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Department of Fish and Game

ANNUAL REPORT NIMBUS SALMON AND STEELHEAD HATCHERY
1968-69 FISCAL YEAR 1/

by

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SUMMARY

The vanguard of the fall-run king salmon (Oncorhynchus tshawytscha) migration was observed at the rack structure on September 18, 1968.

Of the 7,087 king salmon enumerated, 1,318 males, 2,740 females, and 1,175 grilse were processed in the holding pond and carcasses of 324 males, 402 females and 1,128 grilse were removed from the fish weir.

The 2,597 females spawned produced an average of 5,255 eggs per fish for a total of 13,646,660.

There were fewer disease problems this year than in the past. Sacramento River Chinook Disease (SRCD) was not a factor in any of the losses incurred.

A new fish handling technique increased the proportion of fertile eggs from 70 to 89 percent.

Steelhead (Salmo gairdnerii) were processed from December 30, 1968, to February 3, 1969. Some steelhead were observed in the holding pond as early as November 26, but tabulation of the fish did not start until December 30, when the first eggs were taken.

INTRODUCTION

This is the fourteenth 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 with particular references to the numbers of fish trapped and spawned, eggs and fish produced and weather data taken during the period from July 1, 1968, to June 30, 1969.

KING SALMON MAINTENANCE PROGRAM

History of the 1968 Salmon Migration

The fish racks were installed on August 10, 1968, by personnel from the Folsom Field Division of the United States Bureau of Reclamation. As time permitted, hatchery personnel set and secured the individual pickets forming the weir. Security fences and gates were also installed at each end of the rack structure. The weir remained in place until January 15, 1969, when it was removed because of flood releases from Folsom and Nimbus Dams.

The fall migration of 1968 brood year king salmon totaled 7,087. Of this number, 5,233 fish were enumerated in the holding pond and 1,854 escaped through the weir. That portion of the run which entered the holding pond was composed of 1,318 large males, 2,740 females, and 1,175 grilse. A few small females were observed in the holding pond, but were returned to the river and not counted. Carcasses were counted as they were removed from the weir and consisted of 324 large males, 188 spent females, 214 unspawned females, and 1,128 grilse. Approximately 80 percent of the carcasses which become lodged on the weir are recovered.

Of the large females counted in the holding pond 2,597, or 94.8 percent, were spawned, 84, or 3 percent, died before spawning, and 59, or 2.2 percent were too green when killed. The 2,597 females spawned produced 13,646,660 eggs for an average of 5,255 per female.

Prespawning mortality was considerably less this season than in the past. It is felt that this was a direct benefit of the change in sorting and spawning procedures. In previous years adult fish were crowded severely before sorting in order to tire them sufficiently so they could be more easily handled by the sorters. As a result of this crowding, internal injuries were sustained which reduced fertilization and resulted in higher mortalities.

Before the start of the 1968 salmon migration, hatchery personnel designed and constructed a mechanical crowding and handling apparatus which eliminates all handling of fish until they are sorted for ripeness. The mechanical crowder moves fish from the lower to the upper end of the pond.

They are then transferred by means of a hydraulically operated basket into a tank containing an anesthetic. When the fish are sufficiently quieted, they are lifted via another basket onto the sorting table. Ripe females and males and any males considered surplus are killed. Unripe females, and males required for subsequent spawnings, are returned to the pond. All females are spawned within a few minutes of the time they are killed.

During the whole operation, from crowding to sorting and spawning, the fish are never as violently handled as they were in former years. Prior to this season the average fertility achieved was 70 to 71 percent. With the new method of operation, fertility averaged 89 percent. No evidence of internal injuries to females was observed.

Marked King Salmon

No marked king salmon were observed during this year's operations.

1968 Brood Year Salmon

Prior to the advent of the 1968 upstream migration, hatchery operational plans for the next three years were formulated by Anadromous Fisheries Branch personnel and others interested in the perpetuation of king salmon. It was decided that each season as many smolts as possible would be reared to an average size of 90 per pound. Fish would be released in approximately equal numbers in three locations: at the hatchery, at the mouth of the American River, and in the Sacramento River near Rio Vista. Approximately one-third of each group would be marked by fin clipping. The marks would change each year to identify the year class. Two fins would be clipped from fish released at the hatchery and at Rio Vista. Fish planted at the mouth of the American River would have the adipose fin clipped in addition to the same mark as that employed for the Rio Vista releases. Approximately 250,000 marked swimup fry would also be planted at the hatchery. During the first year of this program the An-LV combination was employed for marked smolts released at the hatchery; the An-RV combination was used for releases at Rio Vista and the An-RV-Ad was used for plants at the mouth of the American River. The adipose fin was removed from the swimup fry.

