

State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

ANNUAL REPORT
MAD RIVER SALMON AND STEELHEAD HATCHERY, 1997-98

by

Wilber F. Cartwright
Region 1, Inland Fisheries

Inland Fisheries
Administrative Report No.

1998

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ABSTRACT

This report summarizes the operation of Mad River Salmon and Steelhead Hatchery from July 1, 1997 through June 30, 1998. Tables present daily records of water temperatures, number of salmon and steelhead entering the Hatchery, numbers and size of marked fish returning to the Hatchery, and total numbers of salmonids reared and released.

Totals of seven chinook salmon, Oncorhynchus tshawytscha, 40 coho salmon, O. kisutch, and 1,808⁷ steelhead trout, O. mykiss, were trapped at the Hatchery. Thirty-four of the returning steelhead had marks.

Hatchery staff planted 109,460 chinook yearlings, 31,200 chinook fingerlings, 173,125 coho yearlings, 272,377 steelhead yearlings, 35,470 steelhead fingerlings, 11,745 cutthroat trout, Oncorhynchus clarki, yearlings, and 71,033 rainbow trout, O. mykiss, catchables.

INTRODUCTION

This is the 28th annual report of the Mad River Salmon and Steelhead Hatchery. It describes operation of the Hatchery from July 1, 1997 through June 30, 1998 (for production summary, see Table 1). Copies of previous annual reports are available upon request from the Department of Fish and Game, Inland Fisheries Division, 1701 Nimbus Road, Suite B, Rancho Cordova, CA 95670.

Mad River Hatchery is located on the Mad River near Blue Lake, in Humboldt County, California. The Hatchery was constructed by the Department of Fish and Game with Wildlife Conservation Board funds (Project California AFSC-15) and began operation in January 1971. It was constructed to maintain and enhance runs of chinook salmon, coho salmon, and steelhead trout in California's north coast streams.

HATCHERY OPERATION

Mad River Hatchery has a recirculating water system. Under normal operating conditions, approximately 84% of the water flowing through the rearing ponds is recycled through a battery of eight crushed rock and oyster shell filters. The remaining 16% is wasted from the system directly into the river. When ponds or filters are being cleaned, waste water is discharged to one of two gravel settling basins. Makeup water for the system is supplied from a field of 18 wells located in the Mad River flood plain adjacent to the Hatchery.

PRODUCTION SUMMARY

The Hatchery's fish ladder was opened on November 7, 1997. The first fish entered the ladder on November 8, and the ladder was closed on March 9, 1998. Totals of seven chinook salmon, 40 coho salmon, and 1,808 steelhead trout were trapped (Appendix Table 1). We planted 637,740 yearlings (109,460 chinook, 173,125 coho, 272,377 steelhead, 11,745 cutthroat trout, 71,033 catchable rainbow trout) and 66,670 fingerlings (31,200 chinook and 35,470 steelhead) during the 1997-98 season (Table 1).

The fish are fed a percentage of their body weight using the vendors' suggested recommendations as a guideline. The fish are fed by hand to start and then switched to automatic feeders. When they reach about 250 fish per pound they are fed by a truck-mounted pellet blower. When the need arises for accelerated growth and the fish are around 90 to the pound, they can be switched to demand feeders.

TABLE 1. Mad River Hatchery Production Summary, 1997-98

Species	Fish on hand 7/1/97	Adults trapped	Females spawned	Eggs taken or received	Eggs transferred	Fingerlings received	Fingerlings transferred or planted	Yearlings transferred or planted	Total pounds released	Fish on hand 6/30/98
Chinook salmon										
1996 BY ^{a/}	143,196	0	0	0	0	0	0	109,460	12,775	0
1997 BY	0	4	1	1,145,695 ^{b/}	652,800 ^{c/}	0	31,200	0	300	142,086
Coho salmon										
1996 BY	155,222	0	0	0	0	0	0	173,125 ^{d/}	15,850	0
1997 BY	0	39	18	421,898 ^{e/}	0	0	0	0	0	195,082
Winter-run steelhead										
1997 BY	415,656	0	0	0	0	53,933 ^{f/}	35,470	318,592	49,487	0
1998 BY	0	1,808 ^{g/}	94	485,825	0	0	0	0	0	300,000
Coastal cutthroat trout										
1997 BY	15,879	0	0	0	0	0	0	11,745	2,610	0
Rainbow trout										
1996 BY	12,358	0	0	0	0	0	0	7,600	5,000	0
1997 BY	88,240	0	0	0	0	0	0	63,433	27,490	9,500
1998 BY	0	0	0	103,108	0	0	0	0	0	88,416
TOTALS	830,551	1,851	113	2,156,526	652,800	53,933	66,670	683,955	113,512	735,084

