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ANNUAL REPORT NIMBUS SALMON AND STEELHEAD HATCHERY 1967-68 FISCAL YEAR 1/

by

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SUMMARY

The first king salmon (Oncorhynchus tshawytscha) of the 1967-68 season arrived at Nimbus Hatchery on September 22, 1967, and the last arrived on February 19, 1968.

A total of 5,147 salmon entered the holding ponds. Another 4,342 went upstream through the weir and were removed from the weir racks as they died. Of the run entering the holding ponds, 53.5 percent were males including grilse and 46.5 percent were females.

The 1,638 females which were spawned produced 8,483,625 eggs for an average of 5,179 eggs per female.

Losses of fingerling salmon from what was diagnosed as Sacramento River Chinook Disease (SRCD) was higher this year than in the past two years. In some lots the loss was as high as 50 percent.

Steelhead (Salmo gairdneri) were observed in the holding ponds as early as mid-November, but were not counted and retained for spawning purposes until mid-December. During the season, 1,183 steelhead were counted. The 556 females spawned produced 2,511,180 eggs for an average of 4,516 eggs per fish.

1/ Anadromous Fisheries Administrative Report No. 70-8

INTRODUCTION

This is the thirteenth 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 number of fish trapped and spawned, eggs and fish produced, and water and air temperatures during the period from July 1, 1967, to June 30, 1968.

KING SALMON MAINTENANCE PROGRAM

History of the 1967 Salmon Run

The weir racks were installed by the Bureau of Reclamation on August 22 and 23, 1967. A minor adjustment to the walkways and rack sections was necessary before the structure could be termed operational. This was accomplished by Nimbus Hatchery personnel.

A total of 9,489 king salmon migrated to the hatchery during the 1967 fall run. Of these, 5,147 entered the holding ponds and 4,342 escaped upstream through the weir and were removed from the racks as they died and drifted downstream.

On November 14, 1967, the steel webbing which forms part of the footing for the rack structure was inspected by Department of Fish and Game divers. In several places, holes were discovered through which fish could escape. These holes were subsequently plugged with large cobbles.

The portion of the run entering the holding ponds was composed of 2,022 adult males, 2,392 females and 733 grilse. Thus, 53.5 percent were males, including grilse, and 46.5 percent were females.

Although the first salmon arrived in September, it was October 22 before they were handled and counted.

Included in the 4,342 dead salmon recovered from the racks were 1,436 males, 245 females, 289 unspawned females, and 2,287 grilse.

The total run of 9,489 king salmon, including fish from the racks, consisted of 68.9 percent males and 31.1 percent females. Of the females trapped in the holding ponds, 1,638, or 68.5 percent, were spawned; 726, or 30.3 percent, died before spawning; and 28, or 1.2 percent, were too green when killed to be spawned successfully. The 1,638 females spawned produced 8,483,625 eggs for an average of 5,179 eggs per female.

Prespawning mortality was higher this year than it has been for several seasons. Fish were examined by Department of Fish and Game pathologists and were discovered to be heavily infested with columnaris bacteria. Ceratomyxa was also present. In addition to these disease organisms, fungus was a common sight. Many of the fish arrive at the hatchery with extensive fungus infections, and crowding, along with present methods of handling aggravates the condition and increases its incidence.

Water Temperature Control

The temperature control shutters at Folsom Dam were raised on October 5, 1967, to commence drafting cooler water. Only a minor change in temperature was noted. For a ten-day period prior to raising the shutters, the water temperature varied between 61° and 66° F. For a ten-day period after the shutters were adjusted and a downward trend was noted, the temperature ranged from 57° to 62° F. Some shutters were raised during the month of July to provide cooler water for operation of the generators and this may account for the lack of colder water in October.

1964 Brood-Year Marked King Salmon Returns

During 1965, 78,781 king salmon of the 1964 brood year were reared at Nimbus. These fish averaged 8.1 fish per pound, and were marked by removing the right maxillary. An additional 79,650 salmon from eggs taken at Nimbus Hatchery, but reared at Moccasin Creek Hatchery were marked by removing the left maxillary. These fish averaged 10.5 fish per pound. Both lots of fish were released into the American River near the hatchery during December 1965.

Of the 78,781 right maxillary marked salmon (reared at Nimbus), 419 returned to the hatchery during the past season, making a total return of 569, or .72 percent. Of the 79,650 left maxillary marked salmon, 173 returned to the hatchery during the past season with a total return from this group of 172, or .22 percent.

