

Informational Leaflet 70

ARCTIC-YUKON-KUSKOKWIM AREA SALMON FISHING HISTORY

By:

Steven Pennoyer
Division of Commercial Fisheries
Research Section
Anchorage, Alaska

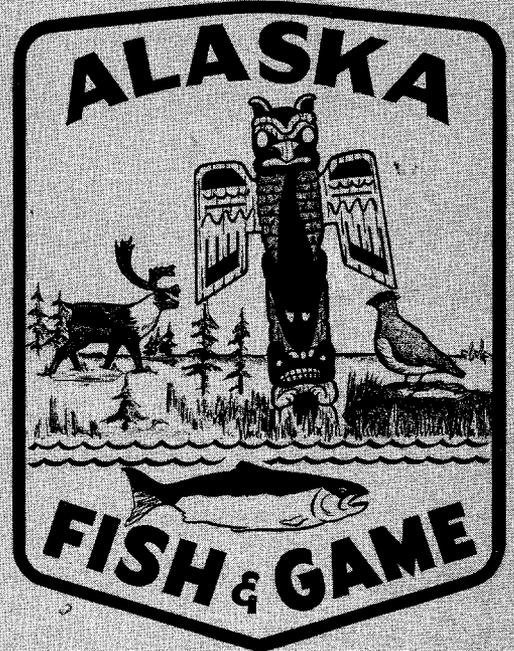
Kenneth R. Middleton
Division of Commercial Fisheries
King Salmon, Alaska

Melvan E. Morris, Jr.
Division of Commercial Fisheries
Kodiak, Alaska

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WILLIAM A. EGAN - GOVERNOR

DEPARTMENT OF
FISH AND GAME
WALTER KIRKNESS - COMMISSIONER
SUBPORT BUILDING, JUNEAU



FOREWORD

The authors wish to acknowledge the assistance provided by many scientists from several agencies in searching the literature for past data. In particular, we are grateful for the help of Mr. Gordon Watson, Branch of River Basins, U. S. Fish and Wildlife Service.

This type of report will never be complete. New data for past years will continue to show up from time to time. However, this history of the Arctic-Yukon-Kuskokwim Area salmon fishery is as complete as information presently available will allow.

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ARCTIC-YUKON-KUSKOKWIM AREA
SALMON FISHING HISTORY

REGULATIONS, COMMERCIAL OPERATIONS, SUBSISTENCE CATCHES

INTRODUCTION

This paper summarizes known catch and regulation data for the Arctic-Yukon Kuskokwim Area through 1961 with emphasis on the Yukon and Kuskokwim drainages. This area encompasses all waters of Alaska from Cape Newenham north and east to Demarcation Point on the Arctic Ocean. The information herein has been gathered from a variety of sources, some of which were available only in reprints of dubious legibility. Some of the earlier data, therefore, is subject to question.

REGULATIONS

The history of regulation on the Yukon and Kuskokwim has been one of trying to protect the large Eskimo and Indian subsistence fisheries in these rivers. This has been accomplished by restriction of commercial fishing activities. No real management was attempted previous to 1953 when a U. S. Fish and Wildlife Service biologist was assigned part-time to the Yukon. Periodic complaints of a lack of fish in the subsistence fishery led to sporadic short term research and the subsequent closure or strict limitation of commercial fishing.

The history of regulation, as far as determined, dates from 1918. At that time, regulation was under the jurisdiction of the Secretary of Commerce. The following information was taken primarily from the original regulation books of the Department of Commerce, Bureau of Fisheries, the U. S. Fish and Wildlife Service, Bureau of Commercial Fisheries, and the Alaska Department of Fish and Game, Commercial Fisheries Division. Secondarily, where none of the above was available, the Alaska Fishery and Fur-Seal Industries Reports were used. The

high points of regulation are presented below in abbreviated form. The entire regulations for each year are not listed. Only the changes made in the regulations from year to year are listed, those remaining the same are not repeated in successive years.

1919 - The pack of canned salmon was limited to 30,000 cases in any year in the Yukon River embracing all waters of its delta to and including the area 500 yards outside each mouth or slough of the delta at mean high tide. The pack was also limited to 1,000 barrels of pickled and 200 tierces of mild cured salmon. Commercial fishing was prohibited above the mouth of the Clear River, 114 miles above the mouth of the Yukon River.

1921 - Fishing inside the Yukon River for export was prohibited.

1924 - In the Yukon Area (all territorial, coastal and tributary waters of Alaska from 61° N. Lat. to 64° N. Lat.), all commercial fishing for salmon was prohibited at all times. This regulation was extended to cover the Kuskokwim in October of 1925.

1930 - Kuskokwim Bay was opened to the commercial taking of 250,000 king and red salmon per year. Fishing was allowed from 6:00 a.m. June 5 to 6:00 p.m. July 31. A weekend closure was the only weekly closure listed. Fishing was permitted for drift nets and set nets only with a 150 fathom limit per boat.

Provision was made for prohibiting herring fishing in Golovnin Bay from January 1 through August 19 and from November 1 through December 31. Gill nets of not less than 2 3/4" between knots could be used. No other restrictions were listed.

1931 - Some striking changes. The airplane started replacing dog teams in carrying the mail. Large amounts of dried salmon had previously been put up to feed these teams. The decrease in fishing pressure brought about by this change led to a limited commercial fishery. The Port Clarence District, the Yukon

District (seaward from 500 yards off the mouth of each stream), and more of Kuskokwim Bay opened to commercial fishing. Fishing was to be done by drift nets and set nets, although purse seines could be used in Kuskokwim Bay. Mesh size restrictions was 8 1/2" for kings and 5 1/2" for reds. King salmon nets only were allowed in the Yukon. Yukon District commercial fishing was allowed only from 6:00 a.m. June 15 to 6:00 p.m. June 30. The combined take of king and red salmon was not to exceed 300,000 fish in any year, of which not over 50,000 could be taken from the Yukon and 250,000 kings and reds from the Kuskokwim.

1932 - The season in the Yukon was extended. Fishing was permitted from 6:00 a.m. June 5 to 6:00 p.m. June 30.

1935 - Commercial fishing was legalized in the Yukon and Kuskokwim Rivers, as well as in Kuskokwim Bay. The total catch for the area was not to exceed 350,000 fish. The Yukon quota was boosted to a maximum of 100,000 king salmon of which not more than 50,000 kings could be taken outside the mouth of the river. Fishwheels were made legal commercial gear for native Indians and permanent white residents for the capture of king salmon in the Yukon and Kuskokwim Rivers.

1936 - The total quota for the area was reduced to 300,000 fish of which 50,000 fish (not more than 25,000 inside the mouth) could be taken from the Yukon River, and the combined take of red and king salmon in the Kuskokwim was not to exceed 250,000 fish. The season was extended to permit fishing from 6:00 a.m. June 1 to 6:00 p.m. July 31, except for the Kuskokwim where fishing was not to close until August 15.

1940 - Control of Fisheries passed into the hands of the U. S. Department of Interior, Fish and Wildlife Service.

1949 - Kotzebue and Norton Sound districts were opened to commercial fishing.

1950 - Motor driven gill net boats were made legal.

1951 - Fishing inside both the Yukon and Kuskokwim Rivers was limited to native Indians and bona fide permanent white residents. A mesh size restriction of 8 1/2" was placed on the Kuskokwim for king salmon nets.

The quotas were changed to:

Yukon District - 50,000 king salmon, not more than 25,000 to be taken within the mouth of the river.

Kuskokwim District - 250,000 red salmon and king salmon combined, provided that only king salmon and not to exceed 15,000 of these could be taken inside the river.

1952 - Kuskokwim District was closed to commercial fishing.

1953 - Bona fide subsistence fishing was to be allowed at all times in the Yukon River at any place which was over 20 miles by shortest measurement from waters legally open to commercial fishing.

1954 - Kuskokwim District was reopened to commercial fishing. Kuskokwim maximum aggregate length of gill nets was restricted to 45 fathoms of drift and 25 fathoms of set. A weekend closure was imposed on subsistence fishing in the Yukon District from 6:00 p.m. Saturday to 6:00 a.m. Monday except after 48 hours following the close of commercial fishing in any sub-district.

The quotas were changed:

Kuskokwim District - 3,000 king salmon below the mouth of the Aniak River and 3,000 above.

Yukon district - 50,000 king salmon below the mouth of the Anuk River, 10,000 between the mouths of the Anuk and Anvik Rivers, 5,000 above the mouth of the Anvik River.

