

STATISTICAL REVIEW OF THE ALASKA SALMON FISHERIES PART III: PRINCE WILLIAM SOUND, COPPER RIVER AND BERING RIVER ¹

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INTRODUCTION

This paper continues the series of reports dealing with the statistics of the salmon fisheries of Alaska. For the sake of uniformity with Parts I and II ² the policy has been continued of treating only the data up to and including 1927 in spite of the fact that data for three more years are now available. After the data for the remainder of Alaska have been presented in this manner it is planned to supplement these records from time to time with those which have accumulated in the interval and thus to provide statistics as complete as possible for the salmon fisheries of Alaska.

The character of the data and the methods of treatment have been fully described and discussed in the earlier numbers of the series and need not be repeated here.

PRINCE WILLIAM SOUND

Prince William Sound is the largest indentation on the southern coast of Alaska between Cook Inlet and Cross Sound. As here considered, it includes all waters from Cape Fairfield on the west to Point Whitshed on the east. This area is shown

¹ Approved for publication, June 18, 1931.

² Statistical Review of the Alaska Salmon Fisheries. Part I: Bristol Bay and the Alaska Peninsula. By Willis H. Rich and Edward M. Ball. Bulletin, U. S. Bureau of Fisheries, Vol. XLIV, 1928 (1929). Bureau of Fisheries Document No. 1041, pp. 41-95, 20 figs. Washington.

Ibid.—Part II: Chignik to Resurrection Bay. Bulletin, U. S. Bureau of Fisheries, Vol. XLVI, 1930 (1931). Bureau of Fisheries Document No. 1102, pp. 643-712, 11 figs. Washington.

in the maps, Figures 1 to 3. Its shore line is very irregular, as several deep, narrow fiords or bays in the western and northern parts extend inland to the active glaciers which fill the valleys of the coast range of mountains. The eastern part of the sound also has numerous bays, but none is touched directly by glaciers, although some of the streams are discolored by glacial water from the ice fields a few miles back from the coast, as in the Valdez Arm section. Although beach areas are very limited in the eastern bays, the shores are less precipitous. For the most part, the streams in the eastern section are clear and flow over gravel bottoms through small valleys and meadowlands and provide excellent spawning grounds for salmon. No large rivers are tributary to any part of the sound. The lakes of the region are also small and few in number, while the streams are short, not more than a few miles in length at

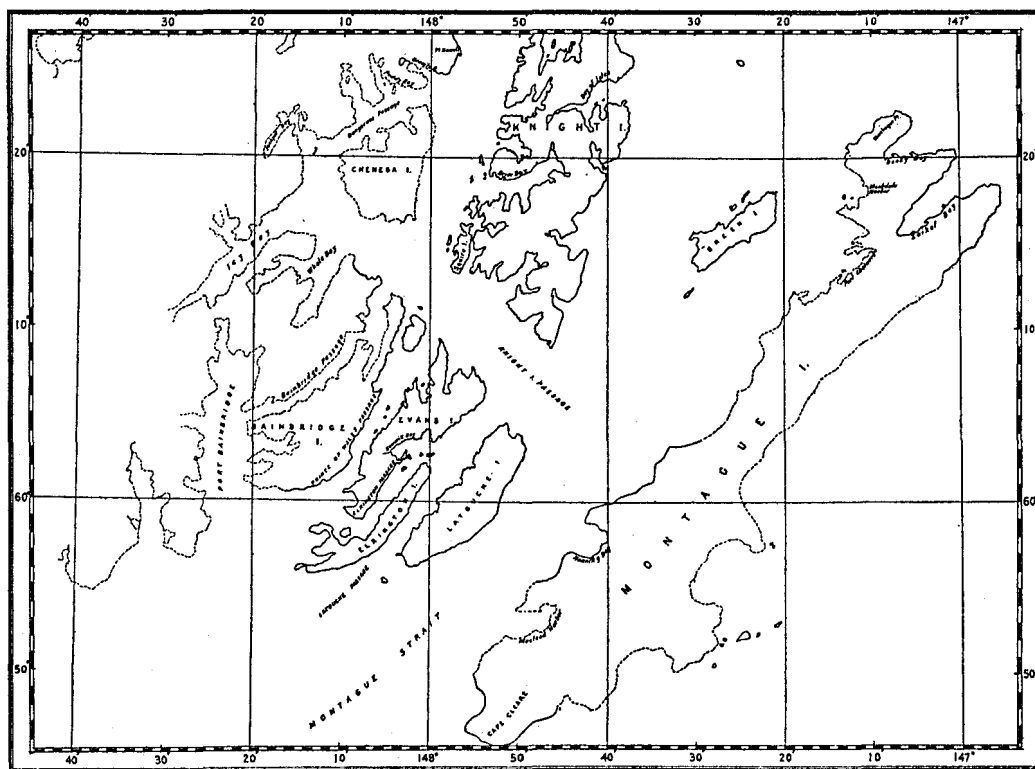


FIGURE 1.—Map of the southwestern part of Prince William Sound

most. Conditions, therefore, are not favorable for red salmon though a few streams produce small runs of this species, notably Eshamy, Miners River, Coghill River, Billys Hole, Jackpot Bay, and Port Valdez, all but one of which are located in the western section. The sound is predominantly a pink-salmon district, although fair catches of chums have been made in late years.

In early years, fishing records were not kept with a view of showing precisely the locality in which catches were made, so information that would now be useful in this review is not obtainable. For that reason errors in the allocation of these early catches have been unavoidable—errors that can not be corrected. In later years, catch records were more carefully kept, and many of the defects of the past were largely eliminated.

The earliest recorded commercial catch of salmon in Prince William Sound was made in 1893. It is probable, however, that salmon were taken here commercially as early as 1889, when the first cannery was operated on the Copper River where red and king salmon were the predominant species and the only ones having at that time a commercial value. Due to the fact that the runs in the Copper River come early and are of short duration, an opportunity was afforded for the exploration of the sound, and it is probable that the red-salmon streams already named were discovered and fished a few weeks each season; not so much for the catches that might be made but to give the men who had been employed as fishermen on Copper River a few more weeks' work while the pack from that district was being prepared for

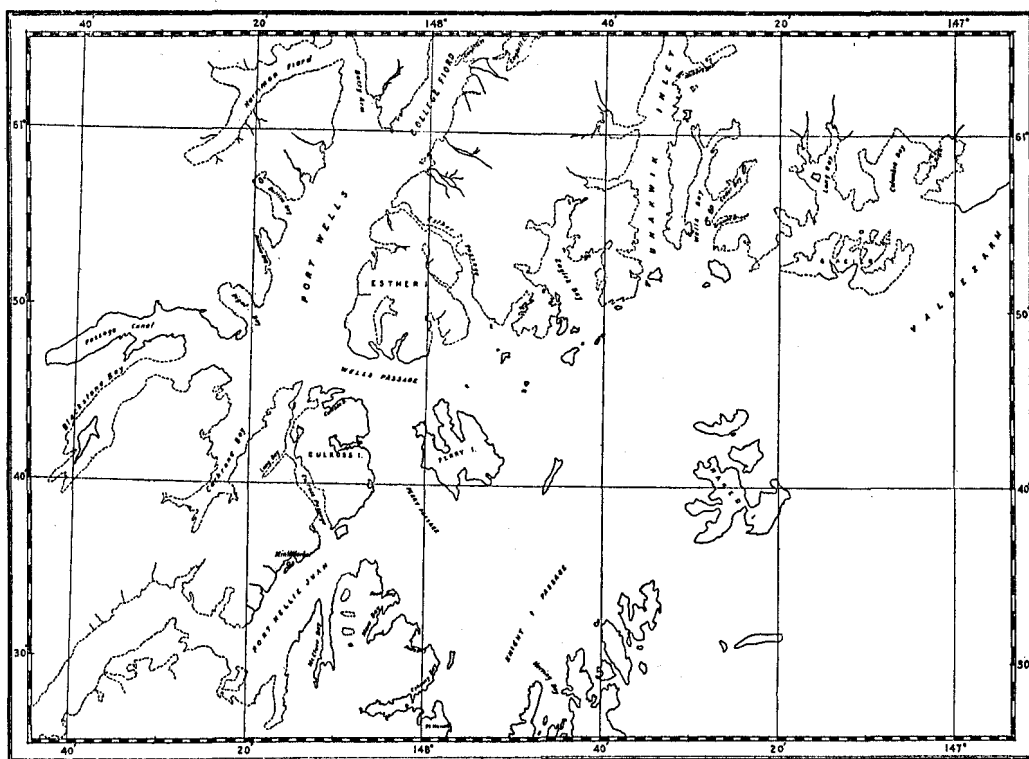


FIGURE 2.—Map of the northwestern part of Prince William Sound

shipment. If such catches were made before 1893, they were probably packed as Copper River salmon and so reported.

The first canneries to pack salmon definitely taken from Prince William Sound were built in 1889 at Odiak—a site between Eyak Lake and the present town of Cordova which was settled about 20 years later during the construction of the Copper River & Northwestern Railway. From that year until 1898, a period of nine years, it might be supposed that the sound had been completely explored and that the salmon packers could then make a fairly close estimate of the salmon resources of the region. However, Moser,³ referring to Prince William Sound, reported in 1898 that "the cannery people are constantly striving to increase their packs, the steamers have prospected the locality very thoroughly, and it is believed that all the salmon streams

³ The Salmon and Salmon Fisheries of Alaska, by Jefferson F. Moser. Bulletin, U. S. Fish Commission, Vol. XVIII, 1898 (1899), pp. 1-178. Washington.

of any value are known. The runs of fish are very uncertain, and as they vary largely from year to year, data of material value can not be obtained." He also says that "Except Cheniga, the streams are all said to have small runs, and the pack of Prince William Sound fish is small." In the same report, he states "The salmon streams of Prince William Sound resemble those of southeast Alaska, although as a rule they are inferior. The total catch for the whole district does not equal the catch of such streams as Quadra, Hetta, and others in a good season, and probably does not average

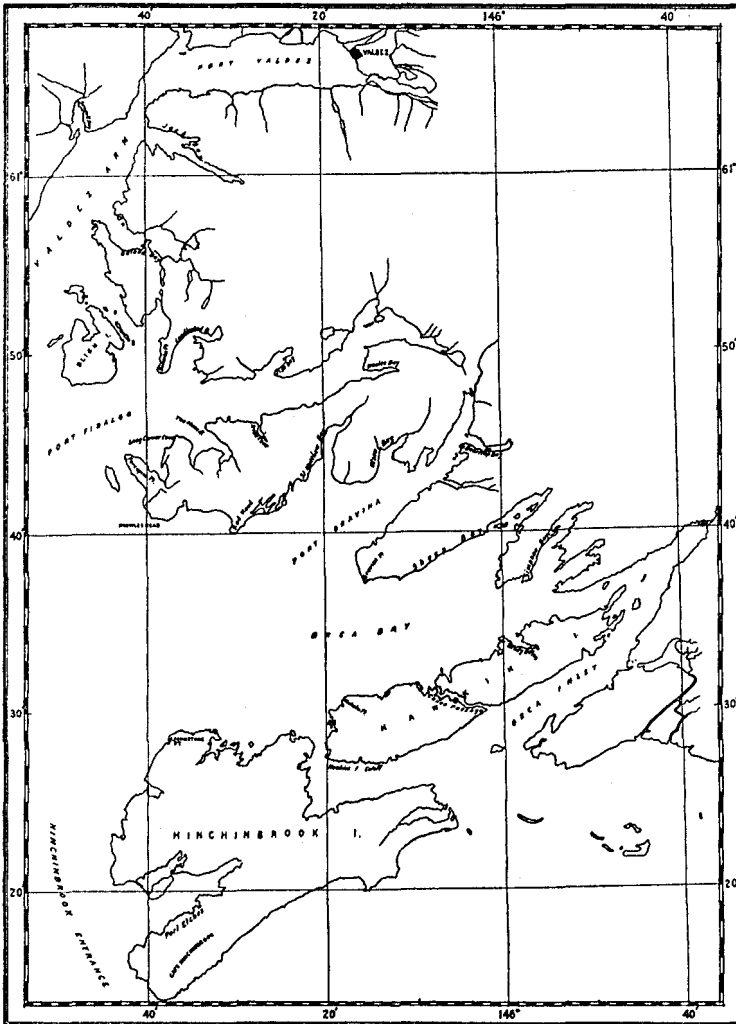


FIGURE 3.—Map of the eastern part of Prince William Sound

over 125,000 redfish and 50,000 cohos per season. The Pacific Steam Whaling Co.'s cannery has never exceeded 32,000 redfish and 35,000 cohos per season from the sound. While there are many streams that contain humpbacks, they are not very plentiful in any one stream. In none do they run even as they do in the smaller streams of southeast Alaska, and they, as well as the redfish and cohos, are decreasing yearly. In short, the district is poor in salmon, and the streams have been injured by injudicious and illegal fishing."

