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ANNUAL REPORT
NIMBUS SALMON AND STEELHEAD HATCHERY, 1990-91^{1/}

by

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ABSTRACT

This report describes the operation of Nimbus Salmon and Steelhead Hatchery from July 1, 1990 through June 30, 1991. Tables present numbers of fish trapped, eggs taken, fish reared and released, and water temperatures. There were 4,850 chinook salmon, Oncorhynchus tshawytscha, trapped, which produced 10,717,320 eggs. There were 223 winter-run steelhead, O. mykiss, trapped, from which 307,600 eggs were taken.

During the year, hatchery personnel planted or transferred a total of 6,069,505 fingerling, 49,070 advanced fingerling, and 278,760 yearling steelhead trout.

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INTRODUCTION

This is the 36th 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 1988-89, with particular reference to numbers of fish trapped, spawned, and released, eggs taken and fish produced, and other pertinent information.

PRODUCTION SUMMARY

During 1990-91, hatchery personnel took 11,024,920 eggs and planted or transferred 8,458,950 chinook salmon and steelhead, trout (Table 1). On October 24-26, 1990, 51 adult males and 50 females were transferred to Mokelumne River Hatchery.

TABLE 1. Production Summary, Nimbus Salmon and Steelhead Hatchery, 1990-91

Species	Eggs taken or received	Eggs or fish transferred	Fingerlings planted	Advanced fingerlings or Yearlings planted	Total weight planted(lb)
<u>Chinook salmon</u>					
1989 BY				1,001,650	21,550
1990 BY	10,717,320	36,290	6,069,505	801,700	65,944
<u>Steelhead</u>					
1990		307,335		278,760	73,700
1991	666,704				

HATCHERY OPERATIONS

The weir was installed September 16, 1990, by the Bureau of Reclamation. The weir pickets were lowered and capped on September 17, 1990. The fish ladder is usually opened about October 1 or when in-river water temperatures drop to 60°F.

This year, because of the continuing drought, low river flows and subsequent high water temperatures, the lower gate in the ladder was not removed and the holding pond was not opened after November 5, 1990. The water temperature was 60°F.

Water Temperature Control

Shutters 1 through 9 were not installed in Folsom Dam because of low water and high temperature. Shutters 1 through 7 were installed on April 11, 1991. Shutter 8 was installed on May 9, 1991.

Disposal of Salmon Carcasses

Edible carcasses were given to State and County institutions, community action groups, and groups or councils representing the local Indians. All inedible carcasses went to a local rendering plant. The total dispensed was 40,300 lb edible, 13,000 lb inedible.

Public Relations

An estimated 502,452 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 an estimated 70,000 visitors.

CHINOOK SALMON MAINTENANCE PROGRAM

Chinook Salmon Counts

The fish ladder was opened October 24, 1990, and the first spawning took place on October 24, 1990. A total of 4,850 salmon entered the holding pond this season, including 1,773 males, 2,251 females, and 826 grilse. Grilse are fish 60 cm (23.6 inches) FL or less (Appendix Table 1). A total of 204 carcasses was removed from the weir: 81 males, 64 females, and 59 male and female grilse.

Sorting and Spawning

Of the females counted, 2,025 were spawned, 105 died in the pond, and 71 were accidentally killed or released. The spawning season, which began October 25, 1990, and ended December 18, 1990, produced a total of 10,717,320 eggs, for an average of 5,292 eggs per female. Fertility, as determined by the difference between green eggs taken and the total eggs eyed, ranged from 0% to 91%, with an average of 70%.

Marked Chinook Salmon Recoveries

All fish were examined for marks as they were processed for spawning 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

1989 Brood Year

An estimated 1,001,650 chinook salmon were on hand July 1, 1990.

1988 Brood Year

We released 7,872,855 fingerlings and advanced fingerlings (Table 2). None of the fish released was coded-wire tagged.

On June 30, 1991, there were approximately 443,100 chinook salmon on hand to be released in July 1991.

TABLE 2. Planting Data for 1989 and 1990 Brood Year Chinook Salmon

<u>Month</u>	<u>Release site</u>	<u>Fingerlings</u>	<u>Advanced fingerlings</u>	<u>size/lb</u>	<u>Average Weight (lb)</u>
<u>1989 BY</u>					
July	Benicia		1,001,650	46	21,550
<u>1990 BY</u>					
Jan.	Secret Ravine Cr.	26,640		1,776	15
Feb.	Auburn Ravine Cr.	17,200		1,230	14
March	Garcia Bend	96,000		480	200
March	Miller Park	1,174,500		429	2,740
March	Cosumnes River	97,920		544	180
March	Coon Creek	99,008		544	182

TABLE 2. (continued)

Month	Release site	Fingerlings	Advanced fingerlings	Average size/lb	Weight (lb)
<u>1990 BY</u>					
March	Dry Creek	197,352		408	483
April	Miller Park	148,750		250	425
April	Garcia Bend	848,835		235	3,605
May	Rio Vista	1,543,000		92	16,700
May	Benicia	1,029,300		76	13,600
June	Benicia	791,000		67	11,800
June	Benicia		<u>801,700</u>	50	<u>16,600</u>
	Totals	<u>6,069,505</u>	<u>1,803,350</u>		<u>87,494</u>

WINTER-RUN STEELHEAD MAINTENANCE PROGRAM

History of the 1990 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, 1990-91.

