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ANNUAL REPORT
NIMBUS SALMON AND STEELHEAD HATCHERY, 1987-88

by

Ronald D. Ducey
Inland Fisheries
Region 2

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ABSTRACT

This report describes the operation of Nimbus Salmon and Steelhead Hatchery from July 1, 1987, through June 30, 1988. Tables present numbers of fish trapped, eggs taken, fish reared and released, and water temperatures. There were 6,258 chinook salmon, Oncorhynchus tshawytscha, trapped, which produced 4,452,760 eggs. There were 705 winter-run steelhead, Salmo gairdneri, trapped from which 1,647,090 eggs were taken.

During the year hatchery personnel planted or transferred a total of 1,257,770 fingerling and 4,278,750 advanced fingerling chinook salmon and 955,350 fingerling and 489,070 yearling steelhead.

INTRODUCTION

This is the 33rd annual report for Nimbus Salmon and Steelhead Hatchery. The Hatchery is located on the American River near the base of Nimbus Dam and is operated by the California Department of Fish and Game under contract with the United States Bureau of Reclamation. This report summarizes the Hatchery activities during 1987-88, with particular reference to numbers of fish trapped, spawned, and released, eggs taken and fish produced, and other pertinent information.

PRODUCTION SUMMARY

During 1987-88, hatchery personnel took 6,099,850 eggs and planted or transferred 6,980,940 chinook salmon and steelhead, and 175,760 steelhead eggs (Table 1).

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

Species	Eggs taken or received	Eggs or fish transferred	Fingerlings planted	Advanced fingerling or yearlings planted	Total weight planted(lb)
<u>Chinook salmon</u>					
1986 BY				375,150	8,950
1987 BY	8,065,081		1,257,770	3,903,600	80,955
TOTALS	8,065,081		1,257,770	4,278,750	89,905
<u>Steelhead</u>					
1987		200,900		288,170	113,600
1988	2,222,115	175,760	955,350		585
TOTALS	2,222,115	376,660	955,350	288,170	114,185

HATCHERY OPERATIONS

The weir was installed September 15-16, 1987, by the Bureau of Reclamation. The weir pickets were lowered and capped on October 15, 1987. The lower gate in the ladder was removed and the holding pond was opened November 18, 1987. Water temperature was 63°F.

Water Temperature Control

Because of low lake level, shutters #8 and #9 were not installed. Shutters #1-#7 were pulled on September 30, 1987 due to drought conditions. Water temperature in Nimbus holding ponds was in the 64° range. On November 18, 1987 pond temperature had lowered to a constant 63°.

Disposal of Salmon Carcasses

Edible carcasses were given to State and County institutions, community action groups, and groups or councils representing the local Indians. Local zoos received carcasses of questionable quality and all inedible carcasses went to a local rendering plant. The total dispensed was 30,000 lb edible, 400 lb animal food, and 23,800 lb inedible.

Public Relations

An estimated 436,040 persons visited Nimbus Hatchery this year. This number was arrived at by an automatic car counter installed at the parking lot entrance and employee counts of bus passengers and bicyclists. November was the peak month, with 72,740 visitors.

CHINOOK SALMON MAINTENANCE PROGRAM Chinook Salmon Counts

The fish ladder was opened November 18, 1987, and the first spawning took place on November 20, 1987. A total of 6,258 salmon entered the holding pond this season, including 1,759 males, 1,586 females, and 2,913 grilse. Grilse were fish 60 cm (23.6 inches) FL or under (Appendix Table 1). A total of 511 carcasses was removed from the weir: 182 males, 258 females, and 71 male and female grilse.

Sorting and Spawning

Of the females counted, 857 were spawned, 725 died in the pond, and 4 were accidentally killed or released. The spawning season, which began November 20, 1987, and ended December 29, 1987, produced a total of 4,452,760 eggs, for an average of 5,196 eggs per female. Fertility, as determined by the difference between green eggs taken and the total eggs eyed, ranged from 52% to 81%, with an average of 66.5%. Due to warm water and poor egg quality, 3,612,321 eyed chinook salmon eggs were received from Feather River Hatchery in December 1987 (Table 1).

Marked Chinook Salmon Recoveries

All fish were examined for marks as they were processed or removed dead from the holding pond. Heads were removed from all adipose fin-clipped fish for recovery of coded-wire tags by the District Biologist (see Appendix Table 2 for tag recovery results).

Chinook Salmon Planting

1986 Brood Year

There was an estimated 375,150 chinook salmon on hand July 1, 1987.

