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SUMMARY OF WESTERN ALASKA CHINOOK SALMON
CATCH DATA, ESCAPEMENT DATA, AND STATUS OF STOCKS

By

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INTRODUCTION

This report summarizes catch, escapement, and stock status for western Alaska chinook salmon (Oncorhynchus tshawytscha). The geographical bounds of western Alaska include the following areas: Kotzebue Sound, Norton Sound, Yukon River, Kuskokwim Bay, Kuskokwim River, Bristol Bay, the North side of the Alaska Peninsula, and the Aleutian Islands (Figure 1).

Chinook salmon are found throughout western Alaska. The commercial and subsistence fisheries are concentrated in the Port Moller area off the Alaska Peninsula; in Bristol Bay, especially in the Nushagak and Togiak areas; Kuskokwim Bay and the lower Kuskokwim River; the Yukon River; and southern Norton Sound. There are negligible amounts of chinook salmon harvested in the Aleutian Island area. More than 90 per cent of the chinook salmon produced in western Alaska originate in the Nushagak, Kuskokwim, and Yukon Rivers. Although western Alaska chinook salmon are harvested for subsistence, and sport purposes, the majority are taken in commercial fisheries (Table 1). The fisheries are conducted in nearshore coastal waters, except for the Yukon and Kuskokwim Rivers where commercial and subsistence fisheries are prosecuted within the rivers. The gear used to capture chinook is primarily nylon gillnets with mesh size 8 1/2 inches or smaller. Some harvest of chinook occurs with fishwheels in the upper Yukon and Kuskokwim Rivers.

THE FISHERIES

Chinook salmon were first harvested for subsistence purposes. Remnants of salmon net stone sinkers have been found in old village sites at Cape Denbigh in Norton Sound that date back to 400 B.C. (ADF&G 1972). Periodic subsistence catch reports available since 1920 for some western Alaska locations are presented in Table 2. However, the quality and completeness of subsistence statistics was poor until 1960. Since 1960, the average annual subsistence chinook harvest has been approximately 81,000 fish. Subsistence harvest has averaged 22 % of the total harvest of chinook during this same period (Table 1). In some locations, such as the Kuskokwim River, the subsistence harvest has frequently exceeded the commercial harvest. The subsistence fishery is managed by a permit system which specifies a guideline harvest level. In recent years management measures have become more restrictive than in the past.

The first significant commercial harvest of chinook salmon began in Bristol Bay during the late 1800's and in the Alaska Peninsula, Kuskokwim and Yukon areas during the early 1900's (Table 3). The average commercial harvest of chinook salmon in

western Alaska since 1960 is approximately 296,000 fish (Table 1). Management of the commercial fishery is primarily by gear restrictions and time - area closures. In recent years management measures have become more restrictive, primarily through reduction in fishing time.

CATCH, ESCAPEMENT, AND STATUS OF STOCKS

The Alaska Department of Fish and Game is concerned over the current abundance level of Western Alaska stocks of chinook salmon. Catches of Western Alaska Chinook salmon have been steadily declining since 1983 (Figure 2), with the 1986 harvest the lowest since 1976. In 1986, escapement levels were substantial less than desired levels for chinook stocks that are harvested in the Kuskokwim River, Goodnews Bay, Nushagak, and Togiak fisheries. Escapement levels for the upper Yukon River (mostly spawning in Canada) chinook stocks in 1986 were also less than desired levels. The following sections outline in greater detail the status of stocks for the most important chinook salmon commercial fisheries in western Alaska, Bristol Bay, Kuskokwim, and Yukon areas.

Bristol Bay.

Prior to 1952 virtually all of the commercial harvest of Bristol Bay chinook was in the Nushagak district. Since then approximately 25% occurs in other Bristol Bay districts, with the Togiak district being the most important of the other districts. Some of the chinook harvests occurs incidentally in the sockeye fishery. The commercial fishery has averaged less than 100,000 chinook per year until the mid-seventies (Table 3), either because of low stock abundance or market limitation. Catches have increased markedly since 1976, in response to a combination of factors including: increased resource availability, increased effort, and more favorable markets. Subsistence harvests have been increasing (Table 2) and have averaged 10,600 fish per year since 1975.

Escapement levels in the Nushagak and Togiak Rivers, based on aerial surveys, have increased markedly since the mid-seventies (Table 4). This suggests that the increased catches of chinook during this same period was, in part, due to increased abundance of chinook.

