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ANNUAL REPORT  
NIMBUS SALMON AND STEELHEAD HATCHERY, 1989-90

by

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Inland Fisheries  
Region 2

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Administrative Report No. 91-2

1991

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ABSTRACT

This report describes the operation of Nimbus Salmon and Steelhead Hatchery from July 1, 1989 through June 30, 1990. Tables present numbers of fish trapped, eggs taken, fish reared and released, and water temperatures. There were 9,741 chinook salmon, Oncorhynchus tshawytscha, trapped, which produced 22,483,730 eggs. There were 594 winter-run steelhead, O. mykiss, trapped, from which 1,267,172 eggs were taken.

During the year we planted or transferred a total of 7,437,911 fingerling and 5,720,220 advanced fingerling chinook salmon and 293,785 fingerling and 442,820 yearling steelhead.

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California Department of Fish and Game, 1416 Ninth Street,  
Sacramento CA 95814

INTRODUCTION

This is the 35th 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 1989-90, with particular reference to numbers of fish trapped, spawned, and released, eggs taken and fish produced, and other pertinent information.

PRODUCTION SUMMARY

During 1989-90, hatchery personnel took 23,750,902 eggs and planted or transferred 13,894,736 chinook salmon and steelhead, and 221,058 steelhead eggs (Table 1).

TABLE 1. Production Summary, Nimbus Salmon and Steelhead Hatchery, 1989-90

<u>Species</u>	<u>Eggs taken or received</u>	<u>Eggs or fish transferred</u>	<u>Fingerlings planted</u>	<u>Advanced fingerlings or Yearlings planted</u>	<u>Total weight planted (lb)</u>
<u>Chinook salmon</u>					
1988 BY				2,629,870	48,796
1989 BY	22,483,730		7,437,911	3,090,350	101,548
<u>Steelhead</u>					
1989				442,820	108,150
1990	1,502,468	221,058	293,785		1,032

HATCHERY OPERATIONS

The weir was installed September 20, 1989, by the Bureau of Reclamation. The weir pickets were lowered and capped on October 3, 1989. The lower gate in the ladder was removed and the holding pond was opened October 30, 1989. Water temperature was 59°F.

### Water Temperature Control

Shutters 8 and 9 in Folsom Dam were raised July 10, 1989 because of low water and high temperature (64°F). Shutters 1-9 were installed on March 22, 1990. Drought conditions and a rapid decline of water storage in Folsom Lake caused higher than normal (64°F) water temperatures at the Hatchery. Shutters 1-9 were removed on June 9, 1990. After removal of the shutters, pond temperature was 46°F.

### 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 84,400 lbs edible, and 32,900 lbs inedible.

### Public Relations

An estimated 551,118 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 94,038 visitors. An interpretive program, funded by the U.S. Bureau of Reclamation and the Department was presented by Sacramento County interpreters under contract to the Department. The program was offered in October, November, and December; 1989-90 was the third year the program has been offered.

### CHINOOK SALMON MAINTENANCE PROGRAM Chinook Salmon Counts

The fish ladder was opened October 30, 1989, and the first spawning took place on October 31, 1989. A total of 9,741 salmon entered the holding pond this season, including 4,105 males, 5,125 females, and 511 grilse. Grilse are fish 60 cm (23.6 inches) FL or less (Appendix Table 1). A total of 1,313 carcasses was removed from the weir: 484 males, 454 females, and 375 male and female grilse.

### Sorting and Spawning

Of the females counted, 4,367 were spawned, 592 died in the pond, and 166 were accidentally killed or released. The spawning season, which began October 31, 1989, and ended December 8, 1989, produced a total of 22,483,730 eggs, for an average of 5,149 eggs per female. Fertility, as determined by the difference between green eggs taken and the total eggs eyed, ranged from 52% to 87%,

with an average of 73.8%. When incubation capacity was reached, 4,324,300 eggs from early-run fish were discarded and replaced with eggs from late-run fish.

### 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

#### 1988 Brood Year

There were an estimated 2,629,870 chinook salmon on hand July 1, 1989.

#### 1989 Brood Year

We released 10,528,261 fingerlings and advanced fingerlings (Table 2). A total of 202,400 of the fish released were coded-wire tagged. On June 30, 1990, there were approximately 1,001,650 chinook salmon on hand to be released in July 1990.

