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ANNUAL REPORT NIMBUS SALMON AND STEELHEAD HATCHERY 1974-75 FISCAL YEAR[1/]

by

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ABSTRACT

This report describes the operation of Nimbus Salmon and Steelhead Hatchery from July 1, 1974 through June 30, 1975. Tables present numbers of adult fish trapped, eggs taken, fish reared and released, and daily river flow, weather conditions, and water and air temperatures.

There were 8,200 king salmon (Oncorhynchus tshawytscha) trapped, which produced 12,566,855 eggs. The 2,164 winter-run steelhead (Salmo gairdnerii gairdnerii) produced 2,372,405 eggs and 131 summer-run fish provided 383,675 eggs.

During the year we planted an estimated 1,870,340 fingerling and 184,075 yearling king salmon, 638,080 fingerling and 327,009 yearling winter-run steelhead, and 81,080 fingerling and 29,923 yearling summer-run steelhead.

1/ Anadromous Fisheries Branch Administrative Report No. 78-9. Submitted October 1976.

INTRODUCTION

This is the 20th 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 Department of Interior, Bureau of Reclamation. This report summarizes the activities of the hatchery during the fiscal year 1974-75 with particular reference to numbers of adult fish trapped and spawned, and eggs and fish produced.

PRODUCTION SUMMARY

During 1974-75 we took an estimated 15,322,935 eggs and planted approximately 3,130,507 salmon and steelhead (Table 1).

Table 1. Nimbus Hatchery Production Summary
1974-75

Species	Number trapped	Eggs taken	Fingerlings planted	Yearlings planted	Total Kg planted	On hand 6/30/75
King salmon						
1973 BY	-0-	-0-	-0-	184,075	7,570	-0-
1974 BY	8,200	12,566,855[a/]	1,870,340		6,419	600,655
Winter-run steelhead						
1974 BY	-0-	-0-	22,950	327,009	27,880	-0-
1975 BY	2,164	2,372,405[b/]	615,130	-0-	558	662,860
Summer-run steelhead						
1974 BY	-0-	-0-	-0-	29,923	2,830	-0-
1975 BY	131	383,675	81,080	-0-	82	127,460

a/ Includes 101,640 eyed eggs shipped to the Mokelumne River Fish Installation and 3,418,765 shipped to the Coleman National Fish Hatchery.

b/ Includes 50,310 eyed eggs shipped to the Mokelumne River Fish Installation and 423,650 spawned by personnel from the Coleman National Fish Hatchery and transported green to that installation.

HATCHERY OPERATIONS

The Weir

The fish weir was installed by Bureau of Reclamation personnel on August 29, 1974. During a short period of reduced river flow on September 4 the hatchery crew cleaned the steel channel and installed pickets. Only about a ton of cobbles was required to close potential escapement routes under the main picket channel. The weir was removed on January 6, 1975 because the salmon migration had concluded, sufficient steelhead were on hand, and the river flow was to be increased.

Water Temperature Control

The number 9 shutters were raised on August 5 and the number 8 shutters on September 3. In each case the effect was not so much a lowering but rather a stabilizing effect of existing temperatures. Between September 28 and October 1 the number 7 shutters were raised. A reduction in water temperature was noticed on October 2. Thereafter, temperatures remained stable, and acceptable for good fish culture (Appendix Table 1).

On January 3, 1975 the number 7, 8 and 9 shutters were lowered.

Disposal of Salmon Carcasses

Organizations including representatives of Indian groups, community action or neighborhood councils, and various charities received 13,789 kg (30,400 pounds) of edible carcasses; State or County institutions received 4,581 kg (10,100 pounds); local zoos were supplied with 1,315 kg (2,900 pounds) for animal food; a local rendering plant obtained 21,273 kg (46,900 pounds) of inedible carcasses; and 272 kg (600 pounds) of inedible fish were given away for use as garden fertilizer.

Public Relations

An estimated 141,635 persons visited the hatchery during the period of the report. However, by periodically checking visitor estimates with actual counts it appears the estimates are too conservative. A car counter will be obtained in the near future to more realistically monitor visitation.

The only tours given were for a few specialized college or high school classes and the Department orientation classes.

During the summer of 1974 a Youth Conservation Corps group sponsored by the Bureau of Reclamation constructed a descriptive sign to aid visitors in learning more of the relationship between the hatchery and the Central Valley Project.

Fish Counts

Fish are counted as they are disposed of (spawned, released unspawned, or carcass removed), not as they enter the hatchery. Therefore, the counts presented in Appendix Table 1 do not necessarily reflect the history of the spawning runs. This is particularly true for steelhead, which may accumulate for many weeks before spawning begins.

KING SALMON MAINTENANCE PROGRAM

History of the 1974 Run

King Salmon Counts

A few adult salmon were seen in the fish ladder as early as the second week in August but no more appeared until shortly before the west holding pond was activited on October 15. On October 23 sufficient salmon were trapped in the

pond to warrant sorting and spawning. By the end of the season on January 10, 1975, 9,102 king salmon had migrated to the hatchery. Of this number 8,200 were trapped in the holding pond and 902 were removed from the weir. Composition of migrants in the holding pond was 2,783 large males, 4,746 large females and 671 grilse[2/]. Included with the grilse were 26 small females. Carcasses removed from the weir included 105 large males, 61 unspawned females, 100 spent females, and 636 grilse including 37 small females. It is estimated that about 80% of the carcasses which lodged on the weir were recovered. It is not always possible to determine if the females removed from the weir have spawned successfully or not because of the state of advanced deterioration. The designation "spent" as used in this and other annual reports from Nimbus indicates very few or no eggs remained in the fish.

Sorting and Spawning

Of the large females counted during processing 2,250 were spawned, 2,164 died before spawning, 11 were immature, when killed, 19 were overripe or were killed accidentally in the sorting mechanism and 302 were returned to the river unspawned.

During the season 12,566,855 eggs were taken for an average of 5,585 per female. Fertility averaged 84,2% and ranged from 63.8 to 90.9%.

Because of limited rearing facilities 101,640 eyed eggs were shipped to the Mokelumne River Fish Installation and 3,418,765 were sent to the Coleman National Fish Hatchery.

Marked King Salmon Recoveries

As fish were sorted and killed for spawning they were examined for marks. Fork lengths and sex were recorded for each marked fish (Appendix Tables 2 and 3). Heads were removed from fish marked "Ad" and "An-LP" for possible recovery of coded wire tags.

Unusual Salmon

During the season five silver salmon (O. kisutch) and one chum salmon (O. keta) were identified in the holding pond.

King Salmon Planting

1973 Brood Year

We released 184,075 yearling king salmon from September 20 to September 24, 1974, in the Sacramento River at Garcia Bend (Table 2).

