

ANNUAL REPORT
NIMBUS SALMON AND STEELHEAD HATCHERY
FISCAL YEAR OF 1959-60

REF 90229

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SUMMARY

The river bed at the weir site was repaired during the week of September 14-21, 1959, and the weir was installed on September 22.

The first salmon arrived on September 24, 1959, and the last on February 4, 1960. The peak of the run occurred during the week of November 15-21. A total of 3,003 males, 7,366 females and 2,866 grilse entered the holding ponds and an estimated 1,749 salmon escaped past the weir, bringing the total run of 14,984.

Of the fish entering the holding ponds, 476 males and 2,999 females were transported to the colder water of Bear River Fish Planting Base in Nevada County for ripening. A total of 14,501,100 eggs was taken at this location.

When the holding capacity of Bear River Base was reached, 54 males and 276 females were transported to Moccasin Creek Hatchery where 1,360,500 eggs were taken.

In all, 6,422 females were spawned during the 1959-60 season and 39,784,000 eggs were taken. It was necessary to plant 5,556,800 eyed king salmon eggs of the 1959 brood year to avoid overcrowding of the hatchery.

During the salmon season water temperatures at Nimbus Hatchery were above 56 degrees Fahrenheit until December 1.

In February, 1960, 1,117,508 late-run upper Sacramento River king salmon eggs were received from the U. S. Fish and Wildlife Service, Coleman National Fish Hatchery.

Of the 20,579 marked king salmon yearlings of the 1955 brood year, 15 males and 40 females returned to the hatchery and above the fish rack during the 1959-60 season. This makes a total of 513 fish of this group to return to the hatchery.

Of the 52,657 marked king salmon yearlings of the 1957 brood year, 62 small males returned to the hatchery during the 1959 season.

During July and August, 1959, a total of 334,320 king salmon fingerlings of the 1958 brood year was released.

During the 1959-60 report period, 20,590,954 Nimbus fingerlings and 959,033 of the Coleman fingerlings of the 1959 brood year were released.

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(Complete report available on request)

Approximately 18,000 silver salmon fingerlings were obtained from Coleman Hatchery in February, 1960. On June 30, 1960, there were 11,600 of these fish on hand.

The steelhead pond was in operation from January 11, 1960, to May 8, 1960, when the last steelhead arrived. During this period, 778 steelhead entered the pond, 354 males and 424 females. A total of 282 females was spawned, producing 1,189,200 eggs for an average of 4,217 eggs per female.

Starting in July, 1959, and continuing through January, 1960, 460,628 steelhead of the 1959 brood year were released.

In June, 1960, 165,120 steelhead of the 1960 brood year were released, leaving 808,000 steelhead on hand.

INTRODUCTION

This is the fifth Annual Report of the Nimbus Salmon and Steelhead Hatchery, operated by the California Department of Fish and Game under contract with the U.S. Bureau of Reclamation. The report summarizes information for the period July 1, 1959, to June 30, 1960, on the numbers of fish trapped and spawned, production of eggs and fish and conditions of water quality and temperatures.

KING SALMON MAINTENANCE PROGRAM

History of the 1959 Salmon Run

A considerable amount of gravel was removed from the stream bed at the weir site by the digging activities of the 1958 salmon run together with high water velocities. A contract was awarded in September, 1959, for repair of the river bed. Between September 14 and September 21, approximately 1,000 yards of gravel were placed at the weir site.

The gravel dyke for diverting a substantial amount of the river flow to the mouth of the ladder was repaired. In order to concentrate the water from the ladder at the point where it flows into the river, the downstream ladder wall was raised two feet.

The weir racks were placed in position on September 22, and the first king salmon (*Oncorhynchus tshawytscha*) arrived on September 24. This was nine days later than the first arrival in 1958. A total of 14,984 king salmon migrated to the hatchery, which was 57 fewer fish than migrated in 1958. Of these fish, 13,235 entered the holding ponds and 1,749 escaped upstream through the weir and were later removed from the racks as they died and drifted downstream.

The portion of the run entering the holding ponds was composed of 3,003 large males, 7,366 females and 2,866 grilse. Thus 44.3 percent were males, including grilse, and 55.7 percent were females. As in previous years, the run extended over a considerable period of time. Three hundred and sixty five salmon arrived at the holding ponds in September, 1,238 in October, 8,655 in November, 2,833 in December, 140 in January and 4 in February. The last fish entered the holding ponds on February 4, 1960.

Of the 1,749 dead salmon recovered on the racks, there were 231 males, 325 females, 1,184 grilse and 9 skeletons unidentifiable as to sex.

The total run of 14,984 king salmon consisted of 49 percent males and 51 percent females.

The results of transporting salmon to colder water at the Bear River Fish Planting Base in Nevada County in 1958 were successful enough to warrant the continued use of the adult salmon holding and egg incubating facilities. This operation has been described by Rice (1960). From September 24 to November 30, 476 males and 2,999 females were transported to Bear River. Of these, 379 males and 2,387 females were spawned, resulting in a production of 14,501,100 eggs.