Subsequent developments have demonstrated the fallacy of Moser's conclusions, for, instead of being exhausted, the fisheries had hardly been touched, as is fully shown in the history of salmon canning on Prince William Sound in later years. From 1897 to 1904, the number of canneries taking salmon from the sound was never more than 2, and in the next 10 years only 1 was in operation. There was no unusual variation in the catch from year to year, and no evidence that the runs were being destroyed by intensive fishing. After 1914, however, important changes in the intensity of fishing began, due to the establishment of other canneries in the district, all of which entered this field to exploit the pink salmon fisheries. The character of fishing changed from gill nets and beach seines to a preponderant use of purse seines and traps. The catch increased proportionately with the increase of canneries and fishing appliances until 1920, when 15 canneries, operating 54 beach seines, 63 purse seines, 217 gill nets, and 47 traps were taking salmon from Prince William Sound.

There is no such definite distinction between the salmon catches in different sections of Prince William Sound as exists between many of the fishing areas to the westward. In various districts that have been treated in Parts I and II the fishery draws upon the salmon produced by only one, or, at most, a few streams, and the catches made can be referred with considerable accuracy to the streams in which the fish originated. This can not satisfactorily be done in such a district as Prince William Sound where many of the important fishing operations are conducted in regions where fish are merely passing through and from which they disperse widely to spawning grounds in all parts of the sound. As will be shown later, similar conditions exist in southeastern Alaska and the same, even greater, difficulties are encountered there in attempting to analyze the statistics. In certain well-defined and limited areas in Prince William Sound catches have been reported that unquestionably are properly allocated to the area in question, but this does not measure the total draft upon the salmon runs native to the area since the fisheries located in the channels through which the fish have passed have taken toll of the runs to an unknown extent. However, it has seemed best to preserve the data in as great detail as possible in spite of their deficiencies, and the table, therefore, gives the data for each definite geographic unit from which catches have been consistently reported.

In addition the sound has been divided into 10 subdivisions, and data are given separately by localities for each one, with the final section of the table for each division showing the total catch in that particular area. The sound is also divided into two parts—eastern and western—the line of separation extending from Point Freemantle on the north to Montague Point on the south. The subdivisions are considered from west to east, and a section of the table immediately following the tabulation of catches in the six districts of the western part shows the total catch in the western part of the sound. Data for the eastern part are presented in the same way, while the last division of the table gives the total catch of salmon by species and the number of fishing appliances used in Prince William Sound. These statistics are given in Table 1.

A considerable part of the catch in many years was simply reported as coming from Prince William Sound without reference to any of the bays or inlets. It was impossible to allocate these catches to specific waters but a more or less arbitrary allocation has been made between the eastern and western parts of the sound. Furthermore, small catches were made occasionally in known localities which were not of sufficient importance to be shown separately; these were put in with the unallocated catches. Other catches were made at places merely designated as Knight Island, Montague Island, and the like, without mention of the waters from which

they were taken. Certain combinations of catches have also been made, as where one locality is known by different names, or where several small localities are contained wholly within a larger body of water, such as Port Wells, Port Fidalgo, and so on. These combinations of unallocated catches will be discussed in detail in the sections dealing with the particular localities.

TABLE 1.—Salmon caught and fishing appliances used in the Prince William Sound district, 1904 to 1927

Year	Cohos	Chums	Pinks	Kings	Reds	Beach seines		Purse seines		Gill nets		Traps	
						Num-ber	Fath-oms	Num-ber	Fath-oms	Num-ber	Fath-oms		
Knight Island Passage district:													
Bainbridge Passage—													
1913			16		110							Num-ber	
1917			24,191		105								
1918		5,040	79,443		1,698								
1919	260	764	6,872	97	1,075								
1920			1,945										
1925	184	73	5,367	15	166								
1926			860										
1927	1,565	322	470										
Chenega Creek and Chenega Island—													
1918	2,099	8,527	112,542	62	18,551								
1919	434	1,341	18,084	42	3,260								
1920	1,126	2,861	167,705	107	4,697								
1921	350	1,000	10,000		8,600								
1922	126	1,960	221,802		3,166								
1923	6	120	88,065	3	610								
1924	166	1,868	276,060		4,756								
1925	184	4,482	137,086		8,235								
1926	1,260	6,085	419,668		28,124								
1927	1,221	5,999	412,498		14,406								
Drier Bay—													
1913			518		2								
1918			2,000										
1919			15,266										
1920		254	11,629		15								
1924		1,385	119,678										
1925		102	2,469										
1926		1,141	48,133		240								
1927	1	1,341	41,044		117								
Eshamy Bay and Lagoon—													
1904				28	54,000								
1905					100,000								
1906					57,862								
1907					17,692								
1908					117,018								
1909					136,603								
1910					63,710								
1911					5,292								
1912	841		3,660		15,207								
1913	383		6,049	3	56,554								
1914	3		7,270		50,305								
1915			10,819		24,386								
1916		417	36,167	6	15,913								
1917	86	4,870	77,065	43	98,196								
1918	1,993	1,223	39,832	32	103,536								
1919	1,220	5,946	27,308	19	52,296								
1920	1,663	952	33,591	64	20,628								
1921	169	375	444		50,335								
1922	868	7,590	370,006	24	92,594								
1923	2,800	221	68,932	22	116,167								
1924	491	309	14,085		2,470								
1925	13	969	4,086		4,497								
1926		1,245	32,693										
1927	352	1,781	22,844	11	15,118								
Falls Bay—													
1922			2,321	10	2,975								
1924	14	1,195	15,205		1,470								
1925	112	3,755	6,561		8,226								
1926		534	5,922		7,850								
1927	75	444	4,086	3	12,320								
Granite Bay—													
1918			6		20								
1924	20	2,345	21,183	3	2,620								
1925	200	4,773	82,581		4,055								
1926	85	595	6,213		8,208								
1927	235	1,776	43,626		13,559								
Jackpot Bay—													
1911					5,885								
1912	150		3,760		3,000								
1913			960		3,091								

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TABLE 1.—Salmon caught and fishing appliances used in the Prince William Sound district, 1904 to 1927—Continued

Year	Cohos	Chums	Pinks	Kings	Reds	Beach seines		Purse seines		Gill nets		Traps	
						Number	Fathoms	Number	Fathoms	Number	Fathoms		
Knight Island Passage district—Continued.													
Jackpot Bay—Con.													
1914					1,977							Number	
1917	19	4,391	9,599	6	21,770								
1918	920		15,000		5,600								
1919		4,843	15,381		3,408								
1920		67	6,967		80								
Latouche Passage—													
1919	46												
1925	794	191	3,749	20	322								
1927	1,945	3	105,643		486								
Main Bay—													
1920		12	14,756										
1924	10	891	12,445		1,450								
1926		450	6,310		7,960								
1927	80	448	4,219		12,926								
Nowell, Point—													
1917	6	131	607	1	9,190								
1925	182	1,773	1,929		2,748								
1927	14	120	14,943		1,923								
Prince of Wales Passage—													
1919	427	383	9,312		10,368								
1920	465	537	19,036	53	1,115								
1921					600								
1922					1,708								
1923					2,148								
1924					92								
1926	334	577	46,185		4,264								
1927	921	2,174	95,763	71									
Squire Island—													
1926	130	660	69,160		638								
1927	302	363	70,043		749								
Thumb Bay—													
1926		56	27,042		40								
1927	2	219	8,756		6								
Whale Bay—													
1918		3,000	2,000										
1920		110	465										
1926		1,225	36,553		10								
Unallocated—													
1913			758		67								
1917		8,822	17,883										
1918	50	3,243	4,310	2	3,236								
1919	1,329	1,375	11,447	7	14,714								
1920	612	1,625	65,430	30	8,493								
1923					2,366								
1925		1,476	47,424		7								
1926		531	47,120		3								
1927	4	96	3,862		343								
Total—													
1904				28	54,000								
1905					100,000								
1906					57,862								
1907					17,692								
1908					117,018								
1909					136,603								
1910					63,710								
1911					11,177								
1912	991		7,426		18,207								
1913	383		8,291	3	59,824								
1914	3		7,270		52,282								
1915			10,819		24,386								
1916		417	36,167	6	15,913								
1917	111	18,214	129,345	50	129,261								
1918	5,062	21,033	255,133	96	132,589								
1919	3,716	14,652	103,070	165	85,121								
1920	3,866	6,318	311,524	254	35,028								
1921	519	1,375	10,444		59,535								
1922	1,014	9,540	594,129	34	100,443								
1923	2,806	341	150,997	25	121,201								
1924	1,035	8,570	504,831	3	13,158								
1925	1,689	17,594	291,252	35	28,256								
1926	2,398	14,096	795,437	71	67,337								
1927	5,796	12,911	732,034	14	71,953								
Montague Strait district:													
Bay of Isles—													
1912	600		1,600		2,500								
1913	23		2,006		1,436								
1917	6	2,754	8,252		4,307								
1918	7	622	22,531		3,506								
1919			1,619		651								
1920	412		12,339		1,040								
1922		30			347								
1926		959	9,166		34								

TABLE 1.—Salmon caught and fishing appliances used in the Prince William Sound district, 1904 to 1927—Continued

