REF 90242

ANNUAL REPORT NIMBUS SALMON AND STEELHEAD HATCHERY 1972-73 FISCAL YEAR[1/]

by

Werner H. Jochimsen
Region 2, Inland Fisheries

ABSTRACT

This report describes the operation of Nimbus Hatchery from July 1, 1972 through June 30, 1973. Two species were reared: king salmon (Oncorhynchus tshawytscha) and steelhead (Salmo gairdnerii gairdnerii).

Tables present numbers of adult fish trapped, eggs taken, juveniles reared and planted, and daily weather and water temperatures.

1/ Anadromous Fisheries Branch Administrative Report No. 74-8.

Submitted for publication October 1973.

INTRODUCTION

This is the 18th annual report of the Nimbus Salmon and Steelhead Hatchery. The hatchery is operated by the California Department of Fish and Game under contract with the United States Bureau of Reclamation. The report summarizes the activities of the hatchery during the fiscal year 1972-73 with particular reference to numbers of fish trapped and spawned, and eggs and fish produced.

Production Summary

Production for the 1972-73 fiscal year is summarized as follows:

Species	Number trapped	Number eggs taken	Fingerlings planted or transferred	Number yearlings planted	Total kg planted	On hand 6/30/73
King salmon						
1971 BY				253,635	11,624	0
1972 BY	7,106	14,638,755[a]	4,562,760		16,429	0
Winter-run steelhead						
1972 BY			390,400	481,955	41,720	0
1973 BY	2,506	1,921,965[b]	574,755		524	574,050
Summer-run steelhead						
1973 BY	43	115,445	12,240	0	11	119,450[c]
Sacramento River steelhead						
1973 BY	101	77,850	6,100	0	5	43,600

[a] Of these, 2.4 million were later shipped to Coleman Hatchery and 5.3 million to Feather River Hatchery.
[b] Includes 304,000 shipped to Mokelumne River Fish Installation.
[c] Includes 63,168 fish received from Moccasin Creek Hatchery.

KING SALMON MAINTENANCE PROGRAM

History of the 1972 Salmon Migration

The fish weir racks were installed by Bureau of Reclamation personnel August 11, 1972. Inspection of the streambed at the weir during the period of lowered flow August 30 revealed no damaged or eroded areas, so placement of cobbles was unnecessary. Pickets were lowered into the rack channel on August 30.

The weir remained in place until January 11. Removal was necessary because flows over 850 m^3/sec (30,000 cfs) were anticipated.

The fall migration of 1972 brood year king salmon totaled 9,275. Of this number, 7,106 were trapped in the holding pond and 2,169 escaped through the weir. That portion of the run entering the holding pond was composed of 2,195 large males, 3,252 large females and 1,659 grilse. Included in the count of grilse were 7 small females. Carcasses were counted as they were removed from the weir and included 104 large males, 13 unspawned females and 2,052 grilse. Approximately 80% of the carcasses which became lodged on the wier were recovered.

Of the large females counted in the holding pond, 2,580 were spawned, 604 died before spawning and 47 were too green when killed. Of the 47 immature females killed, 31 were due to sorting error and 16 were killed in the mechanical sorting apparatus. Twenty-one females and 33 males were returned to the river unspawned.

During the spawning season, October 26, 1972 to January 23, 1973, 14,638,755 eggs were obtained, for an average of 5,674/female. Egg quality continues at a high level with a range of 92 to 98% fertility. Survival from green to eyed eggs averaged 88.3% (range, 77.9-97.4%).

Some eggs were shipped to other hatcheries because of limited rearing facilities at Nimbus. The Coleman National Fish Hatchery received 2,498,780 eyed eggs, and 5,320,120 eyed eggs were shipped to the Feather River Hatchery.

Marked King Salmon Recoveries

All salmon were examined for marks as fish were sorted for spawning. Scale samples were taken and fork lengths and sex were recorded for all marked fish. A total of 597 marked fish bearing 26 different marks was recovered (Appendix Tables 1, 2, and 3).

1972 Brood Year King Salmon Planted and Transferred

A total of 1,135,205 fingerlings was released in order to thin out ponds and troughs. These fish were planted in the American River at either the hatchery or near Sunrise Boulevard and ranged from 0.3 to 2.9 g (1,360-158/lb) at release.

All remaining fish were released in May and June as smolts. Approximately two thirds of the smolt production was released in the Sacramento River near Rio Vista and one third was released in the American River near Sunrise Boulevard. Smolts ranged in size from 3.3 to 6.1 g (75-138/lb).

Another 71,990 fingerlings, weighing 50.5 kg (111 lb), were transferred to the Delta Fish Facility for testing purposes. These fish were released in the lower Sacramento River after tests were completed.

No 1972 brood year king salmon were marked. Release and transfer data are summarized in the following table.

Date	Release site	Smolts	Fingerlings	kg
Jan.-Apr. 1973	Transferred to Delta Fish Facility		71,990	50
March 1973	American River at Hatchery		37,980	16
April 1973	American River near Pacific Coast Aggregates Co.		774,700	1,383
April 1973	American River at Hatchery		322,525	147
May 1973	Sacramento River at Rio Vista	1,140,250		5,330
May 1973	American River near Pacific Coast Aggregates Co.	851,925		3,549
June 1973	Sacramento River at Rio Vista	1,104,830		4,813
June 1973	American River near Pacific Coast Aggregates Co.	258,560		1,141
TOTALS		3,355,565	1,207,195	16,429

1971 Brood Year King Salmon Planted

Date	Release site	Number	kg
September 1972	Sacramento River at Clarksburg	47,300	2,427
October 1972	Sacramento River at Clarksburg	206,335	9,197
TOTALS		253,635	11,624

Fish planted ranged in size from 41 to 52 g (11-8.8/lb) and were not marked.

King Salmon Disease Information

Losses of 1972 brood year salmon related to bacterial or protozoan diseases were minor. Gill bacteria were a problem in the fall of 1972 among 1971 brood year salmon, though losses were held to a low level. Copper sulfate flush treatments, on a 3-day-a-week basis, were employed during late August or early September.

No loss was incurred from the usual "summer ailment", the kidney malfunction that results in an uncontrollable mortality from late July through August.

Sacramento River Chinook Disease was in evidence in almost all lots of pre-smolt fish. Losses amounted to approximately 275,000 fish out of a total population of about 3,500,000 and occurred mainly during a 4-5 week period from the end of March to the end of April.

Experimental Treating of King Salmon Eggs in Wescodyne

All eggs taken this year, except one experimental lot, were water hardened, then treated with a 1:300 Wescodyne solution for 10 minutes.

The experimental lot of eggs was divided into three groups as follows: the first group was untreated; the second was water hardened, then treated with a 1:300 Wescodyne solution for 10 minutes; and the third was water hardened (1 hour) in a 1:300 Wescodyne solution.

All eggs appeared to develop normally throughout the incubation period. The first noticeable difference occurred after eggs had hatched and fry were being removed from the stacks of egg trays. Egg and fish losses among stacks of treated eggs (both the 10 minute treatment and the water hardening treatment) was less than 0.5%, whereas losses among trays of untreated eggs were 1% or more. The lower egg losses may have been due to the effect of Wescodyne on fungus.

