

Fisheries File

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ANNUAL REPORT NIMBUS SALMON AND STEELHEAD HATCHERY ^{1/}
1969-70 FISCAL YEAR

by

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SUMMARY

The first king salmon (Oncorhynchus tshawytscha) of the 1969 fall migration was observed at the entrance to the fish ladder on September 18. No fish were allowed to migrate into the holding pond until mid-October. The last salmon was counted on January 7, 1970.

Steelhead (Salmo gairdneri) entered the holding pond with the early salmon migrants and were counted until February 18, 1970.

Production data are as follows:

Species	Number Trapped	Number Eggs Received	Number Fingerlings Planted	Number Yearlings Planted	Total Pounds	On Hand 6-30-70
King salmon	8,184	7,018,510	3,334,415	108,240*	39,097	756,800
Steelhead trout	1,734	1,892,720	383,103	445,440**	53,679	758,910
Summer steelhead	0	87,300	0	18,700**	2,200	79,680

* 1968 Brood Year King salmon.

** 1969 Brood Year Steelhead trout.

^{1/} Anadromous Fisheries Administrative Report No. 71-6.
Submitted March 1971.

INTRODUCTION

This is the 15th annual report of the Nimbus Salmon and Steelhead Hatchery. The hatchery is operated by the California Department of Fish and Game under contract with the United States Bureau of Reclamation. The report summarizes the activities of the hatchery during the fiscal year 1969-70 with particular reference to numbers of fish trapped and spawned, eggs and fish produced and pertinent weather data.

KING SALMON MAINTENANCE PROGRAM

History of the 1969 Salmon Migration

The weir racks were installed by Bureau of Reclamation personnel on August 26, 1969. Between that date and about mid-September the hatchery crew made some temporary repairs to the rack sub-structure in order to prevent escapement of fish. The nature of the damage to the structure and the conditions under which the work had to be carried out precluded effecting complete repairs. The racks were removed on December 23 because of flows exceeding 7,500 cfs.

The first king salmon of the season was observed at the base of the fish ladder on September 18. However, the ladder was not opened to fish passage until October 16.

A total of 8,184 king salmon migrated to the hatchery from October 16, 1969, to January 7, 1970. Of this number, 3,070 were counted in the holding pond and 5,119 carcasses were removed from the weir. The composition of the run in the holding pond was 1,488, or 48.5%, females; 1,061, or 34.4%, mature males, and 521, or 17.1%, grilse. Included with the grilse were 15 two-year-old females which were returned to the river unspawned. Of the fish removed and counted at the weir, 921 were mature males; 403 were unspawned females; 372 were spent females, and 3,423 were grilse. The large escapement of adults through the weir was primarily due to the numerous breaks in the screen which covers the foundation of the rack structure. Every year grilse escape between the weir pickets.

eggs 2.
The first king salmon eggs were taken on November 3. The last spawning occurred on January 7, 1970. Of the 1,488 females counted in the holding pond 1,334, or 89.7% were spawned; 30, or 2.0%, were killed when too green to be spawned successfully; 111, or 7.4%, died in the pond, and 13, or 0.9%, were released as too green at the end of the season. Adult mortality was lower than the average for prior years. This is attributed to the modernized fish handling facilities described in the 1968-69 annual report.

Planting 1969 Brood Year King Salmon

As part of the evaluation program initiated last year, approximately one-third of the smolts released at each of three sites are marked by fin clipping. This season smolts released at the hatchery were marked RP-LV; smolts released in the Sacramento River near Rio Vista were marked LP-RV; smolts released at the mouth of the American River were marked Ad-LP-RV.

Evaluation Program Releases

<u>Release Site</u>	<u>Marked-Smolts</u>	<u>Unmarked-Smolts</u>	<u>Marked-Swimups</u>
Hatchery	258,976	518,012	257,900
Mouth- American River	258,819	516,764	
Rio Vista- Sacramento River	<u>263,331</u>	<u>526,637</u>	<u> </u>
TOTAL	781,126	1,561,413	257,900

In addition to the evaluation program, 733,976 fingerlings were released at the hatchery between February 26 and June 25, 1970, and 1,132,260 fingerlings were transferred to the Feather River Hatchery.

Planting 1968 Brood Year King Salmon

From November 4 to 11, 1969, there were 108,240 unmarked yearling king salmon planted in the Sacramento River near Rio Vista. These fish ranged from 9.7 to 13 per pound and weighed in the aggregate 9,950 pounds.

Marked King Salmon Returns

During the season 28 grilse, marked Ad-AN, returned to the hatchery. These fish, of the 1967 brood year, were from a group of 50,000 yearlings reared at the Feather River Hatchery and released at Sherman Island.