Year	Cohos	Chums	Pinks	Kings	Reds	Beach seines		Purse seines		Gill nets		Traps
						Number	Fathoms	Number	Fathoms	Number	Fathoms	
Montague Strait district—Continued.												
Cleare, Cape—												
1928		475	23, 109		22							
1927	9, 463	412	52, 566	935	777							
Chalmers, Port—												
1917	724		5, 088									
1918	831	22, 468	20, 215		19							
1924	11	4, 739	31									
1925	11	9, 626	179, 464		8							
1926	1, 318	26, 618	70, 620		142							
1927	5, 315	24, 647	157, 573		11							
Glacier Bay—												
1926	2, 521	4, 056	137, 169	105	2, 858							
1927	3, 759	2, 508	96, 810	66	363							
Hanning Bay—												
1920	1, 617	1, 117	28, 731	208	355							
1924			1, 040									
1925	5, 350	1, 326	26, 481	265	1, 271							
1926	2, 804	5, 377	135, 480	134	3, 273							
1927	3, 743	4, 281	115, 429	329	1, 261							
Macleod Harbor—												
1918			1, 500									
1920	35, 766	12, 852	249, 500	3, 361	7, 947							
1924	34, 379	16, 562	800, 167	1, 000	10, 665							
1925	33, 352	9, 463	115, 531	1, 206	10, 746							
1926	16, 713	22, 002	581, 248	1, 104	22, 545							
1927	27, 535	15, 024	338, 141	1, 143	6, 191							
Stockdale Harbor—												
1917			8, 785		1							
1925		2	4, 597									
1926			10, 135									
Unallocated—												
1917			12, 231		595							
1919	51	836	680		130							
1925			1, 377									
1926		1, 178	32, 564									
1927	4, 732	20, 042	71, 336	13	262							
Total—												
1912	600		1, 600		2, 500							
1913	23		2, 006		1, 438							
1917	730	2, 754	34, 356		4, 903							
1918	838	23, 090	44, 246		3, 525							
1919	51	836	2, 199		781							
1920	37, 795	13, 969	290, 570	3, 569	9, 342							
1922		30			347							
1924	34, 390	21, 301	801, 238	1, 000	10, 665							
1925	38, 713	20, 417	327, 450	1, 471	12, 026							
1926	23, 356	60, 665	999, 491	1, 343	28, 874							
1927	54, 547	66, 914	831, 855	2, 486	8, 885							
Port Wells district:												
Bettles Bay—												
1917		900	2, 804		4							
1918	152	3, 003	114, 950	1	1, 550							
1919		86	304		1							
1920	160	19	15, 498	4	5							
1924		258	519		5							
1925		1, 305	1, 224									
1926		1, 542	30, 465									
1927		1, 460	13, 000									
Cochrane Bay—												
1918		16	15, 587		60							
1919		403	4, 206		6							
1920	157	1, 769	232, 105	1	75							
1924	8	7, 580	440, 781		4, 395							
1925		13, 762	35, 426									
1926		15, 218	312, 814		400							
1927	54	12, 760	146, 728		655							
Coghill River—												
1914					3, 533							
1917	2	20	911	20	23, 448							
1918	249	4, 463	23, 692	11	31, 994							
1919	356	3, 637	20, 999	11	7, 558							
1920	21	421	3, 206	16	3, 944							
1924		730	2, 450		7, 788							
1926		1, 356	32, 019									
1927		1, 260	16, 500									
Culross Passage—												
1917		19, 988	17, 004		37							
1918		32, 599	59, 577		163							
1919	1	9, 905	38, 301		777							
1920	53	2, 338	28, 897		5							
1922			8, 030									
1924		4, 110	199, 924		607							
1925	69	19, 404	204, 329		154							

TABLE 1.—Salmon caught and fishing appliances used in the Prince William Sound district, 1904 to 1927—Continued

Year	Cohos	Chums	Pinks	Kings	Reds	Beach seines		Purse seines		Gill nets		Traps	
						Number	Fathoms	Number	Fathoms	Number	Fathoms		
Port Wells district—Con.													
Total—Continued.													
1924	118	40,571	1,901,300	6	22,177							Number	
1925	609	111,635	618,469		12,177								
1926		60,891	1,615,651		2,265								
1927	241	50,145	953,814	3	2,777								
Eaglek Bay district:													
Eaglek Bay—													
1917	2	14,294	46,605	3	112								
1918		28,450	77,903		390								
1919	99	11,024	13,613	1	61								
1920	6	43	10,987	2	17								
1922		972	4,105										
1923			1,511		1,109								
1924		4,361	1,260		168								
1925		41,690	3,342										
1926		1,755	35,298		886								
1927		1,575	15,500										
Unakwik Inlet district:													
Cedar Bay—													
1916					95								
1917		6,911	17,955	2	955								
1918		6,848	145,530		8								
1919	200	10,141	9,876										
1920	818	1,914	44,001	3	503								
1922			6,544		14								
1924			13,274										
1926		45	29,611		96								
1927		2,473	2,859		264								
Granite Point—													
1926	428	3,117	167,934		2,914								
1927	348	1,445	76,057		1,510								
Miners River—													
1904				125	4,000								
1906					1,854								
1909					13,290								
1910					3,150								
1911					6,591								
1912			4,794		11,435								
1913					8,517								
1914					6,180								
1915					6,771								
1916			604		6,524								
1917					3,056								
1918					11,989								
1919					4,808								
1921					8,361								
1922					1,421								
1923		1	279		1,165								
Unakwik Inlet—													
1917			9,062		124								
1919		6,560	7,821		3,208								
1922		240	104,140		2,775								
1923		1,501	88,134		1,042								
1924	155	980	872,777		4,149								
1925	252	29,181	427,759		5,871								
1926	299	26,379	1,435,857	22	5,151								
1927		17,209	392,652		1,658								
Wells Bay—													
1917		4,250	133,388		58								
1918	68	40,415	29,988		252								
1919		19,023	10,723		255								
1920		5,826	31,422		459								
1922		2,634	22,590		114								
1923			1,000										
1924		198											
1925		3,098	26,854										
1926		2,211	24,654		1								
1927		3,025	16,993										
Total—													
1904				125	4,000								
1906					1,854								
1909					13,290								
1910					3,150								
1911					6,591								
1912			4,794		11,435								
1913					8,517								
1914					6,180								
1915					6,771								
1916			604		6,619								
1917		11,161	160,405	2	4,193								
1918	68	47,263	175,618		12,249								
1919	200	35,724	28,420		8,271								
1920	818	7,740	75,423	3	962								
1921					8,361								

PRINCE WILLIAM SOUND, COPPER AND BERING RIVER SALMON STATISTICS 197

TABLE 1.—Salmon caught and fishing appliances used in the Prince William Sound district, 1904 to 1927—Continued

Year	Cohos	Chums	Pinks	Kings	Reds	Beach seines		Purse seines		Gill nets		Traps	
						Number	Fathoms	Number	Fathoms	Number	Fathoms		
Unakwik Inlet district—Continued.													
Total—Continued.													
1922		2,874	133,274		4,324							Number	
1923		1,502	89,413		2,207								
1924	155	1,178	880,051		4,149								
1925	252	32,279	454,013		5,871								
1926	727	31,752	1,058,056	22	8,162								
1927	348	24,152	488,561		3,432								
Glacier Island district:													
Billys Hole—													
1904				100	3,000								
1906					862								
1909					519								
1910					1,262								
1911					5,362								
1912			1,880		7,470								
1913					3,249								
1914					9,350								
1915					15,775								
1916		200	32,199		10,908								
1917		6,737	61,819		5,187								
1918		19,392	12,209		4,196								
1919		8,161	13,067		2,964								
1920		3,279	54,871		2,244								
1921					3,234								
1922			1,381		1,964								
1923		254	6,250		3,210								
1927			24		109								
Long Bay—													
1917			2,500										
1922		2,950	187,459		2,381								
1923		679	82,283		3,234								
1924		675	36,846		3,005								
1925		8,881	101,193		897								
1926		4,687	168,904		358								
1927	22	14,323	60,335		2,974								
Unallocated—													
1917	372		9,887		1,390								
1922	10		4,769		3,690								
1927	1	7,963	39,581		31								
Total—													
1904				100	3,000								
1906					862								
1909					519								
1910					1,262								
1911					5,362								
1912			1,880		7,470								
1913					3,249								
1914					9,350								
1915					15,775								
1916		200	32,199		10,908								
1917	372	6,737	74,206		6,577								
1918		19,392	12,209		4,196								
1919		8,161	13,067		2,964								
1920		3,279	54,871		2,244								
1921					3,234								
1922	16	2,950	193,609		7,905								
1923		933	88,533		6,444								
1924		675	36,846		3,005								
1925		8,881	101,193		897								
1926		4,687	168,904		358								
1927	23	22,286	108,940		3,114								
Unallocated, western part:													
1904					148,200								
1913													
1915					500								
1916					3,680								
1917	1,838	184	232,000		16,881								
1918	11,841	33,555	93,000		17,576								
1919	11,203	24,242	192,479		12,683								
1920	8,743	22,622	78,778	4,875	5,955								
1922			806,537	287	22,292								
1922			38,702		4,784								
1923	5,792	33,032	611,661		4,024								
1924	275	25	14,057										
1925	2,151	1,172	49,628	81	1,013								
1926		121	17		21,213								
Total, western part:													
1904				253	109,200								
1905					100,000								
1906					60,578								
1907					17,692								

¹ Probably from Eshamy Lagoon and/or Chenega Creek.

TABLE 1.—Salmon caught and fishing appliances used in the Prince William Sound district, 1904 to 1927—Continued

Year	Cohos	Chums	Pinks	Kings	Reds	Beach seines		Purse seines		Gill nets		Traps
						Number	Fathoms	Number	Fathoms	Number	Fathoms	
Total, western part—												Number
Continued.												
1908.					117,018							
1909.					150,412							
1910.					68,122							
1911.					23,130							
1912.	1,591		15,700		45,945							
1913.	406		10,297	503	75,283							1
1914.	3		7,270		72,348							
1915.			10,819		50,612							
1916.		617	300,970	6	50,321							
1917.	3,059	115,654	622,356	84	186,196							
1918.	18,284	287,690	1,507,313	118	202,338							3
1919.	15,996	165,379	392,217	5,161	116,855							17
1920.	52,348	80,029	2,657,218	4,187	76,546							20
1921.	519	1,375	10,444		77,879							1
1922.	1,030	16,676	1,445,406	34	118,092							3
1923.	8,598	35,808	1,007,115	25	135,075							4
1924.	35,973	76,681	4,145,583	1,009	53,322							12
1925.	43,394	233,668	1,845,947	1,587	60,239							15
1926.	26,479	174,567	5,272,854	1,436	119,095							21
1927.	60,955	177,983	3,130,704	2,503	90,161							35
Valdez Arm district:												
Bligh Island—												
1926.	1,107	19,699	288,802	57	1,420							
1927.	1,236	8,985	50,375	22	414							
Galena Bay—												
1917.	1,061	43,310	191,653	8	476							
1918.	617	108,352	136,222		11							
1919.	311	28,068	9,898		62							
1920.	6	10,740	120,418		1							
1923.		13,515	23,725									
1924.		19,312	224,258									
1925.	98	93,868	113,306		12							
1926.	3	52,578	218,281	6	118							
1927.	1	31,738	71,271		30							
Jack Bay—												
1917.		5,047	46,847		109							
1918.		14,391	28,242		54							
1919.		9,617	8,749		26							
1920.	285	8,094	99,772		112							
1923.		1,068	21,871									
1924.		2,478	130,972		14							
1925.		10,144	56,713		46							
1926.	1,046	51,420	392,931		449							
1927.	163	59,252	145,290	11	1,169							
Lowe Point—												
1920.	270	6,080	117,500	59	2,627							
1927.	169	731	2,360	7	234							
Potato Point—												
1920.	900	7,974	135,000	50	2,855							
1922.	1,302	14,048	226,244	252	5,896							
1925.	1,149	20,318	47,515	25	1,612							
1926.	312	10,035	174,750	17	2,340							
Sawmill Bay—												
1917.		7,424	39,654		62							
1918.		56,548	43,760	4	7							
1919.		30,240	25,852		289							
1920.	293	8,919	113,191	63	2,636							
1923.			20,220									
1924.		40	5,532									
1925.	1,351	18,676	51,772	17	1,265							
1926.	336	10,974	144,859	24	2,051							
1927.	2	1,495	70,102		11							
Valdez Arm—												
1917.	1,144	787		33								
1920.	128	2,938	16,581	11	9,278							
1923.	462	4,216	65,308	447	5,205							
1924.	104	4,237	227,811		2,683							
1925.	1,377	547	860									
1926.	657	5,051	128,632		994							
1927.	1,017	9,695	39,751	5	223							
Valdez, Port—												
1917.	8,167	1,511	517		19,012							
1918.	14,616	13,414	14,307	6	18,088							
1919.	10,601	20,265	15,684		18,405							
1921.	2,406	2,124			14,692							
1922.			11,178		10,911							
1923.		566	148	4	15,548							
1924.	1,153	39,480	434,122	180	10,211							
1925.	2,879	6,760	3,485	8	9,084							
1926.	695	6,935	6,043		4,861							
1927.	1	2,213	5,525	1	9,086							

PRINCE WILLIAM SOUND, COPPER AND BERING RIVER SALMON STATISTICS 199

TABLE 1.—Salmon caught and fishing appliances used in the Prince William Sound district, 1904 to 1927—Continued