The first king salmon eggs were taken at the base on October 15, 1959. When the capacity of the holding ponds at Bear River base was reached on November 22, 54 males and 276 females were transported to Moccasin Creek Hatchery. Of these fish, 51 males and 254 females were spawned producing 1,360,500 eggs. These eggs were eyed at Moccasin Creek Hatchery.

Of the 7,366 females that entered the holding ponds, 6,422 or 87 percent were spawned (including fish spawned at the Bear River Base and Moccasin Creek Hatchery) producing 39,784,000 eggs. This is an average of 6,195 eggs per female. The last fish of the season was spawned at Nimbus on February 4, 1960.

Water temperatures at Nimbus were above 56 degrees until December 1, 1959. Sixty one percent of all the females in the run were spawned prior to this date. A total of 7,297,600 eggs taken at Nimbus during the warm water period was transported to San Joaquin Hatchery. After the hatchery at Bear River Base reached its egg capacity on November 14, 1,675,200 eggs were shipped to Moccasin Creek Hatchery. All eggs transported to other hatcheries were returned to Nimbus when eyed.

Nimbus Hatchery received 85,000 king salmon eggs taken at the U. S. Fish and Wildlife Service's Coleman National Fish Hatchery. These eggs were used in conjunction with a study being made of a virus infection of king salmon common at the Coleman Hatchery. Also, 1,032,508 eyed eggs from late run king salmon were received from the Coleman Hatchery in February 1960.

1955 Brood Year Marked King Salmon

This year, 1959, the last of the 20,579 marked yearlings of the 1955 brood year returned. A total of 54 marked fish (15 males and 39 females) entered the hatchery and a single marked female was removed from the fish rack.

This makes a total return to the hatchery and from the fish rack of 513 marked fish, 249 males and 264 females. A report on this group of fish was made by Warner, Fry and Culver (1961).

1957 Brood Year Marked King Salmon

During November and December, 1958, and January, 1959, 52,657 king salmon of the 1957 brood year were marked by the removal of both ventral fins and planted in the American River. These fish were from eggs taken at the Coleman Hatchery in 1958. It is hoped that these fish will retain their late-running characteristics so as to avoid the early period of high water temperatures in the American River. During the 1959 run, 62 of these fish returned as two-year-olds. All were males, and averaged 53 centimeters in length. It is interesting to note that the first of the marked fish arrived on November 17, 1959, and the last on January 28, 1960, and that only 8 of the returned fish (13 percent) arrived before the water temperature dropped below 56 degrees Fahrenheit.

Planting 1958 Brood Year King Salmon

Prior to this report period, all fingerlings of the 1958 brood year from eggs taken at Nimbus were planted (Hinze, 1961). On July 1, 1959, 497,000 king

salmon fingerlings were on hand at the hatchery. These fish were derived from eggs obtained at the Coleman Hatchery. During July and August, this group of fingerlings was released into the American River. A total of 334,320 fish weighing 1,790 pounds was planted.

Planting 1959 Brood Year King Salmon

The take of 39,784,000 green eggs did not crowd Nimbus Hatchery initially, as many of these eggs were incubated at Bear River, San Joaquin Hatchery and Moccasin Creek Hatchery. However, as the eyed eggs were returned to Nimbus, all troughs were filled. Because of lack of space, it was also necessary to bury 5,556,800 eyed eggs in the gravel of the American River upstream from the fish rack.

To accomplish the egg burying operation, a depression about one foot deep was dug in the gravel that was large enough to accommodate a 50-gallon drum from which the ends had been removed. The drum was placed in the depression and gravel was then piled around the outside of the drum to its former level. Approximately 400 ounces of eggs were then poured into the drum and allowed to settle to the bottom of the depression. Enough gravel was placed carefully inside the drum to bring the gravel level about 6 inches above the river bed. The drum then was removed slowly. Very few eggs were lost by using this method.

The eggs in the river hatched in January and the alevins emerged in good condition. They could be observed hovering over the artificial redds in large numbers. In February, before the egg sac was completely absorbed, water releases from Nimbus Dam were increased to the extent that no further observations could be made.

The first of the 1959 brood year fingerlings were planted in January, and planting continued through June at which time a total of 20,590,954 Nimbus fingerlings and 959,033 Coleman fingerlings had been released.

SILVER SALMON

A total of 18,000 silver salmon (Oncorhynchus kisutch) fingerlings was obtained from the Coleman Hatchery in February 1960. At the end of the fiscal year, there were 11,600 of these fish on hand, averaging 37 fish per pound.

No adult silver salmon entered the Nimbus holding pond this season.

STEELHEAD MAINTENANCE PROGRAM

History of the 1959-1960 Steelhead Run

As in previous years, a few steelhead rainbow trout (Salmo gairdnerii) were taken with the king salmon entering the hatchery during October, November, and December, 1959. These fish were returned to the river since they would not mature for several months.