Planting 1966 Brood-Year King Salmon

Prior to July 1, 1967, 18,522,875 king salmon fingerlings were released into the American River at the hatchery. Also 65,775 yearling salmon from the 1966 brood year averaging 9.7 per pound were released at the hatchery on December 11, 1967.

Planting 1967 Brood-Year King Salmon

From February 20, 1968, through June 13, 1968, 5,301,685 king salmon fingerlings were planted. Until June 4, all fish were released at the hatchery. From June 4 to June 13 the fish were trucked downstream to a site within about four miles of the mouth of the American River. The fish ranged in size from 8.5 to 88 per ounce.

Sacramento River Chinook Disease

SRCD was more prevalent this year than it has been for the past two seasons. In one group of about 550,000 fingerlings, the loss was approximately 130,000. In another group of about 565,000 the loss during one month was close to 250,000. To add to the confusion, some groups of fish suffered virtually no loss. Among all groups of fish

held at the hatchery for varying lengths of time, the loss due to SRCD was calculated to be close to 17 percent.

Disposal of Salmon Carcasses

About 23,000 pounds of salmon carcasses were distributed to various state and county agencies, charitable organizations, and Indians of California. Approximately 5,000 pounds were fed to animals at the Folsom and William Land Park Zoos, and 16,400 pounds were given to a rendering company.

Other Species of Salmon Encountered

During the season covered by this report there were two silver salmon (Oncorhynchus kisutch) and three chum salmon (Oncorhynchus keta) encountered while sorting and enumerating king salmon.

STEELHEAD MAINTENANCE PROGRAM

History of the 1968 Steelhead Run

It is not unusual to observe some steelhead early in the salmon migration. However, these fish were returned to the river until December 16, when they commenced to ripen. All steelhead between this date and March 27, 1968, were counted. The counts are as follows:

December	102
January	352
February	663
March	66
Total	1,183

The peak day of the migration was February 23rd when 212 steelhead were counted.

Between January 5, 1968, and March 27, 1968, 2,511,180 steelhead eggs were taken from 556 females for an average of 4,516 eggs per female.

Survival to the eyed egg stage ranged from 80.2 to 98.0 percent; the mean was 94.8 percent.

The eggs were hatched at Nimbus except for 331,200 eyed eggs which were shipped to the Mokelumne River Fish Installation, and 185,640 eyed eggs which were shipped to the Feather River Hatchery.

Mortality of adult fish was not as high as it has been during the past several seasons. Many adults arrive in the holding ponds with injuries

of varying type and degree. These injuries are subject to severe bacterial and fungus infection. As reported in the Progressive Fish Culturist (Knittel, M. D., Vol. 28, No. 1, January, 1966) it is sometimes effective to apply topically a 10 percent solution of malachite green. Basically this procedure was followed during the past season and it is felt that adult mortality was reduced considerably. The following figures, while they do not give the entire picture, indicate some reduction in mortality:

	1964	1965	1966	1967	1968
Total Fish Counted	1,216	778	874	642	1,183
Mortality - Males	46	92	46	115	10
Females	46	64	51	62	11

Complicating factors not included in the above figures are the release of unspawned females, release of males which were not used in spawning, and fish released after spawning, which, though alive at release time, were in poor condition and would undoubtedly not have survived for very long.

Steelhead Marking Program

As in the case of the 1966 brood-year steelhead, all yearlings of the 1967 brood year were released into the Sacramento River near Clarksburg. Of the 217,430 yearlings planted, 209,840 were marked by removal of the adipose fin, and 7,590 were unmarked. The former ranged in size from 6.1 to 8.6 per pound and the latter averaged 33 per pound. All of these plants were made between March 14 and March 25, 1968.

In October and November, 1967, 40,240 fingerlings at 2.3 per ounce were planted in the Sacramento River near Clarksburg.

Return of Marked Steelhead

The cumulative returns to the hatchery for the 1962, 1963 and 1965 brood-year steelhead marked RV and released into the Sacramento River at Clarksburg are 1,103 or .597 percent. The returns for the same brood-year steelhead marked LV and released into the American River at the hatchery are 521, or .288 percent.

The first year return for the 1966 brood-year steelhead marked Ad is 168.

Public Relations

It is estimated that 84,942 persons visited the hatchery this past fiscal year including 427 organized groups. Of the organized groups, 407 visited the hatchery in October and November. Guided tours have been offered for groups of twenty or more persons, provided, in the case of school groups, the youngsters are at least of the fourth grade level.

APPENDIX

Figure A-1: Fish taken at Nimbus Salmon and Steelhead Hatchery, March 1967 through March 1968.