^{a/} BY = Brood year.

^{b/} Includes 39,165 Eel River chinook and 1,103,130 Klamath River chinook.

^{c/} Klamath River chinook.

^{d/} 17,903 received from inventory.

^{e/} Includes 391,298 Noyo River coho.

^{f/} Russian River steelhead.

^{g/} Includes 1 grilse.

We produced 105,162 lb of fish from 137,270 lb of feed giving a conversion rate (pounds of feed to produce 1 lb of fish) of 1.31.

The Hatchery had 25,388 visitors in 1997-98.

DISEASE

Losses to disease were above normal with outbreaks of myxobacteria that were controlled by use of Terramycin mixed into the feed. Some minor outbreaks of ich also occurred and were kept under control with Formalin baths.

PREDATION CONTROL

Because of small numbers of returning salmon and predation by otters, most adults were put into PVC tubes and kept under a security cover in the rearing ponds.

Routine use of electric cattle fence on top of rearing pond walls is used to keep predation by herons and egrets to a minimum, but increasing numbers of birds in the last few years have resulted in larger losses of fish.

CHINOOK SALMON PROGRAM

History of the 1997 Brood Year and Hatchery Operations

Chinook first entered the Hatchery on November 8, 1997. The run ended on November 18, 1997, with 7 trapped at the Hatchery, including 3 males, 1 female, and 3 grilse (total length ≤ 66 cm). One female was spawned, which produced 3,400 eggs. A total of 1,927 Mad River chinook was on hand June 30, 1998; they will be released in the late fall of 1998 as yearlings.

We received 39,165 Eel River chinook eggs from Warm Springs Hatchery. They will be coded-wire nose-tagged and released into the Eel River in the fall of 1998 as yearlings.

We received 1,103,130 Klamath River chinook eggs from Iron Gate Hatchery. A total of 652,800 of those eggs was transferred to Silverado Field Operations Base. A total of 31,200 Klamath River chinook fingerlings was transferred to Crystal Lake Hatchery. Six hundred of the remaining chinook will be tagged, and they will all be planted in Shasta and Trinity Lakes in the fall of 1998 as yearlings.

A total of 109,460 yearling (1996 BY) chinook was planted (Table 2).

CS

TABLE 2. Yearling Chinook Salmon Plants (1996 BY)

Date	Strain	Release site	Number/lb	Number	Mark
10/28/97	Feather River	Shasta Lake	8.7	15,660	None
10/28/97	Feather River	Shasta Lake	8.7	15,660	None
10/28/97	Feather River	Shasta Lake	8.7	7,830	None
10/30/97	Feather River	Shasta Lake	8.0	8,000	None
11/4/97	Feather River	Shasta Lake	8.0	6,800	None
11/10/97	Feather River	Trinity Lake	7.9	7,900	None
11/12/97	Feather River	Trinity Lake	7.5	7,500	None
11/13/97	Eel River	Eel River	9.3	8,835	CW Tagged
11/17/97	Mad River	Mad River	9.0	31,275	None

TOTAL

109,460

COHO SALMON PROGRAM

History of the 1997 Brood Year and Hatchery Operations

The first coho was trapped on November 18, 1997 and the last on January 8, 1998. We trapped 40 at the Hatchery, including 9 males, 30 females, and 1 grilse (total length ≤ 56 cm). Eighteen females were spawned, which produced 30,600 eggs, for an average of 1,700 eggs/female. A total of 21,822 Mad River coho was on hand June 30, 1998; they will be released in the spring of 1999 as yearlings.