1960 - The State of Alaska, Department of Fish and Game assumed management of the fishery. The boundary between the middle and upper sub-districts on the Yukon was changed from the Anvik River to the Bonasila River. Kuskokwim River

quotas were changed to: 3,000 kings and 1,500 silvers below Akiachak, 1,500 kings and 1,500 silvers between Akiachak and the middle mouth of Aniak Slough, and 1,500 kings and 1,500 silvers above the middle mouth of Aniak Slough. The season was extended to September 30, to allow for a silver salmon season. Kuskokwim Bay was closed to commercial fishing except within the mouth of the Kanektok River. The Kanektok River was opened to commercial fishing with a quota of 25,000 red salmon and 3,000 salmon of other species. A weekend closure on all forms of fishing, including subsistence, was instigated in the Kuskokwim as well as in the Yukon District, but later was restricted to only the lower two sub-districts on the Yukon, below the mouth of the Bonasila River. A two day closure on subsistence fishing in the Kuskokwim was considered too drastic in view of the very limited size of the commercial fishery and the proportionately greater size of the subsistence fishery. Two years residence in the areas was required to fish commercially.

1961 - A complete revision of regulations was made from the previous quota system to the present concept of a flexible time fishery. The lower sub-districts of the Yukon were opened to fishing for king salmon four days per week - 6:00 p.m. Sunday to 6:00 p.m. Thursday in the lower sub-district (below the mouth of the Anuk River), and 6:00 p.m. Tuesday to 6:00 p.m. Saturday in the middle sub-district (below Marshall). The Kuskokwim lower sub-district was opened to commercial fishing for king salmon from 6:00 p.m. Monday to 6:00 p.m. Saturday, but this was later restricted to 6:00 p.m. Monday to 6:00 p.m. Wednesday due to a great increase in gear. Norton Sound was fished for the first time out of Unalakleet and was restricted most of the summer to fishing four days per week, as was the Kanektok sub-district. The gear limit on the Kuskokwim was increased to 50 fathoms of set net or drift net. A silver salmon season after August 1 for four days per week was provided for in the Yukon and Kuskokwim Rivers. Mesh size restrictions were eliminated.

COMMERCIAL FISHING - YUKON RIVER

The first recorded commercial take of salmon in the Yukon drainage occurred in Yukon Territory in 1903. In a publication entitled "Bureau of Fisheries Document No. 902, Appendix I to the Report of the U. S. Commissioner of Fisheries for 1921", entitled "Pacific Salmon Fisheries" by John N. Cobb, the following salmon catches and values are listed.

<u>Year</u>	<u>Pounds</u>	<u>Value</u>
1903	70,000	\$ 5,600
1909	138,574	\$17,566
1910	169,900	\$18,689
1911	229,000	\$22,900
1912	224,100	\$22,410
1913	182,000	\$18,200
1914	188,600	\$18,860
1915	157,000	\$15,700
1916	143,500	\$14,350

The species taken were primarily king and dog salmon and these were sold fresh.

The history of commercial fishing for export on the Yukon extends back to 1918 when the Carlisle Packing Company of Seattle and Cordova operated a floating cannery at Andreafsky. Figure 1 shows an advertisement of this company from the Pacific Fisherman yearbook. The inception of this operation caused a storm of controversy and the details are worth recording. A discussion of the history of the subsistence fishery appears later in this report, but for the sake of continuity of thought, some of the details, both subsistence and commercial, of the period 1918-21 will be presented here.

In the spring of 1918, a meeting was held by the Bureau of Fisheries, Department of Commerce in Seattle to review opinions of those for and against

Caught from and Packed on the Yukon



GOLDEN NORTH
BRAND
YUKON CHINOOK
SALMON

Carlisle Packing Co.

GENERAL OFFICES
108 L. C. SMITH BUILDING
SEATTLE, U. S. A.

FIGURE I

the establishment of a commercial operation on the Yukon. Those against such an operation pointed out that the residents of the river were dependent on the salmon run for food for themselves and their dogs. The poor catch of 1917 was used as an example. That winter, they stated, it was necessary to kill many dogs because of a food shortage. The proponents of the operation argued that indifferent effort and primitive methods were responsible for 1917's catch, not a poor run. They stated that a river the size of the Yukon should support several such operations without damaging the runs or the subsistence fishery. The whole matter was held in abeyance until a hearing to be held in the fall on prohibiting or limiting commercial fishing in the Yukon.

Table I lists conversion figures used throughout this report to convert barrels, tierces, cases, etc. to numbers of fish. The pack in 1918 and subsequent years is listed in Table II.

In 1918, Carlisle fished chiefly in the South Mouth. They used 124 gill nets totaling 9,869 fathoms and 6 fishwheels. Two smaller salteries also operated. They took 125 barrels of chum and coho salmon, but these are not listed in the table since they are not separated by species.

The Seattle hearing in the fall of 1918 led to the first fishing restrictions imposed on the Yukon. The commercial catch within the mouth of the river was to be restricted in the 1919 season. However, fishing in the area outside the mouth was not regulated. In 1919, Carlisle took advantage of this by putting up 62% of their pack from outside the river mouth. That year, they put up the largest case pack in Yukon history (see Table II), and the number of kings taken has been exceeded only once, in 1961. The number of chums taken, 327,898, has never been exceeded. Four small salteries also participated in this pack.

The large pack touched off a great deal of opposition to the commercial

TABLE I

STANDARDIZED CONVERSION FACTORS FOR THIS REPORT

825 pounds fish per tierce
52 kings per tierce
26 kings per half tierce
138 chums or silvers per tierce

200 pounds fish per barrel
13 kings per barrel
34 chums or silvers per barrel
45 reds per barrel

5 pounds per dried king
1.3 pounds per dried chum (1,539 dried chums per ton)
1.0 pounds per dried red

20 pounds per king (round weight)
8 pounds per chum or silver (round weight)
6 pounds per red (round weight)

3.5 kings per case (48 one pound cans)

TABLE II
YUKON RIVER COMMERCIAL SALMON CATCH
1918-1961

Year	Number	KING SALMON			CHUM SALMON			SILVER SALMON	
		Cases	Tierces	1/2 Tierces (Barrels)	Number	Cases	Barrels	Number	Cases
1918	12,239	4,224			73,921	6,471		26,144	2,661
1919	104,822	28,582	47		327,898	24,548		37,070	3,181
1920	58,467	15,934	145		155,655	12,819			
1921	69,646	19,435	124	(24)	111,098	6,867	53	1,000	
1922	16,825		277						
1923	13,393		287				10		
1924	27,375		575	(125)			71		
1925									
1926									
1927									
1928									
1929									
1930									
1931									
1932	4,739								
1933	8,829								
1934	25,365	100	421	62					
1935	7,265		130	48					
1936	20,963	190	240	(15) 63					
1937	6,226	60	125						
1938	13,727	280	198						
1939	9,987	152	166						
1940	18,053	1,191	229						
1941	29,905	3,094	229						
1942	22,487	3,691	184						
1943	27,650	5,640	158,190# fresh or mild cure						
1944	14,232	3,056	68						

TABLE II (cont.)

Year	Number	KING SALMON			CHUM SALMON			SILVER SALMON	
		Cases	Tierces	1/2 Tierces (Barrels)	Number	Cases	Barrels	Number	Cases
1945	19,727	4,611	69						
1946	22,782	5,677	56						
1947	54,026	9,704	135						
1948	33,842	5,852	83	36					
1949	36,379	8,849	104						
1950	41,808	9,865	93	94					
1951	47,196	10,476	146	113					
1952	34,405	8,072	77	56					
1953	59,273	12,458	171	141					
1954	59,401	10,779	148	236					
1955	58,684	11,008	149	581					
1956	63,478	12,943	145	229	8,000				
1957	63,623	12,519	219	149					
1958	63,259	12,452	203	115					
1959	78,632	13,710	374	334					
1960	67,591	13,000	254	180					
1961	120,260	19,474	504	146	42,461			2,855	

See Legend following page.