The 1986 return of chinook salmon to Bristol Bay was very poor. The catches of chinook in the Nushagak and Togiak districts was the lowest since 1975. The combined aerial survey estimate of chinook escapement to the Nushagak and Togiak River in 1986 was the lowest ever observed (aerial surveys were initiated in 1967). Because escapements of chinook salmon in Bristol Bay River Systems have been near or above goals until this year, there remains a favorable potential for continued strong returns of

chinook salmon to Bristol Bay River systems. However, in view of the weak 1986 Bristol Bay chinook return, fisheries should be managed with some degree of caution until run strength is assured.

Kuskokwim Area.

Kuskokwim Area commercial catches were first documented in 1913. However, the fishery remained at a relatively low level until the early 1960's. The Kuskokwim area commercial fisheries have been somewhat stabilized by a gradual reduction in fishing time allowed with large mesh sizes that are more efficient in capturing chinook salmon. Note that Kuskokwim Area fisheries include the Quinhagak and Goodnews Bay fisheries.

The Kuskokwim chinook fishery is the only major chinook fishery in Alaska where the subsistence utilization has frequently surpassed the commercial utilization. Since 1975, the total annual harvest has averaged 118,300 fish (55,800 subsistence; 62,500 commercial).

Escapements of chinook salmon to Kuskokwim area rivers have been declining since 1981 (Table 5). Escapement levels of chinook salmon in the Kuskokwim River have been less than desired levels since 1982, with levels during the period 1983 - 1986 being 52%, 43%, 35%, and 33% of desired goal, respectively.

In response to the low escapement in recent years and a poor 1986 return, no directed fishing was allowed for chinook salmon in the Kuskokwim River during 1986. The commercial harvest of chinook included only subsistence and incidental catches in fisheries directed at chum and sockeye salmon. During 1986, the Goodnews Bay chinook fishery was closed for most of the season, with most of the commercial harvests of chinook incidental to directed harvest of chum and sockeye salmon.

Yukon River

The Yukon River commercial king salmon fishery dates back to 1918. Since 1961 commercial catches in Alaska have ranged from 63,800 to 158,000 fish, with the recent 5 year average being 127,500 fish. In addition to the Alaska catch, the catches of chinook in the commercial fishery at Dawson (Yukon Territory) have ranged from 3,000 to 13,000 fish and averaged 7,800 fish (Table 3). The catches in the Canadian fishery have increased sharply since the early 70's (Table 3).

Commercial fishing effort has increased sharply since 1961 until the mid-70's when entry to the fishery became regulated. Yukon River chinook salmon returns generally declined during the early 70's. However, returns since then have been increasing. Restrictions placed on the Alaskan fishery during the 70's coupled with increasing returns have resulted in improved (in qualitative terms) escapements compared to the 1963 - 1969.

Since 1972, escapements to the lower and middle Yukon River spawning grounds, have been very stable (Table 6). Recently however, escapements to the upper Yukon area spawning grounds have been decreasing.

In the Yukon River, the Department is concerned most about the escapement levels for the upriver stocks of chinook salmon. Because these stocks are at the end of the gauntlet of fisheries, beginning with high seas drift net fisheries and ending with the Canadian fishery, these stocks have been harvested at a rate that cannot be sustained. Because of this concern and low upriver escapements beginning in 1982, the lower Yukon River fisheries were severely restricted in 1986. As a result of these restrictions the 1986 catches were reduced by approximately 40 thousand fish from the 1985 level. Escapements to the lower river stocks were above goals in 1986, and near the goal for the midriver stocks. Escapements for the upriver stocks in 1986 were above the 1985 level but much lower than desired, in spite of severe restrictions of the 1986 lower river fishery.

CONCLUSIONS

Because of low chinook salmon escapements that have occurred for several years in many Western Alaska River systems, the outlook is for continued lower returns of chinook salmon in the near future. In particular, the State of Alaska faces critical problems with the conservation of stocks of chinook salmon that spawn in the Kuskokwim River drainage and the upriver areas of the Yukon.