Tables A-1 through A-12: Nimbus Salmon and Steelhead Hatchery, weather and water data for July 1967 through June 1968.

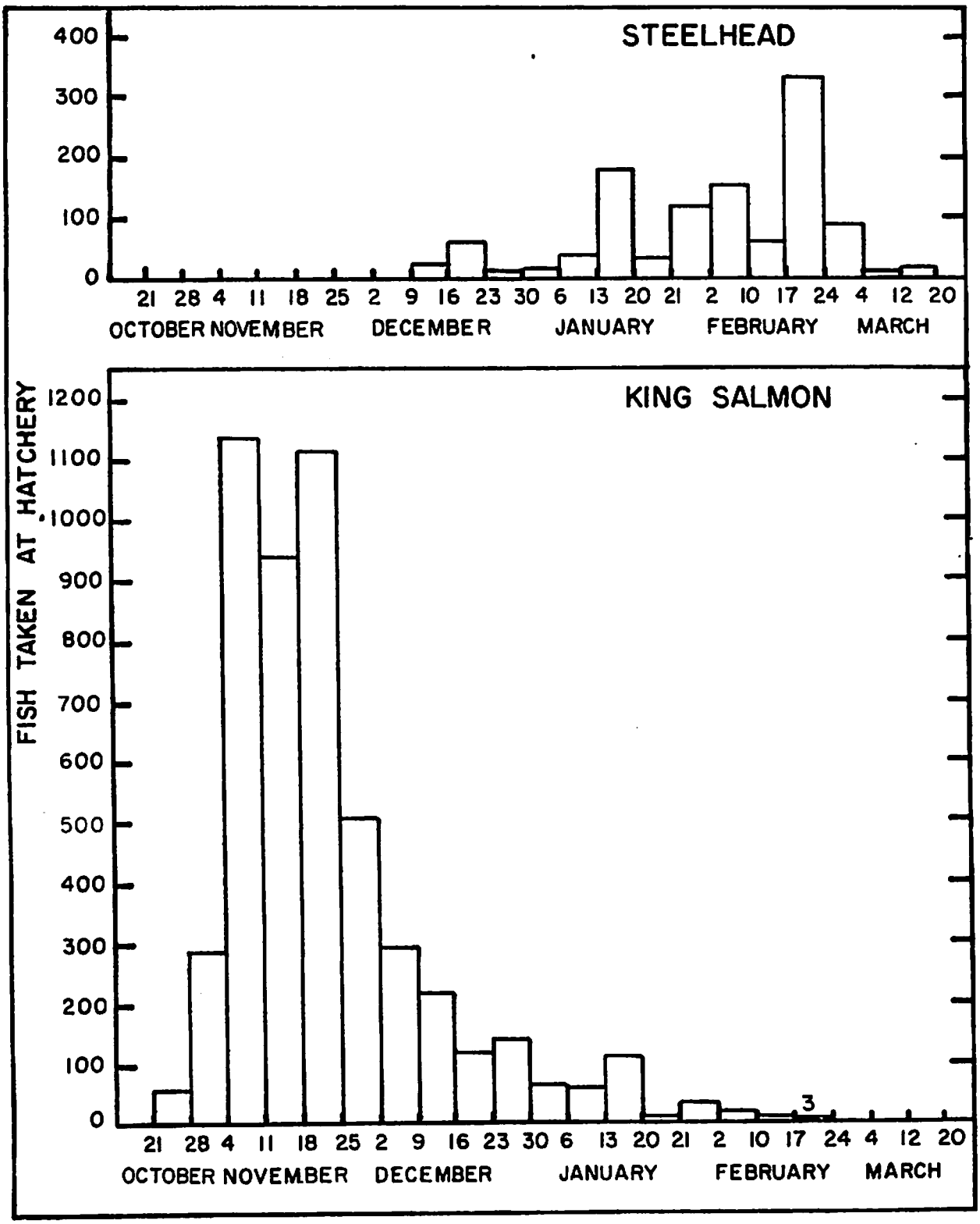

Figure A-1. King salmon and steelhead counts taken at Nimbus Hatchery from October 1967-March 1968.