Water Temperature Control

On August 25, 1969, the number nine shutters in the intake structures for Folsom powerhouse were removed. This was necessary to maintain the proper head of water for the turbine intakes. On October 16 at the request of the Department of Fish and Game the remaining eight shutters in each bay of the intake structure were removed. In three days the water temperature dropped from a range of 62 to 65 F to 55 to 57 F.

On March 23, 1970, eight shutters were installed. One number eight shutter was removed on March 26 because trout at the American River Hatchery became distressed when the water temperature rose sharply.

Prior to March 23 the daily range was 47 to 49 F. On March 24 the range was 50 to 52 F and on March 25 and 26 the range was 51 to 57 F. After one number eight shutter was removed on March 26 the temperature dropped to a range of 48 to 51 F, and there was no longer evidence of fish distress.

Other Species of Salmon Encountered

During the season one female chum salmon (O. keta) and one male silver salmon (O. kisutch) were counted in the holding pond.

Disposal of Nimbus Salmon Carcasses

Approximately 15,000 pounds of salmon carcasses were given to various public institutions, charitable organizations and Indians of California. In addition, 3,300 pounds were given to a rendering plant, and 3,100 pounds were given to a local zoo.

STEELHEAD MAINTENANCE PROGRAM

1970 Brood Year Nimbus Steelhead

There were 27 adult steelhead in the holding pond at the start of the salmon spawning season on November 3. Periodic inventory counts were made and on December 26, 583 steelhead were counted. Thereafter, fish were counted only as they were spawned and released.

<u>Date</u>	<u>Fish Spawned</u>		<u>Released Unspawned</u>		<u>Died in Pond</u>	
	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
12-29-69	18	15			2	4
1- 2-70	10	17			2	1
1- 7-70	28	22			6	6
1-12-70	9	23			5	5
1-16-70	8	15	66		4	6
1-21-70	16	59			3	2
1-26-70	8	29			2	4
1-30-70	13	58			21	16
2- 3-70	16	37			8	7
2- 6-70	11	33	46		24	9
2-11-70	16	26	50	34	15	21
2-18-70	9	33	609	149	63	15
TOTALS	162	367	771	183	155	96

The 367 females spawned produced 1,892,720 eggs for an average of 5,157 per fish. Survival from green to eyed egg stage ranged from 78.3 to 94.6% with the average 87.6%.

A tagging program was initiated by Region 2 management personnel in an effort to determine the catch of adult steelhead in the American River and Folsom Lake. On February 11, 1970, 66 males and 34 females were tagged. Fifty fish were released in Folsom Lake at Beals Point and 50 were released in the American River at Watt Avenue. On February 18 another 66 males and 34 females were tagged. These fish were released as before - 50 in Folsom Lake and 50 in the American River. Of the 100 tagged fish released in the American River 18 were taken by anglers, and one tag was recovered from a dead fish. Of the Folsom Lake releases six tags were returned by anglers and seven from fish that had died.

1970 Brood Year Nimbus Steelhead Planted

In May, 386,103 steelhead fingerlings were released. Of this number 383,535 were released at the hatchery and 2,568 were experimentally planted in North Star Pond near Grass Valley.

1969 Brood Year Nimbus Steelhead Planted

<u>Month</u>	<u>Size</u>	<u>Number</u>	<u>Pounds</u>	<u>Mark</u>	<u>Release Site</u>
8/69	58-59/lb	50,100	855	Unmarked	Hatchery
9/69	33-42/lb	51,600	1,400	"	"
1/70	7-8/lb	198,700	26,700	"	Clarksburg-Sacramento River
3/70	6.3/lb	25,200	4,000	Ad-LV	" "
3/70	5.6-6/lb	25,000	4,300	Ad-RV	Sherman Island (Sacramento River)
3/70	5.6-6.5/lb	91,340	14,950	Unmarked	Clarksburg-Sacramento River
6/70	3.3/lb	1,000	303	RP & Tagged	Rio Vista-Sacramento River
6/70	3.4/lb	1,400	412	"	Clarksburg-Sacramento River
6/70	3.4/lb	1,100	324	"	Hatchery to Watt Avenue (American River)
TOTALS		445,440	53,244		

The 1969 brood year steelhead planted in June were part of an experimental program to try and determine movement and harvest rate of yearling steelhead planted later than the usual March release.

Return of Marked Nimbus Steelhead

During the season 582 males and 602 females, marked Ad, returned to the hatchery. This is a cumulative return for the 1966 and 1967 brood years of 3,976, or 1.89%, of the fish released. As was the case last year a total evaluation was not made because the racks were removed in late December and the fish ladder was closed on February 19, 1970.

1970 Brood Year Summer Steelhead

In April 1970, 87,300 eyed steelhead eggs were received from the Skamania Hatchery in Washougal, Washington, to continue the program of rearing summer-run steelhead.

