

AYK Region
Norton Sound
Salmon Escapement
Report # 354

1984 North River Salmon Counting Tower

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North River Tower 1984

INTRODUCTION

The North River is the largest tributary to the Unalakleet River, the most important salmon producing river in Norton Sound. In 1984 a salmon counting tower was re-established on the North River near the 1973 tower site. During 1972 through 1974 a counting tower operated within 400 yards of the North River bridge (Figure 1). (Regnart, R.I. and L.L. Trasky, 1973., Cunningham, 1973, 1974, 1975.). The tower was discontinued due to the small chum run on the North River and lack of commercial importance. During the past ten years, both the price and run size of the chinook and coho runs have increased. The pink salmon run has also increased dramatically. The increasing commercial importance of the chinook and coho salmon returns to the Unalakleet subdistrict caused the renewed interest in the North River tower.

OBJECTIVES

1. Obtain daily and seasonal timing and magnitude of salmon escapement.
2. Provide an abundance index for comparison with the Unalakleet test fishing and aerial survey results.

METHODS

Tower counts

A 20 foot tower was erected on the east bank of the North River using aluminum scaffolding. The feet of the tower were nailed to two planks which were blocked with wood and sand bags to provide a firm foundation. Two more planks were laid across the lowest rungs of the scaffolding where sand bags were stacked to provide a low center of gravity for the tower. One-quarter inch air craft cable was used for guy wires and anchored to the bases of large alder bushes.

A 40 foot long weir made of fence posts and cattle fencing was placed opposite the tower to deflect salmon closer to the tower.

A flash panel, 50' x 5', was placed between the weir and the cut bank under the tower. The panel was tied at one foot intervals to an air craft cable running on the river bottom between fence post anchors.

Lighting during dark hours was accomplished using a car head light set inside a 5 gallon can. The beam was placed angling slightly down stream and across the flash panel. Car batteries used to power the light could be charged during during the day using a generator.

The counting schedule began on June 28 when two crew members were available to begin counting. A 12 hour counting schedule was maintained until July 2 when a third crew member was hired and an 18 hour schedule became feasible. Once each week the crew was given 24 hours off and once a week they counted the full 24 hour period to provide data used to expand the 18 hour counts. Turbid water conditions caused the tower crew to stop counting from July 7 to July 10 and from July 21 to July 24. On July 29 turbid water conditions again caused the tower to cease operation but at that point it was decided to use the crew on the Unalakleet sonar project for the month of August. During the month of August the tower camp was left operational so that it could be used to test the feasibility of making coho counts from the same site. On August fourth bank erosion forced the disassembly of the tower and it was not erected again until August 27 when three days of counting began.

Daily counts were radioed to Unalakleet and relayed from there to Nome where a running total was kept of the counts. After the field season daily counts with more than the standard six hours missing were adjusted using the following equation:

$$\text{adjusted 1 hour count} = \frac{\text{counted hours}}{\text{corresponding mean hourly \%}}$$

Using the 12 days with complete 18 hour counts, a mean hourly percentage of the 18-hour count was derived for each hour by taking the sum of a given hours count and dividing by the sum of the 18 hour totals for the same 12 days.

The 18-hour counts were expanded to 24-hour counts by using the mean percentage of the normally uncounted block, 0900 to 1500, from the three 24-hour daily counts, July 3, 10, and 17, to expand the adjusted counts. The adjusted counts were divided by

the percentage: 100% minus the mean six hour block percentage, to obtain the expanded counts. Days with no counts at all fell in groups of two this year so that the four most adjacent were totaled and divided by 4 to derive an expanded daily count. If these had been single days of no count then only the daily expanded count on either side of the missing count would have been totaled and divided by two.

Boat Survey

Two boat surveys were made in 1984 to collect chinook carcass samples. The North River was surveyed on July 28 and the Upper Unalakleet River including two miles of the Old Woman River was surveyed July 29. Both surveys were accomplished using a flat bottomed boat equipped with a jet outboard motor. Two surveyors used a combination of boating and walking the bars and side channels where carcasses were likely to be found.