TABLE A-1
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data
July, 1967

Date	TEMPERATURES				Weather	American River Flow At Hatchery C.F.S.
	AIR		WATER			
	Maximum	Minimum	Maximum	Minimum		
1	102	66	56	54	Clear	8,250
2	100	62	56	55	Partly Cloudy	8,250
3	99	62	56	54	Partly Cloudy	8,250
4	100	62	56	54	Partly Cloudy	8,250
5	92	62	56	54	Partly Cloudy	8,125
6	93	62	57	54	Partly Cloudy	7,417
7	91	58	57	55	Clear	5,977
8	90	55	58	55	Clear	4,985
9	92	56	58	55	Clear	4,981
10	98	58	58	55	Clear	4,707
11	102	62	58	55	Clear	4,458
12	105	63	58	56	Clear	3,990
13	103	64	60	56	Clear	3,990
14	102	68	60	56	Clear	3,990
15	102	68	60	56	Clear	3,990
16	96	56	60	57	Clear	3,990
17	90	58	57	55	Clear	3,891
18	87	60	60	56	Clear	3,595
19	92	60	61	57	Clear	3,596
20	96	59	60	56	Clear	3,596
21	98	60	58	57	Clear	3,597
22	94	61	60	58	Clear	3,595
23	99	58	60	57	Clear	3,594
24	97	58	60	57	Clear	3,595
25	100	60	61	57	Clear	3,585
26	100	60	61	58	Clear	3,491
27	100	62	61	58	Partly Cloudy	3,497
28	102	70	61	58	Partly Cloudy	3,497
29	102	76	61	58	Clear	3,497
30	103	68	61	58	Clear	3,503
31	98	63	60	58	Clear	3,505

TABLE A-2
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
August, 1967

Date	TEMPERATURES AIR Maximum	AIR Minimum	WATER Maximum	WATER Minimum	Weather	American River Flow At Hatchery C.F.S.
1	98	61	63	59	Clear	3,499
2	95	62	62	60	Clear	3,501
3	100	61	62	60	Clear	3,503
4	100	62	63	60	Clear	3,504
5	96	60	63	60	Clear	3,510
6	92	60	62	59	Clear	3,499
7	97	60	61	60	Partly Cloudy	3,498
8	100	64	61	59	Partly Cloudy	3,502
9	100	60	63	60	Clear	3,494
10	93	56	63	61	Clear	3,480
11	97	60	64	61	Partly Cloudy	3,201
12	101	61	63	61	Clear	3,179
13	102	62	63	60	Clear	3,194
14	103	64	63	60	Clear	3,196
15	103	68	64	61	Clear	3,196
16	103	64	63	61	Clear	3,199
17	102	64	64	61	Clear	3,195
18	103	63	64	61	Clear	3,196
19	102	64	63	61	Clear	3,194
20	96	63	63	60	Clear	3,195
21	100	61	62	60	Clear	3,203
22	100	63	62	60	Clear	3,195
23	102	64	63	61	Partly Cloudy	3,195
24	102	66	63	61	Partly Cloudy	3,197
25	98	65	63	61	Partly Cloudy	3,193
26	100	68	63	61	Clear	3,191
27	98	64	63	61	Partly Cloudy	3,206
28	91	60	63	60	Partly Cloudy	3,192
29	96	57	63	61	Clear	3,200
30	100	62	63	61	Clear	3,198
31	96	61	63	62	Clear	3,198

TABLE A-3
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
September, 1967

Date	TEMPERATURES AIR Maximum	AIR Minimum	WATER Maximum	WATER Minimum	Weather	American River Flow At Hatchery C.F.S.
1	64	60	98	61	Clear	3,195
2	98	60	64	61	Partly Cloudy	3,197
3	98	63	64	61	Partly Cloudy	3,202
4	96	66	64	62	Partly Cloudy	3,198
5	92	62	63	62	Partly Cloudy	3,203
6	95	62	64	62	Partly Cloudy	3,201
7	94	62	64	62	Partly Cloudy	4,010
8	85	62	63	61	Clear	4,992
9	84	62	63	61	Partly Cloudy	4,935
10	88	59	63	61	Partly Cloudy	4,991
11	87	58	63	61	Clear	4,984
12	90	59	63	61	Clear	4,986
13	91	59	63	61	Clear	4,864
14	91	56	63	61	Clear	3,999
15	90	57	64	62	Clear	3,369
16	88	56	64	62	Clear	2,499
17	86	60	64	62	Partly Cloudy	2,499
18	85	60	65	62	Partly Cloudy	2,499
19	94	57	65	62	Partly Cloudy	1,987
20	92	61	65	63	Clear	1,994
21	93	61	65	63	Clear	1,996
22	84	61	66	62	Clear	1,992
23	84	60	65	63	Partly Cloudy	1,998
24	86	60	64	62	Partly Cloudy	1,995
25	85	56	65	61	Partly Cloudy	1,994
26	90	58	64	62	Clear	1,995
27	90	60	66	63	Clear	1,994
28	88	59	65	62	Clear	1,995
29	85	59	65	63	Partly Cloudy	1,995
30	84	58	65	62	Partly Cloudy	1,995