After the fish were ponded, there appeared to be no difference among the various groups until virus symptoms appeared the third week in April. Virus losses were negligible among fish in the group that had been water hardened in Wescodyne. Losses in the other two groups were comparable to losses among the remainder of the production fish, that is between 5 and 10% of ponded fish. Further tests of water-hardening with Wescodyne will be conducted next year.

Disposal of Salmon Carcasses

Approximately 12,882 kg (28,400 lb) of carcasses were given to welfare organizations for distribution to needy families; 8,437 kg (18,600 lb) to state and county institutions; and 1,814 kg (4,000 lb) to local zoos. A local rendering plant picked up 7,915 kg (17,450 lb) of inedible carcasses.

Other Species

During the season, three silver salmon (O. kisutch) and 3 chum salmon (O. keta) were encountered in the holding pond.

In addition to king salmon, 113 shad (Alosa sapidissima), 7 kokanee (O. nerka), 1 striped bass (Roccus saxatilis), 2 chum salmon and 20 steelhead were removed from the rack. The chum salmon were removed from the rack September 6.

STEELHEAD MAINTENANCE PROGRAM

History of the 1973 Brood Year Nimbus Winter-run Steelhead Migration

Several steelhead were observed in the holding pond in October with the arrival of the first salmon. As in the past two years, estimates were made of the number of arriving steelhead during the salmon spawning season. Fish were counted for the record from the start of steelhead spawning on December 5, 1972 until March 6, 1973. All steelhead were examined for marks as they were spawned or released. Fork lengths and sex were also recorded.

Counts of Winter-run[2/] Steelhead during Spawning Operations

Date	Spawned & released		Released unspawned		Died in pond	
	M	F	M	F	M	F
12/5/72	0	5	23	2	1	2
12/19	20	17	0	0	0	0
12/29	2	21	0	0	3	2
1/2/73	9	35	0	0	1	1
1/4	7	35	60	18	0	0
1/11	21	88	45	21	5	6
1/17	18	91	0	0	6	2
1/23	0	1	313	165	10	5
1/29	0	1	104	184	6	3
2/5	2	2	109	186	7	6
2/13	11	40	87	90	10	2
2/22	0	0	182	135	17	10
3/2	0	0	124	103	12	5
3/6	0	0	5	2	0	0
TOTALS	90	336	1,052	906	78	44

Of the fish released unspawned, 625 were 56 cm (22 inches) or less FL.

The 336 females spawned produced 1,921,965 eggs for an average of 5,720 eggs/fish. Fertility was not checked but survival of eggs from green to eyed stages ranged from 64.3 to 94.8% and averaged 88.4%. Eggs appeared visually to be of better quality than percentages indicated, leading to speculation that Wescodyne treatments may have reduced egg survival, or that errors in measuring green eggs occurred.

Spawned and surplus fish were hauled downriver to the Watt Avenue area. Fish considered surplus were those measuring 22 inches FL or less and fish on hand after egg requirements had been met.

A total of 304,000 eyed eggs was shipped to the Mokelumne River Fish Installation.

Return of Marked Steelhead

A total of 297 marked fish bearing a total of 17 different marks was recorded (Appendix Table 4).

2/ An additional 43 LP marked summer-run steelhead were processed (p. 7). Since summer-run releases have included some unmarked fish, the winter-run counts may include a few summer-run steelhead.

1973 Brood Year Steelhead Planted

Date	Release site	Number	kg
April 1973	American River at Hatchery	312,210	101
May 1973	American River at Hatchery	40,080	7
June 1973	American River at Hatchery	222,465	416
TOTALS		574,755	524

Fish ranged in size from 0.2-2.5 g (2,672-184/lb). Releases were made to relieve crowded conditions and when fish were graded.

1972 Brood Year Steelhead Planted

Date	Release site	Fingerlings	Yearlings	kg
August 1972	American R. near PCA Co.*	188,000		1,678
August	American R. at Hatchery	141,000		1,599
September	American R. near PCA Co.*	34,800		816
September	Sacramento R. at Clarksburg	26,600		635
October	American R. near PCA Co.*		16,560	522
October	Sacramento R. at Clarksburg		56,345	2,495
October	American R. at Hatchery		53,900	1,746
January 1973	Sacramento R. at Clarksburg		100,410	7,893
January	Sacramento R. at Miller Park		3,900	295
February	Sacramento R. at Clarksburg		145,470	12,973
March	Sacramento R. at Clarksburg		102,445	10,773
March	American R. at Hatchery		2,925	295
TOTALS		390,400	481,955	41,720

* Pacific Coast Aggregates Company.

Fingerlings ranging in size from 8 to 26 g (60-17.4/lb) were planted from August 17, 1972 through September 21, 1972. Yearlings ranging from 32 to 142 g (14.4-3.2/lb) were planted from October 25, 1972 through March 13, 1973. No fish were marked.

Winter-Run Steelhead Disease Information

From mid-August through mid-October steelhead fingerlings in all ponds were affected by severe infestations of gill bacteria. All treatments employed to halt the disease resulted in only mediocre success. Flush treatments of copper sulfate were tried. They served to kill some weak and diseased fish, but did not eliminate the disease. Various systems of flushing terramycin solutions through the ponds were also tried, as well as treating fish in tank trucks. Success eluded us until cooler water was obtained shortly after October 1. Losses during the period amounted to about 170,000 fish out of a population of 700,000 to 800,000.

Fish of the 1973 brood year have had only the usual bacterial problems, first in the hatchery building and then on a few occasions in the rearing ponds. No major losses have occurred.

SACRAMENTO RIVER STEELHEAD

1973 Run

There is a fishery for early migrant steelhead in the lower American River yet these fish do not appear to arrive at the hatchery in significant numbers. Therefore an effort was made to assure a small supply of early migrant strain eggs by trapping adult steelhead in the Sacramento River. The 101 fish trapped by Anadromous Fisheries Branch personnel were transported to a holding pond at the hatchery.

Spawning time for these fish extended from December 12, 1972 to February 22, 1973. Altogether, 19 females were successfully spawned. They produced 77,850 eggs.

1973 Brood Year Sacramento River Steelhead Planted

On June 15, 1973, 6,100 steelhead weighing a total of 4.54 kg (10 lb) were released into the American River at the foot of the fish ladder. These fish were smaller than others of the same strain and were surplus to the needs of the program.

Sacramento River Steelhead Disease Information

No disease problems of any consequence were encountered.

Summer Steelhead Program

1972 Brood Year

No eggs were obtained during fiscal year 1971-72 so there was no yearling program during the past year.

1973 Run

Of the 43 marked (LP) summer-run steelhead identified during sorting and spawning operations, 20 females were spawned, producing 115,445 eggs for an average of 5,772/fish. Egg quality was good. Average survival was 92.3% from green to eyed stages.