1974 Brood Year

Fish were released from January 3 to June 17, 1975 (Table 2). Size ranged from 0.4-5.0 g (1,200 to 90/lb). The earliest releases, which were the smallest fish, were used for test purposes at the Delta Fish Facility. No fish were marked. At the end of the fiscal year an estimated 600,655 fish remained on hand for later smolt or fall yearling releases.

2/ Fish <60 cm (23.6 in) are considered grilse.

Table 2. Planting Summary, 1973-74 Broodyear King Salmon, Nimbus Hatchery

Brood year	Month	Release site	Number of yearlings	Number of smolts	Number of fingerlings	Average size	Kg
1973	9/74	Sacramento River-Garcia Bend	184,074			37.1-44.4 g	7,570
1974	1/75	Sacramento River-Rio Vista			6,890	.37-.40 g	3
	2/75	Sacramento River-Rio Vista			5,450	.39-.45 g	2
	3/75	American River-Nimbus Ladder			153,340	.6 g	93
	4/75	Sacramento River-Rio Vista		45,000		5 g	227
	4/75	Sacramento River-Clarksburg		57,750		4.3 g	249
	5/75	American River-Nimbus Ladder			66,875	.8 g	57
	5/75	Sacramento River-Rio Vista		796,750		3.5-4.7 g	3,130
	6/75	American River-Nimbus Ladder			128,260	1.4 g	186
	6/75	Sacramento River-Rio Vista		610,025		3.3-4.9 g	2,472
TOTALS			184,075	1,509,525	360,815		13,989 (30,841 lb)

KING SALMON DISEASE INFORMATION

The virus, infectious hematopoietic necrosis (IHN) caused losses of about 4,250,000, or 61%, out of a potential 1974 broodyear (BY) fingerling crop of 7,000,000. This is an improvement from the 1973 BY when approximately 90% were lost to the virus.

The principal disease problem, other than virus, was bacterial gill disease which persisted in the 1973 BY fish throughout the season and kept losses above normal from mid-August until the fish were released in September. Measures taken to control the problem included copper sulfate flushes and adding terramycin to the feed.

Experimental Inoculation for IHN Control

Dr. William Wingfield, staff virologist experimented with several lots of king salmon in an attempt to immunize them with an attenuated strain of IHN virus.

The physical process of immunization was rather simple. Several tray stacks of recently hatched alevins were immersed in a trough which contained water to which a quantity of attenuated virus material had been added. The water and material was recirculated and aerated for periods of up to two hours, after which the stacks of alevins were returned to the hatchery troughs from which they had been taken.

After fry developed sufficiently to commence feeding they were liberated from the stacks into hatchery troughs for an initial rearing period. Here they were monitored to observe loss patterns and any behavioral differences which, when comparing them to control groups, could be attributed to the immunizing process.

The only observable difference between immunized and control groups was that in the former, virus symptoms appeared earlier and initial loss was higher. Overall, results were inconclusive and further experimentation is planned for next year.

WINTER-RUN STEELHEAD MAINTENANCE PROGRAM

Sorting and Spawning

Since 1970 we have been attempting to establish an "early" steelhead run in the American River by selectively spawning adults entering the hatchery in the fall. Fish arriving prior to November 30 were designated "early migrants". Those arriving after November 30 were classified "late migrants". Early and late migrant progeny were reared separately.

Steelhead commenced arriving in the holding pond with the first appearance of salmon and were moved to the east holding pond as salmon were sorted for spawning. Permanent count records were maintained from the first spawning on December 12, 1974, until the close of the season on March 12, 1975 (Table 3 and Appendix Table 1). All steelhead were examined for marks as they were spawned or released. Fork lengths and sex of marked fish were also recorded.

The 341 females spawned (72 early and 269 late) produced 2,372,405 eggs for an average of 6,957 per fish. Survival from green to eyed eggs ranged from 66.3 to 99% and averaged 92.7%. The total eggs taken includes 423,650 spawned by a crew from the Coleman National Fish Hatchery and transported green to that installation.

Spawned and surplus fish were transported downriver to the Howe Avenue area. Steelhead considered surplus were those $<$58.4 cm (23 inches) FL, and fish on hand after egg requirements were met. Adults returned to the river were marked by the removal of the upper lobe of the caudal fin. Those subsequently returning to the hatchery were not included in the counts.

Marked Steelhead Recoveries

We recovered 378 adult steelhead bearing 11 marks (Appendix Tables 4 and 5).

Table 3. Counts of Winter-run Steelhead, Nimbus Hatchery, 1974-75

Date	Spawned & released M	Spawned & released F	Died in pond M	Died in pond F	Released unspawned M	Released unspawned F	Total
1974							
10/23-12/11	0	0	44	39	0	0	83
12/12	4	10	0	0	0	0	14
12/19	9	13	9	17	0	0	48
12/26	5	12	11	5	102	9	144
12/27	4	5	19	38	0	0	66
1975							
1/3	8	13	6	3	0	0	30
1/6	21	39	27	22	0	0	109
1/10	6	12	4	2	0	0	24
1/13	42	66	4	3	34	1	150
1/17	5	12	3	5	0	0	25
1/20	41	63	5	8	31	3	151
1/24	0	0	5	11	20	11	47
1/27	0	0	11	6	196	190	403
2/3	18	31	5	2	28	7	91
2/10	0	0	9	10	53	117	189
2/18	18	43	2	9	40	37	149
2/24	0	0	0	0	72	57	129
3/3	0	0	17	7	61	51	136
3/12	10	22	15	8	90	31	176
TOTALS	191	341	196	195	727	514	2,164

Winter-run Steelhead Planted

1974 Brood Year

We planted 349,959 winter-run 1974 broodyear steelhead, including 327,009 yearlings (Table 4).

Table 4. Planting Summary, 1974 Broodyear Winter-run Steelhead, Nimbus Hatchery

Date	Release site	Fingerlings planted	Yearlings planted	Mark	Size range	Kg
1974						
October	American River-Nr. Sunrise Bridge	22,950	-0-	--	10 g	232
1975						
January	Sacramento River-Garcia Bend	-0-	39,320	___	63-63.9 g	2,497
January	Sacramento River-Garcia Bend	-0-	45,070	RV	63 g	2,882
February	Sacramento River-Garcia Bend	-0-	121,194	--	81-105.4 g	12,617
March	Sacramento River-Miller Park	-0-	6,095	--	85.5 g	522
March	Sacramento River-Garcia Bend	-0-	23,320	--	85.5 g	1,998
March	Sacramento River-Garcia Bend	-0-	45,370	LV	69.7 g	3,169
March	Sacramento River-Garcia Bend	-0-	38,390	LV-RV	81-90.7 g	3,214
March	Sacramento River-Clarksburg	-0-	8,250	LV-RV	90.7 g	749
TOTALS		22,950	327,009			27,880 (61,465 lb)

Fish Marking

This is the second year of a three-year program to test the effects of diet and times of release on returns. The three marks used are RV for fish released in early January, LV for fish reared on dry food and released in late February or early March, and LV-RV which identifies fish reared on OMP. The latter fish are released at the same general time as fish marked LV.