TABLE A-4
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
October, 1967

Date	TEMPERATURES AIR Maximum	AIR Minimum	WATER Maximum	WATER Minimum	Weather	American River Flow At Hatchery C.F.S.	Salmon
1	78	60	64	63	Partly Cloudy	1,998	-
2	70	54	63	61	Cloudy - Rain	1,997	-
3	68	46	63	61	Partly Cloudy	1,991	-
4	76	46	63	51	Partly Cloudy	1,991	-
5	68	52	64	61	Partly Cloudy	1,998	-
6	72	44	64	61	Partly Cloudy	1,993	-
7	77	45	60	59	Clear	2,000	-
8	82	47	60	58	Partly Cloudy	1,990	-
9	82	50	60	57	Partly Cloudy	1,992	-
10	82	52	60	58	Partly Cloudy	1,991	-
11	84	46	60	53	Partly Cloudy	2,499	-
12	81	55	62	58	Clear	2,499	-
13	80	49	61	58	Clear	2,499	-
14	79	58	61	59	Clear	2,499	-
15	78	44	60	57	Clear	2,500	-
16	80	48	60	58	Clear	2,499	-
17	82	47	61	58	Clear	2,499	-
18	83	48	61	59	Partly Cloudy	2,502	-
19	80	48	61	59	Clear	2,505	-
20	75	47	61	59	Clear	2,496	-
21	70	49	60	59	Partly Cloudy	2,499	-
22	72	52	60	58	Clear	2,496	-
23	79	51	62	59	Clear	2,498	-
24	76	49	61	59	Partly Cloudy	2,499	-
25	76	47	61	59	Partly Cloudy	2,499	-
26	76	44	61	59	Partly Cloudy	2,499	-
27	76	44	61	59	Partly Cloudy	2,497	60
28	75	56	61	59	Partly Cloudy	2,499	-
29	74	49	61	59	Partly Cloudy	2,499	-
30	74	45	60	58	Partly Cloudy	2,499	-
31	76	45	61	59	Clear	2,499	-

TABLE A-5

Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
November, 1967

Date	TEMPERATURES AIR Maximum	AIR Minimum	WATER Maximum	WATER Minimum	Weather	American River Flow At Hatchery C.F.S.	Salmon
1	75	45	61	59	Partly Cloudy	3,006	0
2	77	46	61	59	Partly Cloudy	3,002	285
3	76	48	61	59	Clear	3,001	0
4	62	51	60	59	Cloudy	2,998	0
5	70	58	60	56	Partly Cloudy	2,997	0
6	72	46	61	58	Partly Cloudy	2,999	0
7	76	58	61	58	Clear	2,999	602
8	70	50	60	58	Partly Cloudy	3,000	0
9	68	52	60	58	Cloudy	2,996	235
10	70	44	61	58	Partly Cloudy	3,000	0
11	68	44	59	58	Partly Cloudy	3,000	307
12	68	47	58	57	Partly Cloudy	3,001	0
13	62	50	58	57	Cloudy-Rain	2,999	272
14	64	54	60	57	Partly Cloudy	2,933	0
15	67	48	58	58	Partly Cloudy	2,998	177
16	69	48	60	57	Partly Cloudy	3,547	0
17	70	50	60	58	Partly Cloudy	3,994	491
18	64	52	59	58	Cloudy - Rain	4,505	0
19	58	50	58	57	Partly Cloudy - Rain	4,510	342
20	63	57	60	57	Partly Cloudy	3,869	0
21	62	44	59	57	Partly Cloudy	3,497	489
22	63	42	59	57	Partly Cloudy	3,497	0
23	62	49	58	57	Partly Cloudy	3,497	0
24	54	40	58	57	Partly Cloudy	3,468	288
25	50	40	57	56	Partly Cloudy	3,197	0
26	52	38	57	56	Clear	3,497	119
27	52	36	57	57	Fog	3,493	0
28	52	37	57	55	Cloudy - Rain	3,498	135
29	48	36	55	55	Cloudy - Rain	3,498	0
30	48	38	54	54	Cloudy - Rain	3,498	156