In addition to the eggs taken, 63,168 1973 brood year fingerlings were received June 7, 1973 from Moccasin Creek Hatchery. The eggs had originated at Skamania Hatchery, Washington. The eggs were to have been received at Nimbus but with the new Department of Fish and Game policy relating to interstate egg shipments and quarantine, it was decided to receive them at Moccasin Creek and certify the fish as being disease free prior to receipt at Nimbus.

1973 Brood Year Summer Steelhead Planted

On June 11, 1973, 12,240 summer steelhead weighing a total of 10.89 kg (24 lb) were released in the American River at the foot of the fish ladder. These fish, surplus to the needs of the program, were considerably smaller than others of the same strain that were ponded.

Summer Steelhead Disease Information

Before the fish were ponded, columnaris type bacterial infections caused minor losses. After ponding there were no further problems.

WATER TEMPERATURE CONTROL

Shutters on the power intake structure at Folsom Dam were regulated as follows: the number nine shutters were raised August 1; the number eight shutters were raised about August 31 and the lower seven shutters were raised on September 29. Water temperature did not change with manipulation of the number nine and eight shutters but a drop of 1.7°C (3°F) was noticed on September 30 following adjustment of the lower seven shutters.

PUBLIC RELATIONS

An estimated 94,555 persons visited the hatchery this past season. As in the past, November is not only the peak salmon spawning month but also when most visitors are noted. Again this year only groups with special interests in natural history, mostly at college level, were provided with guided tours of the hatchery.

MISCELLANEOUS

Poaching and illegal fishing appears to be on the increase in this area. For several years a 24-hour watch has been maintained to limit illegal activity. This past season these activities reached such a state that one individual took a salmon from the river at night in the closed area and threatened to shoot the employee trying to stop him.

APPENDIX

Table 1

Marked King Salmon Recoveries, Nimbus Hatchery 1972-73 Season

Mark	Brood year	Number recovered	Area released	Size	Date	Number released	Origin
Ad	1968	57	American River at Nimbus Hatchery	0.4g	March 1969	250,560	Fall run - Nimbus Hatchery
Ad	1969		American River at Nimbus Hatchery	swim-up	April 1970	257,900	Fall run - Nimbus Hatchery
Ad	1970		American River at Nimbus Hatchery	0.4g	March 1971	250,900	Fall run - Nimbus Hatchery
Ad-An	?	1	?	?	?	?	?
Ad-LP	1969	2	Sacramento River at Red Bluff	37mm	October 1969	302,000	Winter run wild fish
Ad-LV	1968	5	Coleman Hatchery	5g	April-August 1969	295,000	Fall run Coleman Hatchery
Ad-LV	1969		Coleman Hatchery	5g	May 1970	327,000	Fall run Coleman Hatchery
Ad-LV	1970		Coleman Hatchery	5g	May 1970	341,672	Fall run Coleman Hatchery
Ad-RP	1970	3	Sacramento River at Red Bluff	37-40mm	October 1970	109,000	Winter run wild fish
Ad-RV	1968	85	Sacramento River at Rio Vista	5g	April-August 1969	321,000	Fall run Coleman Hatchery
Ad-RV	1969		Sacramento River at Rio Vista	5g	May 1970	327,000	Fall run Coleman Hatchery
Ad-RV	1970		Sacramento River at Rio Vista	5g	March 1971	367,869	Fall run Coleman Hatchery
Ad-An-RV	1968	4	Mouth of American River	6g	June 1969	250,299	Fall run - Nimbus Hatchery
Ad-An-RV	1970	10	Mouth of American River	5g	May-June, 1971	256,845	Fall run - Nimbus Hatchery
Ad-LV-LP	?	1	?	?	?	?	?
Ad-LV-RP	?	1	?	?	?	?	?
Ad-LV-RV	?	1	?	?	?	?	?
Ad-RV-LP	1969	31	Mouth of American River	5g	May-June 1970	258,819	Fall run - Nimbus Hatchery
An	?	2	?	?	?	?	?
An-LV	1968	11	American River at Nimbus Hatchery	6g	June 1969	250,265	Fall run - Nimbus Hatchery
An-LV	1970	16	American River at Nimbus Hatchery	5g	May-June 1971	258,278	Fall run - Nimbus Hatchery
An-RV	1968	15	Sacramento River at Rio Vista	6g	June 1969	252,904	Fall run - Nimbus Hatchery
An-RV	1970	14	Sacramento River at Rio Vista	5g	May-June 1971	257,213	Fall run - Nimbus Hatchery
An-LP*	1969	84	½ at Feather River Hatchery	18cm	June 1971	40,000	Fall run - Feather River Hatchery
An-LP*	1970		Rio Vista	18cm	December 1971	120,000	Fall run - Feather River Hatchery
An-RP	?	1	?	?	?	?	?
LV	?	7	?	?	?	?	?
LV-RV	?	5	?	?	?	?	?
LV-RV-LP	?	1	?	?	?	?	?
LV-RV-RP	?	1	?	?	?	?	?
LV-RP	1969	53	American River at Nimbus Hatchery	5g	May-June 1970	258,976	Fall run - Nimbus Hatchery
RV	?	24	?	?	?	?	?
RV-LP	1969	150	Sacramento River at Rio Vista	5g	May-June 1970	263,331	Fall run - Nimbus Hatchery
RV-RP	?	2	?	?	?	?	?
LP		5	?	?	?	?	?
RP		5	?	?	?	?	?

* Coded wire tag in conjunction with a multiple-fin mark.

Appendix
Table 2

Length Frequencies of the Most Common King Salmon
Marks Recovered at the Nimbus Hatchery 1972-73 Season

FL* (cm)	Ad		Ad-RV		Ad-An-RV		Ad-RV-LP		An-LP		An-LV		An-RV		RV-LP		LV-RP		RV		TL* Inches
	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	Males	Females	
35.6									2		1										14
38.1	1												2		1						15
40.6											2		1								16
43.2	1		1		1								1						1		17
45.7			2								1		2								18
48.3			5		1						2		2		2				2		19
50.8			4		1				1		1					1					20
53.3			1		2				2		3								1		21
55.9			8		3		1	1	4		1		1		1	1			1		22
58.4			5					1	4	1	1		1				1		1		23
61.0			7		2				8	3	3		3			1			2		24
63.5		1	2						2	3	1		1		1	3	1		2		25
66.0			1						4	1					4	3	1		2		26
68.6			1	1				1	1	3				1	6	1	2	3			27
71.1		1	2	1					5	5					1	5					28
73.7			1	2					7	4					4	6	1	2		1	29
76.2		2	1	3				3	4	2					9	10	3	4			30
78.7	3	7	1	6				2	8	4				1	7	15	2	4	1	1	31
81.3	4	8		4		1		3	3	1		1		1	5	12	4	5			32
83.8	2	4	1	4			3	5	1			1		2	2	14		5			33
86.4		4	1	3		1	4	4		1		1	1	1	7	6	1			2	34
88.9	3	3	4	4										3	9	4	1	5	2	1	35
91.4	3	3	3	1		1	1	1				2		3	5	2	1			3	36
94.0	2	1		1			1					1					3				37
96.5	1	1	2	1								2	1		1		2	1			38
99.0		1	1									1	1			1	1			1	39
101.6		1			1																40
104.1												1									41
106.7												1									42
109.2																					43
TOTALS	20	37	54	31	11	3	10	21	56	28	16	11	17	12	65	85	24	29	15	9	

* Fork lengths rounded to nearest inch and later converted to metric equivalents.