1968 Brood Year Fish Planted

Release Sites:--	American River Hatchery	American River Mouth	Sacramento River Rio Vista
Marked Swimups	250,560	0	0
Marked Smolts	250,265	250,299	252,904
Unmarked Smolts	500,272	500,293	500,271
Unmarked fingerlings	969,865		
Unmarked yearlings			108,240

In addition to fish planted, there were 2,414,520 fingerlings transferred to the Feather River Hatchery.

1967 Brood Year King Salmon Planted

Release Sites:--	American River Hatchery	American River Mouth	Sacramento River Rio Vista
Unmarked fingerlings		54,080	307,440
Unmarked yearlings	171,040		

Sacramento River Chinook Disease

SRCD did not cause any major losses. This is the first year it has failed to do so since it was suspected of being a causative agent at this hatchery. In several test lots of salmon in which the virus was known to be present, losses were not severe.

Other Species of Salmon

No other species of salmon were encountered during the season.

Water Temperature Control

On August 15, 1968, the number 8 shutters on the intake structure at Folsom Dam were removed because the reservoir level was near the minimum operating level for the turbine intake. On October 21st the lower seven shutters in each bay of the intake structure were removed to start the flow of cold water down the river. By October 24th water temperatures had dropped from a range of 61 to 64 F to a range of 59 to 61 F. Thereafter the temperature declined steadily. All shutters remained out until April 18, 1969, when 8 shutters were installed in each bay.

Disposal of Salmon Carcasses

Approximately 33,000 pounds of carcasses were given to public institutions, Indians of California, and charitable organizations, to be used for human consumption. Another 8,650 pounds were given away for use as animal food.

STEELHEAD MAINTENANCE PROGRAM

History of the 1969 Brood Year Steelhead Migration

Some steelhead were observed in the holding pond as early as November 15, but no fish were tallied until the start of spawning activities on the 30th of December. A casual inventory in mid December indicated that there

were nearly 1,000 steelhead present in the holding pond. Counting procedures were changed this season because of the new sorting and crowding method. Live fish are counted as they are spawned and released or are released unspawned. Dead fish are counted as they are picked up.

Date	Spawned		Died		Released	Unspawned
	M	F	M	F	M	F
12-30-68	14	16	25	10		
1- 3-69	10	20	5	6	18	
1- 9-69	13	36	9	4	12	2
1-13-69			19			
1-15-69	15	32	8	4	255	
1-21-69	78	157	3	2	61	
1-28-69	8	50	15	1		
1-29-69			6			
1-31-69			26	5	803	783
2- 3-69			9	11	205	310
Totals	138	311	125	43	1,354	1,095

All artificial spawning was done between December 30, 1968, and January 27, 1969. The 311 females spawned produced 1,768,790 eggs for an average of 5,687 eggs per fish. Survival from the green egg stage to the eyed egg ranged from 90 to 96 percent and averaged 94 percent. Most of the eggs taken were from marked three-year-olds. Spawned fish were returned to the river at the hatchery. On the 31st of January and on February 3rd, all adult steelhead remaining in the holding pond were transported downstream to the area of the Watt Avenue Bridge.

A total of 301,240 eyed eggs was shipped to the Mokelumne River Fish Installation.

1969 Brood Year Summer Steelhead Program

In April 194,000 summer run steelhead eggs were received from the Skamania Hatchery in Washougal, Washington. Post hatching mortality was much higher than normal and surviving fry were extremely difficult to feed. Several diets were tried after the standard OMP diet seemed to be unacceptable

to the fish. Also diets fortified with vitamin B1 were tried, and feeding live brine shrimp was attempted. The fish had been in a rearing pond for about a month before losses dropped to normal and the regular OMP diet was readily accepted.

Steelhead Marking Program

No steelhead were marked this year.

Planting 1968 Brood Year Steelhead

In mid September 62,400 fish averaging 48 per pound were released in the American River near the Interstate 80 highway bridge. In mid January, 1969, 28,310 fish averaging 15 per pound were planted in the Sacramento River at Miller Park. The balance of the fish, 280,595, ranging in size from 8.2 to 9 per pound, were planted in the Sacramento River at Clarksburg.

Planting 1969 Brood Year Steelhead

In May and June 522,420 steelhead fingerlings ranging from 1230 to 270 per pound were planted at the hatchery.

Return of Marked Steelhead

This season only 3 fish marked RV and 4 fish marked LV returned to the hatchery. Cumulative returns of these fish for the 1962, 1963, and 1965 brood years are 1,106 or 1.599 percent for the RV and 525 or 0.290 percent for the LV marked fish. The fish marked right ventral were released in the Sacramento River at Clarksburg and those marked left ventral were released at the hatchery.

