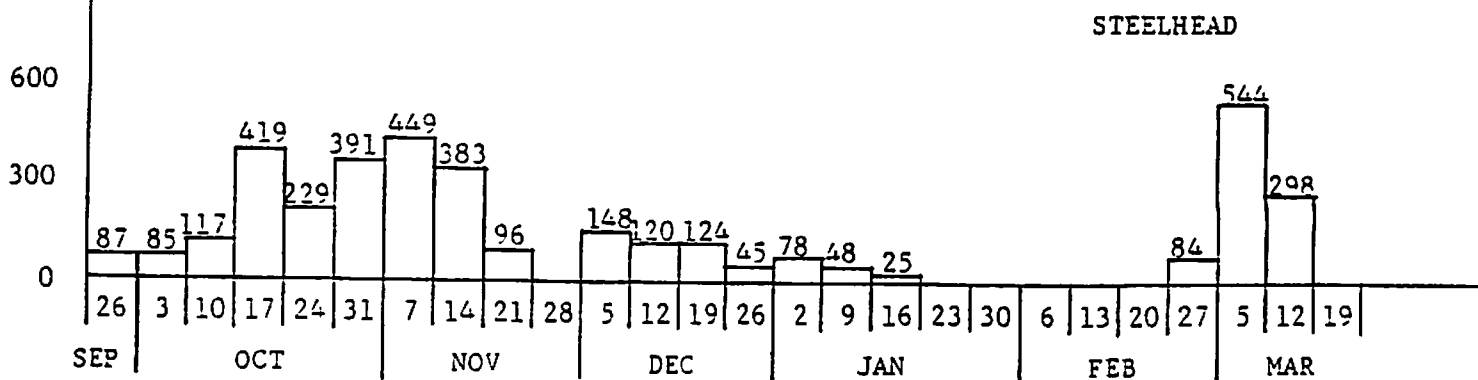


FIGURE 1. Weekly numbers of chinook salmon, coho salmon, and steelhead trapped at Iron Gate Salmon and Steelhead Hatchery, 1987-88 season.

CHINOOK SALMON MAINTENANCE PROGRAM

History of the 1987 Run

Spring-Run, 1987 Brood Year

No spring-run chinook salmon appeared at the trap in 1987.

Fall-Run, 1987 Brood Year

A total of 17,014 fall-run chinook salmon was trapped: 7,451 males, 7,738 females, and 1,825 grilse (Figure 1). Grilse are fish (≤ 56 cm or 22 inches FL). There were 6,220 females spawned; they produced 19,322,680 eggs, for an average of 3,106 eggs per female (Table 1). Prespawning mortality was 1,518 females (24%). Sixteen lots of eggs were taken, with an average fertility of 73%. A total of 15,000 eggs was shipped to the United States Fish and Wildlife Service in South Dakota for a selenium study. An additional 75,000 eggs were shipped to the Bureau of Indian Affairs at Hoopa, California. Approximately 1,160,000 chinook salmon fingerlings were on hand as of June 30, 1988.

Distribution of the 1986 Brood Year Chinook Salmon

There were 25,000 fingerlings transferred July 30, 1987 at 53/lb (Table 2). During November 1987, 1,055,000 yearlings were planted (Table 2), ranging in size from 12 to 10/lb. About 100 salmon were sacrificed by hatchery personnel for smoltification studies, as part of a cooperative program with the University of California at Berkeley.

Distribution of the 1987 Brood Year Chinook Salmon

There were 11,360,000 fingerling salmon planted from April 6 to May 16, 1988 which ranged in size from 245 to 129/lb (Table 2). From May 18 to June 10, 1988, a total of 280,000 fingerling salmon was transferred to the Klamath River Rearing Ponds (Table 2). Another 16,560 fingerling chinook salmon were transferred to rearing ponds on Cappell Creek for the Bureau of Indian Affairs. Approximately 150 salmon were sacrificed by Iron Gate Hatchery personnel for smoltification studies.

Marked Chinook Salmon Recovered

Of the 5,443 marked chinook salmon trapped during 1987-88 (Appendix Table 1), 865 were Iron Gate marks, 81 from Klamath Glen, 26 from Trinity River Hatchery, 6 from Bogus Creek, 4 from Junction City, 3 from Lime Point, 2 from Ferry Creek and the remainder (Ad) were of undetermined origin.