1987 Brood Year CHIN-N

We released 5,161,370 fingerlings and advanced fingerlings (Table 2). A total of 130,263 of the fish released was coded-wire tagged. On June 30, 1988 there were approximately 550,800 chinook salmon on hand to be released in July 1988.

TABLE 2. Planting Data for 1986 and 1987 Brood Year Chinook Salmon

Month	Release site	Fingerlings	Advanced fingerlings	Average size/lb	Weight (lb)
<u>1986 BY</u>					
July	Benicia		375,150	40	8,950
<u>1987 BY</u>					
March	Discovery Park	410,710		613	670
March	Garcia Bend	345,260		610	566
April	Discovery Park	96,600		184	525
April	Garcia Bend	116,600		184	650
April	Miller Park	285,000		136	2,100
May	Benicia		264,000	60	4,400
June	Benicia		2,130,400		49,100
June	Mare Island		1,364,200	55	24,800
June	Discovery Park		145,000	58	2,500
	TOTALS	1,254,170	4,278,750		94,261

WINTER-RUN STEELHEAD MAINTENANCE PROGRAM
History of the 1987 Winter-Run

All steelhead entering the holding pond were spawned as late-run steelhead (Table 3). All fish were examined for marks as they were processed or removed dead from the pond. No marked fish were seen.

TABLE 3. Counts of Winter-Run Steelhead Nimbus Salmon and Steelhead Hatchery, 1987-88

Date	<u>Spawned and released</u>		<u>Pre-spawning mortality</u>		<u>Released unspawned</u>		Total
	M	F	M	F	M	F	
Nov. 30						2	2
Dec. 29						2	2
Jan. 4	37	31					68
Jan. 11	46	43	2	3			94
Jan. 19	73	63	2	1	40	21	200
Jan. 25	61	54	3	2	31	28	179
Feb. 1	50	48	1	1	20	25	145
Feb. 9			12	3			15
TOTALS	267	239	20	10	91	78	705

Spawning Data 1988 Brood Year

The 239 females spawned produced 1,647,090 eggs for an average of 6,891 eggs per female. Survival of green eggs to eyed eggs ranged from 70% to 92%, with an average of 81%. A total of 575,025 eyed late-run steelhead eggs were received in March, 1988 from Mad River Hatchery.

Winter-run Steelhead Planted

1987 Brood Year

From January 1, 1988 through February 9, 1988, a total of 288,170 yearling steelhead was planted and 200,900 transferred (Table 4). No tagged fish were released this year.

TABLE 4. Planting and Transfer Data, 1987 Brood Year Winter-run Steelhead Nimbus Salmon and Steelhead Hatchery, 1987-88

Month	Release site	<u>Planted</u>		
		Number of yearlings	Average size/lb	Weight (lb)
January	Benicia	211,910	2.5	83,900
February	Benicia	76,260	2.6	29,700
TOTALS		288,170		113,600

<u>Transferred</u>			
September	MRH	88,810	7,250
September	FRH	112,090	15,100
TOTALS		200,900	22,350

1987 Brood Year

Prior to June 30, 1988, there were 955,350 fingerlings released into the Sacramento River at Garcia Bend (Table 5). On July 1, 1988, approximately 289,000 Mad River and 253,000 Nimbus fingerlings were on hand; approximately 200,000 will be released in September 1988 and approximately 235,000 will be released in January 1989. Approximately 175,760 eyed steelhead eggs (1988 BY) were transferred to Mokelumne River Fish Installation on February 5, 1988.

TABLE 5. Planting Data, 1988 Brood Year Nimbus Salmon and Steelhead Hatchery, 1987

<u>Month</u>	<u>Release site</u>	<u>Number of fingerlings</u>	<u>Average size/lb</u>	<u>Weight (lb)</u>
April	Garcia Bend	769,350 N	1,923	400
April	Garcia Bend	186,000 MR	1,005	185
TOTALS		955,350		585

Steelhead Disease Information

1987 Brood Year

Due to high water temperatures, numerous treatments using copper sulfate and Terramycin were needed to control Columnaris and gill bacteria from July through November.