We received 391,298 Noyo River coho eggs from Silverado Field Operations Base.

TABLE 3: Yearling Coho Salmon Plants (1996 BY)

Date	Strain	Release site	Number/lb	Number	Mark
12/10/97	Mad River	Mad River	6.4	5,600	None
12/12/97	Noyo River	Wages Creek	20.0	13,000	None
12/12/97	Noyo River	Howard Creek	20.0	5,500	None
12/12/97	Noyo River	DeHaven Creek	20.0	7,500	None
12/19/97	Noyo River	Little N.F., Gualala River	18.4	12,880	None
12/30/97	Noyo River	Wages Creek	16.0	4,000	None
12/30/97	Noyo River	Howard Creek	16.0	4,000	None
12/30/97	Noyo River	DeHaven Creek	16.0	4,000	None
3/3/98	Noyo River	S.F. Noyo River	11.0	13,200	CWT
3/3/98	Noyo River	S.F. Noyo River	11.0	15,400	CWT
3/4/98	Noyo River	S.F. Noyo River	11.0	15,400	CWT
3/17/98	Noyo River	S.F. Noyo River	9.5	11,400	CWT
3/17/98	Noyo River	S.F. Noyo River	9.5	13,300	CWT

Date	Strain	Release site	Number/lb	Number	Mark
3/18/98	Noyo River	S.F. Noyo River	9.5	10,900	CWT
3/20/98	Mad River	Mad River	8.2	2,400	RV
				18,245	None
2/3/31/98	Noyo River	S.F. Noyo River	8.2	9,840	RV
3/31/98	Noyo River	S.F. Noyo River	8.2	6,560	RV

WINTER STEELHEAD PROGRAM

History of the 1998 Brood Year and Hatchery Operations

We trapped 1,807 adult steelhead from November 18, 1997 through March 9, 1998. A total of 94 females was spawned, and they produced 485,825 eggs, for an average of 5,168 eggs/female.

We received 53,933 Russian River 1997 BY fingerlings from Warm Springs Hatchery. We transferred 46,215 Russian River 1997 BY yearlings to the Coyote Valley Fish Facility imprint ponds.

Totals of 272,377 yearling and 35,470 fingerling (1997 BY) steelhead were planted (Tables 4 and 5). A total of 300,000 1998 BY steelhead was on hand June 30, 1998.

TABLE 4. Yearling Winter Steelhead Plants (1997 BY)

Date	Strain	Release site	Number/lb	Number	Mark
3/4/98	Eel River	Eel River	6.0	7,500	RM
3/5/98	Eel River	Eel River	6.0	7,800	RM
3/5/98	Eel River	Eel River	6.0	9,000	RM
3/16/98	Mad River	Mad River	6.2	77,438	AD
3/24/98	Mad River	Mad River	6.9	73,899	AD
4/2/98	Mad River	Mad River	7.0	96,740	AD

TOTAL 272,377

TABLE 5. Fingerling Mad River Winter Steelhead Plants (1997 BY)

Date	Release site	Number/lb	Number	Mark
9/8/97	Mad River	40.0	11,240	None
9/8/97	Mad River	30.0	12,330	None
9/8/97	Mad River	68.0	11,900	None

TOTAL 35,470

Marked Steelhead

A total of 34 marked steelhead returned to the Hatchery during the 1997-98 season (Table 6).

TABLE 6. Number and Origins of Marked Steelhead Returning to Mad River Hatchery

Mark ^{a/}	Number recovered	Fork length (cm)			Brood year	Date planted	Origin Location	Origin		
		Max	Min	Mean				Number released	Number /lb	Strain
AD	34	90	47	77	1992	12/8/92	Mad R.	40,380	12.0	Mad R.
					1992	4/1/93	Mad R.	96,000	6.0	Mad R.
					1993	4/19/94	Mad R.	45,050	5.3	Mad R.
					1993	4/21/94	Mad R.	51,940	5.3	Mad R.
					1994	6/23/94	Mad R.	75,000	100.0	Mad R.
					1994	2/28/95	Mad R.	86,000	4.3	Mad R.
TOTAL							394,370			

^{a/} Mark: Ad = adipose fin-clipped

RAINBOW TROUT PROGRAM

Mad River Hatchery received a total of 103,108 eyed Mt. Shasta strain trout eggs (1998 BY) from Mt. Shasta Hatchery on February 26, 1998. There were 88,416 Mt. Shasta rainbow trout (1998 BY) and 9,500 1997 BY on hand June 30, 1998.