TABLE 2. Iron Gate Hatchery Chinook Salmon Distribution Data, 1987-88

<u>Race and brood year</u>	<u>Date released</u>	<u>Average size/lb</u>	<u>Number released</u>	<u>Release site</u>	<u>Mark (Coded-wire tag number)</u>
Fall-run, 1986	Transferred to Klamath River Rearing Ponds:				
	7/30/87	53	25,000	Grider Creek	
	Planted:				
	11/16-17/87	10	180,000	IGH	
	11/20-21/87	12	100,000	IGH	6-59-42
	11/20-21/87	12	25,153	IGH	6-53-32 ^{a/}
	11/20-21/87	12	749,847	IGH	
<u>Total fingerlings</u>			<u>25,000</u>		
<u>Total yearlings</u>			<u>1,055,000</u>		
Fall-run, 1987	Transferred:				
	5/5/88	144	16,560	Cappell Ck. Pond (BIA)	
	Transferred to Klamath River Rearing Ponds:				
	5/18/88	121	40,000	Indian Creek	
	5/19/88	121	40,000	Indian Creek	
	5/23/88	132	40,000	Bluff Creek	
	5/24/88	132	40,000	Bluff Creek	
	5/31/88	114	40,000	Elk Creek	
	6/7/88	100	40,000	Grider Creek	
	6/10/88	100	40,000	Red Cap Creek	
	Planted:				
	4/6-7/88	245	1,000,000	IGH	
	4/20/88	225	2,000,000	IGH	
	5/3/88	239	2,100,000	IGH	
	5/16/88	129	6,075,000	IGH	
	5/16/88	129	185,000	IGH	B6-2-1
<u>Total fingerlings</u>			<u>11,656,560</u>		

a/ Soft-moist feed group.

COHO SALMON MAINTENANCE PROGRAM

History of the 1987 Run

The first coho salmon entered the trap on October 14, 1987 and the last on January 6, 1988. A total of 2,893 fish was trapped: 1,343 males, 1,238 females, and 312 grilse (≤ 56 cm or 22 inches FL). The 777 females spawned produced 1,923,902 eggs (Table 1) for an average of 2,476 eggs per female. There were 852,462 eggs shipped to Mad River Hatchery. From July 1987 through June 1988, 1,000 fingerling and yearling coho were supplied to the University of California at Berkeley for smoltification studies. Approximately 230,000 fingerling salmon were held for later release.

Planting 1986 Brood Year Coho Salmon

There were 135,000 coho salmon planted during the 1987-88 season (Table 3).

TABLE 3. Iron Gate Coho Salmon Planting Data, 1987-88

Date	Average size/lb	Number	Brood year	Release site	Mark (Coded wire tag No.)
3/18/88	18	75,000	1986	IGH	--
3/27/88	12	12,000	1986	Beaver Ck.	--
4/28-5/3/88	12	24,000	1986	Elk Ck.	--
5/4-9/88	12	24,000	1986	Indian Ck.	--
Total yearlings		135,000			

Marked Coho Salmon Recovered

Of the marked coho salmon recovered in the trap (Appendix 1), 696 were of Iron Gate origin, 17 from the Salmon River, 2 from the Rogue River, and the remainder were of undetermined origin.

STEELHEAD TROUT MAINTENANCE PROGRAM

History of the 1987-88 Run

Between September 21 and December 31, 1987, 2,771 steelhead entered the trap and were held for later spawning. An additional 999 steelhead were trapped between January 1 and March 11, 1988 (Figure 1).

The 672 females spawned produced 1,309,009 eggs, for an average of 1,948 eggs per female. Approximately 375,000 steelhead fingerlings from the 1988 brood year were on hand June 30, 1988.

Planting 1987 Brood Year Steelhead

There were 335,000 steelhead yearling planted in 1987-88 (Table 4).

TABLE 4. Iron Gate Hatchery Juvenile Steelhead Planting Data, 1987-88

<u>Strain</u>	<u>Brood year</u>	<u>Date released</u>	<u>Average size/lb</u>	<u>Number released</u>	<u>Release site</u>	<u>Mark brand</u>
KR	1987	4/25/88	30	100,000	Iron Gate Lake	--
KR	1987	4/25/88	30	35,000	Iron Gate Lake	RP
KR	1987	5/6/88	12	200,000	IGH	--
<hr/>						
Total yearlings				335,000		

Marked Steelhead Trapped

The one marked steelhead (Ad) trapped this season was of undetermined origin.

PUBLIC RELATIONS

During the 1987-88 fiscal year, 3,787 people visited the Hatchery, including 554 people in organized groups.

APPENDIX TABLE 1. Coded-Wire-Tag (CWT) Recoveries for Iron Gate Hatchery (IGH), with Release Data