TABLE II

LEGEND

1. 1918-24 and 1942-43 data taken from Alaska Fishery and Fur-Seal Industries Annual Reports.
2. 1932-41 data from reports of C. F. Townsend, Fishery Inspector, Bureau of Fisheries, Department of Commerce.
3. 1944-46 data taken from Pacific Fishermen's Yearbooks for those years.
4. 1947-59 data taken from U. S. Fish and Wildlife Service annual reports for this period.
5. 1960 and 1961 data taken from Alaska Department of Fish and Game Arctic-Yukon-Kuskokwim annual reports, unpublished.
6. It should be noted that, in some years, the total number of fish taken is more than an expansion of the tierces, cases and half tierces listed. This is because some of the fish were reported in measurements other than those listed. They, nevertheless, have been added to the total number of fish taken commercially. Also, conversion factors in certain years are different from our standards and where specifically listed for any one year were used for that year.

fishery in the fall and winter of 1919. The Bureau of Fisheries report states that this opposition was of "ecclesiastical inception", and that the "propaganda" circulated by the Archdeacon of the area asserted that the cannery was operating under permission granted by the Bureau of Fisheries. The Bureau pointed out that its function was to limit fishing operations, but not to prohibit canneries. Reports were sent in of privation caused the natives by the operation of the cannery. The Bureau made several points in answer. They pointed out that 1919 was undoubtedly a light run in the Yukon as it was over much of Alaska. There had been a history of light runs long before the establishment of the cannery, and in 1897, the residents had to go to Norton Sound to fish. 1919 was a high water year in the Yukon and this interfered with fishing. The psychological effect of a cannery at the mouth caused many of the people to give up and not make a proper effort to take salmon. Inspector Townsend made an extensive tour of the river and found that in some instances subsistence fishermen not only had enough fish for themselves, but also had surpluses for sale, and in other places there were shortages. As the winter progressed, they stated they received no substantiated reports of undue privation. They also point out that there are many other species of fish which are taken and an abundant supply of game. Finally, they state their policy:

"It is not the province of the Department of Commerce in its legal relation to the fisheries of Alaska to consider as paramount the interests of any particular packing company or of any branch of the fishery industry, or any class of people, but under the law it is charged primarily with the protection of the salmon fisheries. Congress has given the Secretary of Commerce authority to do certain things when in his judgment, protection and preservation of the fisheries demand such action. The Department will therefore give unbiased consideration to all the information which comes before it touching

upon the question involved, but it is not required to accept as correct anything less than a fair, unprejudiced presentation of the facts.

"The two main contradictory views involving the Yukon situation are, first, that of the commercial interests which contend that there are large runs of salmon in the Yukon and that the number taken for their purposes is but a small fraction of the total; and second, that of certain of the natives and others who maintain that the runs are small and that no salmon can be exported without a resulting local state of privation. The question of large interest, however, to the Department is not whether commercial fishing shall cease in order that noncommercial fishing may continue, but whether the runs of salmon in the Yukon are being or will be depleted under the present scale of operations. It is proper that cognizance be taken of any condition that threatens to destroy the fisheries, whether it be the result of operations by a packing company or by a resident population, or by both.

"There is much to be learned regarding the salmon runs in the Yukon before the Department considers further limitations upon fishing in those waters. Competent investigators will, therefore, be sent to the Yukon in 1920 to study the salmon runs and to ascertain the actual conditions of the natives in their relation to the salmon fisheries. Further regulations of the Yukon salmon fisheries will depend very largely upon the results of their observations. It remains true that a just regard for the rights of humanity must inevitably weigh heavily in considering the final regulation of these fisheries, but it seems now that the Yukon can support at least a reasonable commercial fishery for salmon and at the same time insure an ample supply for local food purposes in perpetuity."

In 1920, Carlisle's pack was much reduced, presumably because high water and a late start allowed much of the run to escape. Forty-one (41) boats, of

which 30 fished full time, were utilized. Each boat was issued 200 fathoms of king salmon net and 200 fathoms of chum salmon net to the extent that this was obtainable. In addition, they bought fish from 7 fishwheels and an undetermined number of independent fishermen. As in 1919, the largest percentage of the catch, some 69%, was taken outside the mouth of the river.

Dr. Charles Gilbert and Henry O'Malley at the behest of the Bureau of Fisheries undertook in 1920 an investigation of the Yukon fisheries. They traveled the river from Dawson City to the mouth and up the Tanana as far as Nenana. Their findings show a shift in viewpoint from the Bureau of Fisheries report of 1919. From interview, they found that the run of 1919 was "one of the worst, if not the very worst ever known on the Yukon". They estimated 150 or 200 tons of dried fish put up as an outside figure for the whole river. It was stated that the winter of 1919-20 would have been a disaster if hunting had not been exceptionally good.

The extent to which Carlisle's operation can be blamed for this is hard to evaluate. However, it would appear that if the 357,081 chums they took had escaped upstream, it would have alleviated the situation somewhat, since this number is more than Gilbert and O'Malley's estimate of the whole subsistence catch for the river. Although, considering fishing methods and conditions, there is a definite question mark surrounding the number of these fish that would have found their way into the subsistence catch if they had not been taken commercially. Many items indicating the run had been heavily fished commercially were related to the two investigators. Among these: nearly all small kings were taken upriver; large kings were net marked; late run chums were scarce upriver - this was the chum run the cannery concentrated on after the king fishery. Though 1919 was probably a low cycle year, it appears as though the cannery compounded the problem.

In 1920, apparently the runs of all species were good, and the subsistence catches compared favorably with following years. Carlisle put up less than half the pack in 1920 that they put up in 1919, but whether this accounts for the good subsistence catch by itself is doubtful. Nevertheless, since these runs appear to be as cyclic as in other areas, a high commercial catch, especially on chums, in combination with a low cycle year could spell disaster upriver. With the apparent lack of regulation and management in 1918-21, and the great dependence on natural resources then, this was especially true. Gilbert and O'Malley recommended that commercial activity within the mouth of the river be halted and that commercial fishing outside the mouth of the river be brought under the control of the Department of Commerce. They stated that it was wrong to experiment with the welfare of the people of the interior, and commercial activity should be allowed only if it was certain that the subsistence fisheries upriver would not be damaged.

On the basis of Gilbert and O'Malley's findings in 1920, commercial activity was sharply curtailed after the season in 1921 by restricting fishing to waters outside the mouth of the river. In the fall of 1924, all commercial fishing in the area was eliminated.

Carlisle suspended operation after the 1921 season, in which they used 8,850 fathoms of gill net, 1 trap and 2 fishwheels. All commercialization for export after 1924 ceased until 1932. Table III shows a list of commercial operations from 1932 to the present. The first cannery to enter on the scene was a hand pack operation owned by Frank Kern in 1934. In 1937, Kern sold out to Northern Commercial Company. In 1940, Bering Trading Company, Jack Emel, owner, started a hand pack operation at Kwiguk and subsequently moved to Alakanuk. This operation was the Yukon River Fisherman's Cooperative Association in 1961. In 1953, St. Mary's Mission operated a hand pack floating

TABLE III
 COMMERCIAL OPERATIONS
 YUKON RIVER
 1932-1961

Year	Salteries	Hand Pack Canneries	Canneries	Freezers
1932-33	2			
1934-36	3	1		
1937	2	1		
1938-39	3	1		
1940	4	2		
1941-42	3	2		
1943	1	2		
1944*	2	2		
1945	1	2		
1946	1	2		
1947	2	2		
1948	2	2		
1949	2	2		
1950	3	2		
1951	3	2		
1952	4	2		
1953**	3	2	2	
1954	3	2	2	
1955	4	2	3	
1956	4	2	3	
1957	6	2	3	
1958	6	2	3	
1959	6	3	3	
1960	8	2	3	
1961	6	2	3	2

* 1944-46 from Pacific Fisherman Yearbooks.

** 1953 is the first year that mentions the Bering Trading Company and Northern Commercial Company being one line canneries instead of hand pack which they were originally.

Other figures from Department of Commerce, U. S. Fish and Wildlife Service and Alaska Department of Fish and Game Annual Reports.

cannery at Sunshine Bay. This year is also the first year in the reports that shows the change of the Bering Trading Company and Northern Commercial Company from hand pack to one-line cannery. Ira Weisner started a small hand pack in 1953 at Rampart. In 1955, St. Mary's Mission expanded their operation to a one-line cannery and Henry Bogler started to hand pack. This was the canning situation in 1961. There were six (6) salteries on the Yukon in 1961, and two freezerships participated in the 1961 season.

Table IV presents comparative data for the past nine years of commercial fishing. Previous to 1953, data on effort was not detailed enough to perform the computations listed in this table.

TABLE IV

YUKON RIVER COMMERCIAL KING SALMON CATCH
STATISTICS BY SUB-DISTRICT, 1953-1961

YUKON RIVER SUB-DISTRICTS:	1953	1954	1955	1956	1957	1958	1959	1960	1961
<u>LOWER: Mouth to Mountain Village</u>									
King Salmon Catch	55,247	52,896	49,353	52,149	51,322	50,672	61,018	50,713	84,406
Amount of Gear Fished*	5,100F-6W	7,510F	6,165F-1W	4,145F	10,363F	8,425F-1W	11,795F	21,850F	26,485F
Total Days Fished	21.00	21.00	20.25	18.88	22.75	24.75	14.91	15.83	19.75
Total # Man Days	1,137	1,449				1,817	1,396	1,508	2,815
Avg. # Fishermen Per Season	54.0	68.7				73.1	93.5	96.7	130.0
Avg. Catch/Man/ Hour	2.02	1.52				1.16	1.82	1.40	1.25
<u>MIDDLE: Mountain Village to Marshall</u>									
King Salmon Catch	3,247	5,146	8,338	10,479	10,771	11,387	15,934	15,994	29,028**
Amount of Gear Fished	820F		1,800F	3,510F-5W	3,021F	7,000F-2W	8,050F	5,925F	11,180F
Total Days Fished						22.3	15.0	18.25	15.75
Total # Man Days						1,009	986	1,377	946
Avg. # Fishermen Per Season						51.3	65.5	62.4	56.0
Avg. Catch/ Man/ Hour						.47	.67	.48	1.22

TABLE IV (cont.)