The steelhead pond was put into operation on January 11, 1960. During January, 133 males and 80 females entered the pond; during February, 124 males and 163

females; during March, 73 males and 139 females; during April, 24 males and 40 females and during May 2 females. The last steelhead was taken May 8.

A total of 282 females was spawned and 1,189,200 eggs taken between January 13 and May 5, 1960. The average number of eggs per female was 4,217.

In previous years, it had been necessary to import 1,000,000 steelhead eggs from the Eel River for the maintenance of the American River run. This year, 223,920 eggs had been received from the Eel River before it became obvious that sufficient eggs would be taken at Nimbus. The balance of the egg allotment from the Eel River was cancelled.

Planting 1959 Brood Year Steelhead

On July 1, 1959, there were 7,000 Nimbus steelhead and 595,000 Eel River steelhead of the 1959 brood year on hand. Starting in July, 1959, and continuing through January, 1960, 460,628 fish, weighing 6,540 pounds, were planted.

Planting 1960 Brood Year Steelhead

Planting of the 1960 brood year steelhead was started in June, 1960, when 165,120 fish, weighing 262 pounds, were released. On June 30, 1960, there were 808,000 Nimbus steelhead on hand.

PUBLIC RELATIONS

During the period covered by this report, an estimated 91,150 persons visited the hatchery. Of these, 75,800 people came during the salmon run in the months of October, November and December. Included in the estimated number of visitors were 2,411 people in organized groups which were conducted through the installation by hatchery personnel.

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1961. History of yearling king salmon marked and released at Nimbus Hatchery. Calif. Fish and Game, Vol. 47, No. 4, pp. 343-355.

APPENDIX

APPENDIX

Tables A-1 through A-12 give the daily air and water temperatures, weather conditions, river flow, and numbers of fish of each species entering the hatchery during the report period.

Figure A-1 shows the numbers of fall-run king salmon entering the hatchery during each week of the season.

TABLE A-1
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data, July, 1959

Date	TEMPERATURE				Weather	American River flow at hatchery (c.f.s.)
	AIR		WATER			
	Maximum	Minimum	Maximum	Minimum		
1	100	62	56.5	55	Clear	3,257
2	93	68	58	55	Clear	3,229
3	97	68	58	56	Clear	3,306
4	99	60	57.5	55	Clear	3,240
5	97	68	57.5	55.5	Clear	3,267
6	90	60	58	55	Clear	3,282
7	99	63	58	56	Clear	2,696
8	104	68	58	55.5	Clear	2,593
9	104	63	58	55.5	Clear	2,465
10	111	66	58	56.5	Clear	2,423
11	112	69	58	56.5	Partly Cloudy	3,021
12	98	68	57	56	Partly Cloudy	3,561
13	94	63	58	56.5	Clear	3,555
14	96	64	58	56.5	Clear	3,552
15	102	68	58	55	Clear	4,013
16	104	68	58.5	55	Clear	4,102
17	106	70	59	56.5	Clear	4,145
18	101	68	59	56.5	Clear	4,093
19	100	67	58.5	56	Clear	4,071
20	98	62	59.5	59	Clear	4,072
21	96	62	59	57.5	Clear	4,065
22	88	62	59	57	Partly Cloudy	4,130
23	100	67	59	57.5	Partly Cloudy	4,090
24	106	66	60	58	Clear	4,085
25	108	68	60.5	58.5	Clear	3,994
26	98	66	60	58	Clear	3,998
27	102	62	61	59	Clear	3,988
28	102	64	59.5	58.5	Clear	6,062
29	98	64	60	58	Clear	6,028
30	101	62	59.5	58.5	Clear	6,024
31	102	68	60.5	59	Clear	6,039

Water temperature recorded on thermograph at head of nursery ponds. Air temperatures were taken from maximum-minimum thermometer on northeast corner of processing building. River flow data furnished by Bureau of Reclamation. All temperatures are in degrees Fahrenheit.

TABLE A-2
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data, August, 1959

Date	TEMPERATURE				Weather	American River Flow at hatchery (c.f.s.)
	AIR		WATER			
	Maximum	Minimum	Maximum	Minimum		
1	98	62	60.5	59.5	Clear	6,004
2	98	60	61.5	59.5	Clear	5,984
3	96	58	65	60.5	Clear	5,988
4	94	60	64	63	Clear	5,066
5	98	60	64	62.5	Clear	5,052
6	103	64	63	61.5	Clear	4,003
7	107	90	72	61	Clear	4,023
8	102	57	64	61.5	Clear	4,015
9	100	65	64.5	62.5	Clear	3,997
10	102	62	66	61	Clear	4,023
11	101	66	66	64.5	Clear	3,544
12	102	64	66	63	Clear	3,613
13	94	68	66	63.5	Clear	3,542
14	94	62	67	64.5	Clear	3,582
15	92	68	67	65	Clear	3,067
16	92	69	67.5	65	Clear	3,081
17	70	55	69	67.5	Clear	3,086
18	70	55	69	67.5	Clear	2,489
19	80	68	67	65	Partly Cloudy	2,451
20	78	58	65.5	64.5	Partly Cloudy	2,485
21	82	52	66	63	Clear	2,451
22	80	54	67	64.5	Partly Cloudy	1,985
23	100	60	69	66	Partly Cloudy	1,983
24	98	71	69	68	Partly Cloudy	1,970
25	96	66	70	68	Clear	1,798
26	90	60	69	67	Clear	2,000
27	84	62	69	66	Clear	1,998
28	88	58	70	67	Partly Cloudy	2,005
29	92	56	70	66	Clear	1,525
30	94	58	70	67.5	Clear	1,496
31	94	60	71	69	Clear	1,519