TABLE 2. Planting Data for 1988 and 1989 Brood Year Chinook Salmon

<u>Month</u>	<u>Release site</u>	<u>Fingerlings</u>	<u>Advanced fingerlings</u>	<u>Average size/lb</u>	<u>Weight (lb)</u>
<u>1988 BY</u>					
June	Benicia		2,629,870	53.9	48,796
<u>1989 BY</u>					
Jan.	American R.	3,123,500		1,453	2,150
Jan.	Auburn Rav.	124,500		1,245	100
Jan.	Bear River	273,800		1,245	220
Jan.	Coon Creek	124,500		1,245	100
Jan.	Cosumnes R.	522,800		1,245	420
Jan.	Dry Creek	124,500		1,245	100
Feb.	American R.	759,516		1,247	609
March	American R.	575,230		550	1,045
April	American R.	846,265		414	2,045
May	American R.	624,500		95	6,595
May	Maritime Acad.	338,800		97	3,500
June	Benicia		2,714,150	48	56,514
June	Maritime Acad.		376,200	57	6,600
	<b>TOTAL</b>	<u>7,437,911</u>	<u>5,720,220</u>		

**WINTER-RUN STEELHEAD MAINTENANCE PROGRAM  
History of the 1989 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, 1989-90**

Date	<u>Spawned and released</u>		<u>Pre-spawning mortality</u>		<u>Released spawned</u>		Total
	M	F	M	F	M	F	
Dec. 19	14	11	3	3	4	2	37
Jan. 2	36	34	5	3	9	3	90
Jan. 11	35	32	3	4	2	3	79
Jan. 18	55	57	6	1	7	11	137
Jan. 29	21	17	4	0	4	0	46
Feb. 5	27	17	4	1	0	0	49
Feb. 21	11	6	9	2	34	15	77
Mar. 2	24	16	3	0	8	28	79
<b>Totals</b>	<b>223</b>	<b>190</b>	<b>37</b>	<b>14</b>	<b>68</b>	<b>62</b>	<b>594</b>

**Spawning Data 1990 Brood Year**

The 190 females spawned produced 1,267,172 eggs for an average of 6,669 eggs per female. Survival of green eggs to eyed eggs ranged from 25% to 95%, with an average of 80.9%. A total of 235,296 eyed late-run steelhead eggs was received in March 1990 from Warm Springs Hatchery.

**Winter-run Steelhead Planted**

**1989 Brood Year**

From January 1990 through March 1990, a total of 442,820 yearling steelhead was planted (Table 4). No tagged fish were released this year.

TABLE 4. Planting Data, 1989 Brood Year Winter-run Steelhead, Nimbus Salmon and Steelhead Hatchery, 1989-90

Month	Release site	Planted		Average size/lb	Weight (lb)
		Number of fingerlings	Number of yearlings		
January	Clarksburg	0	72,050	4.5	16,000
January	Garcia Bend	0	81,810	4.5	18,100
February	Clarksburg	0	115,440	3.9	29,700
February	Garcia Bend	0	89,100	3.7	24,300
March	Clarksburg	0	39,680	4.5	8,800
March	Garcia Bend	0	<u>44,740</u>	4.3	10,350
TOTAL			442,820		

1989 Brood Year

Prior to June 30, 1990, there were 293,785 fingerlings released into the American River at the foot of the fish ladder (Table 5). On July 1, 1990, approximately 235,295 Warm Springs and 245,720 Nimbus fingerlings were on hand; approximately 430,000 will be released in January 1991. A total of 221,058 eyed steelhead eggs (1990 BY) was transferred to Mokelumne River Hatchery in March 1990.

TABLE 5. Planting Data, 1990 Brood Year, Nimbus Salmon and Steelhead Hatchery, 1989-90

Month	Release site	Number of fingerlings	Average size/lb	Weight (lb)
April	Foot of ladder	254,184	539	472
June	Foot of ladder	<u>39,600</u>	204	194
TOTAL		293,785		

Steelhead Disease Information

1988 Brood Year

Minor outbreaks of Columnaris were controlled by copper sulfate flushes and Terramycin mixed in the fish feed.

