

*[Handwritten signatures and initials]*  
 The Resources Agency  
 Humboldt Co.

**Memorandum**

To : Elton Bailey, Fisheries Management Supervisor

Date : March 13, 1964

REF 90502

*I agree with [unclear] [unclear]  
 went ahead in order*

From : Department of Fish and Game  
 Western Fisheries Management

*Sunny File*

Subject: BENBOW DAM, FISH PASSAGE

*S. Fk. Eel R., Humboldt Co.*

Fish passage facilities at Benbow Dam, South Fork Eel River, have been in use since 1938. Fish have been counted annually at this installation throughout the period of migration of salmon and steelhead.

Recently, I reviewed the counts at Benbow Dam for the period of the 1953-54 through 1962-63 seasons. The number of each species ascending the ladder was recorded by month. During this ten year period, a total of 194221 fish were recorded; 32213 king salmon, 53288 silver salmon, and 108720 steelhead (Table 1).

BENBOW DAM FISH LADDER COUNTS  
 South Fork Eel River, Humboldt County  
 1953-54 through 1962-63 seasons  
 TABLE I

	King Salmon	Silver Salmon	Steelhead	Total
1953-54	7948	3052	15405	26405
1954-55	5367	5952	13609	24928
1955-56	3974	5977	10065	20016
1956-57	1530	5717	12333	19580
1957-58	3050	5433	7910	16393
1958-59	1472	3344	11984	16800
1959-60	473	2119	8367	10959
1960-61	2665	3184	6370	12219
1961-62	2046	8479	14374	24899
1962-63	3688	10031	8303	22022
	<u>32213</u>	<u>53288</u>	<u>108720</u>	<u>194221</u>

Of the 32213 king salmon recorded during this ten year period, 26998 or 83.8 percent ascended the ladder during November and December. Only 5 king salmon of the 32213 total (0.015%) were recorded for the ten year period as passing through the station after February (Table 2).

BENBOW DAM FISH COUNTING STATION  
 South Fork Eel River, Humboldt County  
 1953-54 through 1962-63 seasons

TABLE 2  
KING SALMON

<u>YEAR</u>	<u>OCT.</u>	<u>NOV</u>	<u>DEC.</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>TOTALS</u>
1953-54	1879	4941	1076	51	1	1	0	7948
1954-55	313	2122	2296	636	0	0	0	5367
1955-56	0	2026	1941	7	0	0	0	3974
1956-57	26	265	888	345	5	1	0	1530
1957-58	302	1143	1170	433	2	0	0	3050
1958-59	0	418	723	327	4	0	0	1472
1959-60	0	0	195	252	26	0	0	473
1960-61	0	1185	1369	25	83	2	1	2665
1961-62	4	606	1007	305	123	1	0	2046
1962-63	4	975	2652	37	20	0	0	3688
Totals	2528	13681	13317	2418	264	4	1	32213
Percent	7.85	42.47	41.34	7.51	0.82	0.01	0.00(0.003)	32213

Of the 53288 silver salmon recorded, 51813 or 97.2 percent passed through the ladder during November, December, and January. Only 28 of the 53288 (0.053%) were recorded as passing through the station after February (Table 3).

BENBOW DAM FISH COUNTING STATION  
South Fork Eel River, Humboldt County  
1953-54 through 1962-63 seasons

TABLE 3  
SILVER SALMON

<u>YEAR</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>TOTALS</u>
1953-54	0	1471	1408	173	0	0		3052
1954-55	0	1161	3455	1315	1	20		5952
1955-56	0	1295	4542	100	40	0		5977
1956-57	0	70	2768	2828	51	0		5717
1957-58	215	2044	2728	443	3	0		5433
1958-59	0	127	2483	727	6	1		3344
1959-60	0	0	185	1927	7	0		2119
1960-61	0	94	2549	395	146	0		3184
1961-62	0	1949	5535	796	198	1		8479
1962-63	7	1177	7390	678	773	6		10031
Totals	222	9388	33043	9382	1225	28		53288
Percent	0.42	17.62	62.01	17.61	2.30	0.05		100.1

During the ten year period of review, 80930 (74.4%) of the 108720 steelhead recorded passed through the ladder prior to March 1.