Appendix Table 3

Lengths of Miscellaneous Marked King Salmon
Nimbus Hatchery, 1972-73 Season

Mark	FL* cm	Sex	Mark	FL* cm	Sex	Mark	FL* cm	Sex
Ad-An	64	M	LV	48	M	RP	64	M
			LV	56	M	RP	64	M
Ad-LV	52	M	LV	66	M	RP	64	M
Ad-LV	64	M	LV	71	F		85	F
Ad-LV	74	F	LV	81	M	RP	89	F
Ad-LV	76	M	LV	97	M			
Ad-LV	91	M	LV	98				
Ad-LV-RV	99	M	LV-RV	72	M			
			LV-RV	76	M			
Ad-LV-RP	85	F	LV-RV	76	F			
			LV-RV	81	F			
Ad-LV-RP	86	M	LV-RV	81	M			
Ad-LP	56	M	LV-RV-LP	72	F			
Ad-LP	69	F						
			LV-RV-RP	81	F			
Ad-RP	77	M						
Ad-RP	81	F	RV-RP	81	F			
Ad-RP	94	F	RV-RP	83	M			
An	58	M	LP	60	M			
An	77	M	LP	76	F			
			LP	79	F			
An-RP	77	F	LP	81	M			
			LP	89	M			

* Fork lengths measured to nearest ½ inch, and later converted to cm.

Appendix Table 4

Marked Steelhead Recoveries, Nimbus Hatchery, 1972-73

Mark	Brood year	Number recovered	Area released	Average size (g)	Date	Number released	Origin
Ad	1968	6	Three-mile Slough - Brannon Is.	68	March 1969	22,579	Mokelumne River Fish Installation
Ad	1970		Feather River at Gridley Bar	57	March 1971	50,200	Feather River Hatchery
Ad-LP	1969	2	Battle Creek	61	Feb.-Apr. 1970	119,036	Coleman National Fish Hatchery
Ad-LP	1970		Battle Creek	60	Feb.-Apr. 1971	213,698	Coleman National Fish Hatchery
Ad-LP	1971		Battle Creek	45	Jan.-Feb. 1972	201,706	Coleman National Fish Hatchery
Ad-LV	1969	5	Sacramento River at Clarksburg	72	March 1970	25,200	Nimbus Hatchery
Ad-LV	1969		Three-mile Slough - Brannon Is.	91	March 1970	980	Mokelumne River Fish Installation
Ad-LV	1970		Three-mile Slough - Brannon Is.	57	November 1970	9,000	Mokelumne River Fish Installation
Ad-RP	1969	70	Sacramento River at Rio Vista	59	Feb.-Apr. 1970	118,186	Coleman National Fish Hatchery
Ad-RP	1970		Sacramento River at Rio Vista	57	Feb.-Apr. 1971	211,652	Coleman National Fish Hatchery
Ad-RP	1971		Sacramento River at Rio Vista	46	February 1972	201,785	Coleman National Fish Hatchery
Ad-RV	1969	3	Sacramento River at Rio Vista	76	March 1970	25,000	Nimbus Hatchery
Ad-RV	1969		Mokelumne River - New Hope Land.	91	March 1970	980	Mokelumne River Fish Installation
Ad-RV	1970		Mokelumne River - New Hope Land.	57	November 1970	6,000	Mokelumne River Fish Installation
An-RP	?	1					
LV	1968	47	Three-mile Slough - Brannon Is.	48-67	March 1969	40,951	Mokelumne River Fish Installation
LV	1969		Three-mile Slough-- Brannon Is.	83	March 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	March 1971	49,500	Feather River Hatchery
LV-RP	1971	26	Sacramento River at Clarksburg	72-86	February 1972	40,232	Nimbus Hatchery
LV-RV	?	5					
LP	1969	43	Sacramento River at Clarksburg	53	March 1970	18,700	Nimbus Hatchery
LP	1970		Sacramento River at Clarksburg	61	April 1971	60,170	Nimbus Hatchery
LP	1971		Sacramento River at Clarksburg	49	March 1972	60,115	Nimbus Hatchery
LP-LV	?	2					
LP-RP	?	4					
LP-RP-LV	?	1					
LP-RP-RV	?	1					
LP-RV	1971	49	Sacramento River at Rio Vista	83-86	February 1972	40,056	Nimbus Hatchery
RP	1969	22	American and Sacramento Rivers	142	Jun.-Jul. 1970	12,780	Nimbus Hatchery
RV	1969	10	Mokelumne River - New Hope Land.	89	March 1969	42,840	Mokelumne River Fish Installation
RV	1970		Mokelumne River - New Hope Land.	68	January 1971	20,435	Mokelumne River Fish Installation

Appendix Table 5

Nimbus Salmon and Steelhead Hatchery Weather, Water, and Fish Trapping Data July 1, 1972 Through June 30, 1973

July	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	40.0	21.1	16.7	15.6	clear	113.0	-	-
2	36.1	14.4	17.2	15.6	partly cloudy	85.5	-	-
3	37.8	14.4	17.8	15.6	clear	84.4	-	-
4	39.4	15.6	17.8	15.6	clear	84.4	-	-
5	35.6	14.4	17.2	15.6	clear	84.4	-	-
6	34.4	13.3	17.2	15.6	clear	84.7	-	-
7	35.6	13.3	17.8	15.6	clear	84.7	-	-
8	36.7	14.4	18.3	16.1	clear	84.7	-	-
9	36.1	15.6	17.8	16.1	clear	84.2	-	-
10	35.6	16.7	18.3	16.1	clear	86.4	-	-
11	41.1	16.7	18.3	16.1	clear	85.5	-	-
12	43.3	16.7	18.3	16.7	clear	85.5	-	-
13	47.8	21.1	18.3	16.7	clear	85.5	-	-
14	47.8	20.0	18.3	16.7	clear	85.5	-	-
15	44.4	22.2	18.3	16.7	clear	85.5	-	-
16	36.7	16.7	18.3	16.1	clear	85.5	-	-
17	33.9	16.7	17.8	16.7	clear	85.5	-	-
18	31.1	15.6	17.8	16.7	clear	85.2	-	-
19	26.7	14.4	17.8	16.7	partly cloudy	84.7	-	-
20	27.8	13.9	17.8	16.7	clear	85.2	-	-
21	31.1	14.4	18.3	16.1	clear	85.5	-	-
22	31.1	14.4	18.3	16.7	clear	85.5	-	-
23	34.4	14.4	18.3	16.7	clear	85.5	-	-
24	33.3	13.3	18.3	16.7	clear	85.8	-	-
25	36.7	14.4	18.9	17.2	clear	85.2	-	-
26	33.9	13.3	18.9	17.2	clear	86.4	-	-
27	39.4	14.4	18.9	17.2	clear	99.7	-	-
28	40.6	17.8	19.4	17.8	clear	99.7	-	-
29	42.2	18.9	18.9	17.8	partly cloudy	99.1	-	-
30	37.8	20.0	18.3	17.8	partly cloudy	100.0	-	-
31	35.6	14.4	18.9	17.2	clear	99.7	-	-