APPENDIX TABLE 1. Weekly Adult Salmon and Steelhead Trapping Data for Nimbus Hatchery, 1989-90

<u>Week</u>	<u>Chinook salmon</u>		<u>Steelhead trout</u>	
	<u>Adults</u>	<u>Grilse</u>	<u>Males</u>	<u>Females</u>
Oct. 29 - Nov. 4	747	103		
Nov. 5 - Nov. 11	2,599	134		
Nov. 12 - Nov. 18	2,647	126		
Nov. 19 - Nov. 25	1,754	96		
Nov. 26 - Dec. 2	1,072	45		
Dec. 3 - Dec. 9	406	5		
Dec. 10 - Dec. 16	0	0		
Dec. 17 - Dec. 23	5	2	21	16
Dec. 24 - Dec. 30	0	0	0	16
Dec. 1 - Jan. 6			50	0
Jan. 7 - Jan. 13			40	40
Jan. 14 - Jan. 20			68	39
Jan. 21 - Jan. 27			0	69
Jan. 28 - Feb. 3			29	0
Feb. 4 - Feb. 10			31	17
Feb. 11 - Feb. 17			0	18
Feb. 18 - Feb. 24			54	0
Feb. 25 - Mar. 3			35	23
				44
TOTAL	<u>9,230</u>	<u>511</u>	<u>328</u>	<u>266</u>



APPENDIX TABLE 2. Chinook Salmon Coded-Wire Tag Recoveries  
 Preliminary Data, Nimbus Hatchery, 1989-90

CWT	Number recovered	Brood year	Hatchery	Release site
05-18-42	1	87	Coleman Benicia	
H6-06-06	1	84	Wild	Sprowl and Redwood
06-45-08	1	86	Merced River	Dos Reis
06-31-02	2	87	Feather River	Ryde
06-46-59	1	85	Merced River	Old River
06-48-26	2	86	Mokelumne River	Benicia
06-48-30	1	86	Mokelumne River	Benicia
06-54-05	6	85	Nimbus	Berkeley
06-54-06	16	85	Nimbus	Benicia
06-54-07	29	86	Nimbus	Berkeley
06-54-09	2	87	Nimbus	Benicia
06-54-10	1	87	Nimbus	Benicia
06-54-11	3	87	Nimbus	Benicia
10-00-00		No CWT in head		