CWT code	Egg source	Brood year	Release data				Recovery data					
			Date	Number	#/lb	Site	Year	CWT Recoveries actual	expanded	Mean FL (cm) male	female	Unknown
FALL CHIN												
06 59 23	IGH	83	6/28/84	191,352	6.1	IGH	85-86a/	27	27	52(27)	---	---
							86-87	157	166	70(79)	68(77)	---
							87-88	44	44	85(10)	76(35)	---
06 59 24	IGH	83	6/25-29/84	97,566	5.1	Klamath Glen	85-86a/	18	18	52(18)	---	---
							86-87	45	48	70(27)	68(18)	---
							87-88	13	13	85(6)	75(7)	---
06 59 25	IGH	83	11/21/84	94,738	43.7	IGH	85-86a/	17	17	48(17)	---	---
							86-87	229	243	66(142)	64(84)	---
							87-88	172	172	83(77)	76(94)	---
06 59 26	IGH	83	11/14/84- 12/3/84	23,725	43.7	Klamath Glen	85-86a/	3	3	62(3)	---	---
							86-87	27	29	72(17)	64(10)	---
							87-88	13	13	83(5)	75(8)	---
06 59 31	IGH	83	11/21/84	22,599	43.7	IGH	85-86a/	10	10	45(10)	---	---
							86-87	88	93	64(60)	65(27)	---
							87-88	97	97	78(50)	74(47)	---
06 59 32	IGH	83	11/21/84	24,830	43.7	IGH	85-86a/	16	16	49(14)	85(1)	---
							86-87	135	143	67(85)	65(48)	---
							87-88	83		82(32)	74(51)	---
06 59 33	IGH	83	11/21/84	23,766	43.7	IGH	85-86a/	6	6	46(6)	---	---
							86-87	79	84	66(58)	66(21)	---
							87-88	52	52	81(23)	80(29)	---
06 08 02	BOG	83	3/26-28/84 4/3-26/84	13,995	660.0	Bogus Creek	86-87	2	2	86(2)	---	---
							87-88	1	1	---	75(1)	---
06 56 18	TRH	84	6/12,13/85	98,989	55.0	Junction City	87-88	3	3	64(2)	73(1)	---
06 56 19	TRH	84	6/14,17/85	94,100	8.4	Line Point	86-87	4	4	49(4)	---	---
							87-88	3	3	---	65(3)	---
06 56 21	TRH	84	10/8/85	24,541	12.0	Junction City	87-88	1	1	58(1)	---	---

APPENDIX TABLE 1. Coded-Wire-Tag (CWT) Recoveries for Iron Gate Hatchery (IGH), with Release Data (cont't)

CWT code	Egg source	Brood year	Release data				Recovery data					
			Date	Number	#/lb	Site	Year	CWT Recoveries actual	expanded	Mean FL (cm) male	female	Unknown
FALL CHIN (cont'd)												
06 56 24	TRH	84	2/27-28/86	102,512	81.0	TRH	86-87 87-88	1 17	1 17	35(1) 63(10)	--- 62(6)	--- 67(1)
06 59 22	IGH	84	10/23/85 11/6-7/85	98,500	50.4	IGH	86-87 87-88	62 307	66 307	43(61) 66(192)	--- 64(115)	---
06 59 27	IGH	84	6/27/85	187,500	3.9	IGH	86-87 87-88	15 70	16 70	50(14) 70(26)	71(1) 67(44)	--- ---
06 59 28	IGH	84	6/17-27/85	93,710	4.2	Klamath Glen	86-87 87-88	5 37	5 37	50(5) 72(17)	--- 68(19)	--- ---
06 59 35	IGH	84	11/26/85	24,275	50.4	Klamath Glen	86-87 87-88	7 18	8 18	45(7) 68(8)	--- 67(9)	--- ---
06 61 27	TRH	84	6/10/85	186,708	8.6	TRH	86-87 87-88	2 5	2 5	45(2) 68(3)	--- 70(2)	--- ---
86 08 03	BOG	84	2/26/85- 3/20/85	24,492	891.0	Bogus Creek	87-88	5	5	72(2)	70(3)	---
06 56 23	TRH	85	6/11-27/86	196,249	71.0	TRH	87-88	2	2	54(2)	---	---
06 56 25	TRH	85	10/8-27/86	97,368	13.5	TRH	87-88	2	2	88(1)	72(1)	---
06 59 29	IGH	85	10/20/86	95,296	7.3	IGH	87-88	11	11	46(11)	---	---
06 59 34	IGH	85	6/13/86	147,356	---	IGH	87-88	18	18	56(16)	64(1)	---
06 63 03	IGH	85	11/12-19/86	18,875	7.2	IGH	87-88	1	1	40(1)	---	---
06 63 05	IGH	85	11/12-19/86	16,038	7.2	IGH	87-88	2	2	40(2)	---	---
06 63 06	IGH	85	11/12-19/86	21,225	7.2	IGH	87-88	3	3	44(3)	---	---
06 63 09	IGH	85	11/12-19/86	17,596	7.2	IGH	87-88	1	1	40(1)	---	---
06 63 18	IGH	85	11/20/86	24,443	6.6	IGH	87-88	4	4	58(4)	---	---
07 35 41	CRH	85	9/-/86	27,168	10.8	Ferry Creek	87-88	2	2	47(2)	---	---

APPENDIX TABLE 1. Coded-Wire-Tag (CWT) Recoveries for Iron Gate Hatchery (IGH), with Release Data (cont't)

