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ANNUAL REPORT
VAN ARSDALE FISHERIES STATION, 1986-87

by

Roger Dixon
and
Robert W. Rose
Region 3, Inland Fisheries

Inland Fisheries
Administrative Report No. 88-1
1988

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ABSTRACT

This report describes the operation of Van Arsdale Fisheries Station (Snow Mountain Station), Mendocino County, California, during the 1986-87 season. Steelhead, Salmo gairdneri, and chinook salmon, Oncorhynchus tshawytscha, counts have been made at the Station since 1933.

During the season, 1,952 steelhead and 1,754 chinook salmon were trapped.

Approximately 181,260 steelhead eggs were collected at the Station and shipped to Silverado Fisheries Base. No chinook salmon eggs were collected from fish ascending the Cape Horn Dam fishway this season.

The number of adult fish trapped, egg lots collected, fish planted and shipped, Eel River flows, morning water temperatures, and general weather conditions during the 1986-87 steelhead and salmon migration season were recorded (Tables 1, 2, 3, and Appendix Tables 1 and 2).

^{1/}
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INTRODUCTION

Van Arsdale Fisheries Station is located approximately 25 miles northeast of Ukiah, Mendocino County, California, on the Eel river at Cape Horn Dam, which impounds Van Arsdale Reservoir. The station was constructed by Snow Mountain Light and Power Company in 1907 and subsequently sold to Pacific Gas and Electric Company (PG&E) in 1930. The Cape Horn Dam fish ladder is maintained by PG&E; the fisheries station grounds and facilities are maintained by the Department of Fish and Game.

METHODS

The upstream migrant fish trap was placed into operation on 1 November 1986 and remained in continuous operation until 30 April 1987. On April 30, the ladder was de-watered in preparation for rebuilding of the weirs and other work. The trap was checked and serviced daily during this period. Adult steelhead selected for spawning were placed in a separate holding pen until they were ripe. All other fish were immediately released upstream after data on species, sex, fork length (FL), origin, state of maturity, and general condition were collected.

No downstream migrant fish trapping operations were conducted in the Cape Horn Dam fishway this season.

Environmental data were recorded daily between 0800 and 1000 hours. Eel River flow was measured at the PG&E gauging station E-11, immediately downstream of Cape Horn Dam. Eel river water temperature and general weather conditions were also recorded.

1986-87 STEELHEAD PROGRAM

The first steelhead was trapped on 6 December 1986, and the last on 20 April 1987. A total of 1,952 steelhead (519 males, 946 females, and 487 "half pounders") was recorded (Appendix Table 1). A total of 41 females was spawned, yielding 181,260 eggs (Table 1). Average fecundity was 4,421 eggs per female; overall fertility was 80 percent. All eggs were shipped green to Silverado Fisheries Base, Napa County, for incubation until they reached the eyed stage. The eyed eggs were shipped to Mad River Hatchery, Humboldt County, for rearing.

TABLE 1. Steelhead Production Summary, Van Arsdale Fisheries Station, 1986-87 Season ^{1/}

<u>Date</u>	<u>Number of females spawned</u>	<u>Number of green eggs shipped</u>	<u>Number of eyed eggs</u>	<u>Fertility</u>
February 27	14	65,360	60,450	92%
March 6	11	42,740	33,304	78%
March 12	16	73,150	67,768	93%
Totals	41	181,260	161,522	89%

^{1/} All eggs were shipped green to Silverado Fisheries Base, Napa County.

During the trapping season, many steelhead were observed with fin clips (Table 1). All these fish were released upstream after data were recorded. The clipped adult steelhead were adult returns of 3,514 "test" (RV) and 4,514 "control" (LV) hatchery-reared smolts released in 1985 to assess short- and long-term mortality rates of downstream migrants passing over Cape Horn Dam. The "half-pound" steelhead observed were hatchery-reared smolts released in the spring of 1986 at Van Arsdale from 1985 Eel River brood stock.

TABLE 2. Marked Adult Steelhead Recovered at Van Arsdale Fisheries Station, 1986-87.