A total of 71,033 rainbow trout catchables (1996 and 1997 BY) was planted (Table 7).

TABLE 7. Catchable Rainbow Trout Plants, 1996 and 1997 Brood Year

Date	Strain	Release site	Number/lb	Number	Mark
8/29/97	Mt. Shasta	Fish Lake	1.7	850	None
9/25/97	Mt. Shasta	Dry Lake	1.5	750	None
10/14/97	Mt. Shasta	Ruth Lake	1.6	2,400	None
10/16/97	Mt. Shasta	Ruth Lake	1.6	2,400	None
11/6/97	Mt. Shasta	Freshwater Lagoon	1.2	1,200	None
12/4/97	Mt. Shasta	Freshwater Lagoon	2.3	2,070	None
12/17/97	Mt. Shasta	Freshwater Lagoon	2.2	2,200	None
1/6/98	Mt. Shasta	Freshwater Lagoon	1.9	1,710	None
1/8/98	Mt. Shasta	Lagoon Creek Pond	1.9	950	None
1/21/98	Mt. Shasta	Freshwater Lagoon	2.2	1,980	None
2/5/98	Mt. Shasta	Freshwater Lagoon	1.9	1,710	None
2/18/98	Mt. Shasta	Freshwater Lagoon	1.9	1,900	None
3/4/98	Mt. Shasta	Lagoon Creek Pond	1.8	900	None

Date	Strain	Release site	Number/lb	Number	Mark
3/5/98	Mt. Shasta	Freshwater Lagoon	1.8	900	None
3/18/98	Mt. Shasta	Freshwater Lagoon	1.5	750	None
3/23/98	Mt. Shasta	Ruth Lake	2.5	2,750	None
4/1/98	Mt. Shasta	Ruth Lake	2.5	3,250	None
4/2/98	Mt. Shasta	Freshwater Lagoon	2.5	1,250	None
4/3/98	Mt. Shasta	Ruth Lake	2.5	2,750	None
4/7/98	Mt. Shasta	Ruth Lake	2.5	2,500	None
4/9/98	Mt. Shasta	Lagoon Creek Pond	2.5	1,250	None
4/14/98	Mt. Shasta	Lake Pillsbury	2.3	4,600	None
4/15/98	Mt. Shasta	Freshwater Lagoon	2.3	1,150	None
4/16/98	Mt. Shasta	Ruth Lake	2.5	2,500	None
4/16/98	Mt. Shasta	Dry Lake	2.5	1,875	None
4/21/98	Mt. Shasta	Ruth Lake	2.5	2,500	None
4/22/98	Mt. Shasta	Emily Lake	2.5	5,000	None
4/22/98	Mt. Shasta	Freshwater Lagoon	2.5	1,250	None
4/23/98	Mt. Shasta	Lake Cleone	2.5	2,500	None
4/24/98	Mt. Shasta	Lagoon Creek Pond	2.5	1,250	None
5/1/98	Mt. Shasta	Freshwater Lagoon	2.5	1,250	None
5/8/98	Mt. Shasta	Freshwater Lagoon	2.4	960	None
5/14/98	Mt. Shasta	Dry Lake	2.4	1,800	None
5/15/98	Mt. Shasta	Fish Lake	2.4	2,400	None
5/15/98	Mt. Shasta	Lagoon Creek Pond	2.4	1,200	None
5/20/98	Mt. Shasta	Fish Lake	2.2	2,200	None
5/27/98	Mt. Shasta	Fish Lake	2.2	1,100	None
6/4/98	Mt. Shasta	Fish Lake	2.2	1,078	None

TOTAL

71,033

COASTAL CUTTHROAT TROUT

A total of 11,745 coastal cutthroat trout catchables (1997 BY) was planted (Table 8).