Of the 1966 brood year fish marked Ad and released at Clarksburg, 2,624 returned this season for a cumulative return of 2,792. This represents a return to the hatchery of 1.3 percent of the fish releases. No creel checks were conducted, and the fish ladder was closed to fish passage at the end of January, so the total migration was not adequately evaluated. Of the 3,066 adult steelhead counted this season, 2,631 were marked which is 85.8 percent of the total run into the hatchery.

Public Relations

It is estimated that 79,500 persons visited the hatchery this past year. Of that number 4,900 were counted in 125 organized groups. The organized groups tallied were only those who were offered tours of the installation. Persons in other groups were included in the count of individuals.

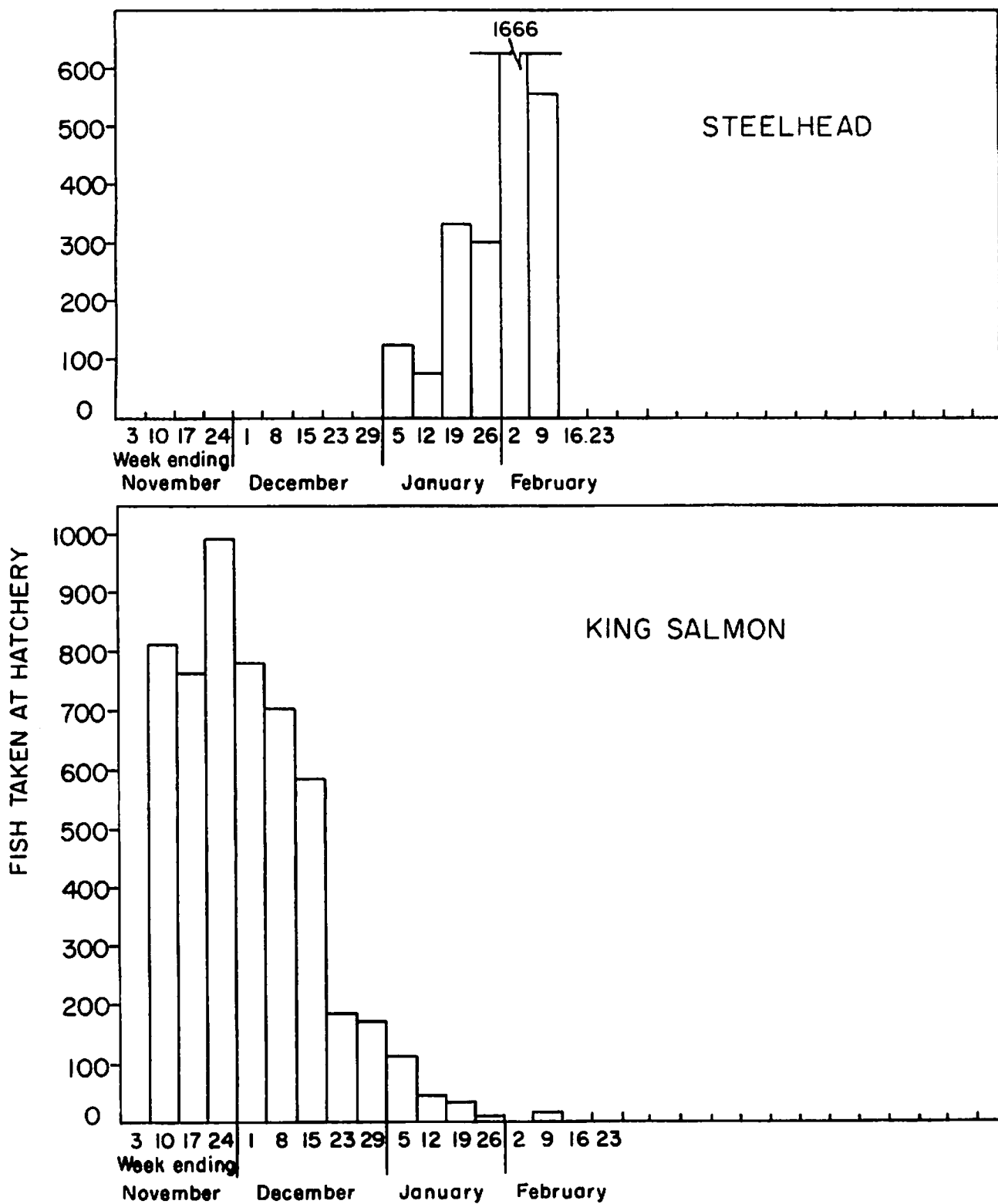


Figure A-1. Fish trapped at Nimbus Salmon and Steelhead Hatchery. Weekly count of salmon and steelhead during 1968-69 season.