CWT code	Egg source	Brood year	Release data				Recovery data					
			Date	Number	#/lb	Site	Year	CWT actual	Recoveries expanded	Mean FL (cm) male	female	Unknown
FALL CHIN (cont'd)												
10 00 00d/	---	---	---	---	---	---	82-83	83	112	---	---	---
							83-84	129	196	---	---	---
							84-85	163	172	---	---	---
							85-86a/	1,245	1,245	76(603)	73(635)	---
							86-87	294	264	79(142)	75(151)	47(1)
							87-88	152	152	68(56)	71(96)	---
20 00 00e/	---	---	---	---	---	---	83-84	14	21	---	---	---
							84-85	65	69	---	---	---
							85-86a/	23	23	71(11)	73(12)	---
							86-87	22	22	76(11)	66(10)	68(1)
							87-88	8	8	73(6)	72(2)	---
COHO												
06 59 43	IGH	84	2/28/86	37,224	26.7	IGH	86-87	94	94	43(92)	65(1)	---
							87-88	696	696	68(281)	68(327)	---
06 59 61	MRH	84	3/27-28/86	21,441	43.2	Salmon River	86-87	13	13	46(12)	48(1)	---
							87-88	17	17	68(13)	68(6)	---
07 31 61	CRH	84	5/-/86	23,752	12.6	Rogue River	87-88	2	2	67(1)	---	---
10 00 00d/	---	---	---	---	---	---	84-85	5	8	---	---	---
							85-86a/	235	235	50(102)	73(38)	---
							86-87	88	88	58(53)	69(33)	---
							87-88	183	183	68(90)	67(91)	53(1)
20 00 00e/	---	---	---	---	---	---	85-86a/	16	16	49(12)	71(1)	---
							86-87	3	3	43(1)	71(1)	76(1)
							87-88	4	4	63(3)	66(1)	---

a/ In 1985-86 heads were removed from 5,840 salmon entering IGH, but only 5,357 were Ad-clipped. Therefore, we assumed that the expanded number was equal to the actual number sampled.

b/ --- = Data not available.

c/ Sample size in parenthesis

d/ 10 00 00 = No CWT in head of Ad-marked fish

e/ 20 00 00 = CWT lost in dissection

f/ 40 00 00 = Cut unreadable

g/ 99 99 99 = Data was recorded but Cut not found

APPENDIX TABLE 2. Summary of Chinook Salmon Runs, to Iron Gate Salmon and Steelhead Hatchery

Season	Fall-trapped Spring-run 1/		Fall-run				Spring-trapped Spring-run 1/	
	Adults	Grilse	Males	Females	Total Adults	Total Grilse	Adults	Grilse
1962-63	2/						1,339	
1963-64					1,723	448	2,171	
1964-65			837	1,651	2,488	110	2,598	
1965-66			141	224	365	313	678	
1966-67			1,129	1,610	2,739	325	3,064	
1967-68			850	1,275	2,125	562	2,687	
1968-69			946	1,690	2,636	72	2,708	50
1969-70	8	3	518	436	954	1,914	2,868	51
1970-71	2	0	2,889	7,395	10,284	219	10,503	10
1971-72	16	0	4,412	6,031	10,443	326	10,769	80
1972-73	97	4	1,126	1,897	3,023	476	3,499	49
1973-74	18	5	3,273	4,135	7,408	1,294	8,702	4
1974-75	19	8	4,024	5,371	9,395	410	9,805	0
1975-76	25	28	3,131	4,571	7,702	3,425	11,127	0
1976-77	13	0	4,604	7,991	12,595	1,130	13,725	0
1977-78	0	0	1,514	2,799	4,313	520	4,833	0
1978-79	17	0	3,027	3,918	6,945	925	7,870	0
1979-80	0	0	1,003	1,298	2,301	257	2,558	0
1980-81	0	0	948	1,464	2,412	451	2,863	0
1981-82	0	0	904	1,151	2,055	540	2,595	0
1982-83	0	0	3,805	4,548	8,353	1,833	10,186	0
1983-84	0	0	3,927	4,444	8,371	514	8,885	0
1984-85	0	0	2,484	2,846	5,330	764	6,094	0
1985-86	0	0	10,073	9,878	19,951	2,159	22,110	0
1986-87	0	0	9,093	8,003	17,096	1,461	18,557	0
1987-88	0	0	7,451	7,738	15,189	1,825	17,014	0

1/ Fall trapped spring-run chinook salmon are the same brood year as the spring-trapped spring-run salmon of the preceding reporting period. Spring-run not differentiated from fall-run prior to 1968-69.

2/ Blanks indicate data not available.