1969 Brood Year Summer Steelhead

The 194,000 steelhead eggs received from the Skamania Hatchery in Washougal, Washington, in April, 1969, resulted in an ultimate production of only 18,700 yearlings. Post-hatching mortality was excessive and the fish that survived were extremely difficult to feed. Several diets were tried in addition to fortifying the diet with vitamin B₁. An attempt was also made to hatch and feed brine shrimp. All methods tried were of little value. After the fish had been in a rearing pond for about a month, they appeared to be accepting the standard Oregon moist pellet diet quite readily. Losses by then were down to normal.

In late January larger than normal losses were incurred during a period of turbid water conditions. Only fish in the first raceway pond in each series were affected. This same phenomenon occurred in the winter of 1968-69. There was also some evidence of a similar problem at the American River Hatchery, in only the first raceway ponds. As soon as the settling basin was activated the problem was rectified. Siltation has been dismissed as being the principal problem because there appeared to be little difference in turbidity at the head and lower ends of the ponds at either hatchery. Also little, if any, difference in turbidity could be noted between the intake and discharge side of the settling basin at the American River Hatchery. A dissolved gas is suspected as the causative agent.

Distribution of 1969 Brood Year Summer Steelhead

In March 1970, 18,700 Washougal steelhead averaging 8.5 per pound and weighing 2,200 pounds were planted in the Sacramento River at Clarksburg. These fish were marked LP.

Public Relations

It is estimated that 103,180 persons visited the hatchery this past year. The period of greatest visitation is during the salmon and steelhead migrations. Included in the count were 8,635 persons in 206 organized groups who were conducted on tours of the hatchery.

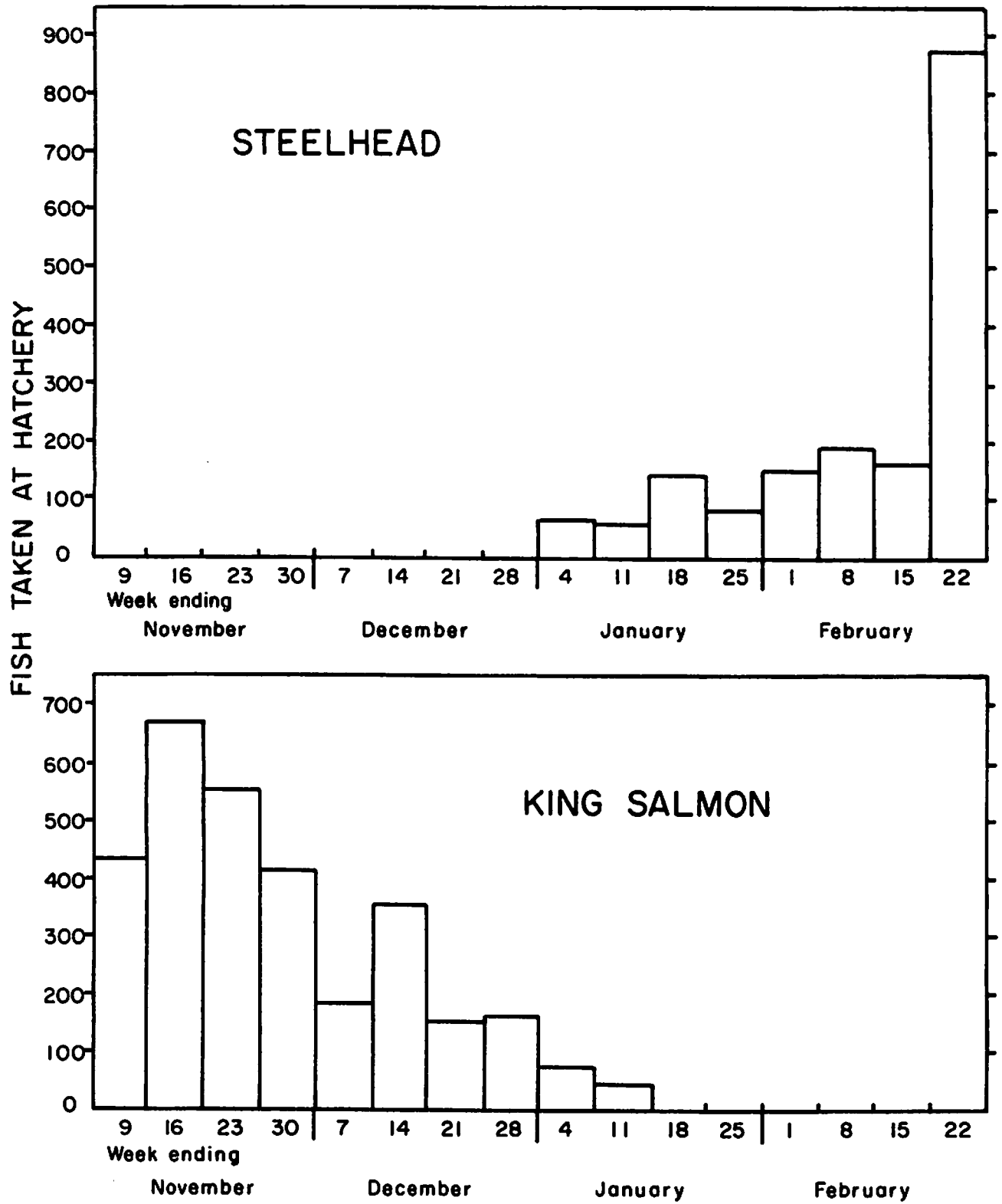


Figure 1. King salmon and steelhead counts taken at Nimbus Hatchery from November 1969 - February 1970.