Aerial Surveys

A chinook survey was flown on the North River July 3 with two observers to verify the tower count.

Chum surveys were attempted on the Unalakleet and North Rivers on July 11 and 24. Turbid water conditions made these surveys impossible.

Coho salmon surveys were flown on September 7. Air turbulence caused the surveys of the North River and Unalakleet Rivers to be flown at higher than normal altitudes. The Old Woman River was also surveyed.

All aerial surveys were flown in the methods explained in the Norton Sound aerial survey operational plan.

RESULTS

Tower Counts

The unadjusted counts are 1730 chinook, 316,073 pink and 1846 chum salmon (Table 1). Hourly and daily counts are presented in Tables 2,3, and 4. The expanded counts are 2844 chinook, 458,387 pink, and 2903 chum salmon (Table 5). The mean percentage for the normally uncounted six hour block that was used for expanding the chinook, pink and chum counts were 2.0%, 5.5%, and 3.6%

respectively. Coho salmon counts were infrequent and of little value due to counting conditions and conflicting projects (Table 6).

Although the counting tower did not operate during the month of August the site was monitored and observations were made on counting conditions there. From July 30 until August 9 the river was running too much debris and mud to count. Again on August 19 a short storm caused the river to rise for a day and would probably shut down counting operations. From August 20 to August 29 conditions were favorable for counting.

The Appendix Tables 1,2, and 3 show the historical tower counts by species for the years the North River tower has operated. Appendix Table 4 presents the aerial surveys made since state management began.

Boat Surveys

The first twenty three miles of the North River were surveyed on July 28. Spawning was most prevalent from mile 13 to mile 23. Eleven chinook carcass samples were collected, the most samples ever collected on a single boat survey of the North River. The Norton Sound and Kotzebue Sound salmon catch and escapement report will present salmon age, sex, and size data collected from the Unalakleet drainage. The crew leader, who has made a boat survey of the North River each of the last four years, felt that this was the largest chinook salmon escapement he had seen there.

The Unalakleet River was surveyed from mile 49 the lower end of the braided portion of the river, to mile 65, the mouth of Old Woman River, on July 29. The run seemed more advanced than the North River which was surveyed the day before because of the number of carcasses and moribund fish. Thirty-six carcasses were sampled.

The crew leader though the Unalakleet River also had the largest chinook escapement in the last four years.

Aerial Surveys

The July 3 survey of the lower thirty miles of the North River was conducted in a very thorough manner using two observers. Fifty-one chinook were counted at the same time the tower had counted 270 chinook and the expanded tower count was 719. The

two observers were unable to see a large percent of the chinook from the air and no adjustment to the tower counts were made.

On September 7 another survey was flown covering sixty miles of the lower North River and 152 coho were counted under poor conditions. Although earlier attempts were made on the Unalakleet River only the September 7 survey of 300 chum and 1272 coho salmon under poor to fair conditions proved useful.

DISCUSSION

A late break-up in the spring of 1984 compressed the early salmon runs by nearly two weeks. The first chinook salmon were caught in the test nets on June 24, five days before any chinook salmon were observed passing the tower site. Pink salmon were first observed at the tower on June 25 and chum salmon a day later. The daily counts of these three species were less than 1% of the seasonal total by July 28, when the tower stopped operating.

The first coho salmon was observed on July 20 and judging from the coho counts in late August, the coho run was nearly over by August 28.

The aerial surveys of the North River serve as an index of escapement when compared to each other but there is poor comparability between tower and aerial surveys. The 1984 chinook survey is an example of an aerial survey being quite different from tower counts. The 1984 coho salmon surveys from the Unalakleet system do not compare as expected when one considers that the 1984 commercial catch is the second highest on record. Poor conditions during the September 7 surveys may account for this difference but it is a value judgement made by the observer and may not be apparent to some one comparing surveys in the future.