TABLE A-1

Chart of Operation
Nimbus Salmon and Steelhead Hatchery
1968-69

Species	Adult Fish Trapped	Adult Fish From Rack	Females Spawned	Eggs Taken	Eggs Trans- ferred	Fingerlings Planted and Transferred	Year- lings Planted	Pounds Planted	Fish On Hand 6/30/60
King Salmon									
Males	1,318	324							
Females	2,740	402							
Grilse	1,175	1,128							
1968 BY						5,889,249 ^{2/}		30,393	112,470
1967 BY						361,520	171,040	15,360	0
Totals	5,233	1,854	2,597	13,646,660		6,250,769	171,040	45,753	112,470
Steelhead									
Males	1,617	2							
Females	1,449	11							
1969 BY-SH-W				194,000 ^{3/}					63,960
1969 BY				1,768,790		522,420		1,179	500,000
1968 BY							371,305	36,390	0
Totals	3,066	13	311	1,962,790	301,240 ^{4/}	522,420	371,305	37,569	563,960

^{2/} Includes 3,474,729 fingerlings planted and 2,414,520 fingerlings transferred to Feather River Hatchery.

^{3/} Received from the Skamania Hatchery, Washougal, Washington.

^{4/} Shipped to Mokelumne River Fish Installation.

Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
July, 1968

American River
Flow
at Hatchery
C.F.S.

Date	TEMPERATURES				Weather	Flow
	AIR		WATER			at Hatch
	Maximum	Minimum	Maximum	Minimum		C.F.S.
1	102	60	64	63	Clear	4,086
2	95	60	65	63	Clear	3,995
3	101	66	65	63	Clear	4,044
4	106	64	66	64	Clear	4,523
5	111	63	66	64	Clear	4,529
6	102	67	66	65	Clear	4,510
7	101	61	65	64	Partly Cloudy	4,521
8	98	62	65	64	Partly Cloudy	4,247
9	99	62	66	64	Partly Cloudy	3,495
10	100	60	66	65	Clear	3,499
11	104	74	67	65	Partly Cloudy	3,504
12	98	63	67	65	Partly Cloudy	3,485
13	96	62	67	65	Clear	3,496
14	94	63	67	66	Partly Cloudy	3,474
15	92	60	67	65	Clear	3,318
16	96	60	68	65	Clear	2,912
17	101	61	69	66	Clear	2,636
18	104	65	69	66	Clear	2,490
19	107	66	68	66	Clear	2,479
20	104	66	69	68	Clear	2,493
21	102	60	68	67	Clear	2,498
22	103	60	68	67	Clear	2,486
23	96	60	68	66	Clear	2,493
24	97	56	69	66	Clear	2,478
25	100	56	69	65	Clear	2,499
26	103	60	70	67	Clear	2,791
27	105	64	70	60	Clear	2,804
28	76	66	69	68	Partly Cloudy	2,190
29	104	70	69	67	Partly Cloudy	2,752
30	104	60	69	67	Partly Cloudy	2,335
31	106	62	69	67	Partly Cloudy	2,022

Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
August, 1968

American River
Flow
At Hatchery
C.F.S.

Date	TEMPERATURES				Weather	Flow
	AIR		WATER			At Hatche
	Maximum	Minimum	Maximum	Minimum		C.F.S.
1	98	64	69	67	Clear	1,893
2	100	60	69	67	Partly Cloudy	1,808
3	98	60	68	64	Partly Cloudy	1,831
4	97	60	69	63	Partly Cloudy	1,997
5	98	60	69	67	Clear	1,980
6	101	62	69	67	Clear	1,595
7	102	64	69	67	Partly Cloudy	1,599
8	98	70	69	68	Partly Cloudy	1,598
9	100	60	70	68	Partly Cloudy	1,601
10	98	76	69	67	Partly Cloudy	1,510
11	98	60	69	67	Partly Cloudy	1,507
12	84	60	69	67	Partly Cloudy	1,506
13	82	58	69	67	Clear	1,505
14	88	58	68	66	Clear	1,390
15	88	58	68	66	Clear	1,300
16	81	62	67	66	Partly Cloudy	1,283
17	90	65	68	66	Partly Cloudy	1,294
18	76	64	67	66	Partly Cloudy	1,280
19	80	58	66	66	Cloudy - Rain	1,255
20	80	62	67	65	Partly Cloudy	1,094
21	82	60	67	64	Partly Cloudy	997
22	36	52	66	64	Partly Cloudy	997
23	92	55	68	65	Partly Cloudy	997
24	96	60	67	65	Clear	998
25	90	60	67	64	Partly Cloudy	998
26	88	58	68	66	Partly Cloudy	997
27	89	60	68	65	Partly Cloudy	998
28	96	60	68	65	Clear	1,000
29	100	65	69	67	Clear	999
30	105	66	68	67	Clear	996
31	98	64	68	66	Clear	998

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

American River
Flow
at Hatchery
C.F.S.