Figure 2
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
July, 1969

Date	TEMPERATURES				Weather	American River Flow at Hatchery C.F.S.
	AIR		WATER			
	Maximum	Minimum	Maximum	Minimum		
1	98	60	62	60	Clear	2,007
2	98	60	66	62	Clear	2,004
3	98	60	66	62	Clear	1,997
4	100	60	64	62	Clear	1,995
5	100	62	63	61	Clear	1,995
6	98	60	64	61	Clear	1,997
7	98	62	63	61	Clear	2,020
8	98	60	63	61	Clear	1,993
9	98	60	64	62	Clear	1,996
10	102	62	64	62	Clear	1,999
11	104	64	65	62	Partly Cloudy	1,984
12	102	66	64	64	Clear	1,978
13	102	66	64	64	Clear	1,978
14	96	64	64	61	Clear	2,013
15	100	62	65	64	Clear	2,013
16	104	64	64	62	Clear	2,013
17	107	67	64	62	Clear	2,011
18	106	67	64	62	Clear	2,013
19	106	68	64	62	Clear	2,017
20	107	68	65	62	Clear	2,002
21	106	72	63	63	Clear	2,011
22	106	68	65	65	Partly Cloudy	2,012
23	100	68	65	63	Partly Cloudy	2,011
24	92	62	65	62	Clear	2,025
25	96	60	65	65	Partly Cloudy	2,024
26	100	60	65	62	Partly Cloudy	2,017
27	99	60	64	62	Clear-Partly Cloudy	2,016
28	100	62	65	63	Clear	2,005
29	98	60	65	62	Clear	2,005
30	100	60	64	62	Clear	2,006
31	102	60	64	62	Clear	2,009

Figure 3
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
August, 1969

Date	TEMPERATURES				Weather	American River Flow at Hatchery C.F.S.
	AIR		WATER			
	Maximum	Minimum	Maximum	Minimum		
1	104	60	65	63	Cloudy	2,004
2	106	64	66	64	Partly Cloudy	2,007
3	106	66	66	64	Clear	2,003
4	104	67	65	63	Clear	2,037
5	102	62	66	63	Clear	2,501
6	102	60	66	63	Clear	2,510
7	102	62	66	64	Clear	2,519
8	102	62	66	64	Clear	2,525
9	106	63	66	63	Partly Cloudy	2,524
10	108	65	65	63	Clear	2,511
11	105	66	65	63	Clear	2,520
12	101	62	66	63	Clear	2,502
13	104	64	66	64	Clear	2,498
14	104	63	67	64	Clear	2,504
15	102	62	66	64	Clear	2,506
16	100	62	66	63	Clear	2,486
17	98	63	66	63	Clear	2,501
18	93	58	65	63	Clear	2,482
19	98	62	66	64	Clear	2,493
20	102	62	66	64	Clear	2,490
21	106	64	66	64	Clear	2,479
22	99	64	66	64	Clear	2,480
23	92	62	65	64	Clear	2,498
24	94	54	65	64	Clear	2,496
25	96	58	67	64	Clear	2,518
26	96	59	66	64	Clear	2,514
27	96	58	66	64	Clear	2,116
28	96	60	65	63	Clear	2,437
29	96	63	66	63	Clear	2,437
30	96	62	65	63	Clear	2,439
31	102	62	65	62	Clear	2,488