CONCLUSION

The North River tower is a more reliable index of salmon escapement in the Unalakleet drainage than aerial surveys. Aerial surveys serve only as a reliable index when counting conditions are "good" during all years compared, the observers are experienced, and simultaneous runs do not greatly outnumber the considered species. Counting towers are able to operate under less ideal conditions with personnel requiring less training, or in other words, within a much broader range of

limitations. Although the 1984 field season had probably the worst summer storm in 10 years at the North River tower site the bulk of the chinook, pink and chum salmon runs were counted. Only two marginally useful aerial surveys were made.

The 1973 tower site was still in evidence at the beginning of the 1984 field season. However, the storm during the first week of August eroded up to 6 feet of bank at the tower site and destroyed the old tower. This high water was comparable to the spring run-off floods in size but the perma-frost had melted back and the cut banks were very susceptible to erosion at that time unlike during the spring thaw. On more normal years, turbidity would only stop the counting schedule for two to four days at a time rather than the 10 day period during early August in 1984. During most years a tower count of the coho salmon would also be feasible.

RECOMMENDATION

Arrange the counting schedule so that the tower counts 7 days per week but each crew member is given one day off.

Use tally counters that have at least 4 separate counters in each unit to minimize confusion during peak migration.

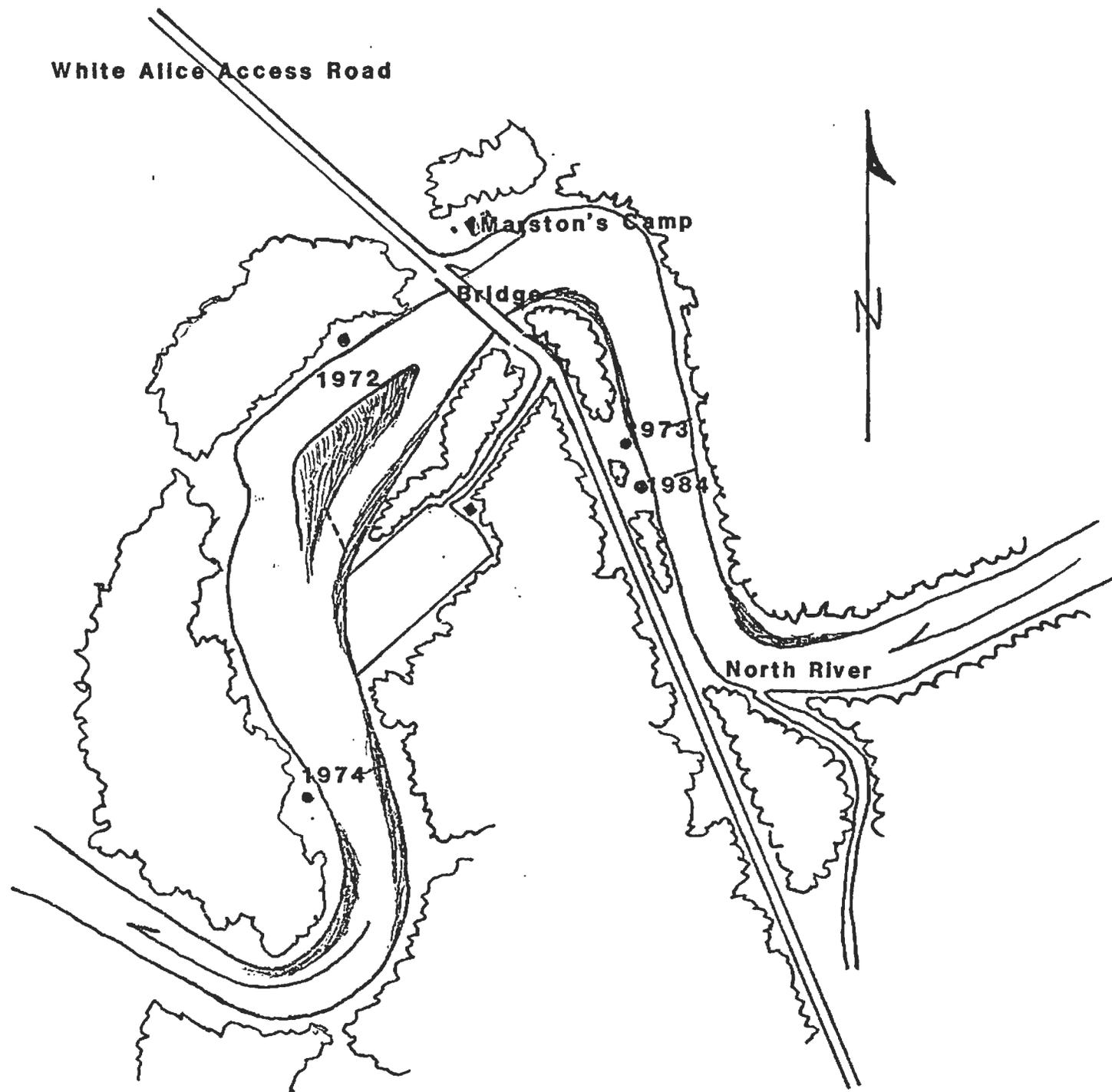
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Lean, C.F. and B.S. Bigler. In Prep. Age, sex, and size of Norton Sound and Kotzebue Sound salmon catch and escapement, 1984.