APPENDIX TABLE 3. Summary of Coho Salmon and Steelhead Trout Run to Iron Gate Salmon and Steelhead Hatchery

Season	Coho salmon					Steelhead ^{1/}		Total
	Males	Females	Adults	Grilse	Total	Fall-trapped early-run	Spring-trapped late-run	
1963-64	81	95	176	14	190			1,542
1964-65	0	0	0	0	0			1,065
1965-66	2	0	0	0	2			227
1966-67	2	2	4	0	4			299
1967-68	27	24	51	28	79			984
1968-69	14	10	24	333	357			370
1969-70	84	118	202	749	951	381	813	1,194
1970-71	716	671	1,387	236	1,623	292	2,073	2,364
1971-72	74	52	126	21	147	174	3,583	3,757
1972-73	38	18	56	35	91	226	1,060	1,286
1973-74	201	212	413	428	841	665	1,200	1,865
1974-75	193	263	456	41	497	1,062	2,165	3,227
1975-76	45	37	82	478	560	423	1,100	1,523
1976-77	581	795	1,376	381	1,757	695	1,246	1,941
1977-78	92	159	251	375	626	3,197	1,214	4,411
1978-79	263	236	499	250	749	812	1,267	2,079
1979-80	213	282	495	1,906	2,401	505	1,152	1,657
1980-81	580	1,220	1,800	251	2,051	359	888	1,247
1981-82	402	502	904	93	997	1,903	358	2,211
1982-83	499	634	1,133	496	1,629	1,267	1,436	2,705
1983-84	128	90	218	71	289	470	362	832
1984-85	444	350	794	211	1,005	373	1,012	1,385
1985-86	1,041	1,288	2,269	408	2,677	1,286	1,879	3,165
1986-87	315	422	737	288	1,025	1,347	1,487	2,834
1987-88	1,343	1,238	2,581	312	2,893	2,771	999	3,770

^{1/} Fall-trapped steelhead not differentiated from spring-trapped prior to 1969-70.

APPENDIX TABLE 4. Fork Length (to nearest cm) of Steelhead Measured at Iron Gate Salmon and Steelhead Hatchery^{1/}

Length	Number trapped	
	Males	Females
39	1	1
40		
41	2	
42	1	4
43	1	4
44	1	10
45	3	15
46	5	18
47	8	10
48	22	21
49	18	15
50	14	9
51	15	16
52	18	12
53	10	9
54	7	14
55	8	5
56	3	6
57	5	3
58	4	5
59	3	3
60	4	1
61	2	
62	1	1
63		
64	1	
65		
66		
67		
68	1	
<hr/>		
Average FL	51.2	49.6