TABLE A-3
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data
September, 1959

Date	TEMPERATURE				Weather	American River Flow at Hatchery (c.f.s.)	King Salmon Taken
	AIR		WATER				
	Maximum	Minimum	Maximum	Minimum			
1	97	62	71.5	69.5	Clear	1,526	0
2	86	60	70	68	Clear	1,526	0
3	86	56	71	68	Clear	1,530	0
4	90	56	71.5	68	Clear	1,540	0
5	94	58	71.5	67	Clear	1,230	0
6	94	60	72	69	Clear	1,235	0
7	98	60	72	70	Clear	1,232	0
8	97	61	72.5	70.5	Clear	1,226	0
9	98	64	72	71	Clear	1,210	0
10	88	60	71.5	70	Partly Cloudy	1,196	0
11	94	50	73	70.5	Clear	1,193	0
12	95	92	73	71	Clear	1,193	0
13	85	58	72	69.5	Partly Cloudy	1,199	0
14	85	60	71.5	70	Light Showers	1,173	0
15	85	64	71	69	Clear	1,167	0
16	75	64	70	68.5	Partly Cloudy	1,138	0
17	79	58	70	68	Partly Cloudy	1,174	0
18	62	50	68.5	68	Rain	1,188	0
19	62	58	69	68	Cloudy	1,210	0
20	70	54	69	67	Partly Cloudy	1,208	0
21	78	54	69	67	Clear	1,129	0
22	82	53	70.5	65.5	Clear	1,217	0
23	84	55	71	68	Clear	1,229	0
24	84	53	71	68.5	Clear	1,224	34
25	86	58	71.5	69	Clear	1,226	33
26	88	59	71.5	70	Clear	1,222	8
27	79	57	71.5	69	Clear	1,219	27
28	76	52	71	69	Clear	1,253	141
29	80	56	70.5	68.5	Partly Cloudy	1,238	80
30	78	48	70	67.5	Clear	1,240	42

The weir was placed in operation September 22, 1959
The first salmon was taken on September 24, 1959

TABLE A-4
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data,
October, 1959

Date	TEMPERATURE				Weather	American River Flow at Hatchery (c.f.s.)	King Salmon Taken
	AIR		WATER				
	Maximum	Minimum	Maximum	Minimum			
1	78	52	69.5	66.5	Clear	591	47
2	80	48	69	66.5	Clear	597	58
3	78	51	69	66.5	Clear	600	8
4	80	51	69	66.5	Clear	600	0
5	73	52	70.5	67	Partly Cloudy	616	76
6	73	52	68	66	Partly Cloudy	630	23
7	74	47	68.5	66	Clear	630	22
8	80	52	68	66	Partly Cloudy	630	12
9	78	62	68	66.5	Partly Cloudy	630	21
10	86	57	69	66.5	Clear	636	0
11	88	58	69.5	68	Clear	636	12
12	86	58	68.5	67	Clear	645	0
13	86	51	70	67.5	Clear	600	42
14	86	53	69	67	Clear	600	16
15	86	52	69	66.5	Clear	600	0
16	85	52	69.5	67	Clear	600	43
17	86	52	69.5	67	Clear	600	0
18	71	54	67.5	66.5	Clear	600	0
19	72	48	68	66	Clear	600	0
20	74	50	68.5	66	Partly Cloudy	600	138
21	81	52	67.5	65.5	Clear	550	48
22	85	52	68.5	64	Clear	500	27
23	84	58	68	66.5	Clear	500	37
24	88	58	68	66.5	Clear	500	0
25	88	58	68	66.5	Clear	500	23
26	86	52	67	66	Fog, Clear	500	59
27	70	52	67	65	Fog, Clear	500	29
28	76	47	66.5	65	Clear	500	34
29	68	53	65	64	Clear	500	59
30	72	50	63	62.5	Clear Smokey	500	158
31	78	45	62.5	61.5	Clear Smokey	500	246