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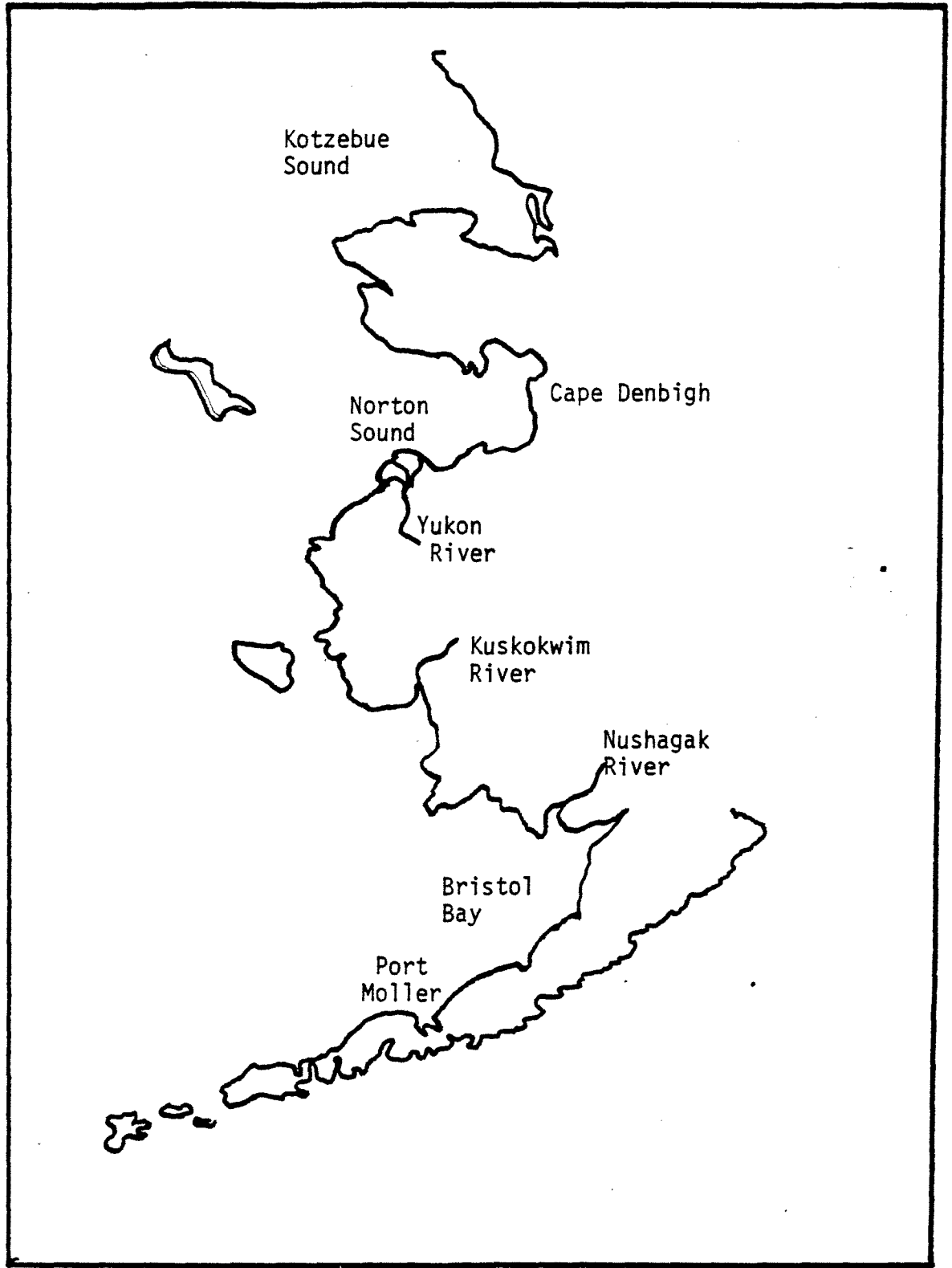


Figure 1. Western Alaska.