BENBOW DAM FISH COUNTING STATION  
South Fork Eel River, Humboldt County  
1953-54 through 1962-63 seasons

TABLE 4  
STEELHEAD

<u>YEAR</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>TOTALS</u>
1953-54		1122	3917	5386	3595	1180	205		15405
1954-55		258	2822	5989	164	4059	317		13609

TABLE 4 cont.

<u>YEAR</u>	<u>OCT</u>	<u>NOV</u>	<u>DEC</u>	<u>JAN</u>	<u>FEB</u>	<u>MAR</u>	<u>APR</u>	<u>MAY</u>	<u>TOTAL</u>
1955-56		142	2257	1633	2608	2825	598	2	10065
1956-57	1	36	193	3393	5169	2845	614	82	12333
1957-58	16	67	679	3266	1547	2101	221	13	7910
1958-59		95	1357	4804	2734	2277	657	60	11984
1959-60			29	4279	1071	2470	470	48	8367
1960-61		81	935	980	3077	1157	139	1	6370
1961-62		215	1658	3193	5033	3521	705	49	14374
1962-63	<u>52</u>	<u>262</u>	<u>1613</u>	<u>877</u>	<u>4325</u>	<u>835</u>	<u>339</u>		<u>8303</u>
TOTALS	<u>69</u>	<u>2278</u>	<u>15460</u>	<u>33800</u>	<u>29323</u>	<u>23270</u>	<u>4265</u>	<u>255</u>	<u>108720</u>
PERCENT	0.06	2.10	14.22	31.09	26.97	21.40	3.92	0.23	99.99

The accumulative totals of steelhead through February of each year were multiplied by  $\frac{4}{3}$  to compare a predicted total for each year against the actual totals recorded (Table 5).

TABLE 5  
Comparison of actual and predicted  
counts for steelhead - Benbow Dam

<u>Year</u>	<u>Thru Feb. totals</u>	<u>Actual totals</u>	<u>Predicted totals derived by a factor of <math>\frac{4}{3}</math> x (Thru Feb. total)</u>	<u>difference</u>
1953-54	14020	15405	18693	3288
1954-55	9233	13609	12311	-1298
1955-56	6640	10065	8853	-1212
1956-57	8792	12333	11723	-610
1957-58	5575	7910	7433	-477
1958-59	8990	11984	11987	3
1959-60	5379	8367	7172	-1195
1960-61	5073	6370	6764	394
1961-62	10099	14374	13465	-909
1962-63	<u>7129</u>	<u>8303</u>	<u>9505</u>	<u>1202</u>
TOTALS	<u>80930</u>	<u>107906</u> 108720	<u>108720</u> 107906	<u>-814</u>

It is apparent in examining Table 5 that the prediction of the total run based on accumulative counts of steelhead through February as compared to actual counts is a satisfactory method of assessing future runs of steelhead for the months of March, April, and May.

Using Table 4, we predict the total steelhead run for the 1963-64 season based on the accumulative total through February to be 13740 ( $10305 \times \frac{4}{3}$ ). We will check the validity of our prediction by using the accumulative count through March times  $\frac{25}{24}$  which should closely approximate 13740. The  $\frac{25}{24}$  was derived by dividing 108720 into 104200, the accumulative total for the ten year period through March, which gave 95.84% and inverted to give the  $\frac{25}{24}$  factor.

Elton Bailey, Fisheries Management Supervisor

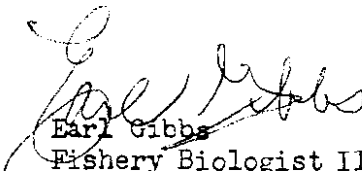
-4- March 13, 1964

Summarizing the contents of this letter, we wish to make these recommendations:

As long as we continue to count fish at Benbow Dam, it is recommended the counting season be terminated at the end of February.

To assume the salmon counts, both silver and king, are total seasonal counts as of the end of February.

That steelhead counts as of the end of February be multiplied by a factor of  $4/3$  to derive the total run for the season.



Earl Gibbs  
Fishery Biologist III

EG:sr

cc: Robert Elwell, MRB.

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