1975 Brood Year

We planted 615,130 fingerlings which were surplus to the needs of the hatchery program (Table 5). Approximately 662,860 fingerlings were on inventory on June 30, 1975 for holdover to yearlings.

Table 5. Planting Summary, 1975 Broodyear Winter-run Steelhead, Nimbus Hatchery

Date	Release site	Number	Size range	Kg
May 1975	American River-at Hatchery	342,960	.63-.99 g	285
June 1975	American River-at Hatchery	272,170	.36-1.8 g	273
TOTALS		615,130		558 (1,230 lb)

SUMMER-RUN STEELHEAD PROGRAM

No steelhead of the summer-run strain, as identified by an LP mark, were observed in the fish ladder during the summer of 1974. The first such fish to appear arrived with the winter-run steelhead and king salmon in late October. As they were encountered on the sorting table while processing salmon, they were moved to facilities separate from early and late winter-run steelhead in the east holding pond. They were counted for the record after spawning or if they died in the pond (Table 6). Sex and fork length were also recorded (Appendix Table 4).

Table 6. Counts of Summer-run Steelhead, Nimbus Hatchery, 1974-75

	Spawned & released		Died in Pond		Released unspawned		
Date	M	F	M	F	M	F	Total
1974							
12/19	0	1	0	1	0	0	2
12/26	2	1	1	1	0	0	5
1975							
1/3	1	1	0	0	0	0	2
1/10	2	4	1	0	0	0	7
1/17	3	5	0	1	0	0	9
1/24	3	2	1	1	0	0	7
2/3	6	11	1	2	0	0	20
2/10	3	3	1	0	7	2	16
2/18	6	7	0	0	0	0	13
2/24	9	15	0	0	0	0	24
3/3	4	8	1	0	0	0	13
3/12	0	0	0	0	10	3	13
TOTALS	39	58	6	6	17	5	131

Spent and surplus fish were hauled downriver to the Howe Avenue area. As with winter-run fish the upper lobe of the caudal fin was clipped to prevent recounting should the fish return to the hatchery.

The 58 females spawned produced 383,675 eggs for an average of 6,615 per fish. Survival of eggs from green to eyed ranged from 79.6 to 98.7% and averaged 94.8%.

Summer-run Steelhead Planted

We planted an estimated 29,923 1974 BY and 81,080 1975 BY summer-run steelhead (Table 7).

Table 7. Summer-run Steelhead Planting Summary, Nimbus Hatchery, 1974-75

Brood year	Date	Release site	Mark	Size	Number	Kg
1974	March 1975	Sacramento River-Garcia Bend	LP	94 g	29,923	2,830
1975	June 1975	American River-Near Hatchery	None	.47-1.5 g	81,080	82
TOTALS					111,003	2,912 (6,420 lb)

STEELHEAD DISEASE INFORMATION

Both summer-run and winter-run steelhead fingerlings of the 1975 BY were affected by the IHN virus which was first observed in mid-March, but losses were not as severe as with 1974 BY fish last year. Mortalities from this source were confined to only a few lots of fish, primarily those taken during the first half of the spawning season. It is estimated that IHN was responsible for the loss of 30,000 summer-run and 80,000 winter-run fingerlings. This is approximately 18% of the total loss prior to the time fish were ponded in mid-June.

Bacterial gill disease and columnaris type bacteria caused the usual bacterial losses in the hatchery building prior to ponding fish.

No disease problems of consequence were noted among yearlings of the 1974 brood year nor among fingerlings of the 1975 brood year after they were ponded.

Appendix Table 1

Nimbus Salmon and Steelhead Hatchery Weather, Water, and Fish Trapping Data July 1, 1974 through June 30, 1975

July	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	36.7	15.6	16.7	15.0	clear	84.699		
2	36.7	14.4	17.2	15.6	clear	84.699		
3	36.1	17.2	16.7	15.6	clear	84.926		
4	37.8	20.0	17.8	16.7	clear	85.124		
5	37.8	16.7	17.2	16.1	clear	84.841		
6	30.0	15.6	17.2	16.1	clear	84.926		
7	28.9	13.3	16.7	16.1	rain	84.756		
8	21.1	12.2	16.1	15.6	rain	84.756		
9	26.7	16.1	16.1	15.0	cloudy	85.152		
10	26.7	12.2	16.1	15.0	partly cloudy	85.407		
11	32.2	11.1	17.2	15.6	clear	85.322		
12	33.3	12.2	17.8	16.1	clear	85.237		
13	36.7	14.4	17.8	16.1	clear	85.322		
14	38.3	15.6	17.2	16.1	clear	85.096		
15	34.4	15.6	17.2	16.1	clear	85.294		
16	33.3	13.3	17.2	16.1	clear	85.096		
17	34.4	15.6	18.3	16.1	clear	85.266		
18	37.8	17.8	18.3	16.1	clear	85.152		
19	40.0	17.8	17.8	16.7	clear	85.294		
20	38.9	17.8	17.8	16.7	clear	85.180		
21	38.9	17.8	17.8	16.7	clear	84.898		
22	40.0	17.8	18.3	16.7	clear	58.477		
23	42.2	16.7	18.9	16.7	clear	56.947		
24	42.2	20.0	18.3	16.7	clear	56.975		
25	42.8	22.2	17.8	17.2	clear	57.117		
26	38.9	21.1	18.3	17.8	clear	58.307		
27	37.8	17.8	18.9	17.8	clear	84.246		
28	37.2	16.7	18.3	17.2	clear	85.124		
29	39.4	15.6	18.3	17.2	clear	85.464		
30	39.4	16.7	18.3	17.2	clear	85.888		
31	36.7	16.7	18.3	17.2	clear	85.549		

* Temperature measured to nearest whole degree F, and later converted to C.
** Flows measured in cfs, and later converted to m^3/sec.