Western Alaska Chinook Salmon
Commercial Catch, 1893 - 1986

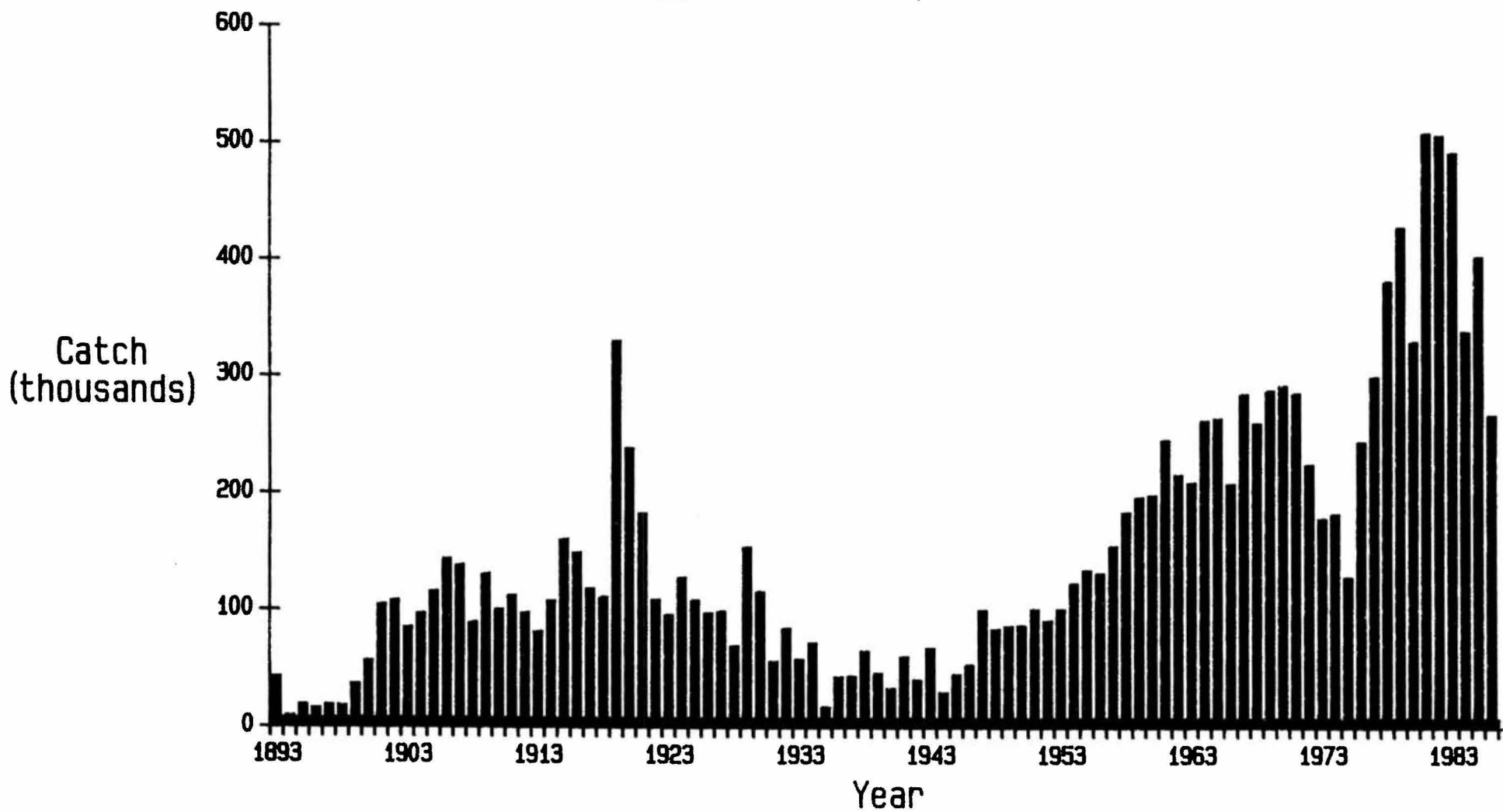


Table 1. Commercial, subsistence, and total catch of Western Alaska (including Canadian catches of upper Yukon chinook stocks), 1960 - 1986

Year	Commercial Catch	Subsistence Catch	Total Catch
1960	199,784	25,956	225,740
1961	246,578	62,198	308,776
1962	217,085	35,652	252,737
1963	210,402	74,002	284,404
1964	263,203	54,684	317,887
1965	265,254	55,966	321,220
1966	209,448	71,988	281,436
1967	286,124	84,875	370,999
1968	261,148	57,022	318,170
1969	289,285	66,216	355,501
1970	293,395	93,947	387,342
1971	286,419	79,118	365,537
1972	225,827	72,085	297,912
1973	179,452	75,537	254,989
1974	183,391	63,217	246,608
1975	129,150	75,690	204,840
1976	245,044	88,334	333,378
1977	300,798	85,551	386,349
1978	382,549	79,512	462,061
1979	428,615	102,788	531,403
1980	331,202	129,770	460,972
1981	510,176	115,546	625,722
1982	507,909	111,272	619,181
1983	493,113	119,307	612,420
1984	339,391	121,342	460,733
1985	403,356	108,063	511,419
1986	267,873	---	---
Average 1960 - 1985	295,696	81,140	376,836

Table 2. Subsistence harvest of Western Alaska chinook salmon (including Canadian harvests of upper Yukon chinook) by area and year, 1920 - 1986.