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Figure 1. Locations of the North River Counting Towers.

Table 1. Daily and Cumulative Salmon Escapement, North River, 1984.

Date	King	King Cum.	Chum	Chum Cum.	Pink	Pink. Cum.
6/25	0	0	0	0	27	27
6/26	0	0	1	1	0	27
6/27	0	0	0	1	352	379
6/28	0	0	0	1	1991	2370
6/29	30	30	72	73	18711	21081
6/30	25	55	30	103	28499	49580
7/1	78	133	34	137	13859	63439
7/2	72	205	56	193	23367	86806
7/3	103	308	36	229	38452	125258
7/4	192	500	56	285	29636	154894
7/5	43	543	21	306	9670	164564
7/6	104	647	16	322	5013	169577
7/7	No counts, turbid water					
7/8	No counts, turbid water					
7/9	5	652	3	325	652	170229
7/10	51	703	21	346	6355	176584
7/11	185	889	72	418	9587	186171
7/12	248	1137	97	515	9728	195899
7/13	136	1273	170	685	10941	206840
7/14	93	1366	224	709	14446	221286
7/15	29	1395	53	762	3911	225179
7/16	68	1463	71	833	15624	240803
7/17	121	1584	364	1197	31826	272629
7/18	58	1642	184	1381	16688	289317
7/19	26	1668	76	1457	8578	297895
7/20	63	1731	302	1759	11207	309102
7/21	1	1732	10	1769	104	309206
7/22	No counts, turbid water					
7/23	No counts, turbid water					
7/24	-1	1731	26	1795	1638	310844
7/25	-3	1728	21	1816	1583	312427
7/26	2	1730	15	1831	1355	313782
7/27	3	1733	10	1841	1253	315035
7/28	-3	1730	5	1846	1038	316073

Table 2. Daily Hourly Migration past North River Counting Tower, 1984. Species: Chinook.