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TABLE A-5

Nimbus Salmon and Steelhead Hatchery
Weather and Water Data,
November, 1959

Date	TEMPERATURE				Weather	American River flow at hatchery (c.f.s.)	King Salmon Taken
	AIR		WATER				
	Maximum	Minimum	Maximum	Minimum			
1	70	43	62	60.5	Clear, Smokey	500	62
2	68	42	61.5	60	Clear, Smokey	500	307
3	65	47	60.5	60	Cloudy	507	156
4	70	48	61	59	Clear	502	196
5	67	42	61	59	Clear	500	263
6	70	40	62	59.5	Clear	500	140
7	69	40	61.5	59.5	Clear	500	95
8	72	42	61.5	59	Clear	500	192
9	72	40	62	60	Clear	500	222
10	70	38	61.5	59.5	Clear	500	54
11	71	39	61	59	Clear	500	80
12	69	39	60.5	58.5	Clear	500	191
13	66	38	60.5	58.5	Clear	500	142
14	67	39	60	58.5	Clear	500	242
15	64	39	59	58	Fog a.m. Clear p.m.	500	355
16	61	41	58.5	53.5	Fog a.m. Clear p.m.	500	314
17	64	38	59	57	Clear	500	407
18	64	40	58	57	Clear	852	347
19	67	42	58	56.5	Clear	Not Received	859
20	66	39	58	56.5	Clear	1,081	919
21	67	44	58.5	56.5	Clear	1,154	827
22	72	44	58	56	Clear	536	294
23	68	44	58.5	56	Clear	553	240
24	69	44	58.5	56	Clear	536	108
25	66	40	57.5	56	Clear	500	362
26	70	39	57.5	55.5	Clear	500	173
27	57	39	57	55.5	Light Clouds	500	316
28	67	38	57	55.5	Clear	500	233
29	64	36	50.5	55	Clear	500	348
30	65	38	56.5	55	Clear	500	211

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TABLE A-6
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data,
December, 1959

Date	TEMPERATURE				Weather	American River Flow at Hatchery (c.f.s.)	King Salmo Taken
	AIR		WATER				
	Maximum	Minimum	Maximum	Minimum			
1	65	38	56.5	55	Clear	500	356
2	69	39	55.5	54.5	Clear, Clouds p.m	500	234
3	68	36	56	54	Few Clouds	500	326
4	66	35	56	54	Clear	500	190
5	60	32	55	54	Clear	500	248
6	61	31	55	53.5	Clear	500	185
7	60	32	54.5	53	Clear	500	148
8	58	30	54	52.5	Clear	500	96
9	58	35	53	51.5	Partly Cloudy	500	158
10	57	33.5	53	51.5	Clear	500	110
11	60	40	53	51.5	Clear	500	89
12	58	32	52	51	P.Cloudy, Lt. Rain	548	64
13	53	32	52	50.5	Fog a.m. Clear pm	500	103
14	62	36	50.5	49.5	Clear	500	79
15	55	35	51.5	50	Clear	500	79
16	54	32	51	49.5	Clear	500	0
17	55	36	50	49	Cloudy	500	61
18	58	37	51.5	49.5	Clear	500	0
19	58	34	51.5	50	Clear	500	75
20	47	36	50	49.5	Cloudy	500	0
21	56	34	50.5	49	Clear	500	60
22	58	40	50.5	49	Clear	500	0
23	52	42	49	49	Rain	499	57
24	53	48	40	49	Rain	499	0
25	57	38	51	49.5	Clear	493	0
26	52	32	50	49.5	Partly Cloudy	503	77
27	59	33	49.5	49	Partly Cloudy	523	0
28	56	34	50	49	Partly Cloudy	524	0
29	53	33	49	48.5	Clear	509	35
30	53	33	49	48.5	Clear	499	0
31	46	30	48	47	Fog	499	23

TABLE A-7
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data,
January, 1960

Date	TEMPERATURE				Weather	American River Flow at Hatcher (C.F.S.)	King Salmon Taken	Steelhead Taken
	AIR		WATER					
	Maximum	Minimum	Maximum	Minimum				

1	49	22	48	47	Clear	499	0	0
2	46	26	48	46.5	Partly Cloudy	499	0	0
3	60	28	48	46.5	Clear	499	0	0
4	46	28	47.5	46.5	Clear	499	42	0
5	49	27	47	46	Clear	500	0	0
6	54	34	47	46	Cloudy	500	0	0
7	55	44	46	45.5	Cloudy, Rain	500	15	0
8	43	43	46	46	Rain	500	0	0
9	45	44	46.5	46	Rain	500	0	0
10	45	43	47	46.5	Rain	500	0	0
11	57	45	46.5	46.5	Rain	499	28	36
12	49	32	48	46.5	Clear	500	9	8
13	48	27	46.5	46	Partly Cloudy	500	6	6
14	47	38	46	46	Rain	500	5	3
15	50	36	47	46	Fog a.m. Clearpm	500	3	4
16	48	27	46.5	45	Clear	500	3	5
17	53	30	46	45.5	Clear	500	4	3
18	54	34	46	46	Cloudy	500	2	4
19	55	38	47	46	Partly Cloudy	500	3	3
20	61	40	46.5	45.5	Partly Cloudy	500	3	5
21	63	48	45	45	Rain	500	0	4
22	62	48	47	46	Partly Cloudy	500	4	9
23	60	46	48	46.5	Partly Cloudy	500	0	0
24	58	44	47.5	47	Rain	500	4	12
25	62	45	47	47	Light Rain	656	3	14
26	62	47	48.5	47.5	Cloudy	841	2	34
27	60	47	48	48	Partly Cloudy	688	1	22
28	66	47	49	46.5	Partly Cloudy	509	0	4
29	66	48	49	48.5	Partly Cloudy	509	1	10
30	62	49	50.5	48	Partly Cloudy	509	2	5
31	62	41	50	48.5	Partly Cloudy	509	0	22