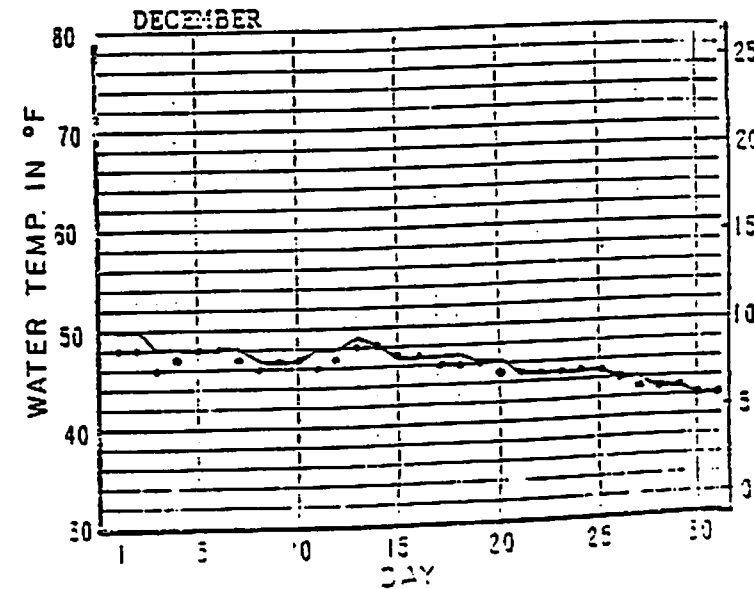
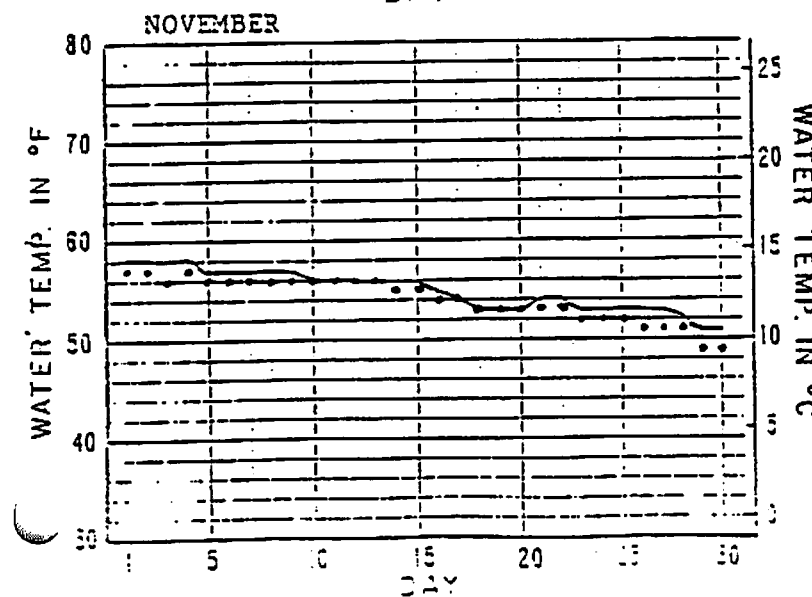
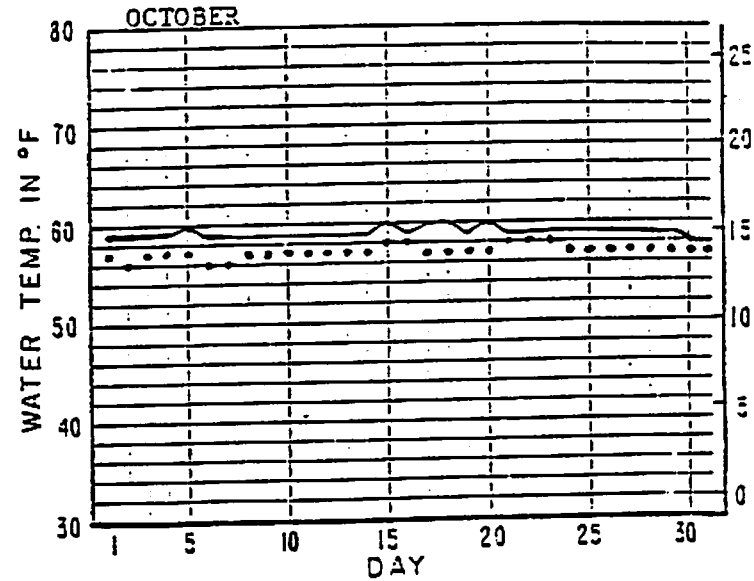
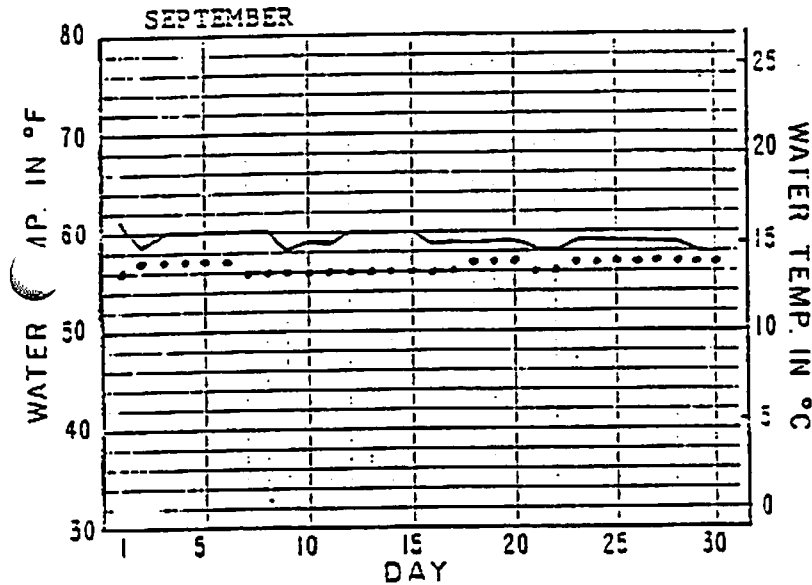
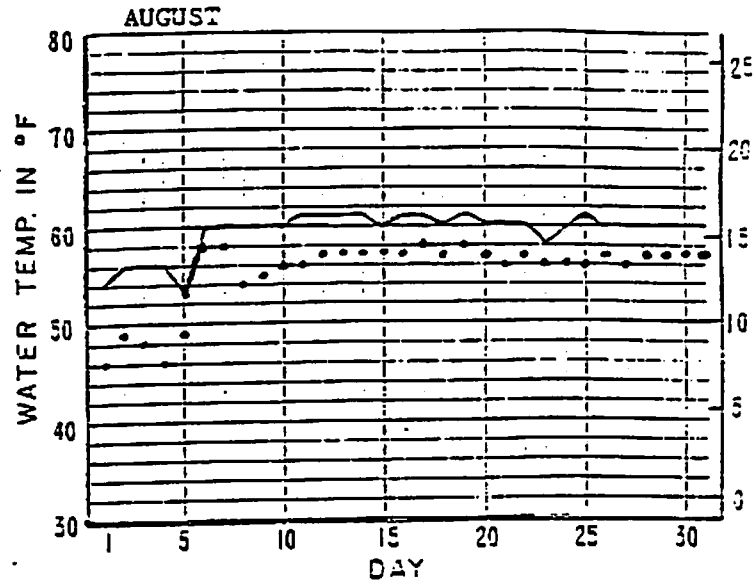
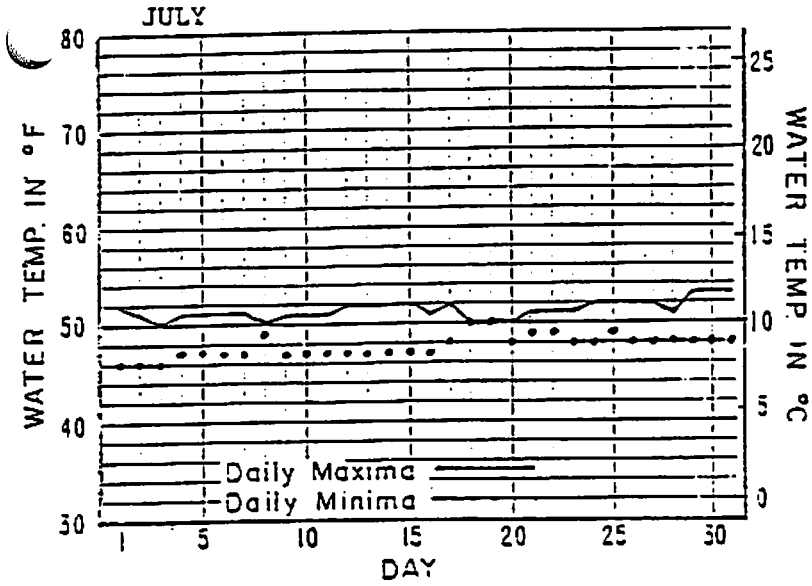
^{1/} Information supplied by Ivan Paulsen, Fishery Biologist, Yreka.