Figure 4
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
September, 1969

Date	TEMPERATURES				Weather	American River Flow at Hatchery C.F.S.
	AIR		WATER			
	Maximum	Minimum	Maximum	Minimum		
1	106	66	64	62	Clear	2,500
2	106	66	65	63	Clear	2,538
3	100	68	65	63	Clear	3,030
4	99	64	65	63	Clear	3,034
5	98	64	65	63	Clear	2,404
6	102	64	65	63	Clear a.m., Partly Cloudy p.m.	3,023
7	101	74	66	64	Rain a.m., Partly Cloudy p.m.	3,024
8	100	54	64	63	Clear	3,015
9	98	66	64	63	Clear	3,009
10	98	64	66	64	Clear	3,013
11	94	66	66	65	Clear	3,027
12	94	63	66	65	Clear	3,024
13	88	60	65	63	Clear	3,009
14	82	54	63	62	Clear	3,008
15	83	52	65	61	Clear	3,013
16	85	52	65	62	Partly Cloudy	3,022
17	85	53	65	62	Clear	3,018
18	86	55	66	62	Cloudy	2,994
19	84	56	65	63	Partly Cloudy	2,991
20	86	57	65	63	Clear	3,007
21	86	53	64	62	Clear	3,007
22	89	58	65	63	Clear	3,009
23	90	58	65	63	Clear	2,996
24	90	60	66	64	Clear	2,993
25	94	58	65	64	Partly Cloudy	2,974
26	94	62	65	65	Clear	2,996
27	86	60	65	63	Clear	2,987
28	88	56	65	63	Partly Cloudy	3,009
29	93	60	65	64	Partly Cloudy	3,014
30	90	57	66	64	Partly Cloudy	3,008

Figure 5
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
October, 1969

Date	TEMPERATURES				Weather	American River
	AIR		WATER			Flow
	Maximum	Minimum	Maximum	Minimum		at Hatchery C.F.S.
1	90	58	66	64	Partly Cloudy	3,015
2	78	56	66	63	Partly Cloudy	3,039
3	80	56	65	63	Clear	3,016
4	78	50	65	62	Clear	2,973
5	80	46	65	62	Clear	2,994
6	84	46	65	63	Partly Cloudy	3,040
7	86	46	65	63	Partly Cloudy	2,980
8	80	56	64	63	Cloudy	3,012
9	76	50	65	62	Partly Cloudy	3,010
10	78	58	65	63	Cloudy	3,134
11	78	45	64	61	Clear - windy	4,061
12	76	44	64	61	Clear	4,483
13	72	46	63	61	Partly Cloudy	4,504
14	70	54	60	63	Cloudy	4,509
15	62	54	59	58	Rain	4,530
16	74	57	58	58	Rain	4,529
17	70	48	58	54	Cloudy	4,490
18	70	42	56	54	Clear	4,498
19	70	44	56	54	Clear	4,485
20	76	48	56	55	Partly Cloudy	2,085
21	76	47	57	55	Clear	4,479
22	74	48	57	55	Clear	4,503
23	72	51	56	55	Partly Cloudy	4,488
24	72	55	57	55	Partly Cloudy	4,490
25	70	55	57	51	Partly Cloudy	4,495
26	72	51	57	53	Partly Cloudy	4,478
27	72	50	58	54	Partly Cloudy	4,491
28	74	47	58	55	Clear-Partly Cloudy	4,483
29	72	42	58	56	Partly Cloudy	4,471
30	76	46	58	56	Clear	4,483
31	78	46	58	56	Clear	4,483

Figure 6
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
November, 1969

Date	TEMPERATURES				Weather	American River	Salmon
	AIR		WATER			Flow	
	Maximum	Minimum	Maximum	Minimum		at Hatchery	
						C.F.S.	
1	76	45	59	56	Clear	4,490	-
2	78	47	58	56	Clear	4,508	-
3	78	46	58	56	Clear	4,493	170
4	78	50	58	56	Partly Cloudy	4,479	-
5	56	52	57	57	Rain	4,475	-
6	66	50	57	56	Rain	4,496	-
7	64	50	58	56	Cloudy - Rain	4,491	268
8	70	48	58	56	Cloudy	4,460	-
9	70	43	58	55	Clear	4,546	-
10	70	41	58	55	Clear	4,508	200
11	72	45	58	56	Clear	4,474	-
12	74	46	58	56	Clear	4,492	128
13	74	46	58	56	Clear	4,522	-
14	72	48	58	55	Clear	4,513	187
15	66	51	56	56	Cloudy	4,491	-
16	66	54	56	55	Partly Cloudy	4,460	155
17	62	38	55	54	Clear	4,122	-
18	62	36	56	54	Clear	3,587	244
19	64	38	57	54	Partly Cloudy	3,107	-
20	68	38	57	55	Cloudy	2,626	214
21	70	40	56	54	Clear	2,501	-
22	62	40	55	54	Clear	2,478	99
23	62	55	54	54	Clear	2,502	-
24	62	38	55	53	Clear	2,503	109
25	64	38	55	53	Partly Cloudy	2,523	-
26	64	40	54	53	Clear	2,511	128
27	61	43	54	53	Clear	2,511	-
28	60	42	54	53	Clear	2,511	80
29	64	38	54	52	Clear - Partly Cloudy	2,517	-
30	62	34	54	51	Clear	2,524	99