Year	Yukon River			Bristol Bay	Total Western Alaska
	Alaska	Canada	Kuskokwim		
1920	20,000	---	---	---	20,000
1921	---	---	---	---	---
1922	15,000	---	---	---	15,000
1923	17,500	---	---	---	17,500
1924	---	---	14,700	---	14,700
1925	15,000	---	10,800	---	25,800
1926	20,500	---	---	---	20,500
1927	---	---	---	---	---
1928	---	---	---	---	---
1929	---	---	---	---	---
1930	---	---	---	---	---
1931	26,693	---	---	---	26,693
1932	23,160	---	---	---	23,160
1933	19,900	---	6,290	---	26,190
1934	---	---	20,800	---	20,800
1935	20,400	---	22,930	---	43,330
1936	22,750	---	33,500	---	56,250
1937	5,528	---	---	---	5,528
1938	19,244	---	10,153	---	29,397
1939	18,050	---	14,000	---	32,050
1940	14,400	---	8,000	---	22,400
1941	17,703	---	8,000	---	25,703
1942	---	---	6,400	---	6,400
1943	---	---	6,400	---	6,400
1944	---	---	---	---	---
1945	---	---	---	---	---
1946	---	---	---	---	---
1947	---	---	---	---	---
1948	---	---	---	---	---
1949	---	---	---	---	---
1950	---	---	---	---	---
1951	---	---	---	---	---
1952	---	---	---	---	---
1953	---	---	---	---	---
1954	---	---	---	---	---
1955	---	---	---	---	---
1956	---	---	---	---	---
1957	---	---	---	---	---

Table 2. (Cont.) Subsistence harvest of Western Alaska chinook salmon (including Canadian harvests of upper Yukon chinook) by area and year, 1920 - 1986.

Year	Yukon River			Bristol Bay	Total Western Alaska
	Alaska	Canada	Kuskokwim		
1958	11,890	8,000	---	---	19,890
1959	---	5,957	---	---	5,957
1960	---	5,595	20,361	---	25,956
1961	21,488	9,800	30,910	---	62,198
1962	11,110	9,900	14,642	---	35,652
1963	24,862	7,794	37,246	4,100	74,002
1964	16,231	4,200	30,853	3,400	54,684
1965	16,608	3,115	31,143	5,100	55,966
1966	11,572	2,510	53,606	4,300	71,988
1967	16,488	2,963	61,224	4,200	84,875
1968	12,106	2,830	34,986	7,100	57,022
1969	14,000	984	43,732	7,500	66,216
1970	13,874	2,052	71,376	6,645	93,947
1971	25,684	3,269	45,465	4,700	79,118
1972	20,258	3,960	43,335	4,532	72,085
1973	24,317	2,323	41,697	7,200	75,537
1974	19,964	3,823	29,590	9,840	63,217
1975	13,045	3,000	51,045	8,600	75,690
1976	17,806	1,525	60,603	8,400	88,334
1977	17,581	2,807	58,163	7,000	85,551
1978	30,297	2,906	38,209	8,100	79,512
1979	31,005	4,200	57,283	10,300	102,788
1980	42,724	13,046	59,900	14,100	129,770
1981	29,690	9,216	63,640	13,000	115,546
1982	28,158	8,268	61,146	13,700	111,272
1983	49,478	5,625	50,704	13,500	119,307
1984	42,428	6,610	61,004	11,300	121,342
1985	39,771	6,428	52,189	9,675	108,063
1986	---	---	---	---	---

Table 3. Commercial harvest of Western Alaska chinook salmon
 (including Canadian catches of upper Yukon chinook)
 by area and year, 1893 - 1986.