APPENDIX TABLE 1. Weekly Adult Salmon and Steelhead Trapping Data For Nimbus Hatchery, 1987-88

<u>Week</u>	<u>Chinook salmon</u>		<u>Steelhead trout</u>		<u>Half-Pounders</u>
	<u>Adults</u>	<u>Grilse</u>	<u>Males</u>	<u>Females</u>	
Nov. 15-Nov. 21	230	386			
Nov. 22-Nov. 28	1,641	1,345			
Nov. 29-Dec. 5	850	718			2
Dec. 6-Dec. 12	313	226			
Dec. 13-Dec. 19	134	214			
Dec. 20-Dec. 26	99	22			
Dec. 27-Jan. 2	78	2			2
Jan. 3-Jan. 9			37	31	
Jan. 10-Jan. 16			48	46	
Jan. 17-Jan. 23			75	64	61
Jan. 24-Jan. 30			64	56	59
Jan. 31-Feb. 6			51	49	45
Feb. 7-Feb. 13			12	3	
SEASON TOTALS	<u>3,345</u>	<u>2,913</u>	<u>287</u>	<u>249</u>	<u>169</u>

APPENDIX TABLE 2. Chinook Salmon Coded-Wire Tag Recoveries. Preliminary Data, Nimbus Hatchery, 1987-88

CWT Code	Number recovered	Brood year	Hatchery	Release site
06-46-41	1	84	Merced River	San Joaquin River above Old River
06-46-42	3	84	Merced River	San Joaquin River above Old River
06-46-43	3	84	Merced River	Carquinez Strait
06-46-46	1	85	Merced River	Stanislaus River
06-46-55	1	85	Merced River	Tuolumne River
06-46-56	1	85	Merced River	Tuolumne River
06-46-58	1	85	Merced River	San Joaquin River above Old River
06-46-59	2	85	Merced River	Stuart Road, Old River
06-48-24	1	85	Mokelumne River	Fort Baker
06-48-29	1	84	Mokelumne River	Vallejo
06-54-49	1	82	Nimbus Hatchery	Berkeley
06-54-50	1	83	Nimbus Hatchery	Berkeley
06-54-51	1	83	Nimbus Hatchery	Port Chicago
06-54-52	2	83	Nimbus Hatchery	Fort Baker
06-54-52	6	84	Nimbus Hatchery	Berkeley
06-54-54	4	84	Nimbus Hatchery	Vallejo
06-54-05	13	85	Nimbus Hatchery	Berkeley
06-54-06	13	85	Nimbus Hatchery	Benicia
06-26-36	2	84	Feather River	South Fork, Mokelumne R.
06-26-42	2	84	Feather River	Courtland
06-26-46	1	85	Feather River	South Fork, Mokelumne R.
06-26-48	1	85	Feather River	Ryde
06-26-48	1	85	Feather River	Old River
06-26-51	1	85	Feather River	Port Chicago
06-26-52	1	85	Feather River	Golden Gate
H6-06-04	1	84	Coleman Hatchery	Courtland
H6-06-05	1	84	Coleman Hatchery	Red Bluff
1 Lost Tag				
33 No Tag				

