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DEPARTMENT OF FISH AND GAME

ANNUAL REPORT
VAN ARSDALE FISHERIES STATION
1984-85

by

Robert W. Rose
Region 3, Inland Fisheries

Anadromous Fisheries Branch
Administrative Report No. 86-05

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ABSTRACT

This report describes the operation of Van Arsdale Fisheries Station (Snow Mountain Station), Mendocino County, California, during the 1984-85 season. Steelhead, Salmo gairdneri, and chinook salmon, Oncorhynchus tshawytscha, counts have been made at the Station since 1933.

During the season, 1,980 steelhead and 153 chinook salmon were trapped. One female coho salmon, Oncorhynchus kisutch, also ascended the Cape Horn Dam fishway. This fish was assumed to be a stray from the Middle or South Fork Eel River.

Approximately 227,940 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.

Approximately 113,440 chinook salmon eggs were brought to Van Arsdale Fisheries Station from fish trapped on Outlet and Long Valley creeks. These eggs were incubated, hatched, and temporarily reared at the Station prior to shipment to the Don Clausen Hatchery (Warm Springs).

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In an assessment of downstream migrant response to passage over Cape Horn Dam, approximately 9,350 yearling steelhead were released into the Eel River and monitored downstream for stress and mortality.

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 1984-85 steelhead and salmon migration season were recorded (Tables 1, 2, 3, and 4 and Appendix 1).

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 19 October 1984, and remained in continuous operation until 5 June 1985. 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 species, sex, fork length (FL), origin, state of maturity, and general condition data 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 0830 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.

Incubation of eggs and rearing of juvenile fish was conducted utilizing water piped from nearby Cape Horn Creek.

1984-85
STEELHEAD PROGRAM

The first steelhead of the season was trapped on 6 November 1984, and the last on 19 May 1985. A total of 1,980 steelhead (549 males and 1,431 females) was recorded (Appendix 1). No tagged or marked fish were observed. A total of 40 females was spawned, yielding 227,940 eggs (Table 1). Average fecundity was approximately 5,700 eggs per female; overall fertility was 92%. All eggs were shipped green to Silverado Fisheries Base, Napa County, for incubation and rearing. Prespawning mortality was 6 males and 15 females.

TABLE 1. Steelhead Production Summary, Van Arsdale Fisheries Station, 1984-85 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>
3-05-85	22	128,100	116,850	91%
3-11-85	18	99,840	92,530	93%
Totals	<u>40</u>	<u>227,940</u>	<u>209,380</u>	

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

Approximately 9,350 yearling steelhead were imprinted at Van Arsdale Fisheries Station and released into the Eel River on 3 April 1985 (Table 2). This total included a "test fish" population of 3,506 right ventral (RV) fin clipped fish and a "control fish" population of 4,496 left ventral (LV) fin clipped fish. "Test" fish were released upstream of Cape Horn Dam, while "control" and unmarked fish were released into the Eel River immediately downstream of the Dam. This experiment was conducted to assess mortality of downstream migrating fish at Cape Horn Dam and included underwater observation of fish by Department personnel and fyke-net trapping by contract consultants. A direct mortality of 43 fish and injury to an additional 42 "test" fish was observed. No mortality was observed in the "control" group.

TABLE 2. Juvenile Steelhead Plants, Eel River at Van Arsdale Fisheries Station, 1984-85 Season^{1/}

<u>Date received</u>	<u>Date released</u>	<u>Number</u>	<u>Size (per lb)</u>	<u>Mark</u>	<u>Location of plant</u>
3-14-85	4-03-85	3,506	5.5	RV	Upstream of Cape Horn Dam
3-14-85	4-03-85	4,496	5.5	LV	Below Cape Horn Dam
3-14-85	4-03-85	1,348	5.5	none	Below Cape Horn Dam
Total		<u>9,350</u>			

^{1/} All fish held at Van Arsdale Fisheries Station for 21 days prior to release.

CHINOOK SALMON PROGRAM

The first chinook salmon of the season was trapped on 10 November 1984 and the last on 14 January 1985. A total of 153 chinook salmon (81 males, 41 females, 31 grilse) was recorded (Appendix 1). One male was found dead in the trap. No tagged or marked fish were observed. All chinook salmon trapped were passed above Cape Horn Dam. No eggs were collected in 1984 due to commencement of a 10-year study by PG&E to evaluate natural production and migration of chinook salmon in the Eel River system.

COHO SALMON

One 66-cm (26-inch), female coho salmon was trapped at Arsdale Fisheries Station this season. To the best of our knowledge, this is only the second season that a fish of this species has ascended the Cape Horn Dam fishway (1946-47). This fish was believed to be a stray from either the Middle or South Fork Eel River, both of which support substantial coho runs.