Figure 6
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
November, 1969

Date	TEMPERATURES				Weather	American River	Salmon
	AIR		WATER			Flow	
	Maximum	Minimum	Maximum	Minimum		at Hatchery	
						C.F.S.	
1	76	45	59	56	Clear	4,490	-
2	78	47	58	56	Clear	4,508	-
3	78	46	58	56	Clear	4,493	170
4	78	50	58	56	Partly Cloudy	4,479	-
5	56	52	57	57	Rain	4,475	-
6	66	50	57	56	Rain	4,496	-
7	64	50	58	56	Cloudy - Rain	4,491	268
8	70	48	58	56	Cloudy	4,460	-
9	70	43	58	55	Clear	4,546	-
10	70	41	58	55	Clear	4,508	200
11	72	45	58	56	Clear	4,474	-
12	74	46	58	56	Clear	4,492	128
13	74	46	58	56	Clear	4,522	-
14	72	48	58	55	Clear	4,513	187
15	66	51	56	56	Cloudy	4,491	-
16	66	54	56	55	Partly Cloudy	4,460	155
17	62	38	55	54	Clear	4,122	-
18	62	36	56	54	Clear	3,587	244
19	64	38	57	54	Partly Cloudy	3,107	-
20	68	38	57	55	Cloudy	2,626	214
21	70	40	56	54	Clear	2,501	-
22	62	40	55	54	Clear	2,478	99
23	62	55	54	54	Clear	2,502	-
24	62	38	55	53	Clear	2,503	109
25	64	38	55	53	Partly Cloudy	2,523	-
26	64	40	54	53	Clear	2,511	128
27	61	43	54	53	Clear	2,511	-
28	60	42	54	53	Clear	2,511	80
29	64	38	54	52	Clear - Partly Cloudy	2,517	-
30	62	34	54	51	Clear	2,524	99

Figure 7
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
December, 1969

Date	TEMPERATURES				Weather	American River	Salmon	Steelhead
	AIR		WATER			Flow		
	Maximum	Minimum	Maximum	Minimum		at Hatchery c.f.s.		
1	60	34	53	52	Clear	2,527	0	0
2	62	36	55	52	Clear	2,475	69	0
3	62	37	53	52	Partly Cloudy	2,501	0	0
4	66	37	52	51	Fog	2,495	69	0
5	64	34	53	51	Fog	2,505	0	0
6	62	38	54	51	Fog	2,502	48	0
7	65	34	50	50	Clear - Fog	2,495	0	0
8	56	42	50	50	Rain	2,487	115	0
9	58	46	51	50	Cloudy	2,505	0	0
10	58	46	51	50	Rain	2,472	89	0
11	64	48	51	50	Rain	2,478	0	0
12	66	48	51	51	Cloudy - Rain	2,473	84	0
13	67	48	52	50	Cloudy	2,503	0	0
14	64	48	52	50	Partly Cloudy	2,523	69	0
15	60	42	51	50	Fog	2,520	0	0
16	60	41	51	50	Fog	2,515	64	0
17	60	40	51	50	Partly Cloudy	2,513	0	0
18	60	48	50	50	Rain	2,512	41	0
19	58	51	50	50	Rain	2,497	0	0
20	66	55	51	50	Cloudy	2,496	51	0
21	64	62	50	50	Rain	2,490	0	0
22	58	43	50	50	Cloudy	3,560	66	0
23	52	47	50	49	Rain	5,955	0	0
24	52	50	50	49	Rain	8,785	63	0
25	62	56	49	49	Rain - Partly Cloudy	9,997	0	0
26	52	36	49	48	Fog - Clear	11,056	35	0
27	50	38	49	48	Clear - Windy	12,062	0	0
28	56	36	49	48	Clear	12,069	0	0
29	52	31	49	48	Clear	10,249	46	39
30	54	30	49	48	Clear	7,959	0	0
31	52	32	48	47	Clear	8,032	0	0

Figure 8
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
January, 1970

Date	TEMPERATURES				Weather	American River	Salmon	Steelhead
	AIR		WATER			Flow		
	Maximum	Minimum	Maximum	Minimum		at Hatchery		
						C.F.S.		
1	54	30	57	48	Clear	7,319	0	0
2	54	30	48	47	Clear - Fog	5,226	32	30
3	50	28	47	46	Clear	5,090	0	0
4	50	28	46	45	Clear	6,203	0	0
5	58	28	46	45	Clear	7,438	0	0
6	54	28	46	45	Cloudy	7,522	0	0
7	54	38	45	45	Cloudy	7,520	48	62
8	52	44	45	45	Rain	7,504	0	0
9	61	48	45	45	Rain	7,503	0	0
10	62	50	46	45	Cloudy - Rain	7,478	0	0
11	60	48	45	45	Rain	7,480	0	0
12	62	55	46	45	Cloudy - Rain	7,410	0	42
13	60	52	46	45	Cloudy - Rain	7,538	0	0
14	60	54	46	45	Rain	7,603	0	0
15	60	46	46	45	Cloudy - Rain	7,677	0	0
16	68	57	47	45	Cloudy - Rain	21,685	0	99
17	65	53	47	47	Cloudy	34,185	0	0
18	65	49	47	46	Partly Cloudy	49,970	0	0
19	61	54	47	46	Rain	42,881	0	0
20	70	51	48	46	Cloudy	26,762	0	0
21	71	58	47	47	Rain	21,260	0	80
22	71	58	49	48	Cloudy	34,662	0	0
23	62	58	49	48	Cloudy	44,616	0	0
24	63	50	48	47	Cloudy	49,996	0	0
25	62	40	49	48	Clear	41,688	0	0
26	64	42	48	47	Partly Cloudy	27,689	0	43
27	59	50	49	47	Clear	23,745	0	0
28	56	35	47	46	Clear	17,359	0	0
29	56	34	47	46	Partly Cloudy	12,973	0	0
30	54	42	47	46	Clear	10,389	0	108
31	60	36	46	46	Clear	9,993	0	0