Date	TEMPERATURES				Weather	Flow
	AIR		WATER			at Hatch
	Maximum	Minimum	Maximum	Minimum		C.F.S
1	96	64	68	66	Clear	1,002
2	92	64	68	66	Clear	991
3	94	59	69	67	Clear	995
4	89	60	68	67	Clear	997
5	93	60	68	66	Clear	999
6	98	61	69	67	Partly Cloudy	998
7	97	60	68	67	Clear	998
8	92	60	68	67	Partly Cloudy	998
9	98	58	68	66	Partly Cloudy	999
10	92	60	68	67	Clear	1,004
11	92	60	67	67	Clear	1,007
12	90	62	68	67	Partly Cloudy	1,003
13	84	58	68	67	Partly Cloudy	1,009
14	88	60	69	66	Partly Cloudy	1,006
15	88	60	69	66	Clear	1,005
16	93	62	70	68	Partly Cloudy	997
17	98	60	68	67	Clear	998
18	94	62	68	66	Partly Cloudy	995
19	82	62	67	66	Partly Cloudy	1,002
20	76	56	68	65	Clear	1,002
21	78	52	68	66	Clear	1,009
22	86	52	67	65	Clear	1,002
23	88	50	67	64	Clear	993
24	92	52	67	64	Clear	1,007
25	94	58	68	65	Clear	1,001
26	98	58	67	65	Partly Cloudy	1,006
27	98	58	67	65	Partly Cloudy	998
28	93	60	67	65	Clear	996
29	83	60	67	65	Clear	1,003
30	82	54	67	64	Partly Cloudy	1,006

Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
October, 1968

Date	TEMPERATURES				Weather	American River
	AIR		WATER			Flow
	Maximum	Minimum	Maximum	Minimum		At Hatchery C.F.S.
1	80	54	66	64	Clear	1,003
2	84	53	67	64	Clear	999
3	78	54	66	64	Clear	997
4	80	54	66	63	Clear	1,000
5	78	58	65	64	Clear	1,000
6	79	52	65	64	Partly Cloudy	994
7	77	50	66	64	Clear	1,007
8	79	45	66	64	Clear	996
9	83	45	65	63	Clear	996
10	80	48	65	62	Partly Cloudy	996
11	67	60	64	63	Partly Cloudy	995
12	79	58	64	63	Cloudy-Rain	999
13	69	56	63	60	Cloudy-Rain	1,002
14	58	48	62	62	Cloudy-Rain	996
15	69	42	63	61	Clear	998
16	72	43	63	61	Partly Cloudy	996
17	79	44	63	60	Partly Cloudy	1,000
18	76	50	64	61	Partly Cloudy	1,003
19	78	48	63	61	Clear	998
20	78	50	63	61	Clear	999
21	80	48	63	61	Clear	998
22	76	47	64	61	Clear	1,006
23	82	50	63	61	Clear	998
24	83	50	61	59	Clear	1,002
25	82	49	60	59	Clear	999
26	84	50	60	58	Clear	1,002
27	80	50	59	57	Clear	997
28	78	48	59	58	Cloudy-Rain	1,001
29	78	50	58	56	Cloudy-Rain	999
30	71	47	59	57	Clear	999
31	70	48	57	57	Cloudy	996

TABLE A-6

Winnipeg Salmon and Steelhead Hatchery
Weather and Water Data for
November, 1963

Date	TEMPERATURES				Weather	American River	Salmon
	AIR		WATER			Flow	
	Maximum	Minimum	Maximum	Minimum		At Hatchery C.F.S.	
1	70	43	53	57	Cloudy	1,000	-
2	64	64	57	57	Rain	1,003	-
3	64	44	57	56	Rain	996	-
4	64	44	57	55	Cloudy	1,001	256
5	65	43	53	56	Partly Cloudy	1,014	-
6	76	43	57	56	Partly Cloudy	1,253	265
7	72	49	58	56	Partly Cloudy	1,493	-
8	74	46	53	56	Partly Cloudy	1,505	186
9	72	50	53	56	Clear	1,507	-
10	72	49	53	56	Partly Cloudy	1,500	110
11	76	50	53	56	Partly Cloudy	1,504	-
12	64	43	53	56	Partly Cloudy	1,502	132
13	56	42	57	56	Partly Cloudy	1,503	-
14	56	37	55	55	Cloudy-Rain	1,540	248
15	55	45	55	55	Cloudy	2,043	-
16	63	46	55	54	Cloudy	2,495	385
17	65	46	55	54	Cloudy	2,492	-
18	69	64	56	55	Cloudy-Rain	2,490	190
19	64	38	57	54	Partly Cloudy	2,495	-
20	53	53	56	56	Cloudy-Fog	2,505	194
21	70	40	56	54	Cloudy	2,506	-
22	59	48	56	56	Cloudy-Fog	2,506	400
23	62	55	54	54	Clear	2,507	-
24	64	48	56	55	Partly Cloudy	2,501	215
25	60	40	56	54	Clear	2,474	-
26	62	38	56	54	Partly Cloudy	2,491	155
27	63	38	55	54	Clear	2,493	-
28	60	38	56	54	Partly Cloudy	2,494	-
29	59	38	55	54	Partly Cloudy	2,495	417
30	57	46	54	54	Cloudy-Rain	2,490	-