* 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 5 (continued)

August	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	37.8	16.7	19.4	17.8	clear	99.1	-	-
2	37.8	14.4	19.4	17.2	clear	99.1	-	-
3	28.9	15.6	17.8	17.2	clear	99.4	-	-
4	35.0	13.3	18.3	16.7	clear	99.4	-	-
5	41.1	13.3	18.3	17.2	clear	99.7	-	-
6	43.3	17.8	18.9	17.2	partly cloudy	99.7	-	-
7	40.0	15.6	18.3	17.2	clear	99.7	-	-
8	40.0	18.3	18.3	17.2	partly cloudy	99.4	-	-
9	40.0	17.8	18.3	17.2	clear	99.7	-	-
10	40.0	18.3	18.9	17.2	clear	99.7	-	-
11	37.8	17.8	18.3	17.8	clear	99.7	-	-
12	35.6	15.6	18.3	17.2	clear	99.4	-	-
13	32.2	16.7	18.3	17.8	clear	99.4	-	-
14	30.0	12.2	18.3	17.2	partly cloudy	99.4	-	-
15	29.4	13.3	18.3	17.2	partly cloudy	99.7	-	-
16	31.7	12.2	18.9	17.2	clear	100.0	-	-
17	32.2	14.4	18.9	17.8	clear	100.0	-	-
18	32.2	15.6	18.9	17.8	clear	99.7	-	-
19	31.1	14.4	18.9	17.2	clear	99.4	-	-
20	33.3	15.0	18.9	17.2	clear	99.1	-	-
21	34.4	18.3	19.4	16.7	clear	98.8	-	-
22	37.8	16.7	18.9	17.8	clear	99.7	-	-
23	37.8	16.1	18.9	17.2	clear	99.1	-	-
24	36.7	16.7	18.3	16.7	clear	99.4	-	-
25	41.1	17.8	18.3	17.2	clear	100.0	-	-
26	38.3	16.7	18.3	17.2	clear	99.1	-	-
27	35.6	16.1	18.3	17.2	partly cloudy	99.1	-	-
28	36.7	16.1	18.9	16.7	clear	100.0	-	-
29	38.9	18.3	18.9	17.8	clear	98.3	-	-
30	38.9	20.0	18.9	17.8	clear	61.2	-	-
31	38.3	18.9	18.9	17.2	clear	85.5	-	-

* 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 5 (continued)

September	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	36.7	18.9	17.2	16.7	clear	85.5	-	-
2	33.3	15.6	17.2	16.7	partly cloudy	85.8	-	-
3	34.4	15.6	17.8	16.7	partly cloudy	85.8	-	-
4	31.1	16.7	17.2	16.7	cloudy & rain	85.2	-	-
5	32.2	16.7	18.9	16.7	clear	85.5	-	-
6	33.3	15.6	17.8	16.7	clear	85.2	-	-
7	33.9	15.6	17.8	16.1	clear	85.2	-	-
8	33.9	14.4	17.8	16.1	clear	85.5	-	-
9	31.1	15.6	17.8	16.1	clear	85.2	-	-
10	29.4	14.4	17.2	16.1	clear	85.2	-	-
11	26.1	12.2	17.8	16.1	clear	85.2	-	-
12	27.8	10.0	17.8	16.1	clear	85.2	-	-
13	32.2	10.0	17.8	16.7	clear	85.5	-	-
14	32.2	11.1	17.2	16.7	clear	85.2	-	-
15	32.2	14.4	17.8	16.7	clear	85.5	-	-
16	31.1	13.3	17.8	16.1	clear	85.5	-	-
17	27.8	16.1	17.2	16.1	clear	85.2	-	-
18	26.7	12.2	17.8	16.1	clear	85.2	-	-
19	26.1	12.2	17.8	16.1	clear	85.2	-	-
20	31.1	10.0	17.8	16.1	partly cloudy	85.5	-	-
21	31.7	12.2	17.8	16.7	clear	85.5	-	-
22	31.7	13.3	17.8	16.7	partly cloudy	85.8	-	-
23	30.0	14.4	17.8	16.7	partly cloudy	85.5	-	-
24	30.0	8.9	17.8	16.1	partly cloudy	85.5	-	-
25	27.8	7.8	17.2	16.1	partly cloudy	85.5	-	-
26	24.4	15.6	17.2	16.7	rain	85.5	-	-
27	27.8	16.1	17.2	16.7	cloudy	85.2	-	-
28	27.2	12.2	17.8	16.1	clear	85.0	-	-
29	30.0	12.2	17.8	16.1	clear	85.2	-	-
30	30.0	14.4	17.2	13.9	partly cloudy	85.0	-	-

* 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 5 (continued)

October	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead***
1	28.9	13.3	14.4	12.2	partly cloudy	85.0	-	-
2	27.8	13.3	14.4	12.8	partly cloudy	85.2	-	-
3	27.8	13.3	14.4	12.8	cloudy	84.4	-	-
4	24.4	14.4	13.9	12.8	partly cloudy	71.4	-	-
5	27.8	12.2	14.4	12.8	partly cloudy	71.9	-	-
6	30.0	12.2	14.4	13.3	partly cloudy	70.5	-	-
7	31.1	12.2	14.4	13.3	partly cloudy	71.1	-	-
8	26.7	13.3	14.4	13.3	partly cloudy	70.5	-	-
9	25.6	13.9	14.4	13.3	cloudy & rain	70.8	-	-
10	23.3	13.9	13.9	13.3	rain	70.8	-	-
11	22.2	13.3	13.9	13.3	cloudy & rain	70.5	-	-
12	24.4	11.1	14.4	12.8	cloudy	70.8	-	-
13	26.7	13.3	14.4	13.3	cloudy	70.5	-	-
14	22.2	13.9	14.4	13.3	cloudy & rain	70.8	-	-
15	23.3	12.8	14.4	13.3	cloudy & rain	70.8	-	-
16	21.1	11.1	14.4	13.3	rain	71.1	-	-
17	22.2	11.1	15.6	13.9	cloudy	71.1	-	-
18	21.1	10.0	15.6	14.4	partly cloudy	70.5	-	-
19	21.1	10.0	14.4	14.4	partly cloudy	71.4	-	-
20	21.1	11.1	15.0	13.9	cloudy	70.8	-	-
21	22.2	10.0	15.6	13.9	partly cloudy & fog	70.0	-	-
22	22.2	8.9	15.6	13.9	clear & fog	56.6	-	-
23	24.4	9.4	16.1	14.4	fog & clear	56.1	-	-
24	22.2	10.0	16.1	14.4	clear	56.1	-	-
25	23.3	10.0	15.6	14.4	clear	56.6	-	-
26	23.9	8.3	15.6	14.4	clear	56.9	339	-
27	21.1	6.7	16.1	14.4	clear	56.9	-	-
28	20.0	6.7	15.0	14.4	clear	56.9	-	-
29	17.8	4.4	15.0	13.9	clear	56.4	-	-
30	16.7	2.2	14.4	13.3	clear	56.6	326	37
31	20.0	2.2	14.4	13.3	clear	56.6	-	-
TOTALS							665	37

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

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

*** Steelhead numbers before December 5 are estimates of fish entering holding ponds. Steelhead numbers after October 4 are counts of fish during spawning operations (see page 5).