OTHER PROJECTS

Approximately 113,400 chinook salmon eggs were collected at Van Arsdale Fisheries Station this season from fish collected in an upstream-migrant trapping operation conducted on Outlet Creek (tributary to Eel River, Mendocino County) and Long Valley Creek (tributary to Outlet Creek) between 30 November 1984, and 15 December 1984 (Table 3). A total of 70 chinook salmon (37 males, 33 females) was transported from the trapping site to the Station and held for ripening. Three males and two females died before spawning. A total of 31 females was spawned, yielding an average of 3,660 eggs per female and an overall fertility of 76%. All eggs were incubated and hatched at the Station.

On 8 May 1985, approximately 74,580 chinook salmon juveniles were transferred to the Don Clausen Hatchery in Sonoma County for continued rearing to a size suitable for implantation of coded wire tags (Table 4). Tagged fish will be returned to the Eel River for outmigration. This tagging operation is being conducted to examine migration routes and return rates of upper Eel River chinook salmon and their relative importance to the ocean commercial and sport fisheries.

TABLE 3. Chinook Salmon Production Summary, Outlet Creek Strain Chinook Salmon, 1984-85 Season^{1/}

<u>Date</u>	<u>Number of females spawned</u>	<u>Number of green eggs</u>	<u>Number of eyed eggs</u>	<u>Fertility</u>
Nov. 30	2	6,956	6,126	88%
Dec. 01	2	7,906	5,900	75%
Dec. 03	1	4,347	4,060	93%
Dec. 06	4	16,240	14,796	91%
Dec. 09	3	11,820	2,464	21%
Dec. 09	1	2,142	660	31%
Dec. 12	4	12,772	12,720	99%
Dec. 14	9	34,500	26,065	76%
Dec. 15	1	4,756	3,740	79%
Dec. 16	2	4,992	4,140	83%
Dec. 20	1	3,402	2,478	73%
Dec. 23	1	3,604	3,528	98%
Totals	<u>31</u>	<u>113,437</u>	<u>86,677</u>	

^{1/} All eggs collected, incubated, and hatched at Van Arsdale Fisheries Station from adult fish trapped in Outlet and Long Valley creeks, Mendocino County.

TABLE 4. Chinook Salmon Shipment Summary, Outlet Creek
Strain Chinook Salmon, 1984-85 Season^{1/}

<u>Date shipped</u>	<u>Number</u>	<u>Size/lb</u>	<u>Location shipped</u>
5-08-85	42,840	280	Don Clausen Hatchery
5-08-85	31,740	345	Don Clausen Hatchery
Total	<u>74,580</u>		

^{1/} To be returned to the Eel River after implantation of coded wire tags.

APPENDIX I. Date of Salmon and Steelhead Arrivals, Morning Eel River Water Temperature, Eel River Flow, and General Daily Weather Conditions at Van Arsdale Fisheries Station, 1984-85 Season

Date	Steelhead			Chinook salmon				Water temp. (°F@0800)	Eel River flow (cfs)	Weather
	M	F	Tot.	M	F	G	Tot.			
<u>1984</u>										
Nov 1								no data	13	Overcast
2								53	136	Rain
3								54	64	Clear
4								54	28	Clear
5								no data	17	Overcast
6	1	2	3					54	119	Cloudy
7								no data	52	Cloudy
8		2	2					54	160	No data
9								54	43	Cloudy
10		1	1	2		1	3	54	280	Rain
11		1	1	5		5	10	54	666	Rain
12	<u>1/</u>			15	2	9	26	54	527	Rain
13		1	1		1		1	52	1350	Rain
14		1	1	1		1	2	50	153	Overcast
15								48	224	Rain
16								48	321	Cloudy
17				1			1	50	182	Rain
18		6	6	6	2	8	16	50	341	Cloudy
19		1	1	5		1	6	50	131	Clear
20				7	1		8	50	160	Rain
21						1	1	50	142	Clear
22								50	114	Clear
23								48	114	Rain
24		2	2	3	6		9	48	617	Rain
25	1	1	2	1		1	2	46	185	Rain
26		1	1	4	2		6	46	457	Cloudy
27				3	1		4	46	510	Rain
28	1	1	2	1			1	48	6120	Rain
29				3	3	1	7	48	3600	Cloudy
30		3	3	1	2		3	48	2280	Rain
November										
Totals	3	23	26	58	20	23	106			

APPENDIX I. (Continued)