Date	00	01	02	03	04	05	06	07	08	15	16	17	18	19	20	21	22	23	18-Hr Total	Daily % of Total
6/25																* 0	* 0	* 0	0	0.00
6/26																* 0	* 0	* 0	0	0.00
6/27																* 0	* 0	* 0	0	0.00
6/28													0	0	0	0	0	0	0	0.00
6/29	0	0	0	0	0	0							7	5	0	5	4	9	30	1.79
6/30	0	0	3	3	0	2							2	2	2	0	5	6	25	1.49
7/1	14	30	9	10	10	5													78	4.65
7/2										0	7	8	19	8	8	5	10	7	72	4.30
7/3	1	8	4	7	7	2	0	6	1	8	1	7	3	4	14	5	2	3	83	4.96
7/4	7	17	21	9	9	7	6	3	7	12	38	4	9	10	22	9	2	0	192	11.46
7/5	2	1	0	0	5	0	0	0	0	0	4	4	2	2	17	2	4	0	43	2.57
7/6	4	1	1	0	3	9	2	0	0	9	30	27	11	7	0	* 0			104	6.21
7/7																			0	0.00
7/8																			0	0.00
7/9																2	3	0	5	0.30
7/10	2	1	0	0	1	0	-1	-1	-4	4	1	7	14	0	3	3	8	10	48	2.87
7/11	7	13	9	2	7	4	2	1	2	1	23	13	12	19	10	21	24	16	186	11.04
7/12	16	13	2	4	5	6	9	4	4	33	63	28	9	4	10	8	11	19	248	14.81
7/13	20	3	0	0	0	0	5	4	4	8	5	4	4	26	8	9	20	16	136	8.12
7/14	17	4	0	0	1	1	1	0	4	0	11	9	7	5	2	4	6	21	93	5.55
7/15	11	1	1	0	1	5	-1	4	7										29	1.73
7/16										3	3	0	9	4	0	0	18	31	68	4.06
7/17	4	0	1	1	0	13	11	9	6	2	3	1	1	4	2	8	13	11	90	5.37
7/18	4	4	0	1	3	1	4	3	1	4	4	4	3	5	4	6	5	2	58	3.46
7/19	3	3	0	0	0	5	0	1	1	1	0	1	3	1	0	0	0	7	26	1.55
7/20	3	1	1	1	3	1	3	-1	2	5	1	1	5	5	9	9	5	9	63	3.67
7/21	1																		1	0.06
7/22																				
7/23																				
7/24										* 0	2	-2	-2	0	0	1	0	0	-1	-0.06
7/25	0	* 0								-1	-1	-3	0	2	0	0	0	0	-3	-0.18
7/26							0	0	0	0	0	0	0	0	0	1	1	0	2	0.12
7/27							0	0	0	0	0	0	0	3	0	0	0	0	3	0.18
7/28										0	0	-1	-2	0	-1	1	0	0	-3	-0.18
Total	116	100	52	38	55	61	41	33	35	89	195	112	116	116	110	99	141	167	1676	
% of Total	6.93	5.97	3.10	2.27	3.28	3.64	2.45	1.97	2.09	5.31	11.64	6.69	6.93	6.93	6.57	5.85	8.42	9.97		100.0

* 1/2 hour counts.

Table 3. Daily Hourly Migration Past North River Counting Tower, 1984. Species Pink