Year	Norton Kotzebue Sound	Yukon River Alaska	Canada	Kuskokwim	Bristol Bay	North Alaska Pens.	Total Western Alaska
1893					44,000		44,000
1894					10,500		10,500
1895					19,925		19,925
1896					17,301		17,301
1897					19,897		19,897
1898					19,260		19,260
1899					38,259		38,259
1900					58,307		58,307
1901					106,047		106,047
1902					109,089		109,089
1903					86,506		86,506
1904					97,953		97,953
1905					116,855		116,855
1906					143,194	1,530	144,724
1907					137,677	1,725	139,402
1908					90,009	600	90,609
1909					130,489	1,500	131,989
1910					101,755		101,755
1911					113,163		113,163
1912					97,728	940	98,668
1913				7,800	74,249	600	82,649
1914					100,964	8,090	109,054
1915					148,028	13,953	161,981
1916				949	105,124	44,244	150,317
1917				7,878	91,145	20,006	119,029
1918		12,239		3,055	87,048	9,679	112,021
1919		104,822		4,836	201,954	19,632	331,244
1920		58,467		34,853	127,350	19,001	239,671
1921		69,646		9,854	91,982	12,474	183,956
1922		16,825		8,944	74,020	10,431	110,220
1923		13,393		7,254	67,013	9,075	96,735
1924		27,375		19,253	71,663	10,493	128,784
1925				1,664	97,448	10,550	109,662
1926					74,604	23,925	98,529
1927					83,846	16,495	100,341
1928					66,075	4,604	70,679
1929					150,663	4,067	154,730
1930				7,515	105,428	3,846	116,789

Table 3. (Cont.) Commercial harvest of Western Alaska chinook salmon (including Canadian catches of upper Yukon chinook) by area and year, 1893 - 1986.

Year	Norton Kotzebue Sound	Yukon River Alaska	Canada	Kuskokwim	Bristol Bay	North Alaska Pens.	Total Western Alaska	
1931					8,541	47,175	1,837	57,553
1932		4,739			9,399	68,286	3,255	85,679
1933		8,829				49,308	1,145	59,282
1934		25,365				45,945	1,619	72,929
1935		7,265			6,448	3,573	991	18,277
1936		20,963			624	21,703	983	44,273
1937		6,226			480	36,629	1,633	44,968
1938		13,727			624	45,934	5,902	66,187
1939		9,987			134	33,408	3,918	47,447
1940		18,053			247	15,267	741	34,308
1941		29,905			187	30,661	716	61,469
1942		22,487				19,006		41,493
1943		27,650				41,146	183	68,979
1944		14,232				16,373	70	30,675
1945		19,727				26,609	86	46,422
1946		22,782			2,288	27,401	2,458	54,929
1947		54,026			5,356	41,641	82	101,105
1948		33,842				49,116	2,164	85,122
1949		36,379				50,752	712	87,843
1950		41,808				45,261	1,101	88,170
1951		56,278			4,210	40,183	1,272	101,943
1952		38,637				52,856	661	92,154
1953		58,859				42,556	808	102,223
1954		64,545			57	56,016	3,379	123,997
1955		55,925				75,429	4,119	135,473
1956		62,208				66,377	4,154	132,739
1957		63,623				91,420	1,040	156,083
1958		63,735	3,000			103,207	14,989	184,931
1959		78,370	2,477		3,760	84,289	28,692	197,588
1960		67,597	4,058		5,985	111,703	10,441	199,784
1961		5,300	119,664	3,446	23,462	88,656	6,050	246,578
1962	12	7,286	94,736	4,037	20,869	84,047	6,098	217,085
1963	7	6,613	117,048	2,283	18,581	62,269	3,601	210,402
1964		2,034	93,587	3,208	21,246	139,536	3,592	263,203
1965		1,449	118,014	2,265	24,428	112,967	6,131	265,254
1966	1	1,553	93,315	1,942	25,823	77,472	9,342	209,448
1967	1	1,804	129,430	2,187	29,986	117,193	5,523	286,124
1968	2	1,045	106,526	2,212	43,157	103,723	4,483	261,148
1969		2,394	90,720	1,640	64,777	124,908	4,846	289,285

Table 3. (Cont.) Commercial harvest of Western Alaska chinook salmon (including Canadian catches of upper Yukon chinook) by area and year, 1893 - 1986.