TABLE 8. Catchable Coastal Cutthroat Trout Plants, 1997 BY

Date	Release site	Number/lb	Number	Mark
1/16/98	Freshwater Lagoon	4.5	3,645	None
1/22/98	Lagoon Creek Pond	4.5	2,250	None
1/27/98	Freshwater Lagoon	4.5	3,600	None
1/29/98	Lagoon Creek Pond	4.5	2,250	None

TOTAL

11,745

APPENDIX TABLE 1. Weekly Adult Salmon and Steelhead Trapping Data for Mad River Hatchery, 1997-98

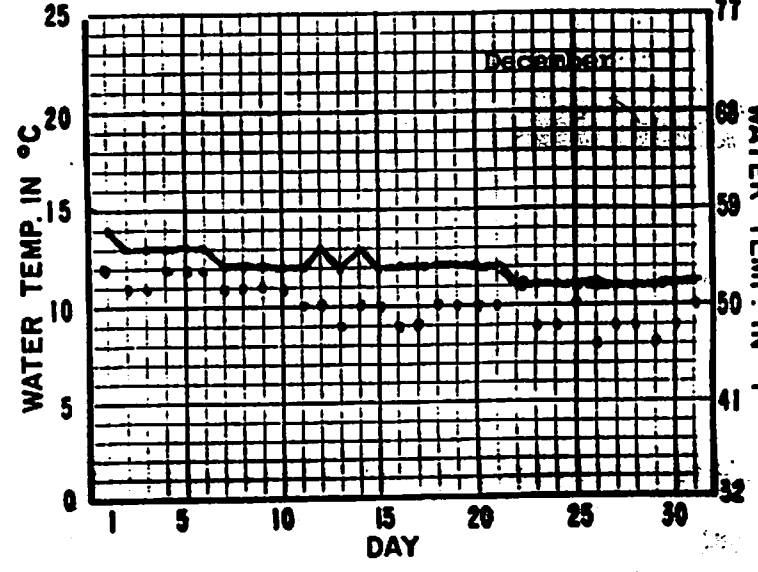
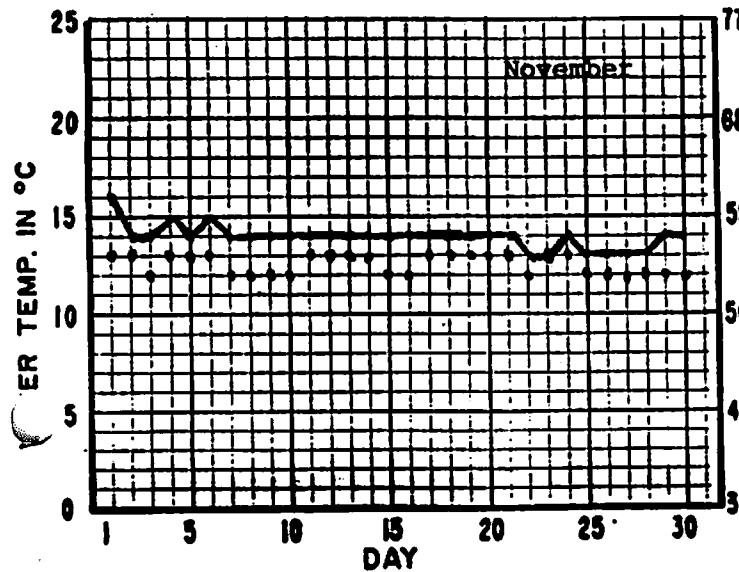
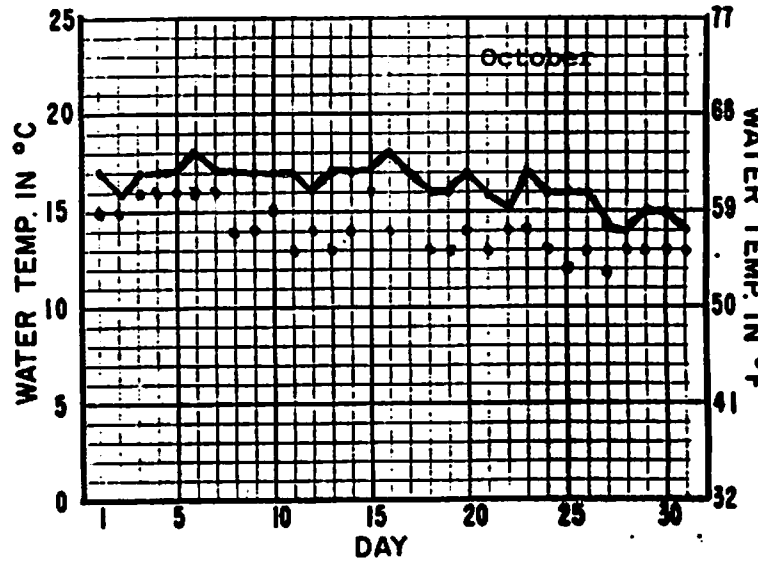
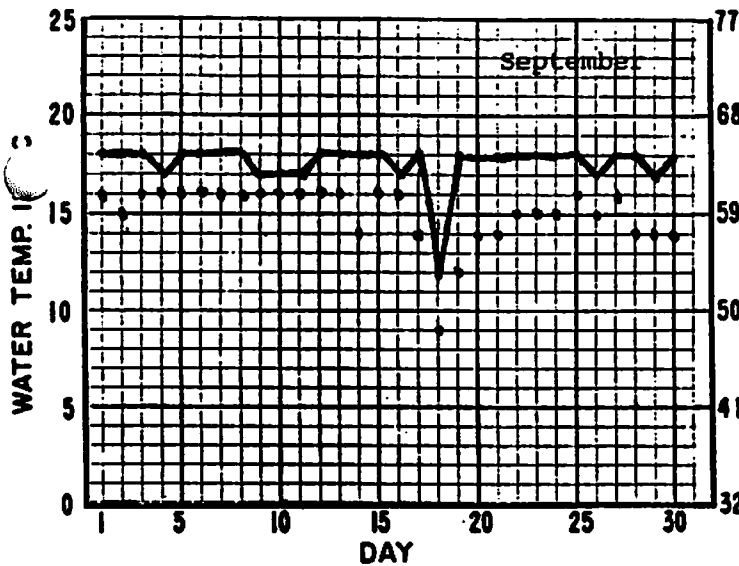
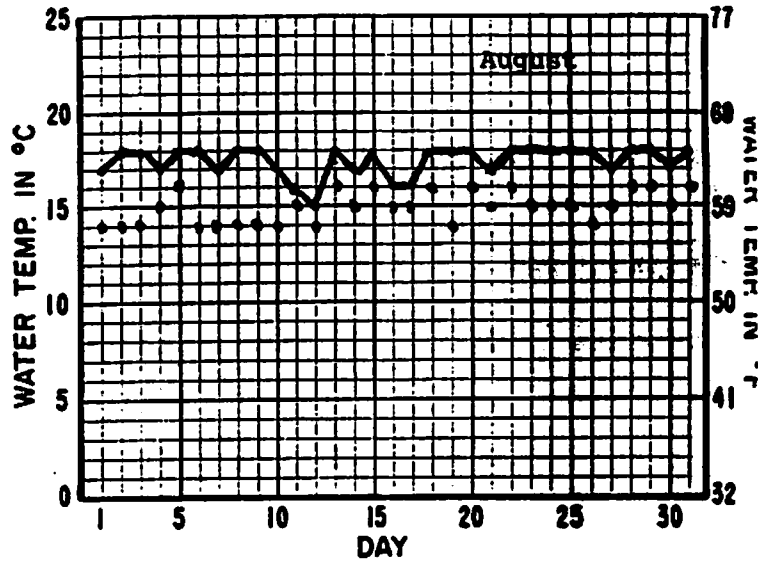