APPENDIX TABLE 5. Weekly Adult Salmon and Steelhead Trapping Data, for Iron Gate Salmon and Steelhead Hatchery, 1987-88

Week	Chinook salmon Adults Grilse	Coho salmon Adults Grilse	Steelhead trout Fall	Steelhead trout Spring
9/20-26	1,493	32	87	87
9/27-10/3	2,183	82	85	85
10/4-10	2,409	197	117	117
10/11-17	5,824	876	419	419
10/18-24	2,562	492	229	229
10/25-31	573	193	391	391
11/1-7	118	365	449	449
11/8-14	19	735	383	383
11/15-21	8	455	96	96
11/22-28		16	148	148
11/29-12/5		15	120	120
12/6-12		7	124	124
12/13-19		49	45	45
12/20-26		12	78	78
12/27-1/2		3		
1/3-9		1		
1/10-16			48	48
1/17-23			25	25
1/24/30				
1/31-2/6				
2/7-13				
2/14-20				
2/21-27				
2/28-3/5				
3/6-12				
Season totals	15,189	2,581	2,771	999

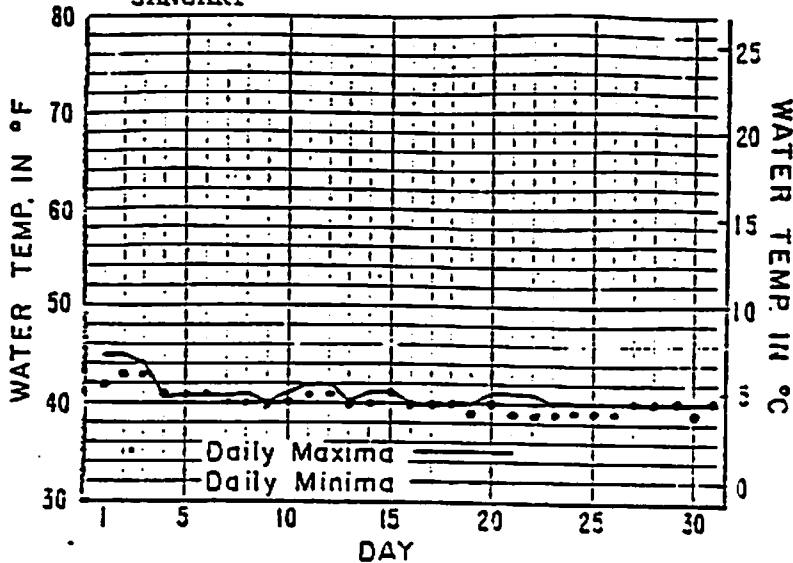
APPENDIX FIGURE 1. Daily Water Temperatures for Iron Gate Daimon and Steelhead Hatchery from July 1, 1987 through June 30, 1988

DAILY WATER TEMPERATURES BY MONTH:

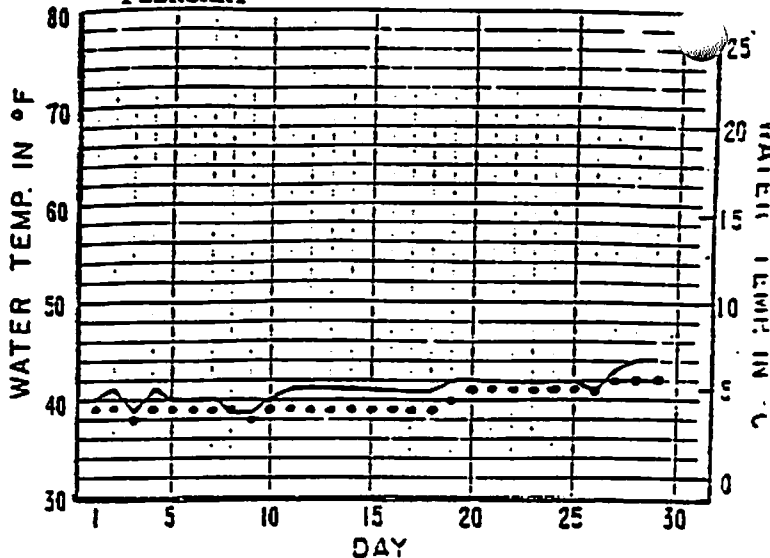


DAILY WATER TEMPERATURES BY MONTH

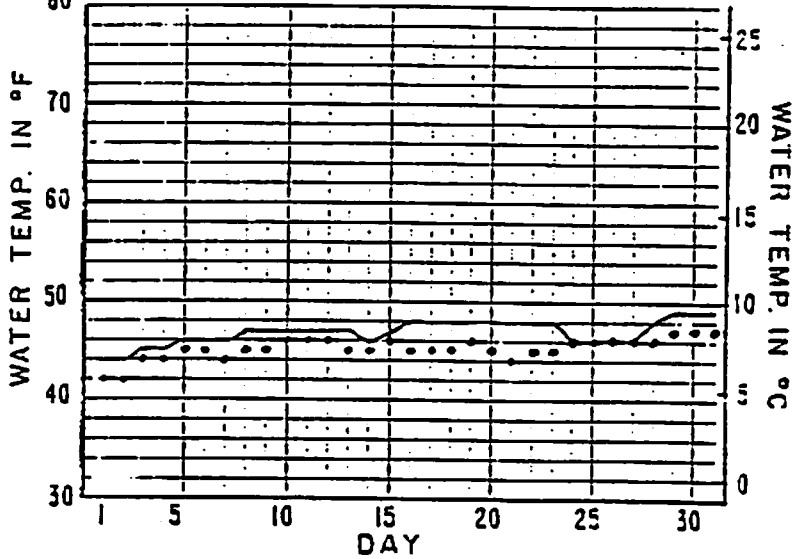
JANUARY



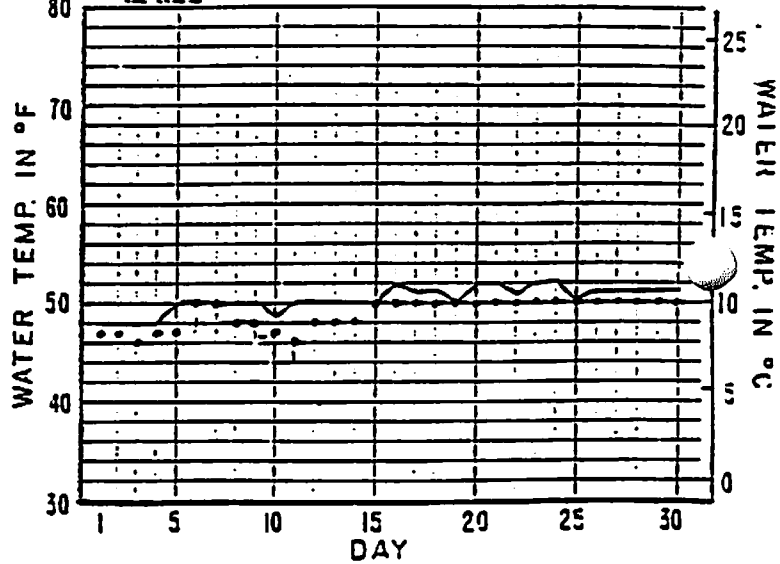
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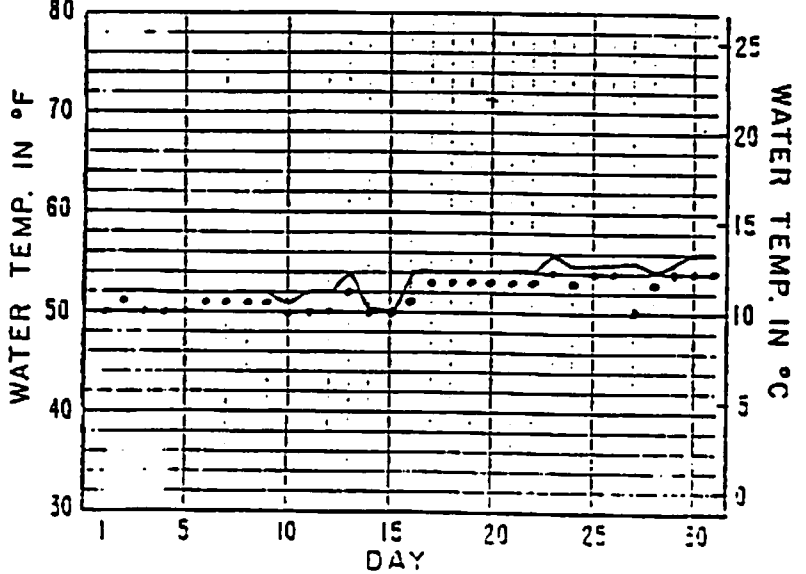
MARCH



APRIL



MAY



JUNE