<u>Source</u>	<u>LV (Control)</u>	<u>RV (Test)</u> ^{1/}
VAFS Trap 1986-87	153 (50.5%)	150 (49.5%)

^{1/} An additional 106 fish exhibited worn dorsal fins, indicating a hatchery origin, but they had no fin clips.

CHINOOK SALMON PROGRAM

The first chinook salmon was trapped on 3 December 1986, and the last on 22 January 1987. A total of 1,754 chinook salmon (905 males, 364 females, 485 grilse) was recorded (Appendix Table 1).

All chinook salmon trapped were passed above Cape Horn Dam. No eggs were collected in 1986-87.

One chinook salmon had a clipped adipose fin indicating it had been tagged with a coded wire tag. The head was removed and sent to Region 3 headquarters for identification.

OTHER PROJECTS

On 7 April 1987, the Pacific Gas and Electric Company began preparations for a major construction project involving Cape Horn Dam and the fish ladder. The project will include: 1) an 88-cfs fish water release and spillway built into the crest of the dam, 2) a fish barrier to prevent upstream migrating fish from bypassing the entrance to the fish ladder, 3) a new fish ladder entrance facility, 4) modification of the existing pools and weirs, 5) a new fish ladder exit, and 6) flow monitoring equipment and automatic flow control.

On 4 May 1987, a water diversion system was finished which carried 30 cfs from Van Arsdale Reservoir around the construction site and spilled back into the river channel. On 5 May, the ladder was closed and sealed in preparation for construction. A coffer dam was finished below the work site on 13 May. On 14 May, the enclosed pool at the base of Cape Horn Dam was pumped almost dry and the trapped fish were rescued.

As of 30 June 1987, construction of the new spillway on the crest of Cape Horn Dam was in progress. The footings for the diversion wall in the river channel were poured, and modification of the fish ladder was in progress.

It is anticipated that PG&E will complete the entire project by 1 October 1987.

APPENDIX TABLE 1. Date of Salmon and Steelhead Arrivals, Morning Eel River Water Temperature, Eel River Flow, and General Daily Weather Conditions at Van Arsdale Fisheries Station, 1986-87 Season.

Date	Steelhead			CHIN salmon				Water temp (F @0800)	Eel River flow (cfs)	Weather	Air temp (F @0800)
	M	F	1/2lb Tot	M	F	G	Tot				
<u>1986</u>											
Dec 1								43	28	Clear	25
2								44	29 1/2	Clear	27
3				48	6	20	74	46	228 1/2	Clear	33
4				98	15	79	192	46	300 1/2	Overcast	44
5				289	106	146	541	48	173 1/2	Overcast	49
6	1		1	206	93	112	411	48	164 1/2	Fog	42
7	1		1	133	76	69	278	46	279 1/2	Clear	38
8				42	23	29	94	47	276 1/2	Clear	30
9								44	24	Clear	25
10								43	15	Clear	44
11				5	4		9	43	22	Clear	28
12								43	19	Clear	23
13				2	5	2	9	44	21	Rain	43
14				7	7	2	16	45	21	Pt. Cloudy	39
15				8	2	5	15	45	23	Pt. Cloudy	44
16				3	1	3	7	45	116	Clear	38
17		1	1	5	1	0	6	44	93	Clear	39
18				17	8	7	32	46	119	Rain	43
19		3	3	3	3	1	7	45	30	Rain	40
20		3	3	6	11	8	25	44	28	Cloudy	37
21				3	3	0	6	44	23	Clear	35
22				1		1	2	44	38	Cloudy	43
23			2	2	3	1	4	44	20	Fog	44
24							1	44	20	Cloudy	37
25				Station Not Attended							
26								44	20	Rain	41
27								44	20	Clear	27
28								43	20	Clear	33
29								44	24	Rain	44
30								44	25	Clear	32
31								45	24	Rain	44
December											
Totals	2	7	5	14	884	362	483	1729			

APPENDIX TABLE 1. (cont'd)