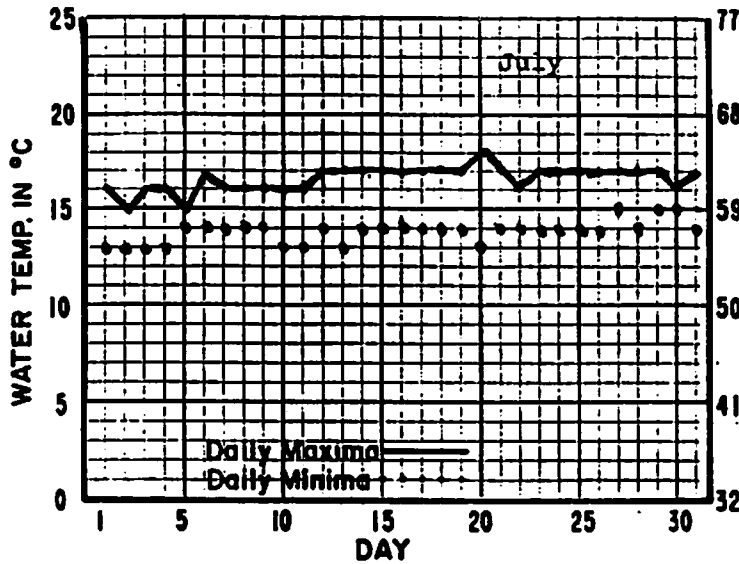
<u>Week</u>	<u>Chinook salmon</u>		<u>Coho salmon</u>		<u>Steelhead trout</u>	
	<u>Adults</u>	<u>Grilse</u>	<u>Adults</u>	<u>Grilse</u>	<u>Males</u>	<u>Females</u>
Nov. 2-8	2					
Nov. 9-15	2					
Nov. 16-22		3	19		2	1
Nov. 23-29			4		6	6
Nov. 30-Dec. 6			1		3	2
Dec. 7-13			10		5	1
Dec. 14-20			3		19	16
Dec. 28-Jan. 3				1	11	4
Jan. 4-10			2		101	67
Jan. 11-17					159	137
Jan. 18-24					66	50
Jan. 25-31					121	165
Feb. 1-7					77	78
Feb. 8-14					80	88
Feb. 15-21					91	150
Feb. 22-28					78	81
Mar. 1-7					24	38
Mar. 8-14					37	43