Year	Cohos	Chums	Pinks	Kings	Reds	Beach seines		Purse seines		Gill nets		Traps	
						Number	Fathoms	Number	Fathoms	Number	Fathoms		
Valdez Arm district—													
Continued.													
Total—													
1917	10,372	58,079	278,671	41	19,659							Number	
1918	15,233	102,705	222,531	10	18,180								
1919	10,912	58,190	60,183		18,782								
1920	1,882	44,745	602,412	183	17,509								
1921	2,406	2,124			14,692								
1922	1,302	14,048	237,417	262	16,807								
1923	462	19,365	131,272	451	20,753								
1924	1,257	65,547	1,022,605	180	12,908								
1925	6,884	150,313	273,651	50	12,019								
1926	4,156	156,690	1,354,298	104	12,233								
1927	2,589	114,109	384,674	46	11,167								
Port Fidalgo district:													
Bidarka Point—													
1919		5,699	12,119										
1920		11,662	142,558	64	3,768								
1925	3,864	16,721	65,631	29	2,945								
1926		12,744	221,361	19	2,436								
1927	1,842	8,619	120,886	59	2,277								
Fidalgo, Port—													
1913			120,653										
1914			46,663										
1915	5,375												
1916			81,991										
1917	2,442	63,365	166,657	183	214								
1918	8,160	146,243	192,090	12	358								
1919	4,177	10,323	8,789	16	170								
1920	86	15,120	14,737		25								
1924	1,550	21,565	8,332										
1925	177	3,401	11,540	91	408								
1926	1,715	13,932	451,670	1	754								
1927	6,220	44,412	189,715	14	662								
Fish Bay—													
1914			77,046										
1915			35,312										
1917	900	4,309	41,495		11								
1918		22,568	56,558		11								
1919		7,072	980		186								
1922			9,730										
1923		7,793	57,666		108								
1924		10,299	1,664										
1925	240	47,659	61,465		41								
1926		37,913	26,364	1	129								
1927		4,243	1,374		5								
Irish Cove—													
1915			11,300										
1917			1,016										
1918		371	23,138		961								
1923		242	23,605										
1925	2,962												
1926	4,198	1,640											
1927	7,066												
Porcupine Point—													
1918	3,461	6,858	201,994	219	4,494								
1919	5,417	9,372	28,718	227	1,808								
1920	3,812	5,359	86,013	232	4,156								
1924	3,000	2,100	210,748		1,550								
1925	3,326	8,200	120,239		2,346								
1926	1,217	3,705	249,212	22	1,426								
1927	2,350	11,303	120,707	64	1,313								
Sunny Bay—													
1919	1,057	19,283	2,988		2								
1923		2,262	9,025										
1924	105	48,854	16,733		149								
1925	179	29,939	17,195		133								
Whalen Bay—													
1915			16,792										
1917		1,078	25,120										
1918		19,914	104,291		800								
1919	342	8,314	3,567		129								
1923		3,095	38,757										
1924		20,531	300										
1925		11,715	37,031		16								
1926		3,839	1,294	1	6								
1927		881	768		1								
Total—													
1913			120,653										
1914			123,709										
1915	5,375		63,404										
1916			81,991										
1917	3,342	68,812	234,288	183	225								
1918	11,621	195,854	578,071	231	6,624								
1919	10,993	60,063	57,161	243	2,295								

TABLE 1.—*Salmon caught and fishing appliances used in the Prince William Sound district, 1904 to 1927—Continued*

Year	Cohos	Chums	Pinks	Kings	Reds	Beach seines		Purse seines		Gill nets		Traps	
						Number	Fathoms	Number	Fathoms	Number	Fathoms		
Port Fidalgo district—Continued.													
Total—Continued.													
1920	3,898	32,141	243,308	296	7,049							Number	
1922			9,730										
1923		13,392	129,053		108								
1924	4,655	103,349	238,377		1,099								
1925	10,748	117,635	313,101	120	5,889								
1926	7,807	78,782	948,801	44	4,761								
1927	17,478	69,413	433,450	137	4,268								
Port Gravina and Orca Bay district:													
Anderson Bay—													
1917			12,372										
1918	11	2,309	9,596		6								
1923		294	2,490										
1924	5	26,470	228,777		39								
1925		10,171	50,610		4								
1926	1	8,762	115,250		8								
1927	41,722	31,296	125,690	19	241								
Bear Trap Bay—													
1915			13,725										
1917		2,319	20,000		120								
1923		40	1,902		3								
1925		5,666	9,947	1	264								
1926		210	19,991		12								
1927	70	4,219	8,671		83								
Canoe Passage—													
1911			25,035										
1915			15,837										
1917			12,309										
1918		185	4,483		4								
1924		83	9,809										
1925		1,003	23,234										
1926		1,199	119,591		73								
1927		1,068	2,250		30								
Double Bay—													
1925		869	4,496		1								
1926		3,984	31,714		1								
1927		5,176	10,592										
Gravina Point—													
1918		300	96,300										
1919	2,153	33,955	75,676										
1920	2,352	6,668	70,968	159	1,926								
1922			25,302		228								
1924	575	15,631	895,690		176								
1925	1,839	17,583	147,458	43	616								
1926	66	21,118	468,757	95	1,852								
Gravina, Port—													
1907			132,198										
1908			18,018										
1910	14,411		140,802										
1911	20,284		69,708										
1912	12,706	405	381,219										
1913			206,649										
1914	11,310		40,800										
1915	1,540	2,124	271,170										
1916		2,420	226,176										
1917	9,530	2,688	35,672	3	889								
1918	9,343	75,119	401,049	7	1,177								
1919	11,101	20,263	27,456		701								
1921	5,391												
1923		13	957		616								
1924	12,295	4,541	165,705		1,222								
1925	4,792	6,491	13,855		1,137								
1926	6,810	4,431	146,769	20	688								
1927	31,085	15,723	126,447		863								
Hawkins Cut-off—													
1917				2	116								
1918	1,067	35,485	227,033		91								
1919	403	8,434	8,818										
1920	1,332	3,578	57,401	86	1,119								
1922	20	668	70,153		334								
1924		1,279	19,395										
1925	2,279	33,065	165,605	18	85								
1926	4,230	11,880	304,519		89								
1927	3,291	27,004	197,814	8	326								
Johnstone Point—													
1917	832	396	25,071		5								
1920	2,199	8,853	63,013	159	2,680								
1922			6,072										
1924		12,304	394,431										
1925	1,130	25,828	146,296	27	414								
1926	1,344	23,307	460,527	98	9,458								
1927	1,632	22,464	258,050	24	1,909								

PRINCE WILLIAM SOUND, COPPER AND BERING RIVER SALMON STATISTICS 201

TABLE 1.—Salmon caught and fishing appliances used in the Prince William Sound district, 1904 to 1927—Continued

Year	Cohos	Chums	Pinks	Kings	Reds	Beach seines		Purse seines		Gill nets		Traps	
						Number	Fathoms	Number	Fathoms	Number	Fathoms		
Port Gravina and Orca Bay district—Con.													
Knowles Head—													
1918	95	1,321	3,202	22	9,826							Number	
1919	7,325	5,643	52,109	190	4,720								
1920	8,236	6,231	96,231	236	4,038								
1922	6,610	19,125	346,248		4,368								
1923	8,667	6,320	213,173	40	10,140								
1924	11,918	4,128	233,972		3,222								
1925	4,657	11,480	169,569		3,004								
1926	2,797	11,103	230,931	85	4,281								
1927	5,949	17,993	157,125	142	2,906								
Makaka Point—													
1915		51	5,545		17								
1917			5,368		309								
1918	53	1,699	9,250		390								
1924	2	213	57,078		25								
1925		1,298	51,479										
1926	39	210	32,105		72								
1927	1,110	15,478	205,463	15	681								
Olsen Bay—													
1918		28,132	79,341										
1919	114	7,082	13,688										
1923		8,353	122,764		275								
1924	116	44,679	193,137	3	708								
1925	408	48,456	47,245	5	600								
1926	52	11,031	189,062	12	119								
1927	20	17,268	38,764		109								
Orca Bay—													
1904			43,795										
1912	208				302								
1916			452,347										
1917	39		9,043										
1922			38,549										
1924		101	156	27	3,122								
1925		2,673	22,594		10								
1926	143	1,517	470,750		166								
1927	781	4,622	49,949		12								
St. Matthew Bay—													
1915			12,524										
1916		352											
1918		1,068	6,437		398								
1920		5,199	36,090	85	899								
1922			19,638										
1923			1,805		18								
1924		12,563	486,984										
1925	811	8,341	43,443	18									
1927	468	8,190	72,280	6	405								
Sheep Bay—													
1910			34,882										
1911			23,467										
1912			4,973										
1913		70	36,017										
1915			3,420										
1916			101,431										
1917		3,519	31,412										
1918		10,342	25,439		71								
1920	1,920	1,768	36,742	62	2,010								
1922			24,317										
1923		240	82,589	11	6								
1924		9,150	84,588		6								
1925	2	30,371	117,798		174								
1926	1	7,023	84,630	13	110								
1927	3,412	32,790	156,080	2	108								
Simpson Bay—													
1907			120,175										
1912	1,058				1,302								
1913			18,365		129								
1914	949												
1915			1,220		179								
1916			18,898										
1917	1,000		40,260		1,286								
1918	1,192	9,376	18,852		340								
1923		647	38,358		22								
1924	2,207	2,683	103,133		356								
1925	2,307	1,577	7,975		55								
1926	2,151	4,507	110,712		1,230								
1927	3,713	6,470	28,415		627								
Windy Bay—													
1910			21,187										
1911			38,139										
1913			27,957										
1914			53,127										
1915			9,187										
1917			7,003										

TABLE 1.—*Salmon caught and fishing appliances used in the Prince William Sound district, 1904 to 1927—Continued*

Year	Cohos	Chums	Pinks	Kings	Reds	Beach seines		Purse seines		Gill nets		Traps
						Num-ber	Fath-oms	Num-ber	Fath-oms	Num-ber	Fath-oms	
Port Gravina and Orca Bay district—Con.												
Windy Bay—Con.												
1918		3,387	14,228		93							Num-ber
1922			104,524		547							
1924	428	1,100	53,830		12							
1925		440	10,047									
1926		6,120	88,428		8							
1927	12	2,659	20,508		31							
Total—												
1904			43,795									
1907			252,373									
1908			18,018									
1910	14,411		190,871									
1911	20,284		156,349									
1912	13,972	405	386,192		1,604							
1913		70	288,988		129							
1914	12,259		93,927									
1915	1,540	2,175	332,628		196							
1916		2,772	798,852									
1917	11,401	8,822	198,510	5	2,725							
1918	11,761	168,723	895,210	29	12,396							
1919	21,096	75,377	177,747	190	5,421							
1920	16,039	32,297	360,445	787	12,672							
1921	5,891											
1922	6,630	19,793	643,803		5,477							
1923	3,667	15,916	464,088	51	11,080							
1924	27,546	134,925	2,926,685	30	8,888							
1925	18,225	205,902	1,031,621	112	6,454							
1926	17,634	116,402	2,873,736	323	18,167							
1927	93,265	212,432	1,458,098	216	8,331							
Hinchinbrook Entrance district:												
Anchor Bay—												
1917			11,442									
1926		2,099	13,358		1							
1927		373	4,740									
Etches, Port—												
1913			1,094									
1914	739											
1917		11,212	32,083	48	780							
1918	167	93,619	78,076	57	48							
1919		20,583	293		27							
1920	4	16	4,531		12							
1923		657	25,762									
1925		13,011	80,768		2							
1926	719	12,793	111,671		4							
1927	1,819	30,161	275,658	57	819							
Rocky Bay—												
1918		2	5,649		14							
1925		6,755	35,960		9							
1926	10	14,482	12,456									
Shelter Bay—												
1917			3,870		16							
1923			1,534		1							
1925		759	4,483		542							
1926	2	828	6,794		15							
1927	1,088	10,200	93,233	100	622							
Zaikof Bay—												
1917		4,472	462	3								
1918	31	1,437	12,528									
1919		181	705		6							
1920	2	26	1,922		5							
1925	824	5,511	56,567	159	271							
1926	1,032	10,607	149,282	162	1,351							
1927	413	5,376	81,099		237							
Unallocated—												
1917			5,597									
1919		560	2,635									
1927	290	4,120	51,623	32	256							
Total—												
1913			1,094									
1914	739											
1917		15,684	53,454	51	796							
1918	198	95,618	98,888	57	62							
1919		20,764	998		33							
1920	6	42	6,453		17							
1923		657	27,296		1							
1925	824	26,036	177,778	159	824							
1926	1,763	40,807	293,561	163	1,371							
1927	3,610	50,230	506,353	189	1,924							