TOTAL

66

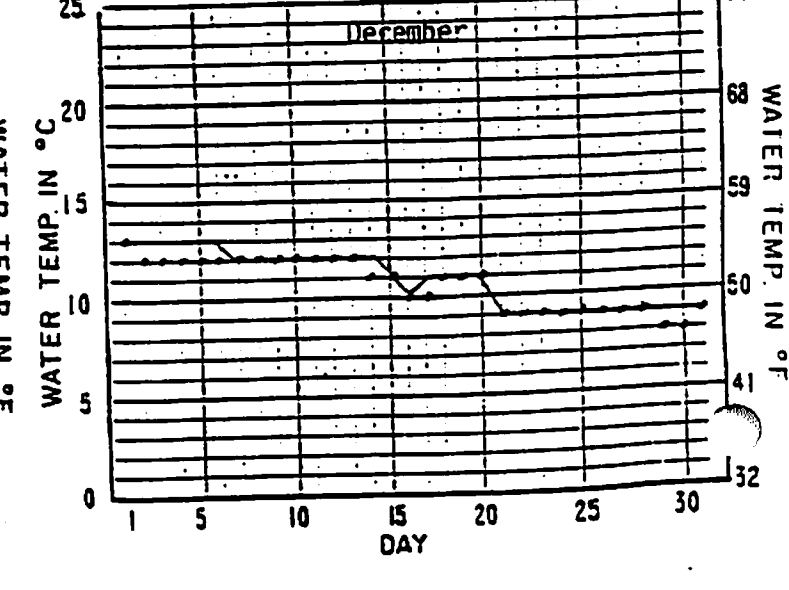
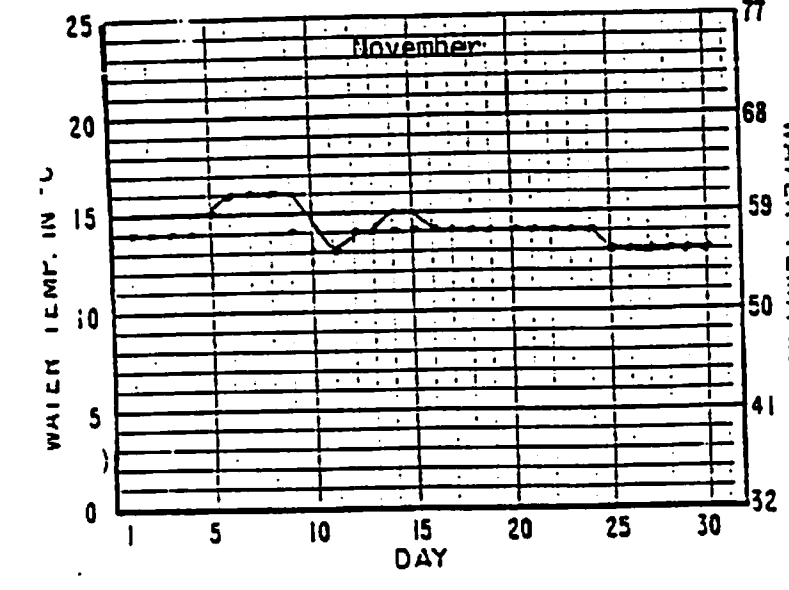
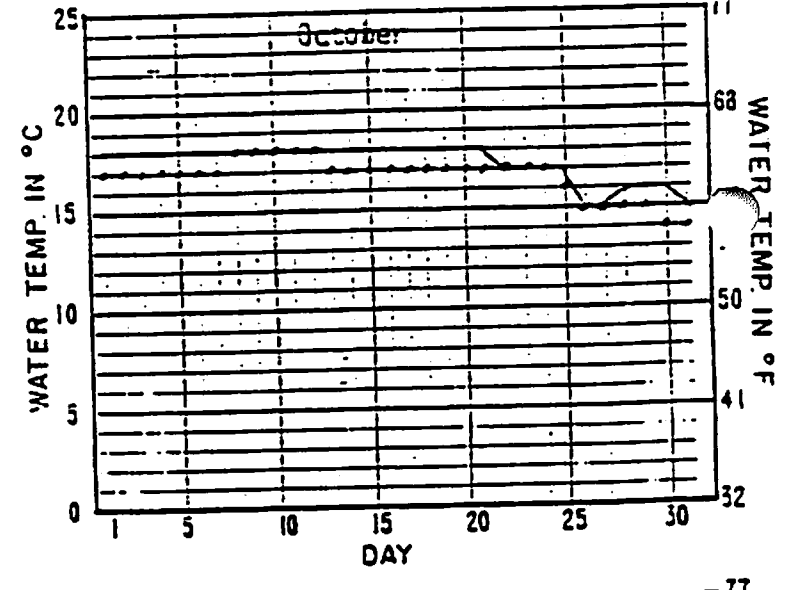
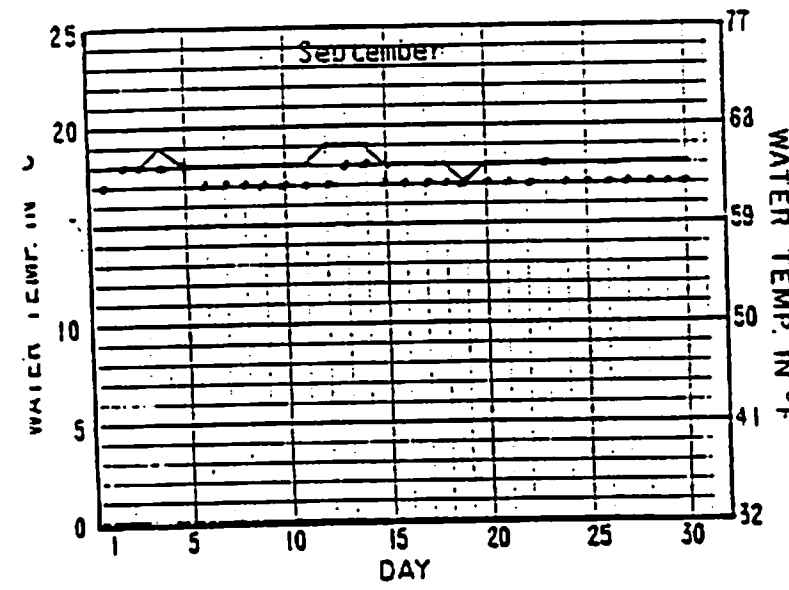
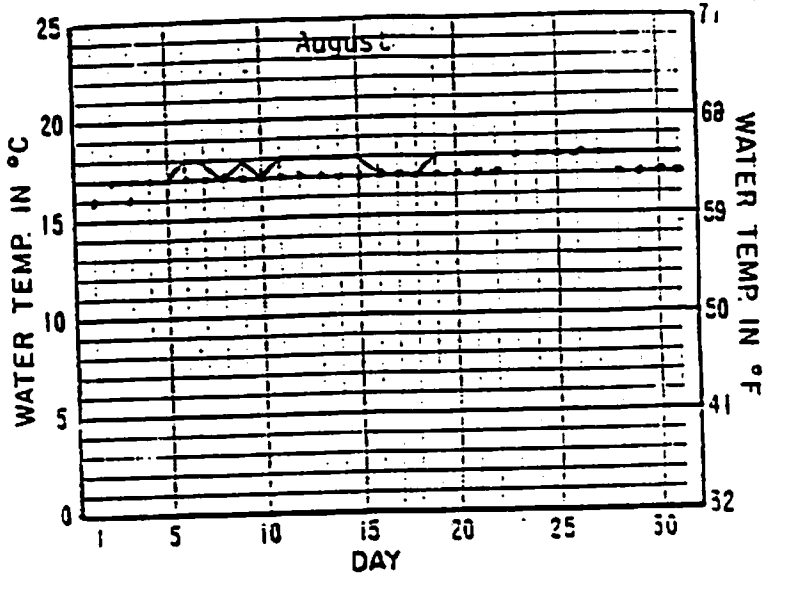
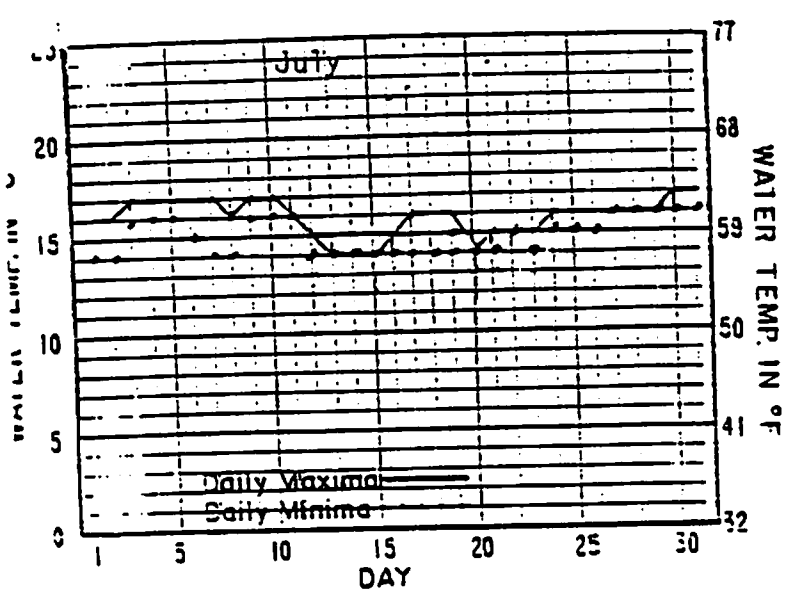
APPENDIX TABLE 3. Summary of Fish Runs to Nimbus Salmon and Steelhead Hatchery

<u>Year</u>	<u>Chinook salmon</u>		<u>Grilse</u>	<u>Steelhead</u>
	<u>Males</u>	<u>Females</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
1988-89	3,777	4,187	661	289
1989-90	4,105	5,125	511	594

\* Included in adult male

APPENDIX FIGURE 1. Daily Water Temperatures for Nimbus Salmon and Steelhead Hatchery from July 1, 1989 through June 30, 1990

### DAILY WATER TEMPERATURES BY MONTH



APPENDIX FIGURE 1. (Con't)

### DAILY WATER TEMPERATURES BY MONTH