<u>Date</u>	<u>Steelhead</u>			<u>Chinook salmon</u>			<u>Water temp.</u> <u>(°F@0800)</u>	<u>Eel River</u> <u>flow (cfs)</u>	<u>Weather</u>	
	<u>M</u>	<u>F</u>	<u>Tot.</u>	<u>M</u>	<u>F</u>	<u>G Tot.</u>				
Dec 1	1		1		1	1	2	47	1690	Cloudy
2								47	1150	Cloudy
3		3	3					46	1600	Clear
4	1	1	2	1	3		4	46	1120	Clear
5		1	1	2	1	1	4	46	958	Cloudy
6		1	1	1			1	47	740	Clear
7								46	619	Clear
8								46	488	Cloudy
9	1	1	2	6	2		8	47	1110	Cloudy
10	1	6	7	5	6		11	48	1300	Cloudy
11	3	7	10	2	3		5	46	1010	Cloudy
12	1	3	4	1			1	47	854	Rain
13								46	701	Clear
14	4	2	6	1	2	1	4	44	539	Clear
15	4	1	5	1			1	46	457	Rain
16	3	9	12	2	1		3	44	249	Clear
17	2	2	4	1			1	44	266	Clear
18	3	14	17					44	215	Snow
19	1	2	3		1		1	42	209	Clear
20								40	165	Clear
21								40	131	Clear
22								41	106	Clear
23								40	98	Clear
24								41	101	Clear
25								41	108	Overcast
26								42	142	Rain
27								40	131	Cloudy
28								40	125	Cloudy
29								40	98	Cloudy
30								41	98	Rain
31								42	98	Partly Cloudy

December
Totals 25 53 78 23 20 3 46

APPENDIX I. (Continued)

Data	Steelhead			Chinook salmon			Water temp. (°F@0800)	Eel River Flow (cfs)	Weather
	M	F	Tot.	M	F	G Tot.			
1985									
Jan 1							40	106	Clear
2							41	101	Clear
3							41	116	Clear
4	2	4	6				40	108	Overcast
5							41	105	Overcast
6	1	3	4				43	106	Overcast
7		1	1				43	119	Rain
8							47	116	Overcast
9							42	114	Rain
10	6	9	15				40	114	Cloudy
11							40	112	Clear
12	1	3	4				41	105	Overcast
13							40	103	Clear
14				1		1	40	105	Clear
15	2		2				40	110	Clear
16	2	1	3				40	108	Clear
17	3		3				41	108	Clear
18	2	3	5				41	108	Clear
19							41	106	Clear
20							41	105	Clear
21	4	1	5				41	105	Clear
22		4	4				41	106	Overcast
23							40	103	Clear
24	5	6	11				40	103	Cloudy
25							40	103	No data
26	1		1				41	95	Overcast
27	1		1				41	103	Clear
28							41	103	Rain
29	11	20	31				40	103	Cloudy
30							40	103	Clear
31							40	No data	Clear
January									
Totals	41	55	96	1	0	1			

APPENDIX I. (Continued)

Date	Steelhead			Chinook salmon				Water temp. (°F@0800)	Eel River Flow (cfs)	Weather
	M	F	Tot.	M	F	G	Tot.			
Feb 1								40	103	Rain
2								40	101	Clear
3	5	2	7					40	110	Clear
4	2	5	7					40	110	Clear
5								40	98	Cloudy
6		2	2					40	95	Cloudy
7	1	2	3					41	131	Rain
8	20	31	51					44	2530	Clearing
9	79	112	191					43	341	Snow
10	50	86	136					43	177	Clear
11	32	86	118					43	196	Overcast
12	30	96	126					45	160	Cloudy
13	36	123	159					43	121	Clear
14	21	68	89					41	182	Clear
15	10	43	53					41	269	Clear
16	7	44	51					41	273	Clear
17	11	38	49					44	259	Overcast
18	3	11	14					44	221	Cloudy
19	3	17	20					43	182	Partly Cloudy
20	1	14	15					42	136	Clear
21	1	7	8					42	108	Clear
22	11	60	71					44	108	Partly Cloudy
23	12	38	50					44	95	Clear
24	8	19	27					44	105	Clear
25	9	31	40					42	100	Clear
26		3	3					44	112	Clear
27	2	9	11					44	114	Cloudy
28	8	22	30					44	114	Clear

February

Total 362 969 1331

APPENDIX I. (Continued)

<u>Date</u>	<u>Steelhead</u>			<u>Chinook salmon</u>				<u>Water temp.</u>	<u>Eel River</u>	<u>Weather</u>
	M	F	Tot.	M	F	G	Tot.	(°F@0800)	Flow (cfs)	
Mar 1	5	18	23					44	116	Clear
2	3	5	8					44	116	Clear
3	1	3	4					44	114	Clear
4	1	3	4					44	123	Rain
5	1	5	6					44	110	Snow
6	2	5	7					44	89	Snow
7								43	119	Snow
8		1	1					43	105	Cloudy
9	9	17	26					44	106	Clear
10	7	24	31					45	204	Rain
11	3	15	18					44	188	Overcast
12	8	9	17					44	146	Overcast
13	7	35	42					45	106	Overcast
14	1	7	8					45	100	Clear
15	2	16	18					44	114	Clear
16	2	14	16					45	108	Overcast
17	8	7	15					44	100	Overcast
18	2	2	4					44	114	Cloudy
19	4	24	28					44	90	Overcast
20		5	5					45	96	Clear
21	1	8	9					45	103	Clear
22	5	1	6					44	108	Clear
23	3	8	11					47	103	Clear
24	3	10	13					48	129	Rain
25	2	4	6					45	100	Clear
26								44	112	Snow
27								43	291	Snow
28								42	207	Snow
29		1	1					43	218	Clear
30	1	2	3					44	160	Clear
31	1	5	6					45	243	Clear
March Totals	82	254	336							