Appendix Table 1 (continued)

August	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	41.1	17.2	18.3	17.2	clear	85.634		
2	42.2	16.7	18.9	17.2	clear	86.172		
3	40.0	20.0	18.9	17.8	clear	86.285		
4	40.0	19.4	18.9	17.8	partly cloudy	85.945		
5	38.9	21.1	20.0	17.8	partly cloudy	86.115		
6	40.0	20.0	18.3	17.8	clear	86.058		
7	36.7	20.0	18.3	17.2	clear	84.982		
8	37.8	15.6	18.3	17.2	clear	85.067		
9	38.9	15.6	18.3	17.2	clear	85.124		
10	34.4	16.1	18.3	16.7	clear	84.996		
11	35.0	14.4	18.3	16.7	clear	85.001		
12	30.0	13.9	17.8	17.2	clear	84.841		
13	32.2	13.3	18.3	17.2	clear	84.189		
14	36.7	12.2	18.9	17.2	clear	84.161		
15	33.3	14.4	18.3	17.2	clear	84.444		
16	33.9	12.2	18.3	17.2	clear	84.472		
17	35.6	13.9	18.9	17.8	clear	84.642		
18	33.3	14.4	18.3	17.2	clear	84.953		
19	31.7	12.2	18.9	17.2	clear	84.811		
20	34.4	13.3	18.9	17.8	clear	84.585		
21	37.8	14.4	18.9	17.8	clear	84.841		
22	38.9	16.7	18.9	17.8	clear	84.528		
23	39.4	17.8	18.9	17.8	clear	84.556		
24	39.4	16.7	18.9	17.8	clear	84.499		
25	36.7	17.8	18.9	17.8	clear	84.613		
26	37.8	16.7	18.9	17.8	clear	84.839		
27	36.7	15.6	18.9	17.8	clear	84.953		
28	33.3	13.3	18.9	17.8	clear	84.613		
29	34.4	13.3	18.9	17.8	clear	84.444		
30	33.9	13.3	18.9	17.8	partly cloudy	84.699		
31	33.3	14.4	18.9	17.8	clear	84.811		

* Temperature measured to nearest whole degree F, and later converted to C.
** Flows measured in cfs, and later converted to m^3/sec.

Appendix Table 1 (continued)

September	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	35.6	15.6	18.3	17.8	clear	85.124		
2	37.2	15.6	18.9	17.8	clear	84.756		
3	35.6	13.3	18.9	17.8	clear	57.995		
4	36.7	15.6	18.9	17.8	clear	49.868		
5	37.8	15.6	18.9	17.8	clear	87.216		
6	38.9	16.7	18.3	17.2	partly cloudy	100.189		
7	38.9	18.9	18.3	17.2	clear	99.651		
8	36.1	16.2	18.3	17.2	clear	99.226		
9	36.1	17.8	18.3	14.4	clear	99.453		
10	37.8	16.7	18.3	17.8	clear	99.764		
11	31.1	15.6	18.9	17.8	clear	99.623		
12	28.9	13.3	18.3	17.8	clear	99.198		
13	32.8	13.3	18.9	17.8	clear	99.198		
14	32.2	13.9	18.9	17.8	clear	98.943		
15	33.3	13.3	18.9	17.8	clear	98.943		
16	33.9	13.3	18.9	17.8	clear	95.547		
17	35.6	13.3	18.9	17.8	clear	90.056		
18	35.6	13.3	18.9	18.3	clear	98.577		
19	32.2	13.3	18.9	18.1	clear	98.549		
20	34.4	13.3	19.4	18.3	clear	99.991		
21	34.4	13.9	18.9	17.8	clear	100.501		
22	33.9	13.3	18.9	17.8	clear	99.368		
23	34.4	12.2	18.9	17.8	clear	99.906		
24	34.4	13.3	18.3	17.8	clear	99.198		
25	26.7	12.2	17.8	17.2	clear	111.460		
26	29.4	12.2	17.8	16.7	clear	113.385		
27	30.0	11.1	17.8	17.2	clear	112.621		
28	30.0	12.8	17.2	16.1	clear	114.206		
29	30.0	12.2	16.7	16.1	clear	113.782		
30	32.2	10.0	17.2	16.1	partly cloudy	113.442		

* Temperature measured to nearest whole degree F, and later converted to C.
** Flows measured in cfs, and later converted to m^3/sec.

Appendix Table 1 (continued)

October	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	34.4	11.1	17.2	16.1	clear	112.677		
2	32.2	13.3	16.1	16.1	clear	113.329		
3	26.7	13.3	15.6	15.0	clear	113.300		
4	27.8	14.4	16.1	15.0	partly cloudy	113.272		
5	29.4	10.0	16.1	15.0	clear	112.820		
6	30.0	9.4	16.1	14.4	clear	113.328		
7	30.0	12.2	16.1	15.0	partly cloudy	113.697		
8	28.9	14.4	16.7	15.6	partly cloudy	113.839		
9	25.6	12.2	16.1	15.6	clear	114.320		
10	22.8	11.1	16.7	15.6	clear	113.017		
11	31.1	11.1	17.2	16.1	clear	113.499		
12	31.7	12.2	16.7	15.6	clear	112.763		
13	29.4	10.0	17.2	15.6	clear	112.735		
14	29.4	10.0	17.2	16.1	clear	84.727		
15	27.8	10.0	17.2	16.1	clear	68.954		
16	33.3	10.0	17.2	16.1	partly cloudy	67.907		
17	33.9	13.3	16.7	15.6	partly cloudy	68.218		
18	32.8	10.0	16.7	15.6	clear	68.784		
19	30.0	12.2	16.7	15.6	partly cloudy	68.756		
20	26.7	10.0	16.7	15.0	clear	68.784		
21	26.7	10.0	16.7	15.6	clear	67.680		
22	25.6	6.7	16.1	15.6	clear	67.680		
23	22.2	6.7	16.1	15.6	clear	67.879	207	
24	23.3	7.8	16.1	15.6	partly cloudy	68.841		
25	26.1	10.0	16.1	15.6	partly cloudy	68.360		
26	23.9	12.2	16.7	15.6	clear	68.359		
27	22.8	11.1	16.1	15.6	partly cloudy	63.218		
28	17.8	12.2	15.6	15.6	cloudy; rain	69.039	323	
29	18.9	6.7	15.6	15.0	partly cloudy	68.332		
30	20.0	7.8	15.6	15.0	cloudy	68.614		
31	17.8	10.0	15.6	15.0	cloudy; rain	68.190		
TOTALS							530	

* Temperature measured to nearest whole degree F, and later converted to C.