Appendix Table 5 (continued)

November	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead***
1	21.1	6.7	15.0	13.9	partly cloudy	56.6	-	-
2	21.1	6.1	15.0	13.9	partly cloudy	56.6	433	11
3	23.3	8.9	15.0	13.9	cloudy & rain	56.9	-	-
4	19.4	13.3	14.4	14.4	partly cloudy & rain	57.2	-	-
5	19.4	7.2	15.6	14.4	partly cloudy	56.6	-	-
6	18.3	5.6	15.0	13.9	partly cloudy	56.4	600	10
7	17.8	8.9	14.4	13.9	cloudy & rain	56.6	-	-
8	15.6	4.4	13.9	13.3	fog & partly cloudy	56.6	-	-
9	15.0	4.4	13.9	13.3	cloudy	56.6	541	10
10	12.2	8.9	13.3	13.3	rain	56.4	-	-
11	16.1	8.9	13.3	13.3	partly cloudy	57.2	-	-
12	16.7	3.3	13.3	12.8	partly cloudy	56.6	-	-
13	12.8	3.3	12.8	12.2	rain	57.2	816	22
14	15.6	11.1	12.8	12.2	rain	57.2	-	-
15	16.7	8.9	12.8	12.2	rain	72.2	-	-
16	18.9	7.8	13.3	12.2	rain	111.0	562	33
17	15.6	6.1	13.9	12.2	partly cloudy	113.3	-	-
18	15.6	6.7	12.8	12.8	cloudy & rain	113.3	-	-
19	16.7	7.8	12.8	12.2	partly cloudy & rain	113.8	-	-
20	14.4	3.3	13.9	11.7	partly cloudy	113.8	478	71
21	15.6	4.4	12.8	12.8	cloudy	112.7	-	-
22	16.7	6.7	12.8	11.7	clear	98.3	-	-
23	13.3	2.2	12.8	11.1	fog & clear	84.7	-	-
24	13.3	1.1	11.7	10.6	fog	71.6	381	76
25	10.0	5.6	11.1	11.1	fog	71.4	-	-
26	11.1	5.6	11.7	11.1	fog	71.1	-	-
27	13.9	5.6	12.2	11.7	partly cloudy & fog	70.8	235	57
28	8.9	2.2	11.7	11.1	fog	70.8	-	-
29	13.3	7.2	11.7	11.1	partly cloudy & fog	70.8	-	-
30	11.1	3.3		10.6	fog	71.1	289	31
TOTALS							4,335	321

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

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

*** Steelhead numbers before December 5 are estimates of fish entering holding ponds. Steelhead numbers after October 4 are counts of fish during spawning operations (see page 5).

Appendix Table 5 (continued)

December	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead***
1	8.3	4.4	11.1	10.6	fog	71.1	-	-
2	8.9	4.4	10.6	10.6	fog	70.8	-	-
3	8.9	4.4	10.6	10.0	cloudy & rain	70.8	-	-
4	11.7	4.4	10.6	10.0	partly cloudy	71.1	328	80
5	8.9	-4.4	10.6	10.0	cloudy	70.8	-	33
6	8.9	1.7	9.4	9.4	cloudy & rain	70.0	-	-
7	7.8	0.0	9.4	8.9	rain	71.1	261	-
8	3.3	-3.3	9.4	8.9	partly cloudy	71.4	-	-
9	3.3	-6.7	9.4	8.9	clear	71.1	-	-
10	5.6	-4.4	8.9	8.3	clear	70.8	-	-
11	5.6	-6.7	8.9	8.3	clear	70.2	287	-
12	7.2	-3.3	8.9	8.3	cloudy	70.5	-	-
13	4.4	-3.3	8.9	8.3	snow	70.2	-	-
14	1.7	-4.4	8.3	7.8	fog	71.1	172	-
15	4.4	-1.1	8.3	7.8	fog	72.2	-	-
16	6.7	0.0	7.8	7.8	cloudy & rain	70.5	-	-
17	11.7	2.2	7.8	7.2	cloudy & rain	71.1	-	-
18	14.4	6.7	8.3	7.8	cloudy & rain	70.5	167	-
19	17.2	10.0	8.9	8.3	cloudy & rain	70.5	-	37
20	16.1	5.0	8.9	8.3	cloudy	72.5	-	-
21	15.6	8.9	8.3	7.8	cloudy	112.7	142	-
22	17.8	10.0	8.3	7.8	partly cloudy	140.5	-	-
23	15.6	4.4	7.8	7.2	partly cloudy & rain	140.5	-	-
24	15.6	6.7	8.3	7.2	partly cloudy	141.3	-	-
25	15.6	9.4	7.8	7.2	partly cloudy	142.4	-	-
26	11.7	3.3	7.8	7.2	cloudy & fog	141.6	188	-
27	10.0	5.6	7.2	7.2	cloudy & rain	141.6	-	-
28	12.8	3.9	7.8	6.7	clear	141.6	-	-
29	12.2	0.0	7.8	6.7	partly cloudy	142.4	170	28
30	12.2	0.0	7.8	7.2	partly cloudy	142.4	-	-
31	14.4	-0.6	7.8	6.7	clear	140.7	-	-
TOTALS							1,715	178

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

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

*** Steelhead numbers before December 5 are estimates of fish entering holding ponds. Steelhead numbers after October 4 are counts of fish during spawning operations (see page 5).