First steelhead held for spawning January 11, 1960

TABLE A-8
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data, February, 1960

Date	TEMPERATURE				Weather	American River flow at hatchery (c.f.s.)	King Salmon taken	Steel- head taken
	AIR		WATER					
	Maximum	Minimum	Maximum	Minimum				
1	52	50	50.5	50	Rain	509	0	9
2	52	41	51.5	50.5	Clear	504	2	3
3	54	41	51	50	Partly Cloudy	503	1	10
4	56	40	51	50	Partly Cloudy	503	1	13
5	60	49	51	50	Cloudy	500	0	13
6	66	48	52	50	Partly Cloudy	498	0	0
7	58	53	51	50	Rain	498	0	13
8	62	55	52	50	Rain	2,492	0	7
9	59	50	52	50	Light Rain	5,018	0	48
10	57	44	50	48.5	Partly Cloudy	5,005	0	10
11	57	34	49.5	48	Clear	4,950	0	19
12	63	40	50	49	Partly Cloudy	4,908	0	14
13	58	44	51	49	Partly Cloudy	4,872	0	12
14	59	38	49	48	Partly Cloudy	4,822	0	5
15	65	39	50	48.5	Partly Cloudy	4,106	0	9
16	61	42	51	48.5	Clear	3,465	0	28
17	63	42	49	48	Partly Cloudy	2,475	0	17
18	60	48	49.5	47.5	Light Rain	2,511	0	5
19	59	32	50.5	48	Clear	2,540	0	14
20	61	38	49	48.5	Clear	2,540	0	8
21	62	38	50	48.5	Clear	2,532	0	9
22	60	51	51	49.5	Clear	2,538	0	3
23	57	50	50	49	Clear	2,537	0	0
24	58	49	49	48	Clear	2,522	0	4
25	62	49	49	48.5	Cloudy	2,515	0	7
26	58	49	49	48.5	Cloudy	2,549	0	1
27	56	49	49	48	Partly Cloudy	2,592	0	4
28	62	51	51	49	Partly Cloudy	2,590	0	2
29	62	50	50	49	Clear	2,575	0	0

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Last salmon taken February 4, 1960

TABLE A-9
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data
March, 1960

Date	TEMPERATURE				Weather	American River Flow at Hatchery (c.f.s.)	Steelhead Taken
	AIR		WATER				
	Maximum	Minimum	Maximum	Minimum			
1	58	42	49	49	Partly Cloudy	1,517	9
2	60	38	49	48.5	P. Cloudy, Lt. Rain	1,512	0
3	62	45	48	48.5	Cloudy	1,520	17
4	69	48	49.5	48	Cloudy	1,523	1
5	58	52	50	48.5	Rain	1,529	6
6	62	50	49.5	49	Rain	1,523	10
7	63	54	49	48.5	Rain	1,518	2
8	60	42	51	49	Partly Cloudy	3,611	14
9	66	44	49.5	49	Partly Cloudy	4,926	4
10	60	43	51	48	Clear	4,879	3
11	68	46	49.5	48.5	Cloudy, Rain	4,976	6
12	62	52	49	48.5	Rain	5,016	2
13	64	52	51	48	Partly Cloudy	5,031	0
14	64	42	51	49	Clear	4,934	10
15	62	41	51.5	48.5	Clear	4,947	17
16	64	50	51	49	Clear	5,027	5
17	72	43	52	49.5	Clear	5,033	4
18	80	44	52.5	49.5	Clear	5,006	6
19	80	48	51	50	Clear	4,995	1
20	82	48	52	49.5	Clear	4,948	2
21	78	48	51.5	50	Clear	4,946	2
22	78	48	51.5	50	Clear	3,592	0
23	78	48	51.5	49	Clear	3,739	21
24	68	50	51.5	49	Fog a.m. Clear	3,517	6
25	66	50	51	49.5	Fog a.m. Clear	3,497	0
26	72	46	51.5	50	Rain	3,485	29
27	66	54	51	50	Rain	3,516	7
28	62	42	51	50	Partly Cloudy	3,533	0
29	66	41	52	50	Partly Cloudy	3,559	28
30	65	43	52	50	Rain	3,527	0
31	70	40	51	49.5	Partly Cloudy	3,525	0

TABLE A-10
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data,
April, 1960