Date	00	01	02	03	04	05	06	07	08	15	16	17	18	19	20	21	22	23	18-Hr Total	% of Total
6/25																* 0	* 0	* 27	27	0.01
6/26																* 0	* 0	* 0	0	0.00
6/27																* 0	* 94	* 258	352	0.11
6/28													51	11	19	86	497	1329	1993	0.64
6/29	1963	2533	1082	63	352	192							3039	2186	500	1784	2615	2402	18711	6.00
6/30	1157	1198	3453	1360	85	36							3001	2911	5284	2079	3000	4935	28499	9.14
7/1	6052	3255	1720	1533	731	560													13859	4.44
7/2										897	3295	5943	2460	2020	3720	2317	1326	1388	23366	7.49
7/3	2869	203	2849	1220	1614	726	1065	313	197	308	534	3200	1850	4100	4300	4530	3620	2350	37682	12.08
7/4	2510	2440	1440	830	527	828	491	329	216	1322	5000	2259	2322	2990	3030	2090	486	520	29630	9.50
7/5	808	1160	60	10	65	124	22	10	17	6	621	1320	383	621	1590	544	2190	93	9644	3.09
7/6	20	221	14	29	33	140	10	0	-1	434	325	2116	724	836	104	* 8			5013	1.61
7/7																				0.00
7/8																				0.00
7/9																228	211	213	652	0.21
7/10	110	89	62	27	52	124	48	42	46	220	329	617	757	245	682	758	665	938	5811	1.85
7/11	512	536	258	200	223	204	296	175	253	92	678	615	847	549	605	1298	965	1206	9592	3.08
7/12	443	215	32	45	29	62	220	131	154	752	1175	733	851	736	929	1054	1052	1115	9728	3.12
7/13	639	132	3	23	48	68	335	130	201	411	549	710	1224	915	1117	1410	1505	1521	10941	3.51
7/14	738	235	59	48	113	103	311	420	440	1021	1150	1210	1477	1360	1279	1190	1255	2037	14446	4.63
7/15	1569	661	191	108	103	194	503	362	220										3911	1.25
7/16										487	1069	1523	1214	1787	1872	979	2968	3725	15624	5.01
7/17	3026	1836	579	173	273	1297	1288	1402	713	540	830	893	866	2795	3620	3162	3001	2635	28929	9.28
7/18	973	524	184	176	155	377	668	696	529	1479	1448	1682	1465	1343	1394	1649	1276	670	16688	5.35
9/19	523	133	22	82	187	344	285	258	216	111	326	315	688	957	994	1072	1099	966	8578	2.75
7/20	796	167	26	66	106	189	412	212	389	237	458	525	905	1748	1576	1459	1183	753	11207	3.59
7/21	104																		104	0.03
7/22																				0.00
7/23																				0.00
7/24										* 61	209	207	156	278	267	182	165	113	1638	0.53
7/25	13	* 4								152	254	236	238	258	194	117	79	38	1583	0.51
7/26							124	57	32	103	71	71	101	106	106	246	249	89	1355	0.43
7/27							117	98	38	96	87	54	107	171	105	97	133	150	1253	0.40
7/28										87	86	82	80	143	254	114	82	110	1038	0.33
Total	24825	17376	12042	5993	4696	5648	6195	4635	3660	8816	18494	24311	24806	29066	33541	28453	29716	29581	311854	
% of Total	7.96	5.57	3.86	1.92	1.15	1.81	1.99	1.49	1.17	2.83	5.93	7.80	7.95	9.32	10.76	9.12	9.53	9.49	100.00	

* 1/2 hour counts.

Table 4. Daily Hourly Migration Past North River Tower, 1984. Species: Chum.