** Flows measured in cfs, and later converted to m^3/sec.

Appendix Table 1 (continued)

November	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	17.8	6.7	15.6	15.0	partly cloudy	68.473	341	
2	18.3	4.4	15.6	14.4	clear	67.992		
3	18.3	4.4	15.6	14.4	clear	68.048		
4	17.8	5.6	15.6	14.4	partly cloudy	67.963		
5	18.9	5.6	15.6	15.0	clear	68.020		
6	21.7	5.6	16.7	16.1	partly cloudy	67.822	433	
7	15.6	7.8	16.1	15.6	cloudy; rain	68.076		
8	16.7	6.7	16.1	15.6	cloudy	68.388		
9	16.7	4.4	15.6	15.0	partly cloudy	68.133		
10	19.4	5.0	15.6	15.0	clear	68.331		
11	21.1	6.7	15.6	15.0	clear	68.869		
12	21.1	15.6	15.6	15.6	partly cloudy	68.898	814	
13	23.3	8.9	15.6	15.6	partly cloudy	69.039		
14	22.2	11.1	15.6	15.3	partly cloudy	68.501		
15	17.8	7.8	15.6	15.6	clear	68.048	809	
16	17.2	7.2	15.0	15.0	cloudy	67.907		
17	18.3	10.6	15.0	14.4	partly cloudy	67.255		
18	18.3	8.9	15.0	14.4	partly cloudy	67.595		
19	16.7	4.4	15.0	14.4	partly cloudy	68.331		
20	18.3	5.6	15.0	14.4	partly cloudy	84.444	825	
21	16.1	10.0	15.0	14.4	rain	85.209		
22	14.4	4.4	15.0	14.4	clear	85.124	375	
23	15.6	1.1	14.4	13.9	clear	85.237		
24	16.7	3.3	14.4	13.9	clear	85.067		
25	16.7	4.4	15.0	13.9	clear	85.181	501	
26	15.6	3.3	14.4	13.9	clear	85.096		
27	14.4	3.3	13.9	13.9	clear	85.067	484	
28	15.0	3.3	13.9	13.3	clear	85.067		
29	15.6	3.3	13.9	13.3	clear	85.265	290	
30	15.6	2.2	13.3	13.3	clear	87.219		
TOTALS							4,972	

* Temperature measured to nearest whole degree F, and later converted to C.

** Flows measured in cfs, and later converted to m^3/sec.

Appendix Table 1 (continued)

December	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	14.4	2.2	13.3	12.8	clear	85.690		
2	13.3	6.7	13.3	12.8	rain	85.520	484	
3	15.6	8.9	13.3	12.8	rain	85.605		
4	16.7	8.9	13.3	13.3	clear	85.265	331	
5	16.1	3.3	13.3	12.8	partly cloudy	85.690		
6	15.0	3.9	13.3	12.8	clear	85.464	375	
7	15.0	3.3	12.8	12.8	clear	85.804		
8	15.0	3.9	12.8	12.2	cloudy	85.662		
9	10.0	3.3	12.2	12.2	clear	86.200	551	
10	8.9	4.4	12.2	12.2	fog	85.690		
11	12.2	5.6	12.2	12.2	cloudy; fog	85.379		83***
12	11.7	6.7	12.2	11.7	cloudy; rain	85.577		14
13	12.2	7.8	12.8	12.2	partly cloudy	85.520	280	
14	15.6	5.6	12.2	12.2	partly cloudy	85.435		
15	13.9	7.2	11.7	11.7	cloudy	85.407		
16	13.9	3.9	12.2	11.7	clear	84.558		
17	15.6	7.2	12.2	11.7	clear	70.540		
18	16.1	3.3	12.2	11.7	partly cloudy	57.089	297	50
19	12.8	3.3	11.7	11.7	partly cloudy	56.268		
20	11.1	3.9	11.7	11.7	fog	55.730		
21	12.8	6.7	11.7	11.1	fog	56.013		
22	11.7	1.7	11.7	11.1	clear	56.608		
23	12.2	0.0	10.6	10.6	clear	56.183		
24	10.6	- 3.3	10.6	10.0	partly cloudy	56.268		
25	10.6	- 0.6	11.1	10.0	clear	56.268		
26	13.3	- 1.7	10.6	10.0	partly cloudy	56.325	222	149
27	13.3	0.6	10.6	10.6	cloudy; rain	56.381		66
28	12.2	7.2	10.6	10.0	rain	56.183		
29	11.1	2.2	10.0	09.4	clear	56.155		
30	11.1	1.7	10.0	09.4	clear	57.401		
31	13.9	3.3	10.0	09.4	clear	57.457		
TOTALS							2,540	362

* Temperature measured to nearest whole degree F, and later converted to C.
** Flows measured in cfs, and later converted to m^3/sec.
*** Eighty-three steelhead died in the holding pond prior to December 12.

Appendix Table 1 (continued)

January	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	10.0	- 1.1	9.4	9.4	clear	57.514		
2	10.0	- 2.2	8.9	8.9	clear	57.599		
3	12.8	- 2.2	9.4	8.9	clear	57.627		32
4	11.1	5.6	9.4	9.4	partly cloudy	57.825		
5	10.6	2.2	9.2	8.9	cloudy	57.910		
6	10.0	7.2	8.9	8.9	rain	57.995	175	109
7	14.4	10.0	9.4	8.9	cloudy; rain	59.864		
8	15.6	11.1	9.4	8.9	partly cloudy	55.362		
9	12.2	2.8	9.4	8.9	clear	56.636		
10	10.0	5.8	9.4	8.9	cloudy	56.834	57	31
11	14.4	2.2	9.4	8.9	clear	56.721		
12	13.3	2.2	9.4	8.9	clear	45.956		
13	15.0	0.0	9.4	8.9	clear	55.447		150
14	13.3	1.1	9.4	8.9	clear; fog	56.296		
15	14.4	0.0	8.9	8.9	cloudy; fog	56.070		
16	12.2	3.3	9.4	9.4	clear; fog	55.588		
17	9.4	3.3	8.9	8.9	fog	55.220		34
18	11.1	3.3	8.9	8.9	partly cloudy; fog	55.135		
19	10.6	4.4	8.3	8.3	fog	55.617		
20	10.0	4.4	8.3	8.3	clear; fog	55.928	19	151
21	11.1	4.4	8.9	8.3	cloudy; fog	56.636		
22	11.1	1.7	8.9	8.3	clear; fog	56.608		
23	12.2	3.3	8.9	8.3	clear; fog	56.381		
24	15.0	1.1	8.9	8.3	clear; fog	56.608		54
25	17.8	3.3	9.4	8.9	clear	55.702		
26	17.2	10.0	9.4	8.3	clear	55.758		
27	12.8	0.0	8.9	8.9	clear	55.588	7	403
28	11.1	- 3.9	8.3	8.3	partly cloudy	56.240		
29	10.0	1.7	8.3	7.8	clear	56.013		
30	10.0	- 3.9	8.3	7.8	clear	56.664		
31	12.8	---	8.3	7.8	cloudy; rain	56.466		
TOTALS							258	964

* Temperature measured to nearest whole degree F, and later converted to C.