YUKON RIVER SUB-DISTRICTS:	1953	1954	1955	1956	1957	1958	1959	1960	1961
<u>UPPER:</u> Marshall to Canadian Border									
King Salmon Catch	779	1,359	993	850	1,530	1,200	1,680	884	1,804
<u>HOLY CROSS AREA:</u>									
King Salmon Catch									4,965
TOTAL CATCH	59,273	59,401	58,684	63,478	63,623	63,259	78,632	67,591	120,203

* F = Fathoms of gill net fished
W = Fishwheels

** Catches made just below the Anuk River on closed days in the Middle sub-district are included in the total catch, but not in the catch/unit effort calculations.

Catch figures presented here taken from Unit Tables in FWS Annual Reports and ADF&G Annual Reports. In some cases these totals did not match totals given elsewhere in the text of the Annual Reports.

SUBSISTENCE FISHING - YUKON RIVER

Table V is a summary of data compiled from a variety of sources on the Yukon subsistence fishery. The following discussion will attempt to explain the method by which we arrived at the figures listed. In most cases, the design of these surveys is obscure, and the coverage is unknown. The data is largely open to interpretation, and a comparison with the 1961 survey is extremely difficult. Nevertheless, some sort of standardization is necessary, and it is suggested that the figures listed be used in the future.

The reader is again referred to Table I, for conversion figures from pounds to numbers of fish. In some years, kings were reported as beleke or kippered kings. These products were dropped from consideration since conversion figures were not known and they comprise a very small percentage of total catch. Unless otherwise stated, all the below information is from the Alaska Fish and Fur-Seal Industries reports.

In 1914, Agent H. O. Smith of the Department of Commerce, Bureau of Fisheries, made a trip from St. Michael to Whitehorse. Some of his observations are worth recording here, though no actual counts were made. Pinks were rare in 1914, as they are today. Reds are not mentioned. He placed emphasis on the use of kings for human consumption. He mentions chums predominating the catch from Holy Cross to Kaltag. He mentions Nulato as the leading fishing center on the river. He recommends that the river be kept closed to commercial fishing.

The next mention of Yukon subsistence fishing dates back to the Bureau of Commerce hearings in Seattle in 1918. After it became generally known that a cannery was considering an operation on the Yukon in 1918, there was a general protest against the establishment of such an operation. At the hearing, it was

TABLE V
SUBSISTENCE FISHING HISTORY
YUKON RIVER

Year *	Number of Families	Wheels	Nets	K I N G S		OTHER SALMON		Remarks
				Number	Pounds	Number	Pounds	
1918		393	430			1,400,000		Main Yukon to border and Tanana River.
1919						269,000	350,000	No Count - an estimate.
1920	511	301		20,000	100,000	860,000	1,144,000	Mouth to Dawson and Tanana River.
1922				15,000		330,000	430,000	
1923				17,500		435,000		Mouth to Tanana and Tanana River.
1924		258	600F			1,130,000	1,470,000	Kwiguk to Rampart Rapids and Tanana.
1925		168	46	15,000	71,200	259,000	336,000	Mouth to Tanana and Tanana River.
1926		188	50	20,500	97,164	555,000	723,000	"
1927		182	66			520,000	679,000	"
1928		212	74			670,000	872,000	"
1929			75			537,000	699,000	"
1930		211	925F			633,000	823,000	"
1931		220	151	26,693		565,000	734,000	"
1932		232	94	23,160		1,092,000	1,420,000	Mouth to Rampart and Tanana River.
1933		242	130	19,950		603,000	784,000	Mouth to Tanana and Tanana River.
1934		215	180			474,000	616,000	"
1935		247	109	20,400		537,000	698,000	"
1936	317	251	119	22,750		560,000	728,000	"
1937	269	210	112	5,528		346,000	450,000	"
1938	305	194	88	19,244		340,450		"
1939	371	204	67	18,050		327,650		"

TABLE V (cont.)

Year*	Number of Families	Wheels	Nets	K I N G S Number Pounds	OTHER SALMON Number Pounds	Remarks
1940	370	222	60	14,400	1,029,000	Mouth to Tanana and Tanana River.
1941	301	141		17,703	438,000	"
1942					197,000	
1943					200,000	
1951			169			
1952			133			
1953		111			380,000	Mouth to Tanana and Tanana River.
1954		165				
1956		115				Main Yukon, Eagle-Kwiguk.
1958	382	127		11,890	337,500	Mouth to Fort Yukon.
1961	645	182	577	23,719	405,632	Mouth to Dawson and Tanana River.

* The years 1921, 1944-1950, 1955, 1957, 1959-1960 were omitted either because there was no survey or the survey was too brief to make any overall statement about the subsistence catch.

brought out that the run of 1917 was very poor, and many dogs had to be killed that winter because of a shortage of food.

As a result of the above hearing, the earliest known count of the subsistence fishery on the Yukon (a partial survey in 1918 by C. F. Townsend and H. J. Christoffers, Bureau of Fisheries) was undertaken. They enumerated 393 fishwheels and approximately 650 to 700 tons of dried fish for the Yukon and Tanana Rivers. These investigators calculated the catch at approximately 1,400,000 small salmon, not figuring in any kings that might have been in the catch. This figure does not include Yukon Territory and probably does not include the Koyukuk River.

No exact production figures are available for 1919, but Gilbert and O'Malley, during their 1920 survey, through interview and observation arrived at a figure of 150 to 200 tons of dried salmon taken in 1919 from the drainage. No separation by species is given. This was considered one of the poorest years in Yukon history by most of the residents they interviewed. Many conflicting views of the 1919 runs and the effect which commercial operations had on them have been printed. These views and actions taken are presented under the section on commercial fishing.

In the 1920 survey, Gilbert and O'Malley estimated the catch for the entire drainage. They estimated 1 1/3 pounds per dried chum, and 5 pounds per dried king. They actually covered only the main Yukon from the mouth to Dawson, and the Tanana as far upriver as Nenana, the same area covered by our 1961 survey, and this is the figure presented in Table V. Their drainage estimate was 1,000,000 chums and 23,000 kings.

No figures were available for 1921. Figures for 1922 were taken from Alaska Fish and Fur-Seal reports for that year. The catch was said to be the smallest in history. It was also one of the highest water years in history.

"At a number of places good catches were made, which indicated that there was a normal run."

The 1923-1930 figures were taken from Alaska Fishery and Fur-Seal Industries Reports, Department of Commerce. The area covered in these surveys is assumed to have been from the mouth of the Yukon to Tanana, and up the Tanana River to Nenana.

The 1924 run of kings and chums was reported to be the largest since 1912. Figures for 1925 show an especially poor year on both kings and chums. C. F. Townsend stated that there was a normal run of kings, but a shortage of chums. The ice break-up caused more damage to wheels than usual and resulted in smaller production of dried salmon. However, no concern was shown over the subsistence fishery, due to a carry-over from the previous year and to the abundance of whitefish and lampreys.

In 1926, there was supposedly a very heavy run of kings, but only about 20,500 kings were counted in the subsistence fishery including those in barrels and dried. Townsend indicates a fair run of chums and a large run of pinks. He states that there was a poor salmon catch on the Tanana due to extremely high water.

The 1927 figures for the king catch add up to about 2,900 kings. This figure seems highly improbable if applied to the whole drainage, so the king count was omitted. This figure may represent the king catch at the mouth only.

The 1928-1930 figures for kings caught are omitted for the same reason as in 1927. These figures down in the 1,000-4,000 range are especially hard to believe since several of these years supposedly had very good runs of kings.

The figures for 1931-50 were taken from both the Alaska Fish and Fur-Seal Industries reports and the unpublished reports of C. F. Townsend, Fisheries Agent. Conflicting figures are offered, probably due to errors in reprinting

the original data, so a choice has had to be made and the most logical figures presented. For instance, in 1931, the Alaska Fish and Fur-Seal totals for kings taken is below 5,000, while Townsend's report shows 26,693 taken. Townsend's figure, although the material we have is very poor copy, sounds much more logical and was therefore used. The separate village totals were added up, and the figure arrived at was 26,593 not 26,693, apparently an error in reprinting. Since it is impossible to say where the error was made, in the village data or the total, the total has been accepted as stated. In all cases where either figure seemed acceptable, the Alaska Fish and Fur-Seal figure was used.