Figure 9
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
February, 1970

Date	TEMPERATURES				Weather	American River	Steelhead
	AIR		WATER			Flow	
	Maximum	Minimum	Maximum	Minimum		at Hatchery C.F.S.	
1	62	40	46	46	Clear	9,985	0
2	62	36	46	45	Clear	9,962	0
3	66	38	47	45	Clear	8,215	68
4	62	40	46	45	Clear	8,077	0
5	64	41	46	45	Clear	7,995	0
6	64	39	47	45	Fog - Clear	8,010	123
7	60	39	46	45	Fog - Clear	8,006	0
8	66	40	46	44	Fog - Clear	7,987	0
9	69	42	45	44	Cloudy - Rain	7,046	0
10	70	40	46	44	Rain	6,020	0
11	71	44	46	44	Cloudy - Rain	5,528	162
12	64	54	46	45	Clear - Cloudy - Rain	5,517	0
13	55	50	45	45	Rain	5,571	0
14	64	49	46	45	Partly Cloudy	5,464	0
15	64	44	46	45	Cloudy	5,445	0
16	59	48	45	45	Partly Cloudy - Rain	5,498	0
17	59	42	46	45	Cloudy	5,541	0
18	60	36	47	45	Clear	5,496	878
19	65	36	47	45	Clear	5,525	0
20	68	36	48	46	Clear	5,491	0
21	66	36	47	46	Clear	5,410	0
22	65	40	48	45	Clear	5,389	0
23	68	38	47	45	Clear	5,446	0
24	68	44	48	45	Clear	5,430	0
25	72	42	47	45	Clear	7,349	0
26	73	44	48	45	Partly Cloudy	7,566	0
27	70	45	47	45	Clear	7,475	0
28	65	49	45	45	Partly Cloudy	7,508	0

Figure 10
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
March, 1970

Date	TEMPERATURES				Weather	American River Flow at Hatchery C.F.S.
	AIR		WATER			
	Maximum	Minimum	Maximum	Minimum		
1	56	46	45	45	Rain	7,468
2	62	34	46	45	Rain	7,470
3	64	38	46	45	Rain	7,496
4	48	42	46	46	Cloudy - Rain	7,506
5	62	36	48	45	Clear	7,463
6	52	42	49	46	Clear	7,461
7	72	42	47	46	Partly Cloudy - Rain	7,432
8	70	42	47	45	Partly Cloudy	7,418
9	64	42	46	45	Rain	7,391
10	64	42	47	45	Rain	7,510
11	64	42	46	45	Partly Cloudy	7,480
12	62	46	48	46	Clear	7,596
13	74	54	48	46	Clear	7,498
14	71	54	47	46	Partly Cloudy	7,489
15	70	53	48	45	Clear	7,470
16	76	46	48	46	Clear	7,455
17	67	46	48	47	Clear	6,523
18	68	46	49	46	Clear	5,233
19	69	44	49	47	Clear	4,208
20	70	36	48	48	Clear	3,987
21	70	42	49	47	Clear	3,280
22	74	42	50	47	Clear	3,032
23	78	44	49	46	Clear	3,020
24	77	46	51	48	Clear	2,547
25	81	48	56	49	Clear	2,492
26	78	45	57	52	Clear	2,495
27	74	50	54	52	Clear	2,479
28	72	44	51	50	Clear	2,487
29	78	48	51	48	Clear	2,482
30	70	48	52	48	Clear	2,497
31	72	49	52	40	Clear	2,470