Year	Kotzebue	Norton Sound	Yukon River Alaska	Canada	Kuskokwim	Bristol Bay	North Alaska Pens.	Total Western Alaska
1971	1	2,593	110,507	3,178	44,936	123,015	2,189	286,419
1972	3	2,938	92,840	1,769	56,939	69,546	1,792	225,827
1973	5	1,918	75,353	2,199	51,374	44,044	4,559	179,452
1974		2,951	97,919	1,808	29,752	45,662	5,299	183,391
1975		2,394	63,868	3,000	27,803	29,992	2,093	129,150
1976	3	2,248	88,269	3,500	50,103	95,968	4,953	245,044
1977	10	4,500	96,757	4,720	58,796	130,526	5,489	300,798
1978	146	10,002	99,168	2,975	64,460	191,539	14,259	382,549
1979	227	10,803	127,743	6,175	53,687	212,873	17,107	428,615
1980	223	6,322	153,985	9,500	48,839	95,528	16,805	331,202
1981	79	7,929	158,018	8,593	79,378	237,304	18,875	510,176
1982	67	5,892	123,644	8,640	79,816	259,737	30,113	507,909
1983	100	10,300	147,910	13,027	93,676	198,600	29,500	493,113
1984	100	8,500	119,900	9,885	74,006	102,000	25,000	339,391
1985		19,500	146,200	12,573	74,083	122,000	29,000	403,356
1986	100	6,300	99,719	10,797	44,957	84,000	22,000	267,873

Table 4. Bristol Bay chinook salmon escapement indices,
1967 - 1986.

Year	Bristol Bay	a/
1967	74,000	
1968	86,000	
1969	43,000	
1970	65,000	
1971	---	
1972	39,000	
1973	46,000	
1974	85,000	
1975	81,000	
1976	114,000	
1977	85,000	
1978	170,000	
1979	115,000	
1980	153,000	
1981	177,000	
1982	164,000	
1983	184,000	
1984	111,000	
1985	130,000	
1986	31,000	

a/ Combined aerial survey estimates for Nushagak and
Togiak Rivers.

Table 5. Kuskokwim Area chinook salmon escapement indices, 1972 - 1986.

Year	Kuskokwim River Index 1	a/	Kuskokwim River Index 2	b/	Holitna River Weir
1972	---		7046		---
1973	24.0%		10262		---
1974	---		---		---
1975	24.0%		8380		---
1976	66.0%		16953		5507
1977	162.0%		10725		2548
1978	152.0%		29198		13132
1979	59.0%		20792		11063
1980	146.0%		17718		6572
1981	303.0%		31727		16075
1982	78.1%		15505		10990
1983	74.0%		5886		3009
1984	37.0%		8902		4928
1985	26.0%		9231		4307
1986	28.0%		7744		3450

a/ Combined aerial survey count as a percent of combined escapement objectives for only those index streams where a survey occurred. Index streams include Kwethluk River, Canyon Creek, Kisaralik River, Kasigluk River, Tuluksak River, Aniak River, Salmon River at Aniak, Holitna River, and Salmon River at Pitka.

b/ Combined aerial survey count of the following index streams. When a stream could not be surveyed the combined count was expanded. Index streams included the Cheeneetnuk, Eek, Holitna, Holokuk, Kisaralik, Kwethluk, Salmon River at Pitka, and Tuluksak Rivers. Note that the Holitna index includes weir counts.

Table 6. Yukon River chinook salmon escapement indices, 1972 -1986.

Year	Lower River	a/	Middle River	b/	Upper River	c/
1972	2578	*	1331	*	1247	
1973	2226	*	412	*	341	*
1974	834	*	2892		493	*
1975	2228		1371		829	*
1976	3262		2172		359	*
1977	5365		1765		670	*
1978	5793		5225		1733	*
1979	5305		5948		2712	*
1980	5111	*	9298		4803	
1981	3975	*	1837	*	6139	
1982	2125	*	4607		2009	
1983	4379	*	4514		2348	
1984	5107	*	1532		3264	
1985	7696		4588		1924	
1986	9204		5399		1989	

* Poor survey conditions and/or incomplete surveys with one or two streams not surveyed.

a/ Combined aerial survey count for East Fork + West Fork Andrafsky River, Anvik River, and Nulato River.

b/ Combined aerial survey count for Chena and Salcha Rivers.

c/ Combined aerial survey count for Big Salmon and Nisutlin Rivers plus the fishway count for the Whitehorse Dam. Note that, the upper Yukon index areas are in Canada.