TABLE 1.—Salmon caught and fishing appliances used in the Prince William Sound district, 1904 to 1927—Continued

Year	Cohos	Chums	Pinks	Kings	Reds	Beach seines		Purse seines		Gill nets		Traps	
						Number	Fathoms	Number	Fathoms	Number	Fathoms		
Unallocated, eastern part:													
1904			530,172									Number	
1913			4,542	500									
1915			42,328		1,303								
1916	47,746	42,529	2,088,469		22,000								
1917	16,383	103,268	1,203,284		12,553								
1918	43,150	401,297	1,000,633	112	9,512								
1919	13,839	168,749	320,006	1,335	9,295								
1920	15,205	71,709	1,444,911	955	14,962								
1921	1,000		2,200										
1922			84,916		340								
1923	9,162	26,444	688,172	3	3,033								
1924		4,749	62,561		81,667								
1925	4,333	47,402	442,986	1,297	11,278								
1926	20,768	20,103	410,413	83	1,696								
1927	80,919	30,992	211,632	3	2,277								
Total, eastern part:													
1904			573,967										
1907			252,373										
1908			18,018										
1910	14,411		196,871										
1911	20,284		156,349										
1912	13,972	405	386,192		1,604								
1913		70	415,277	500	129								
1914	12,998		217,636										
1915	6,915	2,175	438,355		1,499								
1916	47,746	45,301	2,969,312		22,000								
1917	41,498	254,655	1,968,207	280	35,958								3
1918	81,663	1,054,197	2,795,333	439	46,754							15	
1919	58,840	403,143	616,095	1,768	35,827							25	
1920	37,030	180,934	2,657,529	2,221	53,109							27	
1921	8,797	2,124	2,200		14,692								
1922	7,932	33,841	975,866	252	22,624							2	
1923	18,291	75,774	1,439,891	505	34,975							3	
1924	33,458	308,570	4,250,318	210	105,162							9	
1925	41,014	547,288	2,239,137	1,738	36,464							15	
1926	52,128	412,784	5,880,809	717	38,218							19	
1927	197,861	477,176	2,994,207	591	27,957							29	
Grand total:													
1904			573,967	253	109,200	7					10		
1905					100,000	2					10		
1906					60,578	2					5		
1907			252,373		17,692	2	280				5	300	
1908			18,018		117,018	2	315				15	953	
1909					150,412	1	150				20	1,067	
1910	14,411		196,871		68,122	2	290				20	1,000	
1911	20,284		156,349		23,130	3	450				16	800	
1912	15,563	405	401,892		47,549	5	615				16	950	
1913		70	425,574	1,003	75,412	6	550	2	180		27	1,250	
1914	13,001		224,906		72,348	2	300				11	825	
1915	6,915	2,175	449,174		52,111	5	410	13	4,190		19	2,166	
1916	47,746	45,918	3,270,282	6	72,321	9	945	21	5,100		19	1,250	
1917	44,557	370,309	2,590,563	364	222,154	48	4,630	49	6,440		69	5,800	
1918	100,247	1,341,887	4,302,646	557	249,092	70	8,110	64	8,841		97	7,873	
1919	72,836	558,522	1,008,312	6,930	152,682	39	5,351	61	7,889		111	10,280	
1920	80,378	260,963	5,314,747	6,408	129,655	54	4,860	63	9,052		217	15,844	
1921	8,316	3,499	12,644		92,571	17	1,300	3	450		32	3,200	
1922	8,962	50,517	2,421,272	286	140,736	19	1,750	7	1,030		80	4,500	
1923	26,889	111,582	2,447,006	530	170,050	19	3,200	27	2,780		94	8,428	
1924	69,431	385,251	8,365,901	1,219	158,484	24	1,540	21	2,995		62	4,200	
1925	84,408	780,950	4,085,084	3,325	96,703	24	1,800	35	5,490		50	4,500	
1926	78,607	587,351	11,153,663	2,153	157,313	21	2,065	62	6,565		30	5,325	
1927	258,816	655,159	6,124,911	3,094	118,118	6	695	95	7,830		8	640	

NOTE.—No catches were reported in the years omitted from each division of this table.

There follows a discussion of the catches at the several localities in each subdivision of the sound, in which the data in respect to the distribution of salmon and the development of the fishery at each place will be considered. After this a section is devoted to the salmon fisheries of Prince William Sound as a whole.

WESTERN PART

KNIGHT ISLAND PASSAGE DISTRICT

This district embraces all localities of the mainland and adjacent islands within and bounded by a line from Cape Fairfield on the west through Montague Strait to Point Helen at the southern extremity of Knight Island, thence along the watershed of that island, across Ingot and Eleanor Islands to Point Eleanor and thence to the point on the south side of the entrance to Port Nellie Juan.

Bainbridge Passage.—These data include a small catch of pinks reported from Big Bay in 1926. Although a small catch of pink and red salmon was reported from this passage in 1913, no serious fishing effort was made here until 1917 when 24,191 pinks and 105 reds were taken. The catch in 1918 was 79,443 pinks, 5,040 chums, and 1,696 reds, but it declined rapidly thereafter (with no catch reported from 1921 to 1924) until in 1927 only 470 pinks, 322 chums, and 1,565 cohos were taken. No reds or kings were taken in 1926 or 1927. In the 8 years for which data are available, catches of cohos were made in 3 years, chums in 4, pinks in each year, kings in 2, and reds in 5. There are several possible explanations for such irregularity: (1) The runs may be of local origin and easily exhausted; (2) the routes of migration may not be constant, or (3) the fishing operations may have varied in different years. So far as these data indicate, the fishery in Bainbridge Passage appears to be irregular and uncertain.

Chenega Creek and Island.—Prior to 1918, the name "Chenega" seems to have been used interchangeably with Eshamy as there is no authentic record that any salmon were taken at what is now known as Chenega until after 1917. No doubt exists that there was confusion in the use of these names as no catch was reported from Eshamy in 1904 or from 1906 to 1911, inclusive, whereas in 1905 none was reported from Chenega. Moser (loc. cit.) states "Chenega is between Rubber Boot and Point Nowell and has the largest run of redfish in Prince William Sound. In 1895 it furnished about 100,000 but a safe value is 50,000." The only stream of consequence between the points named by Moser is Eshamy, whereas the stream now known as Chenega is on Chenega Island, several miles south of Point Nowell. As the first red-salmon fishery in the western part of the sound was developed at Eshamy and as the entire catch at Chenega from 1904 to 1911 consisted of red salmon, there is slight reason to question the assumption that these catches actually came from Eshamy and are properly allocated to that stream. In late years (beginning with 1918) the east shore of Chenega Island has become one of the most productive fishing areas in the western part of the sound, due largely to the operation of traps. Table 2 shows graphically the catch of cohos, chums, pinks, and reds at Chenega.

TABLE 2.—Graphic table showing the catch of salmon at Chenega, 1918–1927

[Each letter represents the following number of fish: Reds, 2,000; pinks, 20,000; chums, 1,000; and cohos, 250]

Year	Reds	Pinks	Chums	Cohos
1918....	mmmmMmmmmM	mmmmMm	mmmmMmmmm	mmmmMmmmm
1919....	mm	m	mm	mm
1920....	mmmm	mmmmMmmmm	mmmm	mmmmM
1921....	mmmmM	m	m	mm
1922....	mm	mmmmMmmmmMmm	mm	m
1923....	m	mmmmM	m	m
1924....	mmmm	mmmmMmmmmMmmmm	mm	m
1925....	mmmmM	mmmmMmm	mmmmM	mm
1926....	mmmmMmmmmMmmmmM	mmmmMmmmmMmmmmMmmmmMmm	mmmmMmm	mmmmMm
1927....	mmmmMmmmm	mmmmMmmmmMmmmmMmmmmMm	mmmmMu	mmmmM

The coho fishery in this locality is relatively unimportant; and the catch each year was probably made incidental to fishing for other species, especially pinks, and has no value as indicating the extent of the coho runs. This situation is true also in respect to the chum fishery as this species, like the others, was taken in general fishing for all kinds of salmon, largely by traps. The catch of chums at Chenega dropped from 8,527 in 1918 to 1,341 in 1919, or at about the same ratio as the catches of other species declined, indicating that the fishing effort was less. The fluctuations in catch from 1918 to 1924 correspond with those of the pink salmon in the same years, and the increase after 1924 was equally rapid. The trend of the catch is unmistakably upward in approximately the same ratio as the rise in the trend of the pink-salmon catches. All of these facts indicate a close relationship between the catches of chums and pinks which is due, undoubtedly, to the fact that chums are taken chiefly incidental to the taking of pinks.

The pink-salmon catch at Chenega exceeded that in any other locality in the Knight Island Passage district, which makes Chenega one of the most important districts of the sound. It has increased steadily in each even year from 1918 to 1926. Disregarding the season of 1921, the odd years have also shown a progressive increase in production until the catch in 1927 was 412,498, about 7,000 less than the catch in 1926—the best the locality had known. These facts show conclusively an upward trend of the fishery and that the run in the off year of 1927 was abnormally large without apparent cause. A similar unexpected increase in the catch of pink salmon in 1927 was noted in other districts and was discussed in Part II of this series (pp. 709 and 710).

Chenega has produced a few thousand red salmon every season from 1918 to 1927. As stated above, this stream was in early years confused with Eshamy and until the installation of traps along the east coast of Chenega Island all salmon reported as coming from Chenega undoubtedly were taken at Eshamy. It may be assumed safely, moreover, that the red salmon taken in the traps along Chenega Island since 1918 were Eshamy fish and that their migration route was northward through Knight Island Passage.

King salmon have not been reported from Chenega since 1920. Beginning in 1918, catches were made in three years, a total of 211 fish being taken.

Drier Bay.—Scattered catches of coho, chum, and red salmon were made in this bay, but its importance as a fishing locality rests chiefly in the production of pinks. Only one small catch of that species was made before 1918; but since then the catches have increased, though somewhat irregularly, and culminated in a catch of 119,678 pinks in 1924. This comparatively large catch gave prominence to the locality as a producer of pinks, but so few seasons for which data are available in this review have since elapsed that the future of the district remains uncertain. In 1926 and 1927, the catches were 48,133 and 41,044, respectively, which may be regarded as very good yields for a small district having only a few small streams.

*Eshamy Bay and Lagoon.*⁴—From 1904, the year in which the Government began the systematic collection of fishery statistics of Alaska, the record of catches in this locality is unbroken through 24 years. Production has been consistently good, considering that the streams are few and small and that over-fishing was the rule rather than the exception for years. Exclusive of 1921, no serious drop in production of any species occurred until 1924. The reduced production in 1924 and subsequent

⁴ Including also catches reported from Rubberboot Creek, located near the northern entrance to Eshamy Bay.

years was probably due to the effect of new regulations restricting operations rather than to a material decline in the abundance of salmon. These regulations prohibited all commercial fishing within 1,000 yards of the mouth of Eshamy Creek and required a distance interval of 200 yards between all set nets in the bay and lagoon. The regulations effective in 1925 and continued without modification in 1926 and 1927 completely closed the lagoon to commercial fishing for salmon and prohibited fishing operations within 1,000 yards of the mouth of Rubberboot Creek. It seems reasonable, then, to attribute the reduced catch at Eshamy from 1924 to 1927 to the enforcement of these regulations, and consequently the catches in these four years are not comparable with those of preceding years.