The first year where subsistence totals are presented village by village was in 1931. In Table VI, figures on king salmon catch are presented as nearly as possible on the same area basis as the 1961 survey. However, it is not always clear what area of the drainage was included, so some error can be expected.

Very low river levels prevailed during the summer of 1933. Light catches above Mountain Village were stated to be due to this factor. However, the subsistence catch in 1932 was very large and there was a considerable carry over of dried chums to 1933.

Data for 1934 shows no breakdown of the catch by village, and no king total is shown in the raw data in our possession. A very light catch from Pilot Station to Tanana is attributed to high water and drift.

Subsistence catches were poor in 1937. The river was, again, unusually high. "In any case, the wheel is practically useless during high water." All the tributaries were at flood stage during the season and fear was expressed that egg survival would be low.

TABLE VI
 SUBSISTENCE CATCH OF KING SALMON BY VILLAGE
 YUKON RIVER
 1931-33, 1935-40 and 1961

VILLAGE OR FISHING UNIT	1931	1932	1933	1935	1936	1937	1938	1939	1940	1961
Below										
Mountain Village (1)	14,043	12,600	12,750	2,500	3,900	925	10,000	6,710	6,600	772
Mountain Village	500	300	500	200	600	200	400	600	1,000	1,110
Andreafsky (2)	200	300	150	500	400	50	0	700	500	1,810
Pilot Station	500	600	100	500	400	500	100	200	300	753
Marshall (3)	1,500	1,800	850	800	1,100	100	500	700	1,000	1,265
Russian Mission	1,000	900	0	2,500	1,800	0	500	1,000	0	1,563
Paimiut	1,000	1,500	800	600	800	0	1,500	500	900	300
Holy Cross	400	500	600	1,000	1,400	210	600	1,000	3,500	2,348
Anvik (4)	100	200	250	0	100	0	200	50	200	22
Shageluk-Holikachuk (5)	500	600	150	300	500	450	100	0	0	25
Kaltag	0	0	400	700	900	200	4	100	0	33
Nulato (6)	1,600	1,500	900	1,000	1,100	100	0	50	100	513
Koyukuk (7)	1,300	1,300	700	800	1,150	400	200	0	0	483

TABLE VI (cont.)

VILLAGE OR FISHING UNIT	1931	1932	1933	1935	1936	1937	1938	1939	1940	1961
Galena (8)	250	300	100	1,100	1,550	100	---	---	---	626
Ruby and Kokrines	3,400	1,100	800	6,100	6,200	1,950	2,410	6,750	3,300	1,060
Tanana (9)	300	1,200	500	1,700	1,450	500	1,080	500	300	2,379
Tanana River	0	0	200	0	0	---	0	500	1,000	657

The accuracy of the figures for 1931-40 is undetermined. The survey design and coverage in each village is not recorded in the reports of the Department of Commerce for those years. Totaling of the village catches does not in all cases yield the same total king catch shown in Table V. The village data was open to some interpretation and therefore if a total subsistence king catch was stated in the report, this was the figure used in Table V.

See legend following page.

TABLE VI

LEGEND

- (1) It is not possible to compare the area below Mountain Village with 1961 on a village to village basis. Names and locations have changed, therefore, the whole area is grouped together.
- (2) Pitkas Point was included under the heading Andreefsky.
- (3) Inhagamute and Okagamute were included under Marshall.
- (4) Bonasella was included under Anvik.
- (5) Camps between Anvik and Kaltag were assumed to occupy the same position that Shageluk - Holikachuk camps occupy today.
- (6) Half-way camp was assumed to be included as part of the Nulato catch, the same position camps in that area occupy today.
- (7) Bishop Mountain was included under Koyukuk as it was in 1961.
- (8) Camps from Bishop Mountain through Whiskey Creek were included under the heading "Galena", although the town as such apparently did not exist at that time.
- (9) All the camps on the main Yukon above Kokrines were included under Tanana.

In 1938 and 1939, the data shows a small run of chums in both the Yukon and Tanana.

One example of confusion in past figures occurs in 1940. Townsend lists the king catch for the whole river as 32,453 - subsistence and commercial. Alaska Fish and Fur-Seal lists this as the commercial catch only.

In 1941, the local agent estimated a good escapement of kings and an excellent escapement of chums. Galena and Tanana Air Bases were under construction and many fishermen were lured from their fishing by this work.

In 1942, the village to village survey was apparently discontinued. An estimate was made of the catch on the basis of the increased amount of labor available on defense projects along the Yukon (See Table V), and a consequent decrease in subsistence fishing pressure.

In 1943, an estimate was made by the U. S. Fish and Wildlife Service fisheries agent in the area that the Yukon fishery took 130 tons of dried chums of 200,000 fish.

In 1944-47, there are no definite statistics for the drainage on the subsistence fishery.

A small run of kings occurred in the Yukon in 1948 according to a brief survey.

No data is available for 1949.

In 1950, a brief aerial survey was made on the Yukon. The king run was said to be average.

In 1953, a permanent management man was assigned to the Yukon, Mr. George Warner. He states in his 1953 Annual Report that the runs of all species of salmon were exceptionally good. His estimate for numbers of small (chum, silver) salmon dried for personal use between Fairbanks and Kwiguk Slough in the Yukon and Tanana is only 380,000 salmon. He makes the observation that

in the past few years, the price of fur had been low and there had been a great decline in trapping. This fact accompanied by the increase in air travel had greatly reduced the number of dogs and the need for salmon as dog food.

In 1954, personal use catches of king and chum salmon in the Yukon were found to be unusually good. No figures were given.

In 1955, coverage of the Yukon drainage in Alaska was sketchy, but the runs and subsistence catch were stated to be good. The Branch of River Basins, U. S. Fish and Wildlife Service, made a survey of fish and spawning areas in the Upper Yukon River Basin above Carmacks which appears in their Progress Report No. 1. This is one of the few surveys of this area. The residents of this area said the run was poor and late in arriving. No extensive counts were made.

In 1956, a partial survey of the Yukon subsistence fishery was made by Branch of River Basins, U. S. Fish and Wildlife Service. Their figures are presented in Table VII. It is assumed that "human food" included mostly kings, although late run chums and silvers may also be included. They also surveyed the main Yukon as far upstream as Carmacks, Yukon Territory. The survey from Eagle to Carmacks is covered in Progress Report III, "Fisheries Resources of the Upper Yukon River Basin". They state that the fishing pressure was at a low level compared to past years in this area. From Eagle through Carmacks, 144 people were found to be dependent upon salmon for subsistence. The catch data was apparently collected by interview.

In 1956, the surveyed subsistence catch was as follows:

TABLE VII
 SUBSISTENCE CATCH OF SALMON
 IN VARIOUS YUKON RIVER VILLAGES DURING 1956*

Village	H U M A N F O O D			D O G F O O D		
	Population	Fish	Average Fish Per Person	Population	Fish	Average Fish Per Dog
Kwiguk	200	4,400	22.0	400	15,300	38.25
Old Andreefsky	9	1,150	127.7	30	2,100	70.0
Mountain Village	114	1,476	12.9	245	8,881	36.2
St. Marys	63	5,300	24.1	97	6,785	69.9
Pitkas Point	21	986	46.9	49	2,870	58.5
Pilot Station	75	3,470	46.2	225	10,630	47.2
Paimuit	10	422	42.2	10	5,590	55.9
Stevens Village	85	2,750	32.3	106	2,750	25.9
Beaver	86	3,210	37.3	65	9,990	153.7
Venetie	72	240	3.3	55	2,160	39.3
Eagle	61	569	9.3	40	804	20.1

* From U. S. Fish and Wildlife Service Progress Report No. 2, General Information Relative to the Fish and Wildlife Resources of the Yukon River Basin, November, 1957.

<u>Village</u>	<u>King Salmon</u>	<u>Chum Salmon</u>
Eagle	1,163	1,939
Moosehide	595	786
Dawson	3,651	986
Pelly Crossing	670	--
Fort Selkirk	--	600
Kirkland Creek	40	--
Minto	17	255
Carmacks	<u>345</u>	<u>552</u>
TOTAL	6,481	5,118

In 1957, Branch of River Basins, U. S. Fish and Wildlife Service, partially surveyed the personal use fishery from Marshall to the Rapids Fish Camp above Anvik. They pointed out that two main factors other than the number of fish in the river influence catches. These are water conditions and annual changing local employment conditions. The only camps for which total catches were recorded were Rapids, Russian Mission, and Ohogamut. Their total salmon catches are presented below.