Date	Steelhead				CHIN salmon			Water temp (F @0800)	Eel River flow (cfs)	Weather	Air temp (F @0800)
	M	F	1/2lb	Tot	M	F	G Tot				
Jan 1	10	15	17	42	6		6	46	69	Rain	43
2	28	26	32	86	6	1	7	45	176	Cloudy	36
3	30	31	36	97	4	1	2 7	46	349	Rain	43
4	23	43	27	93				46	127	Clear	41
5	16	24	17	57	2		2	45	194	Cloudy	35
6	3	2	3	8				43	159	Rain	34
7	5	7	6	18				43	140	Clear	29
8	1	3		4				41	144	Clear	25
9	3	1		4				42	119	Clear	38
10	4	4	3	11				43	99	Clear	30
11	2	2	1	5				42	89	Clear	35
12		2	2	4	1		1	43	103	Cloudy	38
13	6	5	2	13				42	103	Clear	30
14	3	10		13				41	103	Clear	27
15	1			1				41	99	Clear	28
16	1			1				38	97	Clear	24
17								40	97	Clear	42
18								41	93	Clear	50
19		1		1				40	103	Clear	25
20								39	99	Clear	34
21								40	97	Pt. Cloudy	32
22		2	1	3	2		2	40	93	Rain	35
23	1	5	1	7				41	103	Rain	36
24	5	13	2	20				43	176	Rain	44
25	26	20	20	66				43	110	Rain	48
26	20	26	30	76				44	82	Clear	42
27	11	15	17	43				44	76	Clear	39
28	6	13	17	36				43	224	Overcast	42
29	8	7	14	29				43	99	Overcast	33
30	5	7	3	15				44	121	Overcast	39
31	7	11	14	32				43	84	Overcast	36

January

Totals 225 295 265 785 21 2 2 25

Feb 1		4	2	6				43	110	Clear	38
2	31	59	15	105				44	293	Rain	46
3	21	50	49	120				44	69	Clear	41
4	3	5	6	14				44	71	Clear	33
5	7	10	5	22				45	48	Clear	38
6	5	7	2	14				43	48	Clear	31
7	3	3		6				43	46	Clear	34
8	5	5	1	11				43	42	Overcast	36
9	4	6	1	11				45	47	Rain	48
10	9	28	6	43				46	63	Rain	49
11	14	40	8	62				47	95	Clear	44

APPENDIX TABLE 1. (cont'd)

Date	Steelhead				CHIN salmon			Water temp (F @0800)	Eel River flow (cfs)	Weather	Air temp (F @0800)
	M	F	1/2lb	Tot	M	F	G Tot				
Feb											
12	7	19	3	29				47	58	Rain	46
13	16	34	13	63				49	1192	Rain	47
14	23	62	4	89				46	256	Rain	38
15	19	46	11	76				45	676	Rain	42
16	18	31	9	58				44	138	Clear	34
17	4	22	12	38				44	103	Clear	34
18	2	6		8				44	87	Clear	37
19	2	5	4	11				43	176	Clear	30
20		3		3				44	262	Clear	29
21	3	15	1	19				44	229	Pt. Cloudy	38
22	1	1	3	5				43	186	Clear	30
23								44	144	Clear	28
24	5	14	2	21				43	113	Clear	28
25	1	4		5				43	78	Clear	27
26								43	41	Clear	28
27								43	68	Clear	27
28								44	50	Clear	46
February											
Totals	203	479	157	839							
Mar											
1	3	6	1	10				44	103	Clear	46
2	2	5		7				45	103	Overcast	47
3	3	1	1	5				46	129	Rain	51
4	2	10	5	17				46	194	Overcast	54
5	2	4	1	7				46	682	Rain	47
6	15	32	3	50				46	2885	Clear	40
7	10	10	4	24				45	1515	Cloudy	46
8	6	7	7	20				46	911	Rain	46
9	6	5	1	12				46	637	Clear	43
10	5	10	1	16				46	439	Overcast	41
11	4	5	3	12				46	722	Rain	44
12	10	13	3	26				48	2162	Rain	42
13	3	10		13				46	8101	Rain	45
14	1	3	3	7				46	4112	Rain	46
15	1	9	4	14				45	3025	Clear	42
16	1	2	1	4				46	2094	Clear	37
17	1	2		3				47	1343	Clear	40
18		4	2	6				46	1013	Rain	41
19								45	817	Clear	36
20	2	3	1	6				45	610	Clear	30
21	1	4	5	10				45	524	Snow	42
22		4	1	5				46	482	Clear	44