TABLE A-6
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
December, 1967

Date	TEMPERATURES AIR Maximum	TEMPERATURES AIR Minimum	TEMPERATURES WATER Maximum	TEMPERATURES WATER Minimum	Weather	American River Flow At Hatchery C.F.S.	Salmon	Steelhead
1	49	34	54	54	Partly Cloudy	3,498	0	0
2	49	32	54	54	Partly Cloudy-Rain	3,500	93	0
3	49	40	54	54	Cloudy-Rain	3,500	0	0
4	57	54	54	53	Cloudy-Rain	3,500	84	0
5	54	44	55	54	Partly Cloudy	3,500	0	0
6	49	31	53	53	Partly Cloudy	4,000	136	0
7	52	31	53	53	Partly Cloudy	4,500	0	0
8	50	31	53	52	Partly Cloudy	4,500	73	0
9	51	32	53	52	Partly Cloudy	4,500	0	0
10	51	32	53	52	Clear	4,498	68	0
11	50	32	53	51	Partly Cloudy	4,493	0	0
12	50	34	51	51	Clear	4,493	80	0
13	43	31	50	50	Clear	4,495	0	0
14	46	28	50	49	Clear	4,504	39	0
15	44	30	50	48	Clear	4,500	0	0
16	50	34	50	49	Partly Cloudy	4,501	28	25
17	50	31	49	48	Cloudy	4,501	0	0
18	47	40	48	48	Cloudy-Rain	4,497	58	17
19	48	40	48	47	Cloudy	4,501	0	0
20	52	30	48	47	Partly Cloudy	4,504	41	29
21	47	28	48	47	Partly Cloudy	4,504	0	0
22	56	31	49	47	Partly Cloudy	4,288	21	9
23	58	32	49	47	Clear	3,985	0	0
24	58	35	48	47	Clear	4,130	0	0
25	61	38	49	47	Clear	3,984	0	0
26	59	37	49	47	Clear	4,003	84	12
27	62	40	49	47	Clear	3,986	0	0
28	68	37	48	47	Clear	4,028	0	0
29	68	36	48	47	Clear	3,996	56	10
30	59	34	48	47	Clear	3,508	0	0
31	56	30	47	46	Clear, a.m.-Fog	3,006	0	0

TABLE A-7
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
January, 1968

Date	TEMPERATURES AIR Maximum	AIR Minimum	WATER Maximum	WATER Minimum	Weather	American River Flow At Hatchery C.F.S.	Salmon	Steelhead
1	43	32	46	46	Cloudy - Fog	2,514	0	0
2	42	38	46	46	Cloudy	2,617	42	13
3	46	31	52	46	Partly Cloudy	2,539	0	0
4	52	29	47	45	Clear	2,528	0	0
5	51	26	46	45	Clear	2,512	27	10
6	48	27	45	45	Clear	2,028	0	0
7	42	26	45	45	Fog	2,023	0	0
8	42	34	44	44	Fog	2,021	0	0
9	52	34	45	44	Cloudy	2,018	31	6
10	56	46	46	44	Partly Cloudy	2,016	0	0
11	52	31	46	44	Partly Cloudy	2,005	0	0
12	59	32	46	44	Cloudy	2,003	36	39
13	60	44	46	44	Partly Cloudy	2,013	0	0
14	54	46	45	45	Cloudy - Rain	2,016	0	0
15	58	43	46	45	Cloudy - Rain	2,022	0	0
16	60	40	46	45	Cloudy - Rain	2,010	68	60
17	56	34	46	45	Partly Cloudy	1,988	0	0
18	60	34	46	45	Clear	2,006	0	0
19	62	34	46	44	Partly Cloudy	1,996	38	124
20	58	38	46	44	Clear	1,994	0	0
21	64	38	45	44	Clear	1,998	0	0
22	60	37	45	44	Partly Cloudy	1,994	0	0
23	64	41	46	44	Partly Cloudy	1,930	0	0
24	64	36	46	44	Partly Cloudy	1,993	11	42
25	64	36	46	44	Partly Cloudy	1,999	0	0
26	58	36	45	44	Cloudy-Rain	1,987	0	0
27	57	36	44	44	Partly Cloudy	1,996	0	0
28	52	34	44	43	Cloudy	1,982	0	0
29	54	44	43	43	Rain	1,985	35	58
30	48	43	43	43	Rain	1,992	0	0
31	58	36	44	43	Partly Cloudy	1,993	0	0