Eshamy Creek is the outlet of a small lake and gained prominence among the local fisheries in the early days of the packing industry by reason of the red salmon it produced. It was the stream most preferred by the fishermen from the canneries at Odiak and later by the cannery at Orca. A saltery was once operated within a few yards of its mouth near the head of the lagoon. Fishing was easy and often destructive; competition was keen between fishing crews; and the law was frequently disregarded, as court records at Valdez and Cordova show. Red salmon alone were wanted. No effort was made to take pinks until 1912, at least none was reported from Eshamy before that year. The runs of cohos, chums, and kings, as indicated by the catch, are unimportant. A few hundred cohos were taken in each year since 1912 except two, 1916 and 1926. Chums were caught in slightly larger numbers without interruption from 1916 to 1927. A few kings were taken in most years, but the largest catch in any one season was only 64. No analysis of the data for these species of minor importance seems advisable at this time.

A graphic picture of the catch of red salmon at Eshamy from 1904 to 1927 is shown in Figure 4, and the trend of the catch, calculated on a 5-year moving average, is also shown for the period up to 1923 inclusive. The trend was not figured beyond that year on account of the influence of the new laws and regulations, mentioned above, on the catch in 1924 and subsequent years. In general, it is seen that good catches were secured up to 1910. Then followed a period of six years in which the catches were light and the trend correspondingly lower. Beginning in 1917 there was another period marked by large catches—nearly, but not quite, the equal of those immediately preceding 1910. This lasted until 1924, when the new regulations became effective and since which time the catch has been held at a very low level. For a small stream which has been intensively fished and which has supported a relatively small run, probably never over a few hundred thousand red salmon, the Eshamy run has held up well and apparently shows no serious depletion.

The percentage deviation of the catch from the trend is given in Figure 5. (See Pt. I, pp. 61–63 for an explanation of the use here made of the deviation from the trend and the correlations in the deviations at intervals.) The fluctuations in these deviations are distinct and regular, indicating definite cycles in the catches (and presumably therefore in abundance) at regular intervals. These cycles appear consistently through both good and poor years and are as well marked during the relatively unproductive years from 1910 to 1916 as during the productive periods that preceded and followed. Coefficients of correlation at 4 and 5 year intervals are as follows: Four-year interval $r = 0.69 \pm 0.102$; 5-year interval $r = 0.76 \pm 0.085$. Both of these correlations are high and sufficiently greater than their respective probable errors so that their significance is undoubted. Coefficients were not calculated for

other intervals but it is evident by inspection that the correlations at both 3 and 6 year intervals would be insignificant.

This high correlation at two different time intervals (four and five years) is naturally to be interpreted as indicating that the runs are made up of 4 and 5 year fish in approximately equal numbers, and it has seemed important to attempt to devise some measure of correlation that would take this into consideration. After trying various methods the simple scheme was adopted of correlating each catch with the average catch of the fourth and fifth preceding years. Thus the catch of 1910 was paired with the average for 1905 and 1906, the catch of 1911 with the average for

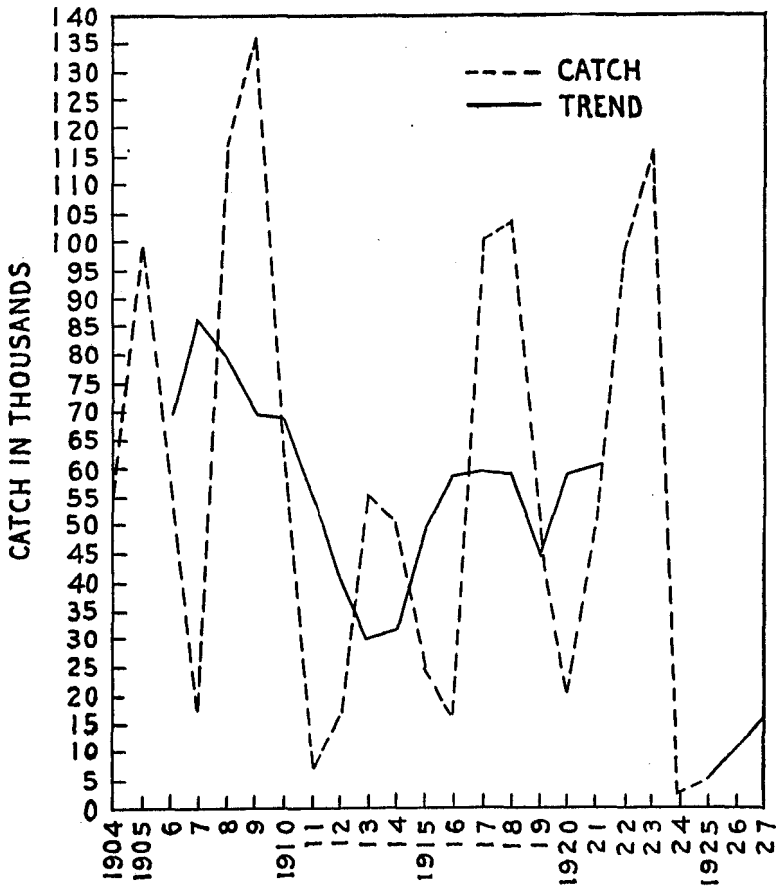


FIGURE 4.—Catch of red salmon at Eshamy

1906 and 1907, etc. Such a procedure, of course, gives equal weight to the two parent years—which seemed advisable in this case on account of the nearly equal value of the correlation coefficients at 4 and 5 year intervals. Any other weighting, of course, could have been used if there had been any good reason, biological or other, for so doing. The results were interesting since r calculated in this manner proved to be 0.89 ± 0.040 , a distinctly higher and more significant correlation than at either 4 or 5 year intervals. This apparently confirms the interpretation that the Eshamy fish are predominantly 4 and 5 years old at maturity and that the two age groups are present in about equal numbers, or, more properly, are produced from each brood in approximately equal numbers.

Falls Bay.—Statistics are available showing the catch of salmon at Falls Bay for five years, from 1922 to 1927, with the exception of 1923. All species have been taken, but the catches have always been small. Red salmon and pinks are taken in approximately equal numbers, although during the last three years, 1925 to 1927, the reds were more abundant than any other species. Records indicate that the fishery was conducted entirely by means of gill nets, but no information was presented to show that operations were confined strictly to the bay. In view of the fact that no salmon were taken here until recent years, it is probable that the bay has no local

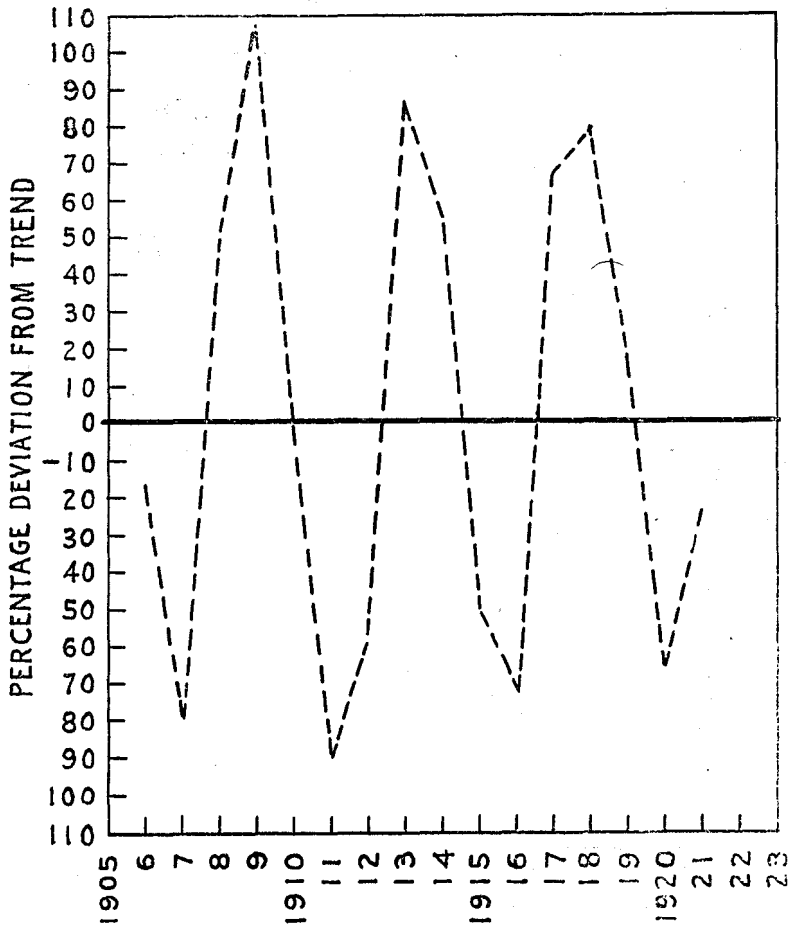


FIGURE 5.—Percentage deviation from the trend of the catch of red salmon at Eshamy

run of red salmon and that gill nets set at the entrance of the bay intercept fish moving toward red-salmon streams in more northerly localities. This assumption would not necessarily apply to pinks and chums, as they are found in all parts of the sound, including Falls Bay.

Granite Bay.—The fishery at this locality is also of comparatively recent origin, practically nothing having been taken there before 1924. It produced pink, red, chum, and coho salmon. The catch of reds increased steadily in the four years from 1924 to 1927 and now gives the locality singular importance by reason of its proximity to Eshamy Bay and its rather sudden development. Inasmuch as the salmon reported from Granite Bay were taken in gill-net fishing, there is a possibility that

they came from a local run and were caught well within the bay. This possibility is suggested by the fact that a lake-fed stream enters at the head of the bay which might support a small run of red salmon. However, if the catches were made off the entrance of the bay, the presumption is that the Eshamy run provides the fish reported from Granite Bay. On account of the fact that the fishery here has developed almost entirely since the stringent regulations affected the fishery at Eshamy, the latter hypothesis seems the more probable.

The catch of pinks has fluctuated considerably in the four years, disclosing two surprising and contradictory phenomena. The records for 1925, an odd year in which the run elsewhere in Prince William Sound was small, show that the catch was 82,581, the largest ever made at Granite Bay. In 1926, the year of the largest run of pink salmon ever known in Prince William Sound, this locality produced only 6,213 pinks, a direct reversal of anticipated results. While nearly all other localities were showing much larger production in 1926, Granite Bay fell off more than 92 per cent in yield of pinks, 87 per cent in chums, and 57 per cent in cohos, but gained 102 per cent in production of reds. This indicates a peculiar condition of the fishery which data at hand do not explain.

Jackpot Bay.—In the early days of salmon fishing in Prince William Sound, Jackpot Bay was rated by Moser (1899, p. 138) as good for 7,000 red salmon annually. It was probably fished as early as Eshamy Lagoon, but the first recorded catch was made in 1911, consisting of 5,885 red salmon. In 1914, the catch had declined to 1,977. The bay was then abandoned and not fished again until 1917 in which year 21,770 reds were caught. Another decline started in 1918 and terminated in 1920 with a catch of 80 reds, 6,967 pinks and 67 chums. Since then Jackpot Bay has not been fished. In 1925, it was permanently closed by departmental regulation for a distance of 2,000 yards from the mouth of the stream at the head of the bay. The closed area was extended to 3,000 yards in 1927.

Latouche Passage.—The available records show that this locality was fished only in 1919, 1925, and 1927. Catches were uniformly small for all species except in 1927 when 105,643 pinks were reported. This extraordinarily large catch is one of the exceptional occurrences for which no explanation can yet be given. If these figures are reliable they would indicate that the fishery in Latouche Passage may be developed into one of considerable importance, but the data are still too fragmentary to warrant any conclusions.