Date	00	01	02	03	04	05	06	07	08	15	16	17	18	19	20	21	22	23	18 Hr. Total	Daily % of Total
6/25																* 0	* 0	* 0	0	0.00
6/26																* 0	* 1	* 0	1	0.05
6/27																* 0	* 0	* 0	0	0.00
6/28													0	0	0	0	0	0	0	0.00
6/29	3	10	3	1	1	0				5	4		0	4	0	25	16	4	72	3.55
6/30	0	0	0	2	0	1				1	4		1	4	1	3	16	2	30	1.48
7/1	3	5	0	12	10	4													34	1.68
7/2										2	11	11	8	1	12	5	4	2	56	2.76
7/3	0	1	5	0	0	-1	1	0	0	0	3	1	0	5	0	5	8	0	36	1.78
7/4	6	4	3	0	0	0	1	2	0	8	22	3	0	3	1	3	0	0	56	2.76
7/5	1	6	0	0	0	0	0	0	0	0	3	3	1	2	1	2	1	1	21	1.04
7/6	1	0	0	0	0	0	0	0	0	1	1	13	0	0	0	* 0	-	-	21	1.04
7/7																			0	0.00
7/8																			0	0.00
7/9																1	1	1	3	0.15
7/10	0	0	0	0	0	0	0	0	0	0	0	0	4	0	5	4	4	3	20	0.99
7/11	0	0	0	0	0	3	1	0	0	0	2	0	8	1	4	15	15	23	72	3.55
7/12	3	0	0	0	2	0	2	2	1	3	3	4	9	8	21	14	17	8	97	4.78
7/13	3	2	0	2	0	1	1	3	3	5	3	5	19	36	17	18	37	15	170	8.38
7/14	9	0	1	1	3	1	0	2	2	4	11	17	29	28	24	24	30	38	224	11.05
7/15	25	13	0	1	2	8	3	1	0										53	2.61
7/16										2	4	6	3	13	11	0	14	18	71	3.50
7/17	53	27	8	0	1	14	10	7	0	4	5	8	10	48	54	21	37	43	350	17.26
7/18	16	14	4	0	0	3	4	2	5	9	8	8	12	17	24	35	17	6	184	9.07
7/19	20	6	0	0	0	10	1	4	1	0	1	2	2	2	4	4	5	13	75	3.70
7/20	31	4	2	0	1	5	5	3	3	1	9	11	20	48	74	24	35	24	300	14.79
7/21	10																		10	0.49
7/22																				
7/23																				
7/24										* 1	2	7	7	1	4	1	2	1	26	1.28
7/25	0	* 0								1	2	5	3	3	3	3	1	0	21	1.04
7/26							0	0	0	3	2	1	2	1	0	1	4	1	15	0.74
7/27							2	0	0	-1	0	1	1	1	2	0	3	1	10	0.49
7/28										1	0	0	0	2	2	0	0	0	5	0.25
Total	192	92	26	19	20	49	31	26	15	44	92	106	144	228	264	208	268	204	2028	
% of Total	9.47	4.54	1.28	0.94	0.99	2.42	1.53	1.28	0.74	2.17	4.54	5.23	7.10	11.24	13.02	10.26	13.21	10.06		100.00

* 1/2 hour counts.

Table 5. Expanded Daily Salmon Migration, North River, 1984.

Date	Chinook Expanded	Pink Expanded	Chum Expanded
6/25	0	27	0
6/26	0	0	1
6/27	0	352	0
6/28	0	3822	0
6/29	55	26100	87
6/30	46	39756	36
7/1	412	70978	196
7/2	129	34030	75
7/3	103	38448	36
7/4	239	31351	58
7/5	54	10204	22
7/6	169	6404	22
7/7	67	6365	18
7/8	67	6364	19
7/9	26	2495	9
7/10	51	6355	21
7/11	230	10149	75
7/12	309	10293	101
7/13	169	11576	176
7/14	116	15285	232
7/15	116	15119	253
7/16	123	22755	94
7/17	121	31826	364
7/18	72	17657	177
7/19	32	9076	78
7/20	78	11858	311
7/21	19	1522	111
7/22	22	4435	120
7/23	22	4435	120
7/24	-2	2386	34
7/25	-5	1975	24
7/26	4	1806	26
7/27	4	1671	12
7/28	-4	1512	7
<hr/>			
Totals	2844	458387	2915

Table 6. Daily Coho Salmon Counts, North River, 1984.

Date	Hours Counted	Coho
7/20	18.0	2
7/24	8.5	18
7/25	13.5	2
7/26	15.0	19
7/27	15.0	28
7/28	17.0	9

8/27	8.0	3
8/28	12.0	10
8/29	11.0	4

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Appendix Table 1. Daily Total Cumulative Chinook Salmon Escapement, North River, 1984.