TABLE A-8
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
February, 1968

Date	TEMPERATURES AIR Maximum	AIR Minimum	WATER Maximum	WATER Minimum	Weather	American River Flow At Hatchery C.F.S.	Salmon	Steelhead
1	58	34	44	43	Cloudy	1,994	0	0
2	62	44	45	43	Cloudy	1,979	7	62
3	60	42	45	44	P.Cloudy-A.M.Fog	2,001	0	0
4	57	44	44	44	Cloudy-Rain	1,995	0	0
5	60	50	45	44	P. Cloudy	2,000	0	0
6	66	43	46	44	Cloudy	1,954	0	0
7	67	45	47	45	P. Cloudy - A. M. Fog	2,008	20	156
8	62	41	46	44	P. Cloudy - A. M. Fog	2,005	0	0
9	64	47	46	44	Cloudy	2,006	0	0
10	65	48	46	45	Clear	1,977	0	0
11	64	40	46	44	P. Cloudy	1,998	0	0
12	68	42	46	44	P. Cloudy	1,994	0	0
13	60	44	45	44	Cloudy	2,020	10	59
14	65	42	45	44	P. Cloudy	2,024	0	0
15	70	44	46	44	P. Cloudy	2,023	0	0
16	60	50	47	45	Cloudy-Rain	1,975	0	0
17	58	52	47	46	Cloudy-Rain	1,986	0	0
18	72	54	47	47	Cloudy-Rain	1,993	0	0
19	63	52	46	45	Cloudy-Rain	2,238	3	120
20	70	57	48	46	Cloudy-Rain	2,901	0	0
21	72	56	48	46	Cloudy	4,854	0	0
22	72	58	47	46	Cloudy-Rain	7,473	0	0
23	74	64	48	46	Cloudy-Rain	7,495	0	212
24	74	50	48	46	P. Cloudy	7,753	0	0
25	73	49	49	46	P. Cloudy	8,050	0	0
26	74	50	48	46	P. Cloudy	8,037	0	0
27	74	46	47	45	P. Cloudy	8,009	0	0
28	74	50	47	45	P. Cloudy	7,955	0	54
29	75	48	49	46	P. Cloudy	7,763	0	0

TABLE A-9
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
March, 1968

Date	TEMPERATURES AIR Maximum	AIR Minimum	WATER Maximum	WATER Minimum	Weather	American River Flow At Hatchery C.F.S.	Steelhead
1	64	50	50	48	Partly Cloudy	7,495	0
2	74	46	51	48	Clear	7,515	0
3	78	47	49	48	Clear	7,538	0
4	76	48	49	47	Partly Cloudy	7,541	33
5	74	52	49	48	Partly Cloudy	7,492	0
6	68	54	49	47	Partly Cloudy	7,493	0
7	66	50	49	48	Cloudy-Rain	6,982	0
8	58	50	48	47	Cloudy	7,013	12
9	65	40	49	47	Partly Cloudy	6,490	0
10	69	40	50	47	Partly Cloudy	5,990	0
11	49	48	50	48	Cloudy	6,000	0
12	68	44	49	48	Cloudy-Rain	5,514	0
13	62	54	48	47	Cloudy-Rain	5,488	17
14	62	48	48	47	Cloudy-Rain	5,004	0
15	70	42	49	48	Partly Cloudy	4,967	0
16	60	50	49	49	Cloudy-Rain	4,548	0
17	65	40	48	47	Partly Cloudy	4,037	0
18	64	38	50	48	Partly Cloudy	3,489	4
19	70	40	51	48	Clear	3,492	0
20	70	38	51	49	Clear	3,497	0
21	77	44	51	49	Partly Cloudy	3,526	0
22	74	48	51	49	Partly Cloudy	3,499	0
23	72	48	51	48	Partly Cloudy	2,999	0
24	73	46	51	49	Partly Cloudy	3,018	0
25	74	48	51	50	Cloudy	2,988	0
26	75	42	51	49	Partly Cloudy	2,979	0
27	76	44	52	49	Clear	3,010	0
28	80	48	52	50	Clear	2,997	0
29	84	50	53	50	Clear	2,998	0
30	85	53	53	50	Clear	2,988	0
31	78	50	52	50	Partly Cloudy	2,989	0