Season Totals	4	3	39	1	880	927
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APPENDIX TABLE 2. Summary of Fish Runs to Mad River Salmon and Steelhead Hatchery.

Year	Chinook salmon			Coho salmon			Steelhead
	Males	Females	Grilse	Males	Females	Grilse	
1971-72	60	178	85	90	178	69	42
1972-73	241	415	380	105	130	231	52
1973-74	337	53	105	105	176	46	2,872
1974-75	110	71	50	67	74	19	2,138
1975-76	53	41	184	167	339	1,597	190
1976-77	323	155	183	88	129	976	658
1977-78	95	68	87	163	290	195	1,317
1978-79	37	19	190	42	31	524	2,190
1979-80	51	77	17	39	90	223	1,411
1980-81	26	40	20	56	106	341	730
1981-82	32	6	213	16	62	57	442
1982-83	257	391	252	73	76	473	1,087
1983-84	119	194	124	11	11	65	838
1984-85	21	13	48	12	8	4	1,015
1985-86	149	28	98	24	14	7	753
1986-87	106	121	72	29	30	265	13,833
1987-88	253	315	278	94	126	733	4,303
1988-89	49	110	83	93	161	591	2,529
1989-90	10	19	17	18	17	221	1,027
1990-91	0	0	1	17	27	48	915
1991-92	2	4	4	6	13	18	3,463
1992-93	13	12	2	24	32	11	7,497
1993-94	2	5	4	15	18	6	5,591
1994-95	27	35	5	46	23	5	11,118
1995-96	16	6	34	7	5	0	11,520
1996-97	24	18	22	58	47	154	8,713
1997-98	3	1	3	9	30	1	1,807

DAILY WATER TEMPERATURES BY MONTH



DAILY WATER TEMPERATURES BY MONTH