** Flows measured in cfs, and later converted to m^3/sec.

Appendix Table 1 (continued)

February	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	12.8	4.4	7.8	7.8	cloudy; rain	56.409		
2	12.8	7.8	7.8	7.8	partly cloudy; rain	56.863		
3	14.4	5.6	7.8	7.8	cloudy; rain	56.863		111
4	13.3	6.7	8.3	8.3	partly cloudy	58.052		
5	15.0	5.6	8.3	7.8	cloudy; rain	86.002		
6	15.6	7.2	8.3	7.8	cloudy; rain	139.693		
7	14.4	6.7	8.3	7.8	cloudy; rain	141.335		
8	20.0	11.1	8.3	8.3	partly cloudy; rain	141.477		
9	17.8	0.0	8.3	8.3	cloudy; rain	141.420		
10	17.2	6.7	8.3	8.3	cloudy; rain	141.986		205
11	17.8	5.6	8.3	7.8	partly cloudy	142.751		
12	11.1	7.8	8.3	7.8	rain	191.545		
13	16.7	10.0	8.3	7.8	cloudy; rain	223.656		
14	13.3	5.6	8.9	8.3	partly cloudy	218.898		
15	15.0	1.1	8.9	8.3	clear	213.263		
16	15.0	2.8	8.3	8.3	clear	212.753		
17	14.4	1.7	8.3	7.8	partly cloudy	212.583		
18	16.7	1.1	8.3	7.8	partly cloudy	210.714		162
19	13.3	8.3	8.3	8.3	rain	211.875		
20	14.4	4.4	8.3	7.8	partly cloudy	149.491		
21	13.9	1.1	9.4	7.8	clear	141.420		
22	14.4	5.6	8.3	7.8	clear	141.250		
23	16.7	1.7	8.9	7.8	clear	141.080		
24	20.0	2.2	8.9	8.3	clear	140.202		153
25	21.1	5.6	8.9	8.3	clear	141.279		
26	21.1	4.4	8.3	7.8	partly cloudy	141.420		
27	21.1	4.4	8.9	7.8	partly cloudy	140.939		
28	24.4	7.8	8.9	8.3	partly cloudy	141.279		
TOTALS								631

* Temperature measured to nearest whole degree F, and later converted to C.

** Flows measured in cfs, and later converted to m^3/sec.

Appendix Table 1 (continued)

March	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	23.3	11.1	8.9	8.9	partly cloudy	141.618		
2	21.1	7.2	8.9	8.3	clear	140.854		
3	21.1	3.9	8.9	8.3	clear	140.174		149
4	23.9	6.7	9.4	8.9	partly cloudy	112.961		
5	18.9	10.6	9.4	9.4	rain	112.592		
6	18.3	10.0	8.9	8.9	rain	111.403		
7	17.8	10.0	9.4	8.9	rain	112.451		
8	18.9	10.0	8.9	8.3	cloudy	112.422		
9	17.8	6.7	9.4	8.3	partly cloudy	111.941		
10	16.7	7.2	9.4	8.3	cloudy	113.272		
11	18.3	7.2	10.0	8.3	partly cloudy	114.008		
12	20.0	5.0	9.4	8.9	clear	112.734		189
13	11.1	4.4	8.9	8.3	rain; snow	112.876		
14	15.6	3.9	8.9	8.3	partly cloudy	112.649		
15	14.4	6.7	8.9	8.3	cloudy; rain	112.819		
16	15.6	4.4	8.9	8.3	partly cloudy	114.093		
17	16.7	4.4	8.9	8.3	cloudy	114.122		
18	17.2	10.0	8.9	8.3	cloudy	140.174		
19	21.1	10.0	9.4	8.9	partly cloudy	140.174		
20	13.3	2.2	10.0	8.3	partly cloudy	140.117		
21	8.9	4.4	8.9	8.9	rain	139.155		
22	19.4	5.6	9.4	8.9	partly cloudy	140.202		
23	19.4	5.6	9.4	8.9	partly cloudy	141.279		
24	15.6	8.9	8.9	8.9	cloudy; rain	141.986		
25	17.8	7.2	10.0	8.9	clear	195.677		
26	15.6	2.2	8.9	8.9	clear	224.788		
27	15.6	1.1	9.4	8.9	clear	225.496		
28	15.6	2.8	9.4	8.9	clear	228.215		
29	21.7	2.2	9.4	7.8	clear	228.526		
30	22.8	5.6	9.4	8.9	clear	227.394		
31	23.3	7.8	9.4	8.9	clear	227.450		
TOTALS								338

* Temperature measured to nearest whole degree F, and later converted to C.
** Flows measured in cfs, and later converted to m^3/sec.

Appendix Table 1 (continued)

April	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	17.8	1.1	10.0	8.9	clear	227.677		
2	21.1	2.2	9.4	9.4	partly cloudy	227.620		
3	16.7	7.8	9.4	9.4	cloudy; rain	226.431		
4	15.6	6.1	9.4	8.9	cloudy; rain	212.753		
5	16.7	4.4	9.4	8.9	cloudy; rain	215.670		
6	16.7	4.4	9.4	8.9	cloudy; rain	211.139		
7	15.6	2.2	8.9	8.9	cloudy; rain	210.261		
8	17.8	5.0	9.4	8.9	partly cloudy	210.346		
9	21.1	2.2	9.4	8.9	clear	213.744		
10	20.6	3.8	9.4	9.4	partly cloudy	210.743		
11	25.0	9.4	11.1	9.4	partly cloudy	174.552		
12	25.6	5.6	11.1	9.4	clear	141.845		
13	25.6	8.9	10.0	10.0	clear	141.732		
14	17.4	8.9	10.0	8.9	partly cloudy	141.647		
15	19.4	2.2	8.9	8.3	partly cloudy	142.666		
16	18.9	2.2	10.0	8.9	partly cloudy	143.516		
17	21.1	1.7	10.6	9.4	clear	141.420		
18	20.6	4.4	10.0	10.0	clear	142.015		
19	23.3	8.9	11.1	10.0	partly cloudy	140.797		
20	26.1	10.6	11.1	9.4	clear	141.760		
21	26.7	10.0	10.6	10.0	clear	141.080		
22	18.9	6.1	10.6	10.0	partly cloudy	140.174		
23	23.3	7.2	10.0	9.4	cloudy; rain	140.202		
24	18.9	7.8	10.0	9.4	cloudy; rain	140.316		
25	19.4	3.3	10.0	9.4	partly cloudy; rain	140.457		
26	21.1	2.2	11.1	9.4	partly cloudy	141.307		
27	24.4	5.0	12.2	10.6	clear	139.721		
28	25.6	7.2	12.2	10.6	clear	141.562		
29	26.7	5.0	12.8	10.0	clear	142.440		
30	23.9	7.2	11.7	11.7	partly cloudy	139.211		

* Temperature measured to nearest whole degree F, and later converted to C.
** Flows measured in cfs, and later converted to m^3/sec.