TABLE A-10
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
April, 1968

Date	TEMPERATURES AIR Maximum	AIR Minimum	WATER Maximum	WATER Minimum	Weather	American River Flow At Hatchery C.F.S.
1	60	54	50	50	Cloudy-Rain	2,989
2	70	49	50	49	Cloudy	2,997
3	74	60	53	50	Partly Cloudy	3,003
4	70	42	52	50	Partly Cloudy	2,992
5	70	48	53	51	Partly Cloudy	2,805
6	74	42	54	50	Clear	2,799
7	78	52	54	52	Clear	2,804
8	81	44	54	52	Clear	2,789
9	84	48	54	52	Clear	2,704
10	86	52	54	52	Clear	2,738
11	90	53	55	52	Clear	2,719
12	80	60	54	52	Clear	2,664
13	82	52	55	52	Clear	2,689
14	84	46	55	52	Clear	2,719
15	78	52	55	53	Partly Cloudy	2,660
16	70	44	54	53	Partly Cloudy	2,503
17	68	42	54	52	Clear	2,509
18	76	46	55	52	Clear	2,498
19	78	46	55	53	Partly Cloudy	2,496
20	72	42	55	53	Partly Cloudy	2,494
21	70	40	55	53	Partly Cloudy	2,478
22	78	46	55	53	Clear	2,490
23	84	58	55	54	Partly Cloudy	2,508
24	80	48	56	54	Partly Cloudy	2,497
25	84	46	56	54	Partly Cloudy	2,493
26	86	56	58	54	Clear	2,495
27	90	58	57	55	Clear	2,490
28	94	69	57	55	Clear	2,505
29	94	55	57	54	Clear	2,435
30	90	52	57	54	Clear	1,990

TABLE A-11
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data for
May, 1968

Date	TEMPERATURES AIR Maximum	AIR Minimum	WATER Maximum	WATER Minimum	Weather	American River Flow At Hatchery C.F.S.
1	88	56	57	55	Clear	2,000
2	92	51	57	54	Clear	1,999
3	84	52	57	54	Clear	1,942
4	78	50	56	54	Partly Cloudy	1,500
5	80	50	56	54	Partly Cloudy	1,508
6	80	46	57	54	Partly Cloudy	1,510
7	85	55	58	48	Partly Cloudy	1,490
8	86	52	57	55	Clear	1,388
9	78	48	56	55	Clear	1,293
10	80	50	57	55	Partly Cloudy	1,196
11	82	48	58	55	Partly Cloudy	1,188
12	76	48	57	55	Partly Cloudy	1,189
13	62	48	54	50	Cloudy - Rain	1,193
14	76	43	56	54	Partly Cloudy	1,181
15	82	47	56	53	Clear	1,089
16	90	49	56	54	Clear	1,084
17	90	51	56	53	Partly Cloudy	988
18	92	58	57	54	Partly Cloudy	984
19	88	60	57	55	Partly Cloudy	983
20	79	56	57	54	Cloudy	986
21	80	51	57	54	Partly Cloudy	984
22	82	50	58	54	Partly Cloudy	986
23	82	51	57	54	Partly Cloudy	988
24	82	50	58	54	Partly Cloudy	991
25	84	58	58	55	Cloudy - Rain	988
26	90	54	58	55	Clear	992
27	96	58	58	57	Clear	994
28	98	68	58	56	Clear	1,003
29	96	60	59	56	Clear	998
30	97	61	62	57	Clear	999
31	98	57	59	57	Partly Cloudy	1,026

TABLE A-12

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

Date	TEMPERATURES AIR Maximum	AIR Minimum	WATER Maximum	WATER Minimum	Weather	American River Flow At Hatchery C.F.S.
1	102	59	61	57	Clear	1,613
2	101	59	59	57	Clear, P. Cloudy	1,649
3	97	66	58	58	Partly Cloudy	1,616
4	84	55	57	56	Partly Cloudy	2,135
5	80	57	59	55	Cloudy	2,086
6	84	58	58	55	Partly Cloudy	2,173
7	83	56	59	55	Partly Cloudy	2,790
8	90	58	58	55	Clear	2,774
9	90	57	58	55	Clear	2,760
10	90	58	60	60	Clear	2,827
11	88	57	61	60	Partly Cloudy	2,885
12	90	54	62	60	Clear	2,880
13	96	52	61	58	Partly Cloudy	2,662
14	102	58	61	60	Partly Cloudy	2,381
15	108	61	62	62	Partly Cloudy	2,620
16	107	68	62	61	Partly Cloudy	3,048
17	104	66	63	61	Clear	3,273
18	103	65	62	60	Clear	3,597
19	102	64	62	60	Clear	3,329
20	98	61	63	60	Clear	3,364
21	104	63	63	61	Clear	3,610
22	106	68	63	61	Clear	3,813
23	103	70	62	61	Clear	3,829
24	107	64	64	62	Clear	3,682
25	106	67	63	62	Clear	3,502
26	98	61	64	61	Clear	3,694
27	102	60	64	61	Clear	3,798
28	94	62	64	61	Clear	4,226
29	88	61	66	64	Clear (windy)	4,128
30	98	55	65	62	Clear	4,385