Main Bay.—This locality has been fished for years by a single company, but operations were not continuous, indicating that the runs of salmon are of little importance. All species except kings were taken but the catch consisted mainly of pinks and reds. The catches of pinks apparently have been decreasing while those of reds have increased—a condition similar to that at Falls and Granite Bays. As gill netting was the preferred method of fishing, it seems likely that the red salmon taken in Main Bay were migrating to other waters, there being no evidence to indicate the existence of a local run.

Point Nowell.—Catches of salmon were reported from this locality in three years. The first was made in 1917 and consisted chiefly of red salmon, the second in 1925 when only a few thousand salmon of four species were taken, and the third in 1927 when the number of pinks increased to 14,943 and that of reds, chums, and cohos dropped to a few hundred. This locality is not an important producer of salmon; the catches are small and are made by traps or set nets, yet it might seem that appliances set along the Point Nowell shore should intercept fish

going to Eshamy Bay or the more northern localities just as they apparently do at Falls Bay, for example.

Prince of Wales Passage.—Beginning in 1919, fishing in these waters has been carried on each year through 1926, except 1925. In that time the catch of red salmon, though never large, has shown considerable fluctuation; but the number taken in 1926 was next to the largest ever reported from the passage. The catch of pinks has increased materially although none was reported during the three years 1921 to 1923 nor in 1925 or 1927. The large catches of 1924 and 1926 were made by traps, and it appears probable that they were not driven in the odd years when only small runs were expected. The streams of the passage are undoubtedly small and not capable of supporting large local runs so that the capture of more than 100,000 salmon in Prince of Wales Passage in 1926 indicates that the salmon taken there were chiefly migratory.

Squire Island, Thumb Bay, and Whale Bay.—Of these three localities, Whale Bay only was fished before 1926. It produced in 1918 and 1920, small numbers of chums and pinks. The bay was not fished again until 1926 when 36,553 pinks were taken and a limited number of reds and chums was also captured. The Squire Island and Thumb Bay data cover only two years but catches were fair at both places. The Squire Island catches were taken (undoubtedly from salmon on their migration to streams beyond) by a trap located at the south end of the island. The data are too few to warrant any attempt at analysis. The unallocated catches in the district include salmon from Chenega Passage in 1919 and 1920; from Crafton Island and Dangerous Passage in 1918 and 1919; from Eshamy Passage in 1920; from Flemming Island in 1927; from Hawkins Bay in 1917; from Knight Island in 1913, 1917, and 1918; from Little Bay in 1920 and 1926; from Paddy Bay in 1913 and 1917; and from Mummy Bay and Sleepy Bay in 1926.

The Knight Island Passage district, as a whole, shows a rather steady production of red salmon from 1904 to 1927. The red-salmon catches are obviously dominated by the Eshamy runs since the figures for the entire district closely parallel those for Eshamy alone and are only slightly higher up to 1924. Since 1924 the catches in the entire district have been markedly higher than those from Eshamy due, without doubt, to the limitation of fishing in Eshamy Bay and the subsequent increase of fishing effort outside, but in localities where the fish bound for Eshamy are running. While the regulations have reduced the catch of red salmon in the immediate vicinity of Eshamy, it is apparent that they have not materially affected the total catch in the district. This evidently means that the gear formerly fished close to the mouth of the stream has been just as effective when moved farther away or else that it has been replaced by other gear which has been effectively operated at a distance from the stream mouth. It is important to note that, at least in this instance, regulations designed to reduce the dangerous concentration of fishing effort at the mouth of the stream still permit a reasonable catch. In the case of pink salmon, the district shows larger catches in 1926 and 1927 than ever before and a consistently better run in each off year since 1921. Chums are not taken in large numbers in this part of the sound, the largest catch being 21,033 in 1918. Small runs may be characteristic of this district, yet on the other hand the small catches may be accounted for in that little or no effort was made to take chums. Cohos are also captured in comparatively small numbers, but the supply was as large in 1927 as in any preceding season. The evidence indicates that here, as elsewhere, cohos and chums are taken chiefly incidental to the fishing for other species. King-salmon runs are insignificant, catches

are small and scattered, ranging from 254 in 1920 to 14 in 1927, the greater part coming from traps along the Chenega shore. Table 3 gives a graphic picture of the catch of all species except kings.

TABLE 3.—Graphic table showing the catch of salmon in the Knight Island Passage district, 1904–1927

[Each letter represents the following number of fish: Reds, 10,000; pinks, 50,000; chums, 2,000; and cohos, 1,000]

Year	Reds	Pinks	Chums	Cohos
1904	mmmmMm			
1905	mmmmMmmmmM			
1906	mmmmMm			
1907	mm			
1908	mmmmMmmmmMmm			
1909	mmmmMmmmmMmmmm			
1910	mmmmMmm			
1911	mm			
1912	mm	m		m
1913	mmmmMm	m		m
1914	mmmmMm	m		m
1915	mm	m		
1916	mm	m	m	
1917	mmmmMmmmmMmm	mmmm	mmmmMmmmmM	m
1918	mmmmMmmmmMmmmm	mmmmMm	mmmmMmmmmMm	mmmmMm
1919	mmmmMmmmm	mm	mmmmMmm	mmmm
1920	mmmm	mmmmMmm	mmmm	mmmm
1921	mmmmMm	m	m	m
1922	mmmmMmmmmMm	mmmmMmmmmMmm	mmmmM	mm
1923	mmmmMmmmmMmm	mmmm	m	mm
1924	mm	mmmmMmmmmMm	mmmmM	mm
1925	mm	mmmmMm	mmmmMmmmm	mm
1926	mmmmMm	mmmmMmmmmMmmmmMm	mmmmMmm	mm
1927	mmmmMmm	mmmmMmmmmMmmmmM	mmmmMmm	mmmmMm

MONTAGUE STRAIT DISTRICT

The Montague Strait district includes all waters east of a median line through Montague Strait to Point Helen at the southern end of Knight Island, thence along the watershed of that island, across Ingot and Eleanor Islands, thence north of Smith Island and south to Montague Point, thence along the watershed of Montague Island to Cape Cleare, and thence to the point of beginning in Montague Strait. This district comprises an area in which no fishing was carried on before 1917, except at Bay of Isles on the east coast of Knight Island where a small run of red salmon was exploited as early as 1912 and fished intermittently until virtually exhausted.

Aside from a few small catches, classed as unallocated, all salmon taken in this district came from the west cost of Montague Island. The development of a fishery in this region commenced in 1917 but did not reach large proportions until 1924. The fishery is, therefore, quite new and the data are necessarily limited to so few years that analysis must be confined largely to a discussion of the catches of pink salmon. This district embraces seven localities, each of which will be considered separately as far as data warrant. The unallocated catch in this district includes salmon reported as taken at Marsha Bay in 1917; at Montague Point in 1925; at Montague Island in 1917, 1919, 1926, and 1927; and at Rocky Point, Sandy Point, and Green Island in 1927.

Bay of Isles.—A stream, the outlet of a small lake, enters the head of the bay where a fishery was conducted intermittently from 1912 to 1926. In the eight years of operation, the catches consisted chiefly of red and pink salmon, but they were small and irregular and gave the stream little importance as a producer of salmon. In 1925, the middle arm of the bay was closed to all commercial fishing for salmon but in 1926 this restriction was removed and the west arm was closed—a restriction

that is still in force. No catches were reported in the years 1923 to 1925, inclusive; but the bay was fished again in 1926, although only small catches of chums, pinks, and reds resulted from the operations. Nothing in the available data indicates that a valuable salmon fishery can be established here; in fact, the conservation of the local run even if fully rebuilt, will be of little material benefit to the fisheries of the sound. Continued closure of this locality appears to be a conservation measure of very limited value.

Cape Cleare.—Although this locality (the southwestern extremity of Montague Island) was certainly fished in earlier years, the only definite records are of moderate catches made in 1926 and 1927. In the earlier fishing, gill nets or seines were probably used, but the recent catches were made by a trap. All species of salmon were taken, which, named in the order of their numerical value were pinks, cohos, kings, reds, and chums. A catch of 9,463 cohos and 935 kings seems to throw some light on the question of the origin of the runs which are intercepted at this point. They may be strictly Prince William Sound fish but there is a possibility that the run, particularly of kings, is bound for some other region, since no tributary of the sound is known as an important king-salmon stream.

Glacier Bay.—Data for 1926 and 1927 only are available for this locality which is a shallow indentation on the west coast of Montague Island about midway between Cape Cleare and Montague Point. This too is a trap fishery of recent development. The larger catch, including all species, occurred in 1926, due to the phenomenal run of that year. Inasmuch as the streams of Glacier Bay are comparatively unimportant, these catches may be regarded as coming from the general runs of Prince William Sound that have been shown to enter through Montague Strait.⁶

Hanning Bay.—Like other places on the west coast of Montague Island, Hanning Bay is a new field the exploitation of which had not been attempted before 1920 when experimental fishing was begun by a company operating a cannery at Seward. A trap was driven in the bay and made an encouraging catch of all species of salmon in the first year it was operated. It is possible that this locality was prospected in 1919 but no catch was recorded under the name of Hanning Bay until 1920. Apparently it was then neglected for several years as the next recorded catch in this locality was made in 1924. Thereafter the bay was fished regularly and produced substantial catches of pinks, a few hundred kings, and several thousand cohos, chums, and reds, thus giving it prominence as one of the best fishing localities in the Montague Strait district. As Thompson has shown (*loc. cit.*) the traps at Hanning Bay in all probability merely intercept a part of the main run of salmon entering the sound through Montague Strait. The streams of Montague Island can not be large on account of the nature of the island and they consequently provide very limited areas for spawning. It is doubtful also that all species of salmon spawn in these streams.

Macleod Harbor.—According to available records, Macleod Harbor was not fished regularly before 1920 although 1,500 pink salmon were taken there in 1918. In 1920, the commercial catch was larger than that of any other locality in the Montague district and ranks fourth in size among the localities of the sound. Records for the next three years show no catches in this bay, yet it is probable that some salmon were taken here but not allocated to the waters where caught, as often happened. Fishing was resumed in 1924 and continued through the next three years

⁶ Salmon Tagging Experiments in Alaska, 1920, by Seton H. Thompson. Bulletin, U. S. Bureau of Fisheries, Vol. XLVI 1930 (1931). Document No. 1084.

with surprising results. Out of a total production of 868,594 salmon in the Montague district in 1924, Macleod Harbor produced 862,773—a catch which has not since been equalled. There was a material falling off in catch of pinks and chums in 1925, cohos decreased slightly, while kings and reds increased. In 1926, large gains were made in the catches of chums, pinks, and reds, but kings declined 8 per cent and cohos about 50 per cent. The catch of chums, pinks, and reds fell off in 1927, whereas that of cohos and kings increased. In the five years for which data are available, the average yield of cohos was approximately 30,000; chums, 15,000; pinks, 416,000; kings, 1,562; and reds, 11,000.

The outstanding feature of the Macleod Harbor fishery is the consistently good catch of king salmon, which is larger than that in any other locality of the sound in the same years. The district is too new and data are too few for comprehensive analysis, but it is safe to say that the bulk of the catch came from passing runs rather than from runs to streams of Macleod Harbor. Catches were made exclusively by traps set near the entrance of the harbor, which in itself is an indication that the local runs, if any, are unimportant so that seining is not profitable.

Port Chalmers.—Chum and pink salmon were reported from this locality in six years, 1917 and 1918 and from 1924 to 1927. Catches of cohos and reds were insignificant, but those of chums and pinks have been of more importance. Contrary to the common rule, the largest catches of pinks were made in the odd years of 1925 and 1927, while all other localities in the Montague Strait district show larger catches in the even years. This place seems to have been fished chiefly by companies located at Cordova using seines. The total absence of kings and the small number of reds in the catches afford some reason for assuming that the salmon came from local runs to the streams of Port Chalmers. Evidence of the interception of migrating salmon at this point, as noticed at the more southerly localities of the Montague shore, is wholly lacking here.