Date	1972 1/	1973 1/	1974 2/	1984 3/
6/25			0	0
6/26			0	0
6/27			1	0
6/28			3	0
6/29		1	6	55
6/30		1	42	101
7/1		1	48	513
7/2		6	53	642
7/3		10	88	745
7/4		16	125	984
7/5		19	151	1038
7/6		20	173	1207
7/7	11	22	184	1274
7/8	15	26	191	1341
7/9	30	33	191	1367
7/10	50	43	192	1418
7/11	126	71	192	1648
7/12	172	82	192	1957
7/13	194	83	193	2126
7/14	245	87	196	2242
7/15	309	94	196	2358
7/16	376	97	196	2481
7/17	406	119	196	2602
7/18	458	150		2674
7/19	466	150		2706
7/20	475	216		2784
7/21	492	231		2803
7/22	508	262		2825
7/23	521	298		2847
7/24	535			2845
7/25	544			2840
7/26	551			2844
7/27	556			2848
7/28	561			2844

1/ 24 hour counts
 2/ 18 hour counts
 3/ expanded counts

Appendix Table 2. Daily Total Cumulative Pink Salmon Escapement, North River, 1984.

Date	1972 1/	1973 ^{2/} 1/	1974 2/	1984 3/
6/25			111	27
6/26			371	27
6/27			2410	379
6/28			5366	4201
6/29		0	14140	30301
6/30		0	36909	70057
7/1		49	49445	141035
7/2		83	59699	175065
7/3		187	85613	213513
7/4		539	108778	244864
7/5		1004	120023	255068
7/6		1196	131573	261472
7/7	3790	1394	141361	267837
7/8	11743	1504	143621	274201
7/9	18374	1931	143692	276696
7/10	23589	3276	143724	283051
7/11	30323	6925	143764	293200
7/12	34836	10115	143764	303493
7/13	39428	12265	143772	315069
7/14	42550	16510	143777	330354
7/15	46046	19384	143783	345473
7/16	49000	20028	143785	368228
7/17	50801	21094	143789	400054
7/18	52079	22192		417711
7/19	52303	23205		426787
7/20	52512	24323		438645
7/21	52956	25265		440167
7/22	53409	25976		444602
7/23	53965	26542		449037
7/24	54320			451423
7/25	54545			453398
7/26	54710			455204
7/27	54763			456875
7/28	54934			458387

- 1/ 24 hour counts
- 2/ 18 hour counts
- 3/ expanded counts

Appendix Table 3. Daily Cumulative Chum Salmon Escapements,
North River, 1984.

Date	1972 1/	1973 ^{2/} 1/	1974 2/	1984 3/
6/25			0	0
6/26			0	1
6/27			19	1
6/28			23	1
6/29		0	33	88
6/30		0	91	124
7/1		9	177	320
7/2		9	217	395
7/3		19	369	431
7/4		59	533	489
7/5		72	633	511
7/6		79	717	533
7/7	96	88	751	551
7/8	215	96	769	570
7/9	272	121	776	579
7/10	344	288	776	600
7/11	548	681	776	675
7/12	687	891	776	776
7/13	777	1041	780	952
7/14	958	1545	793	1184
7/15	1114	2144	798	1437
7/16	1418	2190	810	1531
7/17	1696	2436	826	1895
7/18	1742	2666		2072
7/19	1742	3087		2150
7/20	1754	3310		2461
7/21	1859	3546		2572
7/22	1990	3798		2692
7/23	2119	4334		2812
7/24	2204			2846
7/25	2241			2870
7/26	2268			2896
7/27	2285			2908
7/28	2332			2915

- 1/ 24 hour counts
- 2/ 18 hour counts
- 3/ expanded counts

Appendix Table 4. Peak Annual Aerial Surveys, North River,
1962 - 1984.

Year	Chinook	Chum	Pink	Pink and Chum	Coho
1962	162			16087	
1963 1/	287			73274	
1964	23			5981	
1965	153			16600	
1970 1/	1	20655	12400		
1971 1/	256			1047	
1973	267	3644	16590		
1975 1/	60	5237	17885		
1976 1/	66	196	10606		
1977	1275	8139	4565		
1978	321	9349	21813		
1979	735	1130	9500		
1980	61	2300	127900		204
1981	68	405	575		263
1982	8	599	173352		4145
1983	347	4135	4980		
1984	51				152

1/ Poor survey conditions or partial survey.