Appendix Table 5 (continued)

January	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead***
1	2.2	-1.1	7.2	6.7	clear	141.3	-	-
2	13.3	0.0	7.8	7.2	partly cloudy	139.3	-	46
3	10.0	0.0	7.8	7.2	clear	111.9	-	-
4	10.0	-2.2	7.8	6.7	clear	74.8	105	120
5	10.0	-3.3	7.8	6.7	clear	72.8	-	-
6	10.0	-2.8	7.8	6.7	clear	98.6	-	-
7	10.0	-3.3	7.8	6.7	partly cloudy	100.5	-	-
8	6.7	3.3	6.7	6.7	rain	99.4	-	-
9	11.1	2.2	7.2	6.7	cloudy & rain	99.1	-	-
10	15.6	8.9	7.8	6.7	cloudy	101.1	-	-
11	11.7	8.9	7.2	7.2	rain	101.4	88	189
12	15.0	10.0	7.8	7.2	cloudy & rain	224.3	-	-
13	15.0	10.0	7.8	7.2	cloudy & rain	824.1	-	-
14	17.2	10.0	7.2	6.7	partly cloudy	852.4	-	-
15	15.6	5.6	7.2	6.7	cloudy & rain	747.6	-	-
16	16.7	11.1	7.8	7.2	cloudy & rain	427.6	-	-
17	14.4	7.8	7.8	7.2	cloudy	464.4	98	120
18	13.3	7.8	7.8	7.2	cloudy & rain	617.3	-	-
19	12.2	1.1	7.8	7.2	clear	793.0	-	-
20	16.7	-1.1	7.8	7.2	clear	815.6	-	-
21	9.4	4.4	7.2	6.7	partly cloudy	365.3	-	-
22	11.7	0.0	7.8	6.7	partly cloudy	281.5	-	-
23	13.9	0.0	7.8	7.2	partly cloudy	230.0	28	499
24	12.2	0.0	7.2	7.2	cloudy	228.0	-	-
25	11.1	5.6	7.2	7.2	rain	228.0	-	-
26	11.1	0.6	7.8	6.7	partly cloudy	224.3	-	-
27	14.4	-1.1	7.2	6.7	partly cloudy	172.5	-	-
28	14.4	0.0	7.2	6.7	partly cloudy	169.3	-	-
29	13.9	2.2	7.2	6.7	rain & partly cloudy	167.9	8	303
30	11.1	6.7	8.3	6.7	partly cloudy	169.3	-	-
31	16.1	6.7	8.3	7.2	partly cloudy	168.5	-	-
TOTALS							327	1,277

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

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

*** Steelhead numbers before December 5 are estimates of fish entering holding ponds. Steelhead numbers after October 4 are counts of fish during spawning operations (see page 5).

Appendix Table 5 (continued)

February	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	8.3	7.2	clear	169.6	-	-
2	14.4	5.6	8.3	7.2	cloudy	169.6	-	-
3	13.9	10.6	7.8	7.2	rain	170.0	-	-
4	16.7	11.1	7.8	7.2	cloudy & rain	170.8	-	-
5	18.9	5.6	7.8	7.2	cloudy	170.5	3	314
6	14.4	7.2	7.8	7.8	cloudy	170.8	-	-
7	16.1	13.9	7.8	7.2	rain & partly cloudy	169.3	-	-
8	16.1	12.8	8.3	7.2	rain	170.5	-	-
9	18.9	9.4	8.3	7.2	cloudy & rain	188.3	-	-
10	15.6	8.9	7.8	7.2	cloudy & rain	225.1	-	-
11	16.1	8.3	8.3	7.2	cloudy & rain	226.5	-	-
12	12.2	6.7	8.3	7.8	partly cloudy & rain	231.4	-	-
13	16.7	8.9	8.3	7.8	cloudy	413.4	-	240
14	14.4	8.9	8.3	8.3	cloudy & rain	424.8	-	-
15	16.7	4.4	9.4	7.8	clear	368.1	-	-
16	16.7	3.3	8.9	7.8	clear	248.6	-	-
17	17.2	3.3	9.4	8.3	partly cloudy	226.5	-	-
18	17.2	3.3	8.9	7.8	partly cloudy	226.5	-	-
19	20.0	3.3	9.4	8.3	clear	227.1	-	-
20	17.8	3.3	10.0	8.3	clear	226.3	-	-
21	17.8	3.3	9.4	8.3	clear	213.8	-	-
22	17.8	3.3	9.4	8.9	clear	212.7	1	348
23	21.1	5.6	8.9	8.3	partly cloudy	213.8	-	-
24	20.0	5.0	8.9	8.9	rain	212.1	-	-
25	21.1	9.4	8.9	8.3	partly cloudy	211.5	-	-
26	14.4	4.4	8.3	8.3	rain	213.5	60	-
27	17.8	8.3	8.9	8.3	cloudy & rain	210.7	-	-
28	18.9	10.0	9.4	8.9	cloudy & rain	220.0	-	-
TOTALS							64	902

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

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

*** Steelhead numbers before December 5 are estimates of fish entering holding ponds. Steelhead numbers after October 4 are counts of fish during spawning operations (see page 5).

Appendix Table 5 (continued)

March	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead***
1	18.9	5.6	8.9	8.9	cloudy	226.0	-	-
2	17.8	4.4	10.6	8.3	clear	225.1	-	264
3	17.2	6.1	8.9	8.3	rain	212.7	-	-
4	16.7	5.6	8.9	8.3	partly cloudy	211.8	-	-
5	16.7	1.1	8.9	8.9	clear	213.0	-	-
6	15.6	7.8	8.9	8.9	cloudy & rain	213.5	-	7
7	17.8	4.4	8.9	8.3	cloudy	213.2	-	-
8	17.8	6.7	10.6	8.9	partly cloudy	212.4	-	-
9	18.9	5.6	9.4	8.9	clear	211.8	-	-
10	17.2	7.8	8.9	8.9	rain & partly cloudy	212.7	-	-
11	16.1	2.2	10.0	8.3	clear	213.0	-	-
12	20.0	5.6	10.0	8.3	partly cloudy	212.1	-	-
13	16.7	4.4	10.0	8.9	clear	212.7	-	-
14	16.7	4.4	10.0	8.9	clear	212.7	-	-
15	17.8	2.8	10.0	8.9	clear	209.0	-	-
16	20.0	5.6	10.0	8.9	partly cloudy	144.1	-	-
17	18.3	10.0	10.0	8.9	partly cloudy	141.9	-	-
18	18.3	2.2	10.0	8.9	clear	142.4	-	-
19	15.6	5.0	9.4	8.9	cloudy & rain	142.2	-	-
20	15.6	6.7	9.4	8.9	cloudy & rain	142.4	-	-
21	12.2	6.1	8.9	8.3	rain	142.7	-	-
22	16.7	4.4	10.6	8.9	clear	142.7	-	-
23	20.0	2.2	11.1	8.9	clear	140.2	-	-
24	21.7	5.6	10.6	9.4	clear	141.6	-	-
25	20.0	7.8	11.1	9.4	partly cloudy	141.9	-	-
26	18.9	8.9	10.0	9.4	cloudy	141.6	-	-
27	18.9	10.0	11.1	9.4	fog & clear	140.7	-	-
28	17.8	5.6	10.6	9.4	partly cloudy	113.0	-	-
29	20.6	3.3	11.1	9.4	cloudy	74.8	-	-
30	12.8	7.8	10.0	10.0	cloudy & rain	71.1	-	-
31	18.9	10.0	10.6	9.4	partly cloudy	70.5	-	-
TOTALS								271

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

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

*** Steelhead numbers before December 5 are estimates of fish entering holding ponds. Steelhead numbers after October 4 are counts of fish during spawning operation (see page 5).