Date	TEMPERATURE				Weather	American River Flow at Hatchery (c.f.s.)	Steelhead Taken
	AIR		WATER				
	Maximum	Minimum	Maximum	Minimum			
1	72	44	55	51	Clear	3,528	5
2	78	48	54.5	51	Clear	3,519	2
3	84	52	53	51	Partly Cloudy	3,517	0
4	86	40	53.5	52	Partly Cloudy	3,534	0
5	85	54	53.5	51.5	Partly Cloudy	3,529	0
6	81	44	52.5	50.5	Partly Cloudy	3,500	14
7	72	56	53.5	52	Partly Cloudy	3,475	2
8	68	50	53	51	Clear	3,482	0
9	63	51	53	52	Partly Cloudy	3,485	11
10	63	44	53.5	50.5	Partly Cloudy	3,451	0
11	68	50	54	51	Light Rain	3,499	3
12	70	42	54	51.5	Partly Cloudy	3,502	0
13	74	46	54	51	Clear	3,546	0
14	68	52	56	52	Partly Cloudy	3,543	2
15	68	42	55	52	Clear	3,036	0
16	74	42	54.5	52	Clear	3,043	0
17	78	43	54	52	Clear	3,036	0
18	76	48	54.5	53	Clear	2,739	0
19	78	47	55	53	Clear	2,452	2
20	80	46	54	51	Clear	2,463	0
21	71	47	52.5	51	Partly Cloudy	2,449	3
22	62	44	54	51	Light Rain	2,449	0
23	60	42	52	50.5	Rain	2,460	11
24	62	40	52	50	Cloudy	2,464	0
25	70	40	54	51	Cloudy	2,500	3
26	70	42	53	51	Light Rain	2,467	2
27	60	48	52	51	Rain	2,462	1
28	60	39	52	50.5	Partly Cloudy	2,474	1
29	71	41	53.5	52	Clear	2,517	2
30	72	48	54	52.5	Partly Cloudy	2,510	

TABLE A-11

Nimbus Salmon and Steelhead Hatchery
Weather and Water Data,
May, 1960

Date	TEMPERATURE				Weather	American River flow at hatchery ... (c.f.s.)	Steel- head taken
	AIR		WATER				
	Maximum	Minimum	Maximum	Minimum			
1	68	50	55	53	Light Rain	2,025	0
2	76	48	54	52.5	Partly Cloudy	2,093	0
3	72	42	55	51.5	Light Rain	1,992	0
4	68	44	57	52	Partly Cloudy	1,993	0
5	78	48	55	54	Clear	1,979	1
6	84	50	56	53.5	Clear	1,999	0
7	86	54	55.5	53.5	Clear	2,002	0
8	84	50	55.5	54	Clear	2,000	1
9	84	48	56	54.5	Clear	1,980	0
10	90	53	56	54.5	Clear	1,990	0
11	85	58	55	53	Partly Cloudy	1,988	0
12	80	57	55.5	53	Partly Cloudy	1,997	0
13	79	50	58	50.5	Clear	2,004	0
14	82	50	56	52.5	Clear	2,003	0
15	82	43	55	52.5	Clear	2,009	0
16	79	52	58.5	56.5	Clear	2,029	0
17	80	52	56.5	54.5	Clear	2,026	0
18	77	50	59.5	54.5	Clear	1,990	0
19	83	51	57	55	Clear	2,004	0
20	80	58	55	54	Partly Cloudy	2,000	0
21	70	43	57.5	55	Partly Cloudy	1,464	0
22	70	42	56	54.5	Partly Cloudy	1,479	0
23	51	44	55	54	Rain	1,535	0
24	68	48	54.5	53.5	Rain	1,513	0
25	73	49	55	53.5	Partly Cloudy	1,498	0
26	82	50	55	53	Partly Cloudy	1,511	0
27	84	42	58	54	Clear	1,574	0
28	92	56	58	55	Clear	1,522	0
29	89	54	57	54.5	Clear	1,521	0
30	92	56	58.5	57	Clear	1,512	0
31	96	60	59	56.5	Clear	1,510	0

Last steelhead taken May 8, 1960

TABLE A-12
Nimbus Salmon and Steelhead Hatchery
Weather and Water Data,
June, 1960