Appendix Table 1 (continued)

May	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	28.3	07.8	12.2	11.1	clear	141.590		
2	24.4	07.8	11.7	11.1	partly cloudy	140.174		
3	21.1	10.0	11.1	10.6	partly cloudy; rain	140.939		
4	17.8	08.9	11.7	11.7	partly cloudy	141.533		
5	23.3	04.4	12.8	10.6	clear	140.202		
6	26.1	06.1	12.2	11.7	clear	141.279		
7	28.9	07.2	12.2	11.7	clear	141.420		
8	28.9	07.8	12.2	11.1	clear	140.316		
9	28.9	10.6	12.2	11.7	partly cloudy	141.392		
10	28.9	08.9	12.2	11.7	clear	142.071		
11	27.2	11.1	13.3	12.2	clear	143.431		
12	33.3	09.4	12.8	11.7	clear	143.516		
13	37.2	13.3	13.3	12.8	clear	140.117		
14	23.3	10.6	12.2	11.7	clear	140.033		
15	26.7	09.4	12.2	11.1	clear	139.863		
16	32.2	09.4	13.3	12.2	clear	140.457		
17	34.4	17.8	12.2	12.2	clear	140.514		
18	36.1	14.4	13.3	12.8	clear	140.004		
19	33.3	12.8	12.2	11.7	partly cloudy	139.211		
20	22.2	10.6	12.8	12.2	partly cloudy	140.486		
21	28.9	09.4	14.4	12.2	partly cloudy	140.882		
22	32.2	11.1	13.3	12.8	partly cloudy	141.590		
23	33.3	11.7	13.3	12.8	clear	142.440		
24	34.4	13.3	13.9	12.8	clear	140.089		
25	33.3	14.4	13.9	13.3	clear	140.202		
26	36.1	13.3	13.3	13.3	clear	138.022		
27	33.9	14.4	14.4	13.3	clear	140.995		
28	35.0	16.7	15.0	13.3	clear	142.241		
29	37.8	20.0	15.0	13.3	clear	141.024		
30	38.9	14.4	14.4	13.3	clear	142.156		
31	38.9	16.7	14.4	13.3	clear	140.202		

* Temperature measured to nearest whole degree F, and later converted to C.
** Flows measured in cfs, and later converted to m^3/sec.

Appendix Table 1 (continued)

June	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	33.3	13.3	13.3	12.8	clear	141.279		
2	29.4	12.2	12.8	12.8	partly cloudy	142.553		
3	34.4	12.8	15.0	12.8	clear	142.666		
4	39.4	17.8	13.9	13.3	clear	142.298		
5	36.7	15.6	13.3	12.8	clear	141.958		
6	32.2	13.3	13.9	13.3	clear	143.034		
7	35.0	16.7	13.9	13.3	clear	143.119		
8	36.1	15.6	15.0	13.3	clear	141.788		
9	37.8	17.2	14.4	13.3	clear	140.882		
10	40.6	16.1	13.9	13.3	clear	140.967		
11	30.6	15.6	13.3	13.3	clear	141.194		
12	37.8	17.8	13.9	13.3	clear	142.156		
13	42.2	17.2	14.4	13.3	clear	141.392		
14	36.1	16.7	14.4	13.3	clear	113.527		
15	33.1	14.4	13.9	13.3	clear	113.782		
16	33.1	12.8	14.4	13.3	clear	113.753		
17	32.2	12.8	14.4	13.9	partly cloudy; rain	114.065		
18	30.0	11.1	14.4	14.4	clear	113.612		
19	25.0	11.1	13.9	13.3	partly cloudy	113.867		
20	32.2	10.0	14.4	13.3	clear	112.876		
21	32.8	11.1	15.0	13.9	clear	98.207		
22	36.1	13.3	15.0	14.4	clear	99.340		
23	26.7	12.2	15.0	13.9	cloudy	98.971		
24	26.7	11.7	13.9	13.9	partly cloudy; rain	99.566		
25	26.7	7.8	11.4	13.9	clear	100.047		
26	32.2	10.0	15.6	14.4	clear	99.481		
27	33.3	11.1	16.1	14.4	clear	99.793		
28	34.4	13.9	16.1	15.0	clear	97.754		
29	34.4	15.0	16.1	15.0	clear	99.424		
30	27.8	12.8	15.6	14.4	clear	97.754		

* Temperature measured to nearest whole degree F, and later converted to C.

** Flows measured in cfs, and later converted to m^3/sec.

Appendix Table 2

Marked King Salmon Recoveries, Nimbus Hatchery, 1974-75

Mark	Brood year	Number recovered	Area released	Average size	Date(s)	Number released	Origin
Ad	1969	14	American River at Nimbus	swim-up	April, 1970	257,900	Nimbus Hatchery
Ad	1970		American River at Nimbus	0.4 g	March, 1971	250,900	Nimbus Hatchery
Ad	1972	1	?	?	?	?	?
Ad-An	?	2	?	?	?	?	?
Ad-An-LV	?	3	?	?	?	?	?
Ad-An-RV	1970	22	Mouth of American River	5 g	May-June, 1971	256,845	Nimbus Hatchery
Ad-LV	1969	4	Battle Creek (Upper Sacto. R.)	5 g	May, 1970	327,000	Coleman Hatchery
Ad-LV	1970		Battle Creek (Upper Sacto. R.)	5 g	May, 1971	341,672	Coleman Hatchery
Ad-RV	1969	47	Sacramento River at Rio Vista	5 g	May, 1970	327,000	Coleman Hatchery
Ad-RV	1970		Sacramento River at Rio Vista	5 g	March, 1971	367,869	Coleman Hatchery
Ad-LV-RV	?	1	?	?	?	?	?
Ad-LP	1969	3	Sacramento River at Red Bluff	37 mm	October, 1969	302,000	Winter-run wild fish
Ad-RP	?	1	?	?	?	?	?
An	?	4	?	?	?	?	?
An-LV	1970	42	American River at Nimbus	5 g	May-June, 1971	258,278	Nimbus Hatchery
An-RV	1970	41	Sacramento River at Rio Vista	5 g	May-June, 1971	257,213	Nimbus Hatchery
An-RP	?	1	?	?	?	?	?
An-LP(+CWT)	1969	9	1/2 at Rio Vista and 1/2 at	61 g	Feb. 1971	40,000	Feather River Hatchery
An-LP(+CWT)	1970		Feather River Hatchery	76 g	Feb. 1972	110,000	Feather River Hatchery
An-LP-RP	?	1	?	?	?	?	?
LV-RV	?	2	?	?	?	?	?
LV-RP	1969	1	American River at Nimbus	5 g	May-June, 1970	258,976	Nimbus Hatchery
LV	?	10	- Many of these fish may have been An-LV marks with regenerated anal fins -				
RV	?	24	- Many of these fish may have been An-RV marks with regenerated anal fins -				
LP	?	5	?	?	?	?	?
RP	?	1	?	?	?	?	?