TABLE 2-7

Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
December, 1968

Date	TEMPERATURES				Weather	American River	Salmon	Steelhead
	AIR		WATER			Flow		
	Maximum	Minimum	Maximum	Minimum		At Hatchery C.F.S.		
1	62	46	54	53	Partly Cloudy	2,499	212	-
2	58	35	54	53	Partly Cloudy	2,489	-	-
3	53	33	54	53	Partly Cloudy	2,505	263	-
4	52	32	54	53	Partly Cloudy	2,497	-	-
5	56	36	54	53	Partly Cloudy	2,489	273	-
6	53	36	53	53	Partly Cloudy	2,489	-	-
7	55	40	53	53	Fog	2,494	170	-
8	58	44	53	52	Partly Cloudy	2,358	-	-
9	68	44	53	52	Partly Cloudy	2,495	238	-
10	60	56	53	52	Cloudy-Rain	2,497	-	-
11	58	38	52	51	Partly Cloudy	2,488	111	-
12	54	34	52	51	Partly Cloudy	2,481	-	-
13	62	34	52	51	Cloudy	2,488	164	-
14	60	43	52	51	Cloudy	2,499	-	-
15	58	43	52	52	Cloudy - Rain	2,491	74	-
16	52	36	52	51	Partly Cloudy	2,495	-	-
17	52	34	50	49	Partly Cloudy	2,504	94	-
18	54	33	52	50	Partly Cloudy	2,491	-	-
19	49	40	52	52	Partly Cloudy	2,470	-	-
20	46	29	51	51	Clear	2,491	92	-
21	46	25	49	49	Clear	2,488	-	-
22	47	31	49	48	Clear	2,512	-	-
23	50	36	50	50	Cloudy-Rain	2,494	110	-
24	55	41	50	50	Cloudy-Rain	2,984	-	-
25	56	46	50	50	Partly Cloudy-Rain	3,007	-	-
26	52	40	51	50	Partly Cloudy	3,253	-	-
27	50	34	50	49	Cloudy	4,261	63	-
28	53	41	49	47	Cloudy-Rain	4,999	-	-
29	55	45	48	48	Partly Cloudy	5,000	-	-
30	56	36	50	50	Partly Cloudy	5,024	80	65
31	53	38	50	50	Partly Cloudy	4,997	-	-

TABLE A-8

Timber Salmon and Steelhead Hatchery
Weather and Water Data for
January, 1969

Date	TEMPERATURES				Weather	American River	Salmon	Steelhead
	AIR		WATER			Flow		
	Maximum	Minimum	Maximum	Minimum		At Hatchery C.F.S.		
1	52	37	49	49	Fog - Cloudy	4,509	-	-
2	52	38	49	48	Cloudy	3,988	-	-
3	51	42	48	48	Cloudy	3,518	32	59
4	51	44	48	46	Fog	3,505	-	-
5	52	44	48	46	Cloudy	3,502	-	-
6	48	42	48	48	Cloudy	3,518	-	-
7	48	40	48	48	Fog	3,487	-	-
8	51	38	48	48	Partly Cloudy	3,504	-	-
9	52	32	48	47	Partly Cloudy	3,518	43	76
10	55	31	48	48	Partly Cloudy	3,497	-	-
11	53	46	48	47	Rain	3,484	-	-
12	52	47	48	47	Cloudy	3,505	-	-
13	57	39	48	48	Rain	3,503	-	-
14	56	38	48	47	Partly Cloudy	3,504	-	-
15	58	33	47	47	Partly Cloudy	4,718	35	333
16	56	40	48	48	Partly Cloudy	7,005	-	-
17	56	32	47	47	Partly Cloudy	7,515	-	-
18	52	42	48	48	Rain	7,521	-	-
19	61	56	48	48	Rain	7,528	-	-
20	58	56	48	47	Rain	26,407	-	-
21	62	56	48	48	Rain	56,218	9	301
22	50	40	48	48	Cloudy-Rain	69,991	-	-
23	55	38	48	48	Cloudy-Rain	59,984	-	-
24	51	38	48	48	Rain	24,991	-	-
25	62	46	48	48	Cloudy-Rain	27,679	-	-
26	59	46	48	47	Cloudy-Rain	40,000	-	-
27	54	38	48	48	Cloudy-Rain	40,000	-	74
28	52	42	48	48	Rain	34,458	-	-
29	51	28	48	47	Partly Cloudy	20,042	-	6
30	52	36	47	47	Partly Cloudy	19,038	-	-
31	50	30	48	47	Cloudy - Rain	15,003	-	1,586

Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
February, 1969

Date	TEMPERATURES				Weather	American River	Salmon	Steelhead
	AIR		WATER			Flow		
	Maximum	Minimum	Maximum	Minimum		at Hatchery C.F.S.		
1	56	42	47	47	Cloudy	10,011	-	-
2	56	35	47	46	Clear	9,706	-	-
3	57	36	47	46	Clear	8,037	17	566
4	55	36	46	46	Partly Cloudy	8,006	-	-
5	52	44	46	45	Cloudy - Rain	8,000	-	-
6	53	44	46	45	Cloudy - Rain	8,000	-	-
7	58	39	47	46	Partly Cloudy	8,000	-	-
8	60	39	46	46	Partly Cloudy	8,000	-	-
9	65	47	46	45	Cloudy - Rain	8,000	-	-
10	63	46	47	45	Partly Cloudy	8,000	-	-
11	54	50	45	45	Rain	8,000	-	-
12	58	42	46	45	Partly Cloudy	8,121	-	-
13	59	34	46	45	Partly Cloudy	8,000	-	-
14	52	46	46	46	Rain	8,000	-	-
15	56	45	46	46	Cloudy - Rain	8,000	-	-
16	64	45	47	45	Partly Cloudy	11,833	-	-
17	64	42	47	45	Partly Cloudy	12,000	-	-
18	54	46	46	46	Cloudy - Rain	12,000	-	-
19	50	46	46	46	Cloudy	12,000	-	-
20	56	47	46	46	Cloudy	12,000	-	-
21	54	36	46	46	Cloudy	12,000	-	-
22	53	40	46	46	Cloudy	12,000	-	-
23	55	42	46	46	Cloudy - Rain	12,000	-	-
24	53	42	46	46	Rain	12,000	-	-
25	53	42	47	46	Cloudy - Rain	12,000	-	-
26	60	39	48	46	Partly Cloudy	12,000	-	-
27	56	41	47	46	Cloudy - Rain	12,000	-	-
28	52	46	46	46	Partly Cloudy	12,000	-	-

TABLE A-10

Travis Salmon and Steelhead Hatchery
Weather and Water Data for
March, 1969

Date	TEMPERATURES				Weather	American River
	AIR		WATER			Flow
	Maximum	Minimum	Maximum	Minimum		at Hatchery C.F.S.
1	63	40	48	46	Partly Cloudy	12,000
2	60	33	46	46	Partly Cloudy	12,000
3	57	52	47	46	Partly Cloudy	12,000
4	65	42	48	46	Partly Cloudy	12,000
5	64	33	48	46	Partly Cloudy	12,000
6	62	34	46	46	Clear	12,000
7	59	32	48	46	Clear	12,000
8	53	34	48	46	Partly Cloudy	12,000
9	62	34	47	46	Cloudy-Rain	12,000
10	60	39	48	45	Partly Cloudy	12,000
11	60	39	48	46	partly Cloudy	11,000
12	53	40	47	46	Cloudy - Rain	10,000
13	64	33	48	46	Partly Cloudy	10,000
14	69	34	49	46	Partly Cloudy	10,000
15	68	40	48	46	Clear	10,000
16	70	40	48	46	Partly Cloudy	10,034
17	68	40	49	46	Partly Cloudy	8,982
18	66	47	49	47	Partly Cloudy	8,996
19	69	40	49	46	Partly Cloudy	8,019
20	63	40	47	46	Cloudy - Rain	7,995
21	64	43	49	46	Partly Cloudy	8,015
22	70	40	49	46	Clear	7,969
23	73	42	49	47	Clear	7,968
24	75	40	50	47	Clear	8,007
25	77	45	51	47	Clear	8,019
26	80	50	49	47	Clear	8,009
27	82	45	50	47	Clear	8,010
28	83	46	50	48	Clear	8,913
29	78	48	50	48	Partly Cloudy	8,013
30	82	48	50	48	Partly Cloudy	8,005
31	76	56	49	48	Partly Cloudy	8,000

Hirbus Salmon and Steelhead Hatchery
Weather and Water Data for
April, 1969

American River
Flow
at Hatchery
C.F.S.