Date	TEMPERATURE				Weather	American River Flow at Hatchery (c.f.s.)
	AIR		WATER			
	Maximum	Minimum	Maximum	Minimum		
1	104	64	61	56.5	Clear	1,517
2	106	78	61.5	58	Clear	3,154
3	108	72	58	54.5	Clear	4,248
4	100	62	57	54	Clear	4,523
5	96	68	55.5	53.5	Clear	4,508
6	83	64	56.5	55	Clear	3,516
7	81	60	57	55.5	Fog A.M., Clear P.M.	2,472
8	81	58	58.5	55.5	Clear	2,366
9	83	52	57.5	55	Clear	1,969
10	91	62	58.5	55.5	Clear	1,513
11	101	61	60	56	Clear	1,511
12	104	60	59	58	Clear	1,513
13	103	72	60	58.5	Clear	1,521
14	104	72	59.5	57.5	Clear	1,767
15	102	68	61.5	57	Clear	1,820
16	102	72	59.5	56.5	Clear	2,055
17	90	62	62	55.5	Clear	2,304
18	92	61	61	58.5	Clear	2,540
19	92	64	63	57.5	Clear	2,530
20	92	68	65	57	Clear	2,831
21	100	68	59	56	Clear	3,491
22	102	62	58	55.5	Clear	3,503
23	104	65	57	55	Clear	3,571
24	92	58	56.5	54.5	Clear	3,601
25	88	56	56.5	55	Clear	3,523
26	92	55	56.5	55	Clear	3,527
27	90	56	58	56.5	Clear	3,538
28	89	56	57	56	Clear	3,483
29	90	56	59	56	Clear	3,515
30	92	60	58	56	Clear	3,517

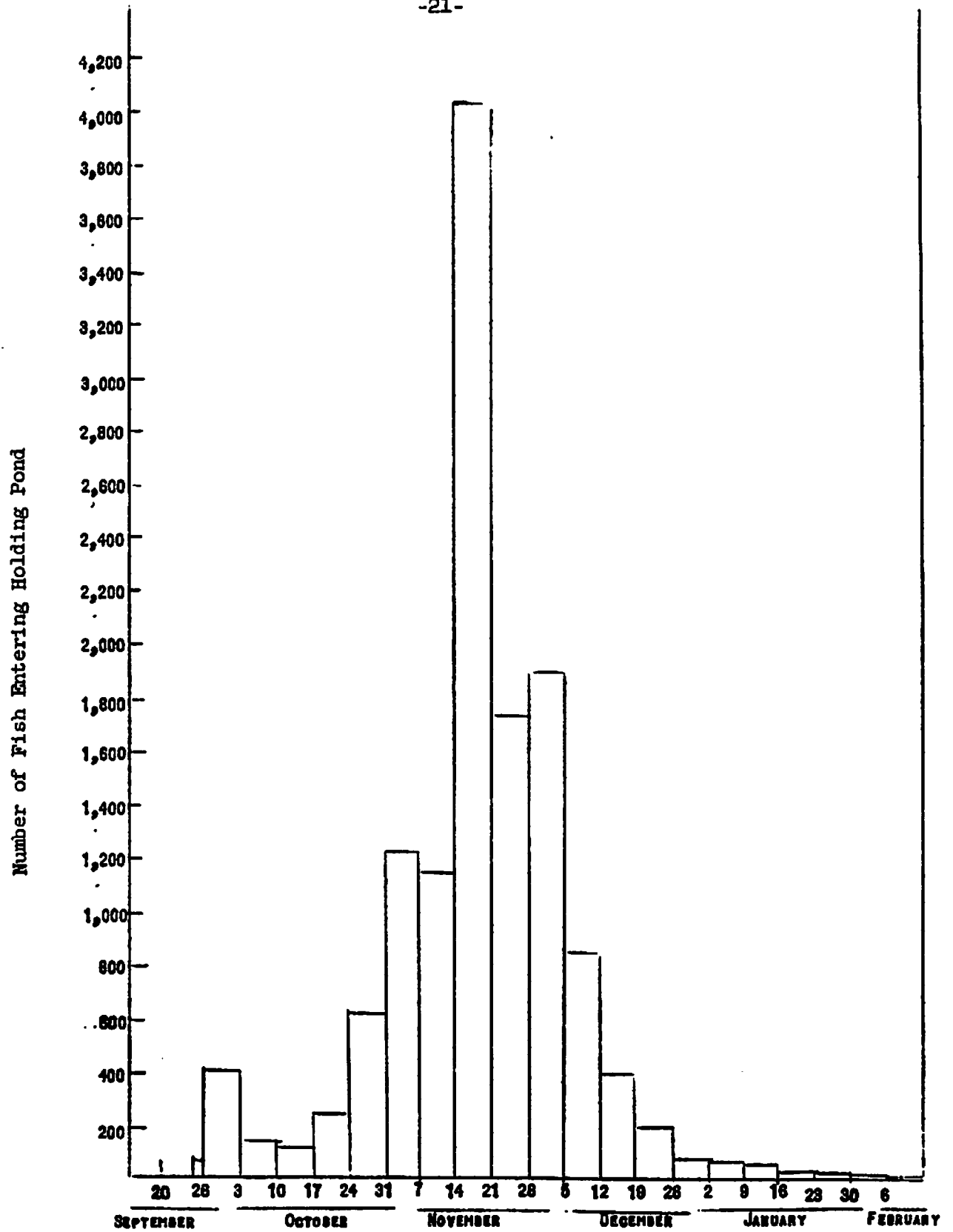


FIGURE A-1. Nimbus Salmon and Steelhead Hatchery fall-run king salmon, 1959-60