<u>Species</u>	<u>Rapids Fish Camp</u>	<u>Russian Mission</u>	<u>Ohogamut</u>
Kings	N. R.	1,600	4,000
Chums	10,350	9,800	7,000
Silvers	---	4,000	2,000

In 1958, Mr. Lawrence Knapp, Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, made a fairly exhaustive survey of the subsistence fishery of the Yukon. Table VIII compares the village by village catches obtained in Knapp's 1958 and 1959 surveys, where data is available, with the Alaska Department of Fish and Game 1961 survey. Mr. Knapp's figures were expanded on a district basis rather than on a village by village basis, so our figures are compared with his the same way in Table IX. His totals of kings taken for the lower three districts vary so much from ours that we must assume there has been some basic change in fishing habits or there is some error in

TABLE VIII
SUBSISTENCE CATCH BY VILLAGE
YUKON RIVER

Village	K I N G S			C H U M S		
	1958	1959	1961	1958	1959	1961
Black River						
Akulurak	29			2,862		
Sheldons Point	0	3	180	2,500	1,043	12,683
Alakanuk		113	165		2,477	8,932
Kwiguk-Emmonak	0*	293	137	7,000*	13,742	15,670
Aproka Pass			171			7,303
Snotty Slough			8			1,106
Axel Johnson's Camp						
Hamilton		107	111		3,616	3,931
Mountain Village		290	1,110		4,075	7,373
St. Marys	0*		1,810	4,539*		8,771
Pilot Station	25*		753	2,600*		5,605
Marshall			1,265			5,992
Russian Mission	10	1,251	1,563	3,275	11,882	4,098
Paimiut	8/13 no catch		300	8/13 no catch		1,076
Holy Cross			2,348			20,068
Anvik	19	19	22	34,284	53,523	61,406
Shageluk-Holikachuk	35*	137	25	29,843*	27,636	56,284
Kaltag	0	0	33	23,935	550	23,395
Nulato	0*	0	513	31,007	23,668	63,163
Koyukuk	15*	75	483	10,457	9,250	13,544
Galena	550	700	626	7,502+	7,000	10,585
Ruby and Kokrines	823	493	1,060	8,211+	7,080	15,654
Tanana	3,391	1,280	2,379	9,372+	15,197	12,775
Rampart	1,045**	199	605	735+	1,360	11,722
Stevens Village	1,385*	675	650	213+	3,465	3,490

TABLE VIII (cont.)

Village	K I N G S			C H U M S		
	1958	1959	1961	1958	1959	1961
Beaver		150	185		2,500	2,975
Fort Yukon			2,958			13,252
Circle		550	496		0	992
Eagle	1,200	980	875	100+	75	150
Dawson			2,231			750
Manley Hot Springs			330			1,950
Minto			17			4,536
Nenana		666	310		22,009	6,426
EXPANDED TOTALS	11,890		23,719	334,472		405,632

1958 7/21 to 8/19 Eagle-Mouth. Knapp (1958 Annual Report, U. S. Fish and Wildlife Service)

1959 No indication of completeness of counts. Knapp unpublished data (1959)

1961 7/25 to 9/18 Mouth-Dawson and Tanana River.

* = Incomplete census of village with no correction factor available to us.

+ = Incomplete count of fish.

** = Includes commercial catch.

TABLE IX
 1958 AND 1961 SUBSISTENCE SURVEYS
 COMPARED BY DISTRICT
 YUKON RIVER

Area	K I N G S		C H U M S	
	1958	1961	1958	1961
Yukon Mouth to Mountain Village	329	772	99,563	49,625
Mountain Village through Holy Cross	198	9,149	60,164	52,983
Holy Cross through Koyukuk	57	1,076	174,655	222,792
Koyukuk through Eagle	<u>11,306</u>	<u>9,834</u>	_____	_____
TOTALS	11,890	20,831	334,382	325,400

the data. It is valuable to compare these two years, because they are the only surveys prior to 1962 for which methods and means are well documented. The 1958 survey did not extend above Eagle on the main Yukon and did not include towns on the Tanana or Koyukuk. In the area from Koyukuk to Eagle, chum runs were just starting, and counts were so minimum that they were not included. The runs of kings, pinks, and reds were over in all districts and the runs of chums were over except in the upper district. In general, 1958 was rated as a "poor to fair year" for subsistence fishing. On the comment side of the ledger, it was noted that many people above Holy Cross complained of a lack of kings. It was also stated by some residents that the king run had been decreasing for years. Blame was often placed on the commercial fishing at the mouth.

It was reported by residents of the mouth of the river that the king salmon run in 1959 was one of the largest in history. "Good catches of king salmon were realized in all camps along the Yukon where concerted effort was usually put forth to capture them. There were considerable complaints about poor runs, but these were from camps where the fishing effort was quite lax" (Knapp, 1959). The chum salmon runs were agreed to be good and Knapp calculated the subsistence catch to be about twice that of 1958.

No subsistence survey was made in 1960. However, the runs of kings were considered fair, while the chum run was good.

Extensive treatment of the 1961 and 1962 subsistence fisheries of the Yukon River is given in the annual reports of the Alaska Department of Fish and Game for those years.

COMMERCIAL FISHING - KUSKOKWIM RIVER

Although the history of commercial fishing on the Kuskokwim River dates back forty-nine (49) years prior to 1961, lack of personnel and of a continuing program of fisheries investigation have probably been the primary factors resulting in the paucity of information on Alaska's second largest river.

Four basic references have been used in this section: Alaska Fishery and Fur-Seal Industries Reports, Pacific Fisherman Yearbooks, supplemental unpublished field reports of the U. S. Fish and Wildlife Service, and unpublished data of the Alaska Department of Fish and Game for 1960 and 1961.

Prior to 1935, the Kuskokwim River had been closed to commercial fishing while Kuskokwim Bay was being fished commercially at least as early as 1913. The first recorded report of any commercial operation occurs in the 1913 annual report, Alaska Fishery and Fur-Seal Industries, when the power schooner Bender Brothers, operated by J. E. Shields of Seattle, put up a mild cure pack of more than 150 tierces of king salmon. This would amount to approximately 7,800 fish.

In 1914, about 100 tierces were mild cured, of which 20 tierces were chum salmon and the rest kings. The Pacific Fisherman Yearbook for 1914 also lists a hard salt pack of forty 300-pound barrels of red salmon processed for export.

The 1915 Alaska Fishery and Fur-Seal Industries report states that a few tierces of mild cured salmon were put up on the Kuskokwim River that year.

Though no mention is made of any commercial operations in the Bureau of Fisheries annual reports for 1916 through 1921, there were mild cure and hard salt packs for all of these years and these are listed in the Pacific Fisherman Yearbook editions for that period. The 1920 season represented the largest commercial catch ever taken on the Kuskokwim with five operators processing a total of some 35,000 king salmon that year.

In 1922, Assistant Agent L. G. Wingard voyaged from Seattle to conduct a special investigation of the Kuskokwim. He patrolled the river for 32 days and journeyed approximately 400 miles upriver. This was the first recorded fisheries survey since the advent of commercial operations in 1913. Four salteries were operating when he arrived, all near the mouth of the river. The pack of these operators involved king and red salmon and totaled 25,000 fish, all for export. This, of course, did not include the many fish processed along the river for local sale and barter. Wingard's report is fairly comprehensive and his general observations are of particular interest in that it was the first record of any subsistence catches. He estimated that 150,000 small fish (chums and reds) were dried for subsistence use in 15 villages between Bethel and the river mouth, allowing 1,000 fish for each family, a figure obtained by local estimates and substantiated by actual counts. One-half and sometimes more were sold or bartered, leaving the rest for home consumption. In fifty villages and camps above Bethel, 150 families averaged 1,000 fish per family, or a total of 150,000 salmon.

Table XII lists the villages which Wingard surveyed. While he does not differentiate between species, he mentions that very few king salmon were caught because the people were late in beginning to fish and many families dried none at all. Several of the villages or camps listed on earlier reports no longer exist or else names have changed, which makes direct comparison with recent data difficult.

Apparently many of these earlier reports were based on brief visits or on reports from local residents or operators. In 1923, the Inspector of Fisheries spent a week making a general investigation of the Kuskokwim. Though no commercial report is given in the Bureau of Fisheries annual report, Pacific Fisherman lists three operators and a total pack of one hundred nineteen 825-pound tierces and eighty-two 200-pound barrels of king salmon in 1923.

A stream guard was stationed on the Kuskokwim in 1924 and reported a commercial take of 32 tierces of mild cured kings, 329 tierces and 37 barrels (200 pound) of pickled kings, 430 barrels of pickled chums and silvers, and 20 barrels of pickled reds.