Appendix Table 3

Fork Lengths (nearest cm) of Marked King Salmon Recovered at Nimbus Hatchery During The 1974-75 Season

FL(cm)	Ad		Ad-AN-RV		Ad-RV		An-LV		An-RV		An-LP	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
57	1											
67										1		
8												
9												
70				1		1						1
1												
2												
3									1	1		
4										1		1
5				1		1		1		1	1	
6						2				2		
7				2	2	2			1	1		
8				1	1			4		1		
9		1				3		2		1		1
80				1		1			1	2		
1		1				2		3				
2		1		1		2	1	2		2		
3		1		1	1		1	1				1
4					1	3		2		3	1	
5		1		1		1		1		2		1
6	1	1				3		3	1	5		
7		3			1	2		1	2	4	1	
8		1				2		3		1		
9					2	4	1	2		3		
90							1	1	1	1		1
1			1	1		2	1					
2							1	2				
3				1	1				1			
4	1			1			2					
5		1		1	1	2	1	1				
6			1	1			2					
7			1	1					1			
8			1									
9					1							
100		1			1		1					
1			1									
2												
3												
4												
105			1		1		1					
measured				1	1							
tals by Sexes	3	12	6	16	14	33	13	29	9	32	3	6
tals exes mbined	15		22		47		42		41		9	

Appendix Table 3 (continued)

FL(cm)	RV Male	RV Female	LV Male	LV Female	LP Male	LP Female
57						
8						
9						
60	1					
1						
2		1				
3						
4				1		
5						
6						
7						1
8						
9					1	
70						
1						
2						
3						
4		2				
5						
6				1		
7	2	1		1		
8		1				
9						
80		1		1		
1						
2						
3				1		
4	1					1
5						
6	1					
7	1			1		
8		1		1	1	
9		1				
90	1	1		1		
1						
2		1	1	1	1	
3						
4						
5						
6						
104	1					
Unmeasured	1	5				
Totals by Sexes	9	15	1	9	3	2
Totals Sexes Combined	24		10		5	

Ad-AN	Ad-AN-LV	Ad-LP	Ad-LV
30 F	80 F	80 M	74 M
87 F	82 M	82 F	80 F
	87 M	83 F	88 F
			94 F

Ad-LV-RV	Ad-RP	An	An-LP-RP
80 F	91 F	68 F	69 F
		74 F	
		77 F	
		77 F	

An-RP	LP-RP	RP
87 F	79 F	67 F

LV-RV	
Unmeasured	F
"	F

Appendix Table 4

Marked Steelhead Recoveries, Nimbus Hatchery, 1974-75

Mark	Brood year	Number recovered	Area released	Average size (g)	Date(s)	Number released	Origin
An	?	1					
LV	1968	25	Three-mile Slough-Brannon Is.	48-67	Mar. 1969	40,951	Mokelumne River Fish Installation
LV	1969		Three-mile Slough-Brannon Is.	83	Mar. 1970	42,972	Mokelumne River Fish Installation
LV	1970		Three-mile Slough-Brannon Is.	61-97	Jan.-Mar. 1971	45,452	Mokelumne River Fish Installation
LV	1970		Feather River at Gridley Bar	30	Mar. 1971	49,500	Feather River Hatchery
LV-LP	?	1	?	?	?	?	?
LV-RP	1971	4	Sacramento River at Clarksburg	72-86	Feb. 1972	40,232	Nimbus Hatchery
LV-RV	?	24	?	?	?	?	?
LV-RV-LP	?	1	?	?	?	?	?
RV	1969	28	Mokelumne River-New Hope Landing	89	Mar. 1969	42,840	Mokelumne River Fish Installation
RV	1970		Mokelumne River-New Hope Landing	68	Jan. 1971	20,433	Mokelumne River Fish Installation
RV	1970		Feather River at Gridley Bar	30	Mar. 1971	49,900	Feather River Hatchery
RV-LP	1971	3	Sacramento River at Clarksburg	83-86	Feb. 1972	40,056	Nimbus Hatchery
LP	1969	175	Sacramento River at Clarksburg	53	Mar. 1970	18,700	Nimbus Hatchery
LP	1970		Sacramento River at Clarksburg	61	Apr. 1971	60,170	Nimbus Hatchery
LP	1971		Sacramento River at Clarksburg	49	Mar. 1972	60,115	Nimbus Hatchery
LP-RP	?	45	?	?	?	?	?
RP	1969	71	American & Sacramento Rivers	142	Jun.-Jul. 1970	12,780	Nimbus Hatchery

Appendix Table 5

Fork Lengths (nearest cm) of Marked Salmon Recovered at Nimbus Hatchery During The 1974-75 Season

FL(cm)	LP		LP-RP		LV		LV-RV		RP		RV	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
27									1			
40												1
1												
2												
3	1						1				1	
4						1					1	
5	4	1				2					1	
6	4	1					1				3	
7		1			2						2	
8	2	1		1	1						1	
9	6	3										1
50	7	3	1				1	1			2	2
1	4	1	2		1	1				1	2	
2	5	3			3	1	2		1		1	1
3	1	1			1		1	2				
4	4	2	1	1		2	3				3	1
5	4	2		1		1	1	1			1	
6	1	1			4		1	1			1	
7							1		1			
8	1	1			1	1	1		2	1	1	
9	1											
60	1	1				2		1				
										1		
									1	2		
3		3		2						2		1
4	2		1	4						1		
5	3	1	1	4						3		1
6	2	7	1	3					1	5		
7	1	6					1		3	4		
8	5	9	1	2				1	3	2		
9	2	4		3					1	3		
70	6	15	4		1				3	8		
1	2	4	1	2					4	3		
2	3	5	5				1		1	2		
3	4	1							1			
4	2	1	1						4	1		
5	1	1	2				1	1		1		
6	2	1							1			
7	2								1			
8	3			1					1	1		
9	3											
80	1											
1	1											
2												
3												
4	1											
85	2											
Unmeasured		1										
Totals by Sexes	94	81	21	24	14	11	16	8	30	41	20	8
Totals Sexes Combined	175		45		25		24		71		28	

Appendix Table 5 (continued)

LV-RP	AN	LP-LV	LP-RV	LP-LV-RP
54 F	50 M	51 F	68 F	80 M
68 F			72 F	
68 F			88 M	
75 F				