Date	Spawned and released		Pre-spawning mortality		Released unspawned		Total
	M	F	M	F	M	F	
Jan. 9	7	7					14
Jan. 18	5	6				2	13
Jan. 25	13	11	3	2	32		61
Jan. 31	7	4					11
Feb. 8	13	10					23
Feb. 15	9	6	2				17
Feb. 22	5	5					10
Mar. 1	16	11					27
Mar. 8	5	4			37	1	47
TOTALS:	80	64	5	2	69	3	223

Spawning Data 1991 Brood Year

The ~~80~~⁴⁴ females spawned produced 307,600 eggs, for an average of ~~3,845~~ eggs per female. Survival of green eggs to eyed eggs ranged from 0% to 100%, with an average of 66%. A total of 359,104 eyed, late-run steelhead eggs were received in March 1991 from Mad River Hatchery. Average 4806

Winter-run Steelhead Planted

1990 Brood Year

From January 14, 1991 through March 3, 1991, a total of 278,760 yearling steelhead was planted (Table 4). No tagged fish were released this year.

TABLE 4. Planting and Transfer Data, 1990 Brood Year Winter-run Steelhead, Nimbus Salmon and Steelhead Hatchery 1990-91

<u>Month</u>	<u>Release site</u>	<u>Planted</u>		<u>Average size/lb</u>	<u>Weight (lb)</u>
		<u>Number of fingerlings</u>	<u>Number of yearlings</u>		
Jan.	Clarksburg		59,000	3.9	15,100
Jan.	Garcia Bend		81,350	3.9	20,950
Feb.	Clarksburg		55,780	3.7	15,100
Feb.	Garcia Bend		67,870	4.2	16,050
Mar.	Clarksburg		9,000	3.6	2,500
Mar.	Garcia Bend		<u>5,760</u>	3.6	<u>1,600</u>
	Total		278,760		71,300

A total of 258,265 fingerling and 49,070 advanced fingerlings were transferred to Mokelumne River Hatchery.

1991 Brood Year

No fingerlings were released into the American River at the foot of the fish ladder. On June 30, 1991, approximately 183,390 Mad River and 184,580 Nimbus fingerlings were on hand; approximately 350,000 will be released in February 1992. No eyed steelhead eggs (1991 BY) were transferred.

Steelhead Disease Information

1990 Brood Year

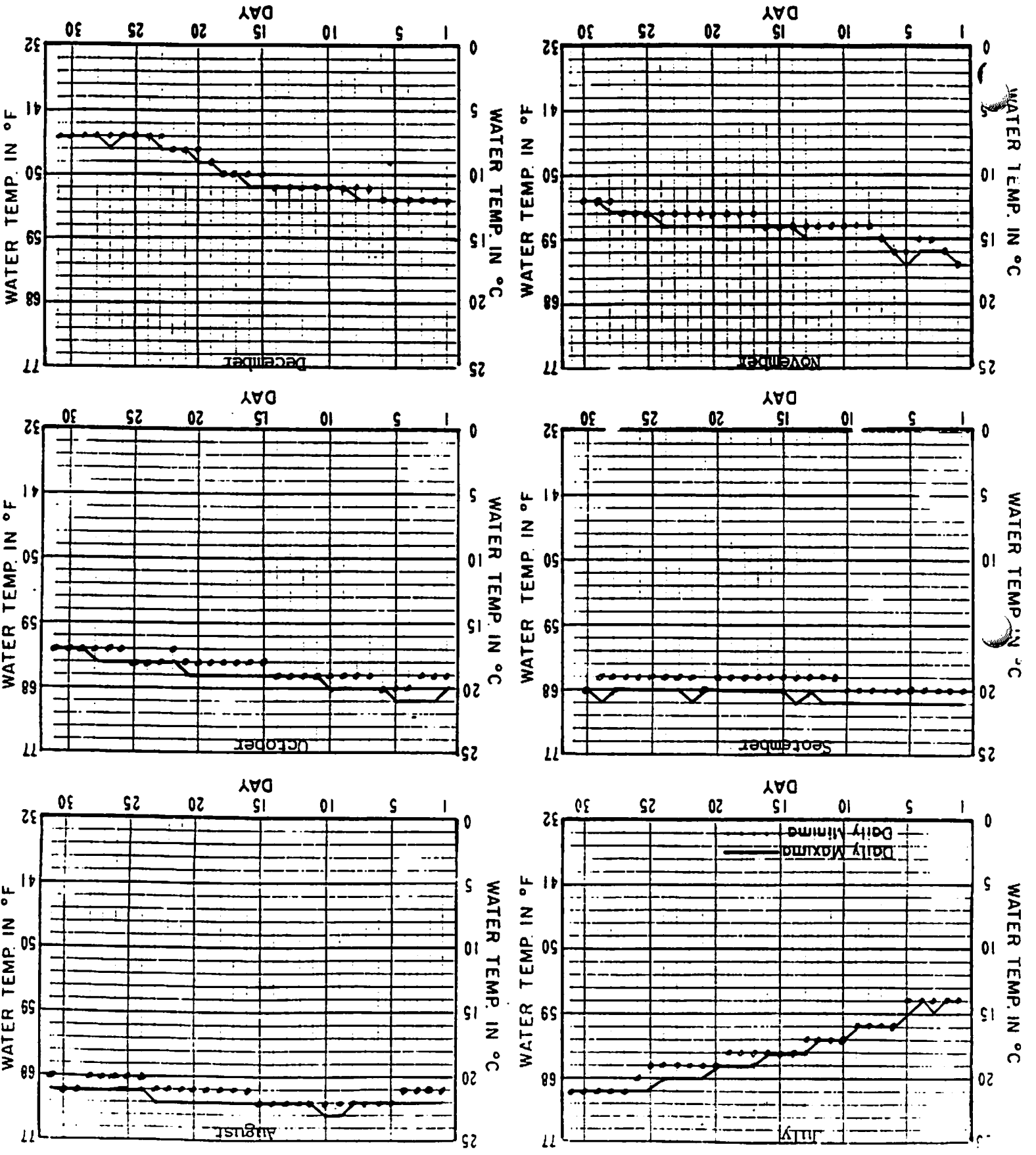
Minor outbreaks of Columaris were controlled by copper sulfate flushes and Terramycin milled or mixed into the fish food.