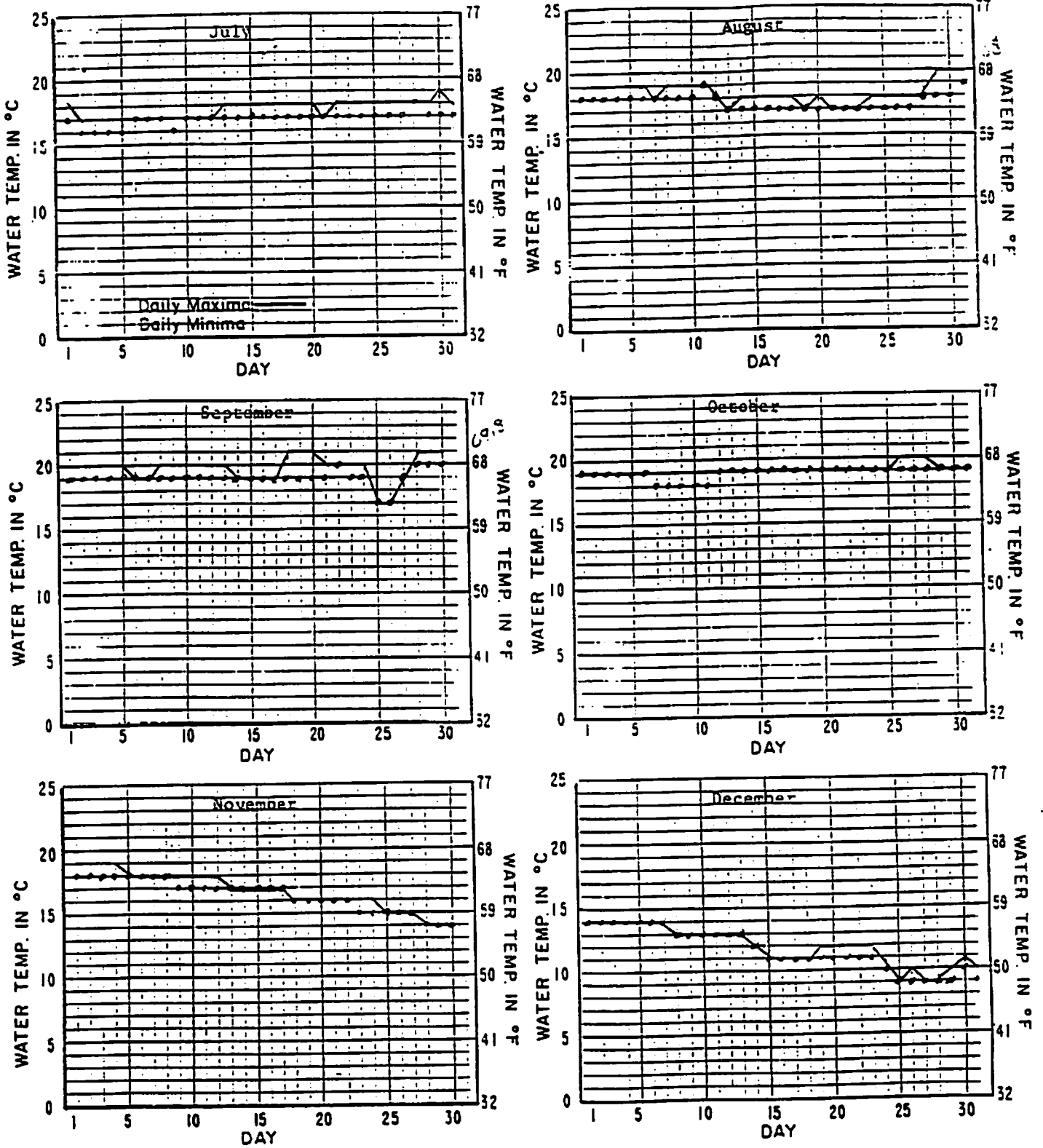
APPENDIX TABLE 3. Summary of Fish Runs to Nimbus Salmon and Steelhead Hatchery

	<u>Chinook salmon</u>			<u>Steelhead</u>
	<u>Males</u>	<u>Females</u>	<u>Grilse</u>	
1955-56	4,427	3,012	*	110
1956-57	267	502	774	115
1957-58	297	341	252	51
1958-59	2,655	638	1,538	102
1959-60	3,003	7,366	2,866	778
1960-61	13,455	6,487	9,331	316
1961-62	3,446	9,257	1,638	137
1962-63	5,088	4,138	3,442	2,141
1963-64	1,213	1,215	813	1,216
1964-65	7,209	8,799	4,534	778
1965-66	5,295	7,595	786	874
1966-67	2,434	5,098	573	642
1967-68	2,022	2,392	733	1,183
1968-69	1,318	2,740	1,175	2,449
1969-70	1,488	1,061	521	1,733
1970-71	3,027	4,827	770	3,033
1971-72	3,384	4,493	1,269	2,256
1972-73	2,195	3,252	1,659	2,506
1973-74	5,155	5,704	1,676	3,157
1974-75	2,762	4,746	671	2,295
1975-76	2,734	3,833	846	2,262
1976-77	2,002	2,340	894	1,307
1977-78	3,496	2,874	498	619
1978-79	2,348	3,767	2,047	680
1979-80	4,779	2,394	3,067	1,310
1980-81	6,122	7,553	2,068	836
1981-82	10,497	7,286	2,805	3,190
1982-83	4,535	3,813	2,576	1,003
1983-84	3,081	3,486	2,514	5,155
1984-85	4,548	5,748	1,953	910
1985-86	3,349	4,439	1,305	1,193
1986-87	2,168	2,617	910	1,431
1987-88	1,759	1,586	2,913	705

* Included in Adult Male

Appendix Figure 1. Daily Water Temperatures for Nimbus Salmon and Steelhead Hatchery from July 1, 1987 through June 30, 1988.

DAILY WATER TEMPERATURES BY MONTH



Appendix Figure No. 1 (Con't)

DAILY WATER TEMPERATURES BY MONTH