Date	TEMPERATURE				Weather	Flow at Hatch C.F.S.
	AIR		WATER			
	Maximum	Minimum	Maximum	Minimum		
1	70	46	50	49	Partly Cloudy	8,002
2	70	47	48	48	Cloudy - Rain	8,005
3	64	42	49	48	Partly Cloudy	8,005
4	70	42	49	48	Partly Cloudy	8,020
5	50	43	49	49	Cloudy - Rain	8,029
6	66	44	50	48	Partly Cloudy	8,015
7	68	40	52	49	Partly Cloudy	7,993
8	74	44	51	49	Partly Cloudy	8,002
9	70	50	54	49	Partly Cloudy	8,025
10	70	46	53	50	Clear	8,043
11	76	50	52	49	Partly Cloudy	8,006
12	74	52	50	49	Cloudy	8,007
13	73	48	51	49	Clear	8,028
14	53	47	71	49	Partly Cloudy	8,007
15	75	42	53	50	Partly Cloudy	9,036
16	83	47	53	50	Partly Cloudy	8,074
17	74	50	51	49	Clear	8,018
18	74	46	52	50	Clear	8,007
19	80	46	55	51	Partly Cloudy	8,003
20	85	50	55	52+	Clear	7,992
21	8	47	55	53	Partly Cloudy	7,987
22	76	47	54	53	Partly Cloudy	7,989
23	66	50	53	52	Cloudy-Rain	7,995
24	62	48	53	51	Partly Cloudy	8,015
25	72	44	56	52	Partly Cloudy	8,002
26	80	48	57	53	Partly Cloudy	8,005
27	82	49	56	53	Clear	8,019
28	87	52	55	53	Clear	8,000
29	79	53	55	54	Clear	8,011
30	72	48	54	53	Clear	8,011

TABLE A-12

Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
May, 1969

Date	TEMPERATURES				Weather	American River
	AIR		WATER			Flow
	Maximum	Minimum	Maximum	Minimum		at Hatchery C.F.S.
1	82	46	56	53	Clear	8,009
2	91	40	59	54	Clear	8,013
3	96	57	58	55	Clear	8,002
4	80	53	55	55	Clear	8,002
5	91	40	59	54	Clear	8,002
6	96	57	58	55	Clear	8,002
7	80	53	55	55	Clear	8,024
8	86	53	56	54	Clear	8,018
9	94	55	57	54	Clear	8,001
10	96	59	57	55	Partly Cloudy	8,007
11	92	64	57	55	Clear	8,010
12	79	55	56	55	Partly Cloudy	8,006
13	76	52	55	54	Clear	8,013
14	80	52	57	54	Clear	8,012
15	80	52	58	55	Clear	8,008
16	94	56	58	55	Clear	8,007
17	99	58	58	55	Clear	8,012
18	87	56	57	55	Clear	8,008
19	82	50	59	55	Clear	8,002
20	81	51	59	56	Clear	8,006
21	91	54	59	56	Partly Cloudy	7,995
22	95	55	58	55	Partly Cloudy	8,001
23	85	56	57	55	Cloudy	7,720
24	88	62	58	55	Clear	7,517
25	78	59	57	55	Clear	7,507
26	86	56	55	55	Partly Cloudy	7,517
27	82	53	58	56	Partly Cloudy	7,505
28	92	53	59	56	Clear	7,503
29	103	58	58	56	Clear	7,505
30	98	64	59	57	Partly Cloudy	7,258
31	101	64	58	57	Clear	7,017

Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
June, 1969

American River
Flow
at Hatchery
C.F.S.

Date	TEMPERATURES				Weather
	AIR		WATER		
	Maximum	Minimum	Maximum	Minimum	
1	92	60	58	56	Clear
2	90	58	59	56	Partly Cloudy
3	90	56	60	58	Partly Cloudy
4	88	60	60	59	Partly Cloudy
5	85	58	58	57	Partly Cloudy
6	86	56	57	56	Partly Cloudy
7	87	56	57	55	Partly Cloudy
8	79	58	57	55	Partly Cloudy
9	79	60	58	57	Partly Cloudy
10	86	59	59	56	Partly Cloudy
11	86	58	59	57	Clear
12	86	54	60	57	Clear
13	90	57	60	58	Partly Cloudy
14	94	60	61	59	Partly Cloudy
15	98	60	61	58	Clear
16	100	62	62	61	Clear
17	88	58	62	58	Cloudy
18	90	58	62	60	Cloudy
19	92	58	64	59	Partly Cloudy
20	86	58	64	60	Cloudy
21	90	60	64	59	Partly Cloudy
22	94	58	64	59	Clear
23	98	65	64	60	Partly Cloudy
24	93	62	63	61	Clear
25	90	58	63	61	Partly Cloudy
26	88	60	62	60	Clear
27	86	56	64	60	Clear
28	89	55	63	60	Clear
29	96	58	63	60	Clear
30	98	60	63	60	Clear