APPENDIX TABLE 1. Weekly Adult Salmon and Steelhead Trapping Data for Nimbus Hatchery, 1990-91.

Week	<u>Chinook salmon</u>		<u>Steelhead trout</u>	
	Adults	Grilse	Males	Females
Oct. 21 - Oct. 27	123	109		
Nov. 4 - Nov. 10	192	104		
Nov. 11 - Nov. 17	990	194		
Nov. 18 - Nov. 24	804	155		
Nov. 25 - Dec. 1	846	181		
Dec. 2 - Dec. 8	552	64		
Dec. 9 - Dec. 15	264	3		
Dec. 16 - Dec. 22	253	16		
Jan. 9 - Jan. 12			7	7
Jan. 13 - Jan. 19			5	8
Jan. 20 - Jan. 26			48	13
Jan. 27 - Feb. 2			7	4
Feb. 3 - Feb. 9			13	10
Feb. 10 - Feb. 16			11	6
Feb. 17 - Feb. 23			5	5
Feb. 24 - Mar. 2			16	11
Mar. 3 - Mar. 9			42	5
TOTALS	<u>4,024</u>	<u>826</u>	<u>154</u>	<u>74</u> ?

APPENDIX TABLE 2. Chinook Salmon Coded-Wire Tag Recoveries:
Preliminary Data, Nimbus Hatchery, 1990-91

<u>CWT</u>	<u>Number recovered</u>	<u>Brood year</u>	<u>Hatchery</u>	<u>Release site</u>
06-31-01	2	87	Feather R.	Ryde Sac R.
06-31-04	1	87	Feather R.	Port Chicago
06-31-06	2	87	Feather R.	Steamboat S.
06-45-08	1	86	Merced R.	San Joaq.R.
06-48-31	2	88	Mokelum.R.	Berkeley
06-54-07	16	86	Nimbus	Berkeley
06-54-08	2	86	Nimbus	Benicia
06-54-09	36	87	Nimbus	Benicia
06-54-10	22	87	Nimbus	Benicia
06-54-11	30	87	Nimbus	Benicia
06-54-12	7	88	Nimbus	Benicia
06-54-13	2	88	Nimbus	Benicia
06-54-14	5	88	Nimbus	Benicia
06-54-15	13	88	Nimbus	Benicia
10-00-00	24		No Tag	
20-00-00	2		Lost Tag	
B6-14-02	1	87	Feather R.	Courtland
B6-14-04	4	87	Feather R.	Courtland
B6-14-05	1	87	Feather R.	Courtland
B6-14-06	1	87	Feather R.	Miller Park
B6-14-08	1	87	Feather R.	Port Chicago
06-62-26	1	82	Error - No	such tag
06-62-53	1	86	Feather R.	Courtland
06-62-59	1	87	Feather R.	Courtland
06-62-63	1	87	Feather R.	Ryde Sac R.



DAILY WATER TEMPERATURES BY MONTH

Appendix Figure 1. Daily water temperatures for Ambus Salmon and Steehed Hatchery, from July 1, 1990 through June 30, 1991

DAILY WATER TEMPERATURES BY MONTH

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