APPENDIX TABLE 1. (cont'd)

Date	Steelhead				CHIN salmon			Water temp (F @0800)	Eel River flow (cfs)	Weather	Air temp (F @0800)
	M	F	1/2lb	Tot	M	F	G Tot				
Mar											
23	2	6	1	9				45	665	Rain	41
24	2	2		4				45	637	Clear	36
25	1		1	2				46	509	Clear	35
26			2	2				47	469	Clear	40
27	1	1		2				47	337	Clear	36
28		1	2	3				47	296	Clear	52
29	1			1				47	253	Clear	58
30		1		1				47	216	Clear	37
31	1			1				48	192	Clear	40
March											
Totals	86	160	53	299							
Apr											
1								47	162	Clear	37
2		1		1				48	148	Overcast	41
3								48	137	Clear	36
4								47	123	Clear	36
5		1	3	4				48	119	Clear	36
6								48	115	Clear	40
7								48	108	Clear	38
8			3	3				51	127	Overcast	38
9	1	1	1	3				52	84	Clear	39
10								53	78	Overcast	40
11								52	82	Pt. Cloudy	38
12								51	73	Pt. Cloudy	34
13		1		1				51	82	Clear	37
14		1		1				52	80	Clear	38
15								53	85	Clear	36
16								53	85	Clear	36
17	1			1				54	82	Clear	38
18								54	82	Clear	38
19								51	84	Clear	32
20	1			1				52	82	Clear	34
21								54	84	Clear	39
22								55	84	Clear	41
23								55	76	Clear	42
24								54	66	Clear	38
25								55	69	Clear	39
26								56	68	Clear	39
27								57	68	Clear	39
28								58	68	Clear	39
29								56	60	Overcast	44
30								57	71	Rain	44
April											
Totals	3	5	7	15							

APPENDIX TABLE 1. (cont'd)

Date	Steelhead			CHIN salmon			Water temp (F @0800)	Eel River flow (cfs)	Weather	Air temp (F @0800)
	M	F	1/2lb Tot	M	F	G Tot				

Season

Totals 519 946 487 1952 905 364 485 1754

APPENDIX TABLE 2. Annual Steelhead and Chinook Salmon Counts, Van Arsdale Fisheries Station, 1933-34 to 1986-87

<u>Season</u>	<u>Steelhead</u>	<u>Chinook salmon</u>	<u>Season</u>	<u>Steelhead</u>	<u>Chinook salmon</u>
1933-34	3,247		1960-61	1,130	
1934-35	2,225		1961-62	1,693	
1935-36	6,310		1962-63	2,030	9
1936-37	6,861		1963-64	846	3
1937-38	3,413		1964-65	921	108
1938-39	4,786		1965-66	423	94
1939-40	3,990		1966-67	534	119
1940-41	2,228		1967-68	531	
1941-42	no record		1968-69	340	
1942-43	no record		1969-70	719	15
1943-44	no record		1970-71	1,863	47
1944-45	9,528		1971-72	696	
1945-46	5,054		1972-73	586	
1946-47 ^{1/}	4,409	917	1973-74	1,040	12
1947-48	178		1974-75	1,126	1
1948-49	2,433		1975-76	1,077	2
1949-50	no record		1976-77	39	
1950-51	1,091	55	1977-78	590	23
1951-52	5,444		1978-79	106	5
1952-53	2,197		1979-80	87	
1953-54	2,590		1980-81	1,966	
1954-55	6,131		1981-82	646	175
1955-56	3,719		1982-83	369	9
1956-57	4,109		1983-84	1,534	26
1957-58	5,151		1984-85 ^{2/}	1,980	153
1958-59	3,335		1985-86 ^{3/}	1,196	961
1959-60	2,206		1986-87 ^{3/}	1,952	1,754

^{1/} Forty-seven coho salmon also ascended the fishway during this season.

^{2/} Includes 86 steelhead "half-pounders" and 705 chinook salmon grilse.

^{3/} Includes 487 steelhead "half-pounders" and 485 chinook salmon grilse.