In 1925, a stream guard was once again patrolling the river and reported a commercial pack of 32 tierces of king salmon and 130 barrels of red salmon.

The Kuskokwim area was closed to all fishing for export from 1926 through 1929. No reason was available in the literature for the closure. Commercial fishing had been conducted for thirteen continuous years prior to this restriction. Even though commercial fishing was prohibited for four years until 1930, a stream guard was stationed on the Kuskokwim each fishing season from 1925 until 1937.

In 1930, supplemental orders were issued modifying the regulations to permit commercial fishing in part of Kuskokwim Bay. This relaxation of restrictions on fishing was brought about at the request of local residents who felt a limited cannery operation would not take an undue proportion of the salmon run and would give employment to local residents, thus minimizing the effect of a diminished market for dried fish as a result of the displacement of dog teams by air service. These regulations provided for the taking of 250,000 king and red salmon. A floating cannery operated in Kuskokwim Bay for a short time and put up 2,147 cases of kings and 204 cases of reds.

Three operators packed 94 tierces and two hundred eighty-one 200-pound barrels of king salmon in 1931.

In 1932, three companies engaged in commercial fishing. Their total output was 137 tierces of mild cured kings and 175 barrels of pickled chums, kings, and reds.

There was no fishing for export conducted in 1933 and 1934.

Two operators fished near the mouth of the river in 1935. Their total output consisted of 12 tierces of mild cured king salmon, 448 barrels of pickled kings, and 244 barrels of pickled cohos.

One operator prepared 12 tierces of pickled king salmon in 1936.

No personnel were stationed on the Kuskokwim in 1937, and one operator reported a take of 7,200 pounds of king salmon.

In 1938, a rather complete subsistence survey was conducted from the river mouth to Napaimiut, some 297 miles upriver. One operator put up 12 tierces of kings and 6 tierces of cohos for export.

Except for an occasional survey flight by the agent in the Bristol Bay area, no fisheries personnel observed the fishery from 1939 to 1959.

Only one operator processed fish for export during 1939, 1940, and 1941. The totals for each year are: 1931 - 2,000 pounds of king salmon, 1940 - 3,000 pounds of pickled cohos and 3,700 pounds of pickled kings, 1941 - 4,040 pounds of pickled cohos and 2,800 pounds of pickled kings.

There are no reports on the Kuskokwim from 1942 until 1946, when the Pacific Fisherman Yearbook reported one operator with a pack of 44 tierces of king salmon.

In 1947, Pacific Fisherman listed two operators with a total pack of 103 tierces of kings.

No reports or data are available for 1948 and 1949. The 1950 U. S. Fish and Wildlife Service annual report, Bristol Bay District, reports that the floater Columbia arrived on the Kuskokwim at the end of the king season and as a result realized a poor catch, but no figures are given as to amount of catch. The report also refers to "last year's operation", but again no data is presented for the 1949 season. Apparently, some local agitation against commercial fishing began to develop in 1950. Evidently, the notes of discord coincided with the

arrival of the unsuccessful floater operation.

The floater Columbia returned in 1951 to fish the king season and salted 54 tierces of king salmon or approximately 2,800 fish. In this same year, the commercial regulations were modified to the taking of king salmon only and not to exceed 15,000 fish inside the river mouth, the balance of the quota to be taken in Kuskokwim Bay. The annual report for the 1951 season indicates that the agitation against commercial fishing had gained momentum, stemming primarily from the Native Service, and since little interest had been shown in any commercial operations for many years, it was recommended that commercial fishing be closed on the Kuskokwim beginning in 1952. Unfortunately, the lack of biological and subsistence use data greatly hindered any formulation of regulations for proper utilization of the salmon resources.

In 1954, the Kuskokwim River was once again opened to commercial fishing, for king salmon only. Kuskokwim Bay remained closed. A quota of 6,000 king salmon was allowed, 3,000 for the upper district of the river. No discussion of the regulation change or quota figures is found in any of the reports. No mention of the Kuskokwim is made in the annual reports from 1951 until 1958.

Though commercial fishing was legalized on the Kuskokwim again in 1954, no commercial fishing took place until 1959. Two operations purchased king salmon in the 1959 season, one at Bethel in the lower district and one at Aniak in the upper district. The total catch was 3,760 king salmon.

The management of the fisheries resources became the responsibility of the State of Alaska in 1960. Regulations remained essentially the same, except that the upper district was subdivided into two districts and the former upper district quota was likewise divided. Also, provisions were made for the commercial harvest of silver salmon. There was one additional operator in 1960, bringing the total to three for the entire river. A catch of 5,969 king salmon was realized.

The need for acquiring biological data and a method of better utilizing the existing fisheries resources on a sustained yield basis led to a revision of commercial regulations in 1961. The modified quota system of 1960 was retained for the upper two districts, but the lower district was placed on an experimental time fishery to spread the catch, thereby insuring adequate escapement and better utilization as well as a sampling of the entire king salmon run.

Commercial fishing methods have varied greatly over the years. Purse seining and drift fishing off the mouth of the river were tried a few times, but the combination of tides, sand bars, and difficult weather resulted in these ventures being short-lived. In 1930, a floating cannery operated in Kuskokwim Bay, but was not very successful and returned to the Alaska Peninsula in early July. Net fishing in the river is the basic and most successful method of fishing. In the lower reaches of the river where sand bars are extensive, and where there is tidal action, set nets are primarily used. Further upriver, particularly in the Bethel area, drift nets are widely used and are the most efficient gear, but a large number of small set nets are used for subsistence purposes. Beginning at about Lower Kalskag, some 192 river miles upstream, fishwheels appear and are used throughout the rest of the river. Drift nets are also employed to some extent in all the upriver areas.

The earlier commercial operations depended on hard salt and mild cure processing of their catches. As mentioned earlier, a small amount of canning was carried on aboard "floaters". More recent operations have shipped fresh fish by air for canning or the fresh fish market, and in 1961, mild curing and freezing operations were also conducted.

All the recorded commercial fishing data on the Kuskokwim River is summarized in Table X. Many of the totals of numbers of fish have been converted from tierces or barrels and are therefore only approximations. With the

TABLE X
KUSKOKWIM RIVER COMMERCIAL SALMON CATCH
1913-1961

Source	Year	KING SALMON		RED SALMON		SILVER SALMON		CHUM SALMON		# of Oper.		
		Number	Tierces	Number	Barrels	Number	Barrels	Number	Barrels			
1	1913	7,800	150							1		
1,2	1914					2,667	40(300#)			1		
2	1916	949			73					3		
2	1917	7,878			606					2		
2	1918	3,055			235					1		
2	1919	4,836	93							1		
2	1920	34,853	383		1,149					5		
2	1921	9,854	167		90					2		
1	1922	8,944	138		136	6,120	136			4		
2	1923	7,254	119		82					3		
1	1924	19,253	361		37	900	20	7,167*	215*	7,167*	215*	3
1	1925	1,664	32			5,850	130					2
3	1930	7,515	2,147 Cases			2,448	204 Cases					1
2	1931	8,541	94		281							3
1	1932	9,399	137		175**							3
1	1935	6,448	12		448			8,296	244			2
1	1936	624	12									1
1	1937	480	7,200 lbs.									1
1	1938	624	12					828				1
1	1939	134	2,000 lbs.									1
1	1940	247	3,700 lbs.					500	3,000 lbs.			1
1	1941	187	2,800 lbs.					674	4,040 lbs.			1
2	1946	2,288	44									1
2	1947	5,356	103									2
3	1951	2,808	54									1
3	1959	3,760										2

TABLE X (cont.)

Source	Year	KING SALMON		RED SALMON		SILVER SALMON		CHUM SALMON		# of Oper.
		Number	Tierces	Barrels	Number	Barrels	Numbers	Barrels	Numbers	
4	1960	5,969					2,498			3
4	1961	18,918	147				5,044			4
TOTALS		179,638	2,058	3,312	17,985	326	25,007	459	7,167	215

* - 430 Barrels of chums and silvers arbitrarily divided equally.

** - Mixed kings, reds, and chums.

Sources: 1 - Alaska Fish and Fur Industries Reports, Bureau of Fisheries
 2 - Pacific Fisherman Yearbook
 3 - Unpublished Fish and Wildlife annual reports
 4 - Unpublished Alaska Department of Fish and Game field reports

conversion factors used, the totals will tend to be minimal rather than maximal.