Appendix Table 5 (continued)

April	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	24.4	4.4	11.1	9.4	clear	71.4	-	-
2	25.6	5.6	11.7	8.9	clear	70.8	-	-
3	23.3	8.9	12.2	10.0	clear	70.8	-	-
4	26.7	7.8	13.3	11.1	clear	71.4	-	-
5	26.7	7.8	12.2	10.6	clear	70.8	-	-
6	26.7	8.9	13.3	11.1	clear	69.7	-	-
7	24.4	9.4	13.9	11.1	clear	70.8	-	-
8	26.7	6.1	12.2	11.1	partly cloudy	70.5	-	-
9	26.7	10.0	12.8	11.7	clear	71.1	-	-
10	28.9	4.4	13.3	11.7	clear	71.1	-	-
11	28.9	10.0	12.8	11.7	clear	71.9	-	-
12	24.4	10.0	12.8	11.7	partly cloudy	70.8	-	-
13	18.3	8.9	12.2	11.1	rain	71.4	-	-
14	21.1	9.4	12.2	11.1	clear	71.4	-	-
15	22.2	10.0	12.2	11.1	clear	70.8	-	-
16	18.3	12.2	12.2	11.7	cloudy	71.4	-	-
17	23.3	11.1	12.8	11.1	rain	72.2	-	-
18	21.1	4.4	12.8	11.7	partly cloudy	71.4	-	-
19	25.6	4.4	12.2	11.1	clear	70.8	-	-
20	22.2	4.4	13.3	11.1	clear	73.1	-	-
21	25.6	8.9	13.9	11.7	clear	71.1	-	-
22	29.4	15.6	13.3	12.2	partly cloudy	70.8	-	-
23	30.0	10.0	13.9	12.8	clear	70.8	-	-
24	31.7	10.0	15.0	12.8	clear	70.8	-	-
25	32.2	10.0	13.9	12.8	clear	70.8	-	-
26	32.2	13.3	13.9	12.8	clear	70.8	-	-
27	31.1	11.1	13.9	12.2	clear	70.8	-	-
28	25.6	10.0	13.3	11.7	clear	71.1	-	-
29	25.6	8.9	13.3	12.2	partly cloudy	71.1	-	-
30	26.7	8.9	13.9	12.8	clear	70.8	-	-

* 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 5 (continued)

May	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	28.9	8.9	13.9	12.8	clear	72.8	-	-
2	28.9	7.8	13.9	12.2	partly cloudy	71.6	-	-
3	28.9	11.1	13.9	12.2	partly cloudy	71.4	-	-
4	23.3	10.0	13.3	12.2	partly cloudy & rain	71.4	-	-
5	27.2	6.7	13.3	12.2	clear	70.8	-	-
6	27.2	8.9	13.3	12.2	clear	71.1	-	-
7	29.4	10.0	13.9	12.2	clear	70.8	-	-
8	30.0	8.9	15.0	12.2	clear	70.0	-	-
9	33.3	10.0	15.0	13.3	clear	71.4	-	-
10	32.2	12.2	15.0	12.8	clear	71.4	-	-
11	36.7	12.2	14.4	13.3	clear	71.1	-	-
12	37.8	13.3	15.0	13.3	partly cloudy	71.1	-	-
13	40.0	16.7	14.4	12.8	clear	70.8	-	-
14	35.6	18.9	14.4	12.8	clear	71.4	-	-
15	34.4	15.6	14.4	12.8	clear	71.4	-	-
16	37.8	16.7	15.0	12.8	clear	71.1	-	-
17	40.0	17.8	14.4	12.8	clear	71.1	-	-
18	40.6	17.8	14.4	13.3	clear	71.4	-	-
19	29.4	14.4	13.9	12.8	clear	71.1	-	-
20	28.3	12.2	15.0	13.3	clear	71.1	-	-
21	32.2	11.7	15.0	13.3	clear	71.6	-	-
22	30.0	11.1	15.0	12.2	clear	72.5	-	-
23	30.0	11.1	14.4	12.8	partly cloudy	85.0	-	-
24	25.6	14.4	13.9	13.3	cloudy	85.2	-	-
25	27.8	13.3	14.4	12.2	partly cloudy	85.0	-	-
26	27.8	8.9	13.9	12.8	clear	85.2	-	-
27	32.2	11.1	15.0	13.3	clear	85.0	-	-
28	38.9	15.6	15.0	13.3	clear	85.0	-	-
29	41.1	16.7	14.4	13.3	clear	84.7	-	-
30	33.9	21.1	14.4	13.3	cloudy	85.8	-	-
31	28.3	14.4	14.4	12.8	partly cloudy	112.4	-	-

* 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 5 (continued)

June	Temperature (C*) Air Maximum	Air Minimum	Water Maximum	Water Minimum	Weather	American River flow at hatchery (m^3/sec**)	Salmon	Steelhead
1	31.1	13.3	13.9	12.2	clear	113.6	-	-
2	32.2	13.3	14.4	12.8	clear	113.3	-	-
3	33.9	14.4	14.4	12.8	clear	113.6	-	-
4	37.8	15.6	14.4	12.8	clear	113.6	-	-
5	40.0	16.7	14.4	13.3	clear	115.5	-	-
6	41.7	16.7	15.0	13.3	clear	113.6	-	-
7	41.1	16.7	15.0	13.3	clear	113.6	-	-
8	43.3	17.2	14.4	13.3	clear	113.8	-	-
9	40.6	17.8	14.4	13.3	clear	113.6	-	-
10	35.6	16.1	14.4	13.3	partly cloudy	113.3	-	-
11	35.6	18.3	14.4	13.3	partly cloudy	113.8	-	-
12	32.2	15.6	14.4	13.3	clear	112.4	-	-
13	30.6	14.4	14.4	13.3	partly cloudy	99.1	-	-
14	28.9	11.1	14.4	13.3	clear	99.4	-	-
15	30.0	11.1	14.4	13.3	clear	99.1	-	-
16	28.9	14.4	14.4	13.3	partly cloudy	99.1	-	-
17	27.8	10.6	15.6	14.4	partly cloudy	99.1	-	-
18	33.9	11.1	15.6	13.3	clear	99.1	-	-
19	39.4	13.3	15.6	13.9	clear	99.1	-	-
20	44.4	16.7	15.6	13.9	clear	99.1	-	-
21	46.7	17.8	15.6	14.4	clear	98.6	-	-
22	34.4	16.7	15.6	13.9	partly cloudy	98.6	-	-
23	32.2	15.6	15.0	13.9	partly cloudy	98.8	-	-
24	38.3	16.7	14.4	13.9	partly cloudy	98.8	-	-
25	39.4	17.8	15.6	13.9	clear	99.1	-	-
26	44.4	20.6	15.0	13.3	clear	99.1	-	-
27	44.4	22.8	15.0	13.9	partly cloudy	99.4	-	-
28	39.4	21.1	14.4	13.9	clear	98.8	-	-
29	34.4	17.8	15.6	13.9	clear	99.1	-	-
30	33.3	12.2	15.0	13.9	clear	98.8	-	-
GRAND TOTALS							7,106	***

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

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

*** Steelhead numbers before December 5 are estimates of fish entering holding ponds. Steelhead numbers after October 4 are counts of fish during spawning operation (see page 5).