APPENDIX I. (Continued)

<u>Date</u>	<u>Steelhead</u>			<u>Chinook salmon</u>				<u>Water temp.</u> (°F@0800)	<u>Eel River</u> <u>Flow (cfs)</u>	<u>Weather</u>
	M	F	Tot.	M	F	G	Tot.			
Apr 1	1	3	4					45	201	Clear
2	3	7	10					48	112	Clear
3		6	6					49	165	Clear
4	5	10	15					50	116	Clear
5	5	6	11					51	95	Clear
6	2	3	5					52	98	Overcast
7		3	3					52	273	Clear
8	2	2	4					53	136	Clear
9	5	2	7					53	112	Clear
10								54	108	Cloudy
11	1	1	2					53	90	Clear
12		2	2					54	84	Clear
13	1	2	3					56	138	Clear
14	2	5	7					57	73	Clear
15		1	1					57	67	Overcast
16	1	5	6					56	65	Overcast
17	2		2					56	65	Cloudy
18								56	106 2/	Clear
19								54	165 2/	Cloudy
20		2	2					54	287 2/	Drizzle
21	1	4	5					54	163 2/	Drizzle
22								53	121 3/	Partly Cloudy
23	2	1	3					54	118	Clear
24								54	50	Clear
25								54	54	Clear
26		1	1					54	60	Clear
27								56	50	Clear
28	1	1	2					57	48	Clear
29								57	47	Clear
30	1	4	5					58	39	Clear
April Totals	35	71	106							

APPENDIX I. (Continued)

Date	Steelhead			Chinook salmon				Water temp. (°F@0800)	Eel River Flow (cfs)	Weather
	M	F	Tot.	M	F	G	Tot.			
May 1								58	42	Overcast
2		1	1					58	39	Clear
3								58	38	Cloudy
4								57	35	Clear
5								56	36	Clear
6								58	37	Clear
7								57	39	Cloudy
8								55	39	Clear
9	1	1	2					55	38	Clear
10								56	38	Rain
11								56	39	Cloudy
12								56	39	Clear
13								58	35	Clear
14								59	34	Clear
15								60	35	Clear
16								60	23	Partly Cloudy
17		2	2	3/				60	81	2/Partly Cloudy
18		1	1	3/				60	140	2/ Clear
19		1	1					60	269	2/ Clear
20								61	149	2/ Clear
21								60	136	2/ Partly 4/ Cloudy
22								Station not attended		
23								Station not attended		
24								64	131	4/ Overcast
25								64	125	4/ Clear
26								64	125	4/ Cloudy
27								64	129	4/ Cloudy
28								64	121	4/ Cloudy
29								59	125	4/ Rain
30								60	129	4/ Overcast
31								62	121	4/ Cloudy
May Totals	1	6	7							

APPENDIX I. (Continued)

<u>Date</u>	<u>Steelhead</u>			<u>Chinook salmon</u>				<u>Water temp. (°F@0800)</u>	<u>Eel River Flow (cfs)</u>	<u>Weather</u>
	M	F	Tot.	M	F	G	Tot.			
June 1								60	14	Cloudy
2								Station not attended		
3								61	5	Partly Cloudy
4								63	9	Cloudy
5								Trap dismantled		
June Totals	0	0	0							

	<u>Steelhead</u>			<u>Chinook Salmon</u>			
	M	F	Tot.	M	F	G	Tot.
1984-85 Season Totals	549	1431	1980	81	41	31	153

^{1/} One 66-cm (26-inch) female coho salmon also trapped on this date.

^{2/} Special releases for the Department of Fish and Game from Lake Pillsbury to stimulate downstream migration of juvenile fish.

^{3/} Summer run steelhead. Fish of 5-17-85 sacrificed to document stage of egg development. Fish of 5-18-85 passed above Cape Horn Dam.

^{4/} Trans-basin diversion shut down for inspection and repairs.

APPENDIX 2. Annual Steelhead and Chinook Salmon Counts, Van Arsdale Fisheries Station, 1933-34 to 1984-85.

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

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