As can readily be seen, the fishing effort has fluctuated considerably over the years. The only period of sustained commercial effort was from 1917 to 1926, a period of nine years in which 97,591 king salmon were harvested for an average of 10,843 per year. The two highest catch years occurred in this period with five operators processing 34,853 kings in 1920, and three operators totaling 19,253 kings in 1924. The third highest catch recorded on the Kuskokwim was in 1961 when 18,918 kings were taken commercially.

Generally, the commercial fishing efforts on the Kuskokwim have either been limited to one or two small operators putting up a limited pack of salted fish or else an occasional larger operation which was usually short-lived.

As indicated earlier in the report, king, red, and some chum salmon were taken commercially prior to 1954. Regulations by the U. S. Fish and Wildlife Service in 1954 provided for the taking of only king salmon for commercial purposes. In 1960, the Alaska Department of Fish and Game regulations also provided for the commercial harvest of silver salmon. Silver salmon on the Kuskokwim have never been utilized to any extent, either commercially or for subsistence purposes. This has been due primarily to the lateness of the run in August when the rainy season precludes proper drying, and many of the people are leaving their fish camps to return to the villages with their winter's supply of fish.

SUBSISTENCE FISHING - KUSKOKWIM RIVER

Information on personal use or subsistence fishing is very limited. Usually, the subsistence data are listed as tons of dried chums without indicating how the figures were obtained. As indicated on the subsistence summary (Table XI), the last six years of any recorded information prior to 1960 were estimates based on averages of previous years. Actual village by village enumeration is only documented for five different years prior to 1960 with the first survey in 1922 and the last recorded one in 1938. In 1959, a survey was conducted for a few of the fishing camps. In 1960, the Alaska Department of Fish and Game initiated a systematic subsistence fishing survey by boat from about Johnson (Tundra) River, 50 miles above the mouth, to McGrath, some 500 miles upstream. This survey was again conducted in 1961, and is to be an integral phase of the fisheries management in this area to aid in assessing the utilization of its salmon resources.

A considerable number of fresh salmon are consumed during the fishing season, particularly kings which are the first to appear, and these are not included in any of the surveys.

Though not apparent on the basis of figures given in Table XI, which are at best gross estimations in most instances, utilization of chum salmon has decreased since the early 1930's when the airplane began to replace the numerous dog teams used to carry mail over vast areas of this north country. Dried chum salmon and other species as well were also widely used for trading to obtain flour, sugar, and other modern commodities. This type of exchange is still carried on to some extent, but has greatly declined with the advent of more cash in the economy from employment in canneries, increased construction work, some year-round employment, and primarily due to reduced values of dried fish as a commodity.

TABLE XI
 SUBSISTENCE FISHING HISTORY
 KUSKOKWIM RIVER

Year	KING SALMON		CHUM SALMON		RED SALMON
	Number		Tons Dried	Number	Number
+1922		180,000	(All species combined)		
1924	14,700		132	203,148	
1925	10,800		150	230,850	
1926			479	737,181	1,395
1927			186	286,254	
1928			310	477,090	4,000
1929			364	560,196	
1930			350	538,650	
1931			253	389,367	
1932			485	746,415	
1933	6,290		282	433,998	
+1934	20,800		388	597,132	
+1935	22,930		360	554,040	
+1936	33,500		357	549,423	
*1937			349	537,111	
+1938	10,153		243	373,977	26,265
*1939	14,000		75	115,425	10,000
*1940	8,000		257	395,523	20,000
*1941	8,000		257	395,523	20,000
*1942	6,400		201	309,339	16,000
*1943	6,400		200	307,800	18,000
+1960	19,457			266,487	70,580
+1961	28,898			130,837	54,464

+ Years of actual village catch counts.

* Estimates based on previous averages, no actual count.

TABLE XII
SUBSISTENCE CATCH BY VILLAGE
KUSKOKWIM RIVER

Village	1922*	1 9 3 4		1 9 3 5 *		1 9 3 6 *		1 9 3 8		Reds
	All Species	Kings	Chums	Kings	Chums	Kings	Chums	Kings	Chums	
Popokamuit	30,000	1,000	15,380	1,400	23,070	2,000	30,760	10	1,450	300
Popok		1,500	30,760	1,500	26,146	1,000	21,532	(525 -	4,480 -	1,090) Eek
Apokak	8,700	1,000	38,450	1,000	15,380	2,000	30,760	235	3,940	705
Helmick Point	1,500	1,050	23,070	600	21,532	2,000	33,836	125	1,000	150
Napakiak	15,000	1,100	32,298	1,500	44,602	2,000	27,684	700	20,550	2,200
Lomavik	9,000	600	15,380	300	13,842	800	12,304			
Napaskiak	5,500	1,000	30,760	1,100	29,222	1,700	24,608	520	17,750	1,350
Bethel	5,500	2,000	69,210	2,500	69,210	4,000	69,210	1,220	31,450	4,025
Kwethluk		1,200	61,520	2,000	53,830	2,500	53,830	1,065	24,385	1,825
Akiachak	18,000	1,500	46,140	1,500	38,450	2,000	36,912	1,815	18,975	1,950
Akiak	15,000	900	46,140	1,400	38,450	250	10,766	1,205	17,975	1,425
Tuluksak	8,000	300	30,760	180	24,608	2,000	24,608	250	9,975	1,520
Bogus Creek		500		250	7,690	2,000	36,912			
Kalskag	13,000	600	21,532	1,000	15,380	500	9,228	373	24,020	1,950
Crow Village	5,500	500		100	6,152	500	4,614	200	4,200	4,200
Aniak	1,100	1,000	23,070	1,300	21,532	250	4,614	1,245	43,040	2,720
Russian Mission	1,700	500	7,690	150	3,076	500	4,614	30	2,470	130
Napaimute	400	1,200	23,070	500	16,918	1,200	15,380	635	12,275	725
Crooked Creek				900	26,146	1,400	38,450			
SUB-TOTALS	137,900	17,450	515,230	19,180	495,236	28,600	490,622	14,625	323,720	31,755
*Additional not Included above ¹ :	141,050			1,400	46,140	2,900	56,906			
TOTALS	278,950	17,450	515,230	20,580	541,376	31,500	547,528	14,625	323,720	31,755

¹ Several villages and camps were not permanent establishments. These were included as additional.

TABLE XII (cont.)

Village	1 9 5 9		1 9 6 0			1 9 6 1		
	Kings	Chums	Kings	Chums	Reds	Kings	Chums	Reds
Tuntatuliag			226	2,250	1,851	2,226	4,890	3,636
Napakiak	3,036	11,990	1,830	11,309	8,579	2,573	2,459	3,330
Kasigluk			135	700	700	1,215	2,334	1,323
Nunapitchak			683	1,627	1,116	2,042	3,267	1,601
Kipnuk						248	1,947	1,012
Kwigillingok			250	1,250	180	35	128	192
Napaskiak			536	3,760	1,439	1,258	2,701	1,585
Oscarville			1,968	3,200	748	282	672	1,008
Bethel			1,923	6,064	6,908	4,150	7,681	5,164
Kwethluk	1,271	15,872	2,692	24,033	8,942	3,763	12,519	8,587
Akiachak	3,003	33,138	1,626	7,461	8,471	3,052	8,216	4,362
Akiak	4,420	12,142	1,865	10,786	2,275	3,159	6,536	1,669
Tuluksak			737	15,795	3,466	1,486	5,941	1,987
Lower Kalskag			961	9,447	2,116	571	6,085	1,679
Upper Kalskag			667	33,435	4,963	1,049	21,868	5,281
Aniak	1,450	27,000	1,057	35,138	1,535	688	11,033	4,902
Russian Mission	70	8,330	64	19,645	2,725	54	2,246	676
Napaimute			20	9,874	1,143	16	5,078	1,157
Crooked Creek			747	38,791	2,472	518	14,079	3,479
Sleetmute			465	14,454	2,805	222	5,934	950
Red Devil						40	1,190	160
Stony River			435	10,050	1,700	25	1,918	724
Stony River to McGrath			570	7,418		226	2,115	---
TOTALS			19,457	266,487	64,153	28,898	130,837	54,464

NOTE: For 1934, 1935, and 1936, the only data given for chums is in dried tons. A conversion factor of 1.3 pound per chum is used to obtain numbers of fish. This accounts for the repetition of numbers.

COMMERCIAL PACK - KOTZEBUE

The Midnight Sun Packing Company operated in Kotzebue Sound in the early 1900's. Details of their operation are apparently not available, but Pacific Fisherman Yearbooks 1915-1919 list packs for the company as follows:

1914	-	900 cases 1 pound talls "reds"
1915	-	500 cases 1 pound talls "silvers"
1916	-	2,000 cases 1 pound talls
1917	-	3,515 cases 1 pound talls 330 barrels hard salt
1918	-	2,885 cases 1 pound talls

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