Figure 11
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
April, 1970

Date	TEMPERATURES				Weather	American River Flow at Hatchery C.F.S.
	AIR		WATER			
	Maximum	Minimum	Maximum	Minimum		
1	78	42	52	49	Clear	2,486
2	77	43	54	51	Clear	2,484
3	78	44	53	51	Clear	2,448
4	80	42	52	50	Clear	1,992
5	80	45	52	50	Clear	1,985
6	80	49	52	49	Clear	1,979
7	72	42	52	48	Clear	1,965
8	75	46	53	50	Partly Cloudy	1,967
9	78	46	53	50	Clear	1,977
10	78	52	53	50	Clear	1,976
11	75	45	55	52	Clear	1,968
12	78	42	53	49	Clear	1,986
13	49	42	50	49	Cloudy	1,995
14	56	46	50	49	Rain	1,500
15	70	36	51	49	Partly Cloudy	1,485
16	75	40	52	49	Partly Cloudy	1,487
17	74	40	53	50	Partly Cloudy	1,487
18	74	42	53	51	Partly Cloudy	1,484
19	70	50	54	51	Partly Cloudy	1,472
20	72	40	53	52	Partly Cloudy	1,485
21	76	40	53	51	Clear - Partly Cloudy	1,557
22	76	40	53	50	Partly Cloudy	1,507
23	76	41	54	50	Clear - Partly Cloudy	1,498
24	78	42	55	51	Clear	1,562
25	71	42	55	52	Partly Cloudy	2,170
26	68	45	53	51	Cloudy	2,204
27	58	36	51	51	Partly Cloudy	1,829
28	68	38	53	50	Partly Cloudy	1,516
29	72	40	54	51	Clear - Partly Cloudy	1,504
30	83	40	55	52	Clear	1,508

Figure 12
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
May, 1970

Date	TEMPERATURES				Weather	American River
	AIR		WATER			Flow
	Maximum	Minimum	Maximum	Minimum		at Hatchery C.F.S.
1	88	48	56	54	Clear	1,508
2	92	54	56	54	Clear	1,510
3	98	56	56	53	Clear	1,507
4	92	56	56	54	Clear-Partly Cloudy	1,502
5	80	48	54	53	Clear-Partly Cloudy	1,500
6	71	52	55	53	Cloudy	1,509
7	78	46	56	54	Partly Cloudy	1,504
8	72	50	55	53	Cloudy	1,515
9	78	58	56	54	Partly Cloudy-Cloudy	1,520
10	75	48	56	53	Partly Cloudy	1,507
11	70	43	54	53	Cloudy	1,485
12	75	48	56	53	Partly Cloudy	1,495
13	78	50	56	54	Partly Cloudy	1,489
14	92	54	58	55	Partly Cloudy	1,499
15	98	54	58	55	Clear	1,493
16	104	61	57	55	Clear	1,487
17	99	62	56	55	Clear	1,491
18	87	55	56	54	Cloudy	1,490
19	80	55	54	54	Partly Cloudy	1,056
20	83	47	58	53	Clear	1,513
21	92	52	57	55	Clear	1,519
22	98	56	58	54	Clear	1,514
23	93	61	58	54	Clear	1,511
24	98	68	58	57	Partly Cloudy	1,511
25	89	56	55	54	Clear	1,505
26	79	54	55	53	Clear	1,505
27	82	53	57	54	Partly Cloudy	1,512
28	89	50	57	55	Partly Cloudy	1,512
29	92	55	56	55	Clear	1,509
30	94	56	60	55	Clear	1,509
31	102	58	57	55	Clear	1,505

Figure 13
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
June, 1970

Date	TEMPERATURES				Weather	American River
	AIR		WATER			Flow
	Maximum	Minimum	Maximum	Minimum		at Hatchery
						C.F.S.
1	105	64	56	54	Clear	1,509
2	106	65	57	57	Clear	1,508
3	107	64	58	56	Clear	1,525
4	106	62	59	57	Partly Cloudy	1,976
5	88	57	57	55	Clear	1,983
6	89	56	54	54	Clear	1,605
7	88	54	58	52	Clear	1,518
8	66	56	57	56	Cloudy-Rain	1,517
9	70	54	58	57	Rain	1,521
10	82	54	58	55	Partly Cloudy	1,525
11	86	53	56	55	Clear	1,534
12	85	58	58	55	Partly Cloudy-rain	1,539
13	88	55	57	54	Partly Cloudy	1,521
14	88	58	57	54	Partly Cloudy	1,520
15	88	56	57	54	Clear	1,524
16	88	57	56	54	Clear	1,505
17	90	53	56	54	Clear	1,475
18	97	56	57	55	Clear	1,490
19	99	60	58	55	Clear	1,514
20	98	68	59	56	Clear	1,575
21	104	63	60	55	Clear	2,052
22	105	64	58	56	Partly Cloudy	2,078
23	92	59	59	55	Partly Cloudy	2,503
24	94	60	58	56	Partly Cloudy	2,515
25	96	63	57	55	Partly Cloudy	2,494
26	92	64	57	54	Partly Cloudy	2,501
27	84	58	58	55	Partly Cloudy	2,552
28	82	58	58	57	Partly Cloudy	3,002
29	86	53	57	56	Clear	3,008
30	92	56	58	56	Partly Cloudy	3,007