Stockdale Harbor.—Small catches of pink salmon were made at this bay in three years, but the data are entirely too few for analysis. Although the catch in 1926 was larger than that of the other two years, none was made in 1927, and it would seem that the run is commercially unimportant. The unallocated catch in this district includes salmon reported as taken at Marsha Bay in 1917, at Montague Point in 1925, at Montague Island in 1917, 1919, 1926, and 1927, and at Rocky Point, Sandy Point, and Green Island in 1927.

The Montague Strait district, considered in its entirety, constitutes an area of relatively recent exploitation since, prior to 1920, it was not known to offer any possibility for profitable fishery development. Small catches had been made in the bays of the east coast of Knight Island and along the northwest coast of Montague Island, but not until traps were driven in 1920 at points on the southwest coast of Montague was it discovered that a large part of the Prince William Sound run entered through Montague Strait and could be reached by traps driven from the shore. In the last four years, 1924 to 1927, catches have reached rather large proportions and occasioned interest in the possible effect they may have upon the runs of salmon to the inland waters of the sound. In reviewing the data for this district, it was pointed out that there was little or no evidence to support the notion that salmon moving along the west coast of Montague were bound to local streams. That idea seems untenable in view of the physical peculiarities of the island which is long and narrow and traversed lengthwise by a high and rugged range of mountains. The most plausible theory, and one supported by the evidence of tagging experiments, is that the salmon passing

along this shore are not bound to any particular section of the sound but disperse in all directions.

PORT WELLS DISTRICT

In this district are embraced all waters of Prince William Sound north and west of a line from the south entrance of Port Nellie Juan to Point Eleanor on Eleanor Island and thence to the southernmost point of the peninsula between Esther Passage and Eaglek Bay. Thirteen localities in this district are given individual consideration in this analysis. The following combinations of data have been made: A catch made at Beattie in 1917 was included in the catch at Bettles Bay; a catch at Surprise Cove in 1920 was added to the Cochrane Bay catch; Coghill River figures include catches reported from Coghill Bay in 1919, 1926, and 1927; from Coghill Lake in 1919, and from College Fiord in 1919, 1920, and 1924; Culross Passage catches are combined with those from Culross Island in 1925 and 1927, from Colms Passage in 1919, and from Goose Bay in 1919 and 1922; Pigot Bay catches include salmon reported from Pichet Bay in all years; Port Wells catches include fish from Hobo Bay in 1918, from Passage Canal, sometimes called Portage Bay, in 1918 and 1919, from Blackstone Bay in 1918, 1919, and 1920, from Blackstone Glacier, Entry Cove, and Harrison's Lagoon, also called Hearigans Lagoon, in 1920, from Wells Passage in 1920 and 1924, from Culross Bay in 1925, and from Perry Passage in 1927.

Bettles Bay.—This bay is a small tributary of Port Wells, indenting the mainland about midway between Point Pigot and Point Pakenham. Salmon of all species have been taken here but only pinks in quantities. Catches were made in seven years covering the period from 1918 to 1927, with the exception of the three years from 1921 to 1923. The most productive season, 1918, shows a catch of 119,656, chiefly pinks, but in 1919 the catch dropped to 391 salmon, consisting of chums, pinks, and reds. Since then, wide fluctuations have occurred and the catch has dwindled from the large total of 1918 to 14,460 chums and pinks in 1927. These fluctuations are doubtless due, at least in part, to faulty records, but the development of an important fishery in this locality is quite unlikely. The source of the fish taken here is probably local.

Cochrane Bay.—This locality, like Bettles Bay, has been fished seven years. Small catches of chums, pinks, and reds were made in 1918 and 1919, but in 1920 the catch of pinks increased to 216,000. In the next three years, no catches were reported from this bay; however, in 1924, the catch was 450,000, chiefly pinks. In 1925 the catch declined to 50,000, while in 1926 and 1927 it was again relatively high, giving some assurance that a profitable fishery may be maintained in this locality.

Coghill River.—This river is the outlet of Coghill Lake; it enters College Fiord, the northernmost arm of Port Wells, at Coghill Point. Fishing has been somewhat irregular and was first carried on in 1914 for the red salmon obtainable there. Further exploitation began in 1917 by the operation of a trap directly at the mouth of the river, and a fair catch of reds and pinks was made in 1918 and 1919. Notwithstanding the fact that no fishing was done there during 1921 to 1923, the catch in 1924 was again poor. No catches were reported from this locality in 1925, and since then only chums and pinks have been caught. In 1925 waters within 2,000 yards of the mouth of the river were closed to all commercial fishing for salmon, a regulation which has been continued to the present time and undoubtedly accounts for the failure to take red salmon at this locality since 1924. The catches of chums and pinks were made in College Fiord at some distance from Coghill River.

Culross Passage.—Culross Passage has been one of the largest producers of pink and chum salmon in the Port Wells district. It is a narrow strait separating Culross Island from the mainland and is probably one of the routes used by salmon entering Port Wells, although the larger part of the catches were made by purse seines, indicating that the fish were schooled in considerable bodies. Long Bay, the only arm on the west side of the passage, was closed by regulation in 1925 and has not since been opened. The passage has been fished every year from 1917 to 1927, inclusive, except 1921 and 1923. In the last four years of this period, the catch of pinks was exceptionally high, while a fair number of chums was also caught. The other species were represented in the catches of nearly every year, but not in sufficient quantities to give such runs real significance. The largest catch of pinks was reported in 1926, which would naturally be expected in a season of such unprecedented runs as then occurred; but 1927 was also a good year, the yield being second only to the catch of 1926.

Point Culross.—Data for this locality cover two years, 1926 and 1927. The catches were made by a trap which intercepted the runs to Port Wells along an abrupt shore where the water is deep and where only floating traps can be used. Although data for only two years can have no immediate significance they are kept separate in view of the probability of future development in this locality. The same procedure has been followed elsewhere in this series.

Esther Passage.—This passage separates Esther Island from the mainland. It has been fished irregularly since 1914 and catches, apparently from local runs, have always been small. On the west side of the passage is a stream, the outlet of a small lake, which supports a small run of red salmon. The comparatively early exploitation of the fisheries of Esther Passage was probably due to the presence of these few red salmon. Nothing in the records at this locality gives promise of a valuable fishery in the future. If any considerable part of the salmon going to Port Wells enter through this passage, it might reasonably be assumed that a fishery of importance could be maintained, but there is no evidence that the passage is so used.

Hummer Bay.—This bay has provided catches of pink and chum salmon. The first catches were reported in 1918, the second in 1920, but not again until 1924. From then until 1927 fishing was carried on each season. As the catches in 1918 and 1920 bear little or no relation to those in 1924 and later, consideration is here given only to the data of the other years. Hummer Bay is a small indentation on the west side of Port Wells. In 1924 the entire catch was made by seines and in all probability was taken well within the bay. Since then more than half the catch came from a trap at or near the entrance of the bay, while in 1926 the trap made two-thirds of the catch. The even years show the largest production, though the catches in the odd years were relatively good. It can not be definitely determined, however, that all the trap-caught fish were Hummer Bay salmon, as it is probable that salmon going to more northerly waters of Port Wells were captured by this trap.

Long Bay.—This bay was referred to in the discussion of Culross Passage data. It was set out as a separate locality in order to localize as far as possible the larger catches in places where there was reasonable assurance that operations would be continued after 1927—the last year considered in this review. Fair catches of pinks and chums were made here in 1926 and 1927, notwithstanding that the bay had been closed to commercial fishing for salmon since 1924. Evidently the catches in subsequent years were made at the entrance of the bay rather than in the closed area and were reported as Long Bay fish in order to differentiate them from salmon

taken in other parts of Culross Passage. As the catches were made with seines, the salmon doubtless schooled at the mouth of the bay.

McClure Bay.—In the four years from 1917 to 1920 a few pinks and chums, with occasional cohos, kings, and reds, were reported from this bay. Production then ceased until 1925, when chums and pinks were again taken. Inasmuch as no salmon were reported from this bay in 1926, the best year in the history of the sound fisheries, or in 1927, also a good year, it would now seem that the locality has been abandoned or that fish taken here are reported with other catches.

Mink Harbor.—Mink Harbor is not indicated by name on Coast and Geodetic Survey Chart No. 8550, but is a local name applied to a small bay located on the west side of Port Nellie Juan, almost directly opposite the mouth of McClure Bay. According to the available data, fishing began here in 1918 with the catch of a few thousand chums and pinks. Nothing more was done until 1924, but, beginning then and continuing through 1927, catches were large and show progressive increases for the cycles of both even and odd years. In the four years for which there are continuous records the fishery has attained a position of real importance among the localities of the Port Wells district. It is a seine fishery and for that reason the correctness of the data may be questioned, as fishermen are disinclined to reveal the source of good catches. However, in the absence of proof to the contrary, the figures must be accepted as essentially correct. The record contains no evidence of depletion.

Port Nellie Juan.—Among the localities of the western part of the sound Port Nellie Juan comes next in size to Port Wells, and, like most other localities in that district, it is mainly a producer of pink and chum salmon. Catches were reported in two 4-year periods, from 1917 to 1920, inclusive, and from 1924 to 1927. The break in fishing in the three years from 1921 to 1923, likewise noted in the records for several other localities in this district, may mean that salmon taken in those years were reported only as coming from the sound rather than that there was no fishing at all. If catches were made, definite allocation was omitted and therefore analysis of data is correspondingly more difficult. Assuming the statistics to be correct, the catch of pinks in the even years increased from 165,840 in 1918 to 534,546 in 1924. In 1926 it dropped to 213,737, showing, in a year of great abundance elsewhere in the sound, a decided decrease in the catch as compared with that of the second preceding year without a noticeable change in the intensity of fishing. The catch in the odd years was much smaller, and the decline from 1925 to 1927 was even more marked than that from 1924 to 1926. No reason can be given for these changes, which may be due to faulty data or to shifts in the fishery of which there is no record. The catch of chums also fluctuated widely, finally dropping from 29,476 in 1925 to 1,460 and 1,350 in 1926 and 1927, respectively. This decline, if genuine, was probably due to reduced fishing effort for chums in favor of greater activity for pinks in this and other localities. A few hundred cohos and reds were taken irregularly, but these species are of negligible importance.

Pigot Bay.—This bay is a small arm on the west side of Port Wells just north of Point Pigot. Records show, except in 1919 when the catch was only 1,143, that it has produced annually from 22,000 to 54,000 pink salmon, exclusive of three seasons in which fishing was apparently suspended. Runs of chums were much smaller, and catches of cohos, kings, and reds were negligible. The pink-salmon fishery appears to be in no immediate danger of depletion, while the others have little economic importance.

Port Wells.—Port Wells proper with its tributaries, forms the largest arm of Prince William Sound; it has produced more salmon than any other locality in what is here called the Port Wells district, but fluctuations in the catch have been erratic. In 1912 and 1913, red salmon only were reported from this locality and they probably came from Coghill River. The next catch, consisting entirely of pinks, was made in 1917; thereafter fishing was prosecuted each year through 1927 although in 1921 only reds were taken while in 1923 the catch consisted wholly of pinks. In several years chums and reds were caught in appreciable numbers, occasionally cohos and kings; but pinks constituted the valuable fishery. Since 1922, the trend of the catch allocated strictly to Port Wells has been downward.

Looking at the Port Wells district as a whole, it is observed that the trend of the pink-salmon catch is decidedly upward and was not seriously affected by the total abandonment of fishing in the district in 1921 and the limited activities of the next two years. Although the catch in 1926 was smaller than in 1924 by 15 per cent, the catch in 1927 was 54 per cent larger than that in 1925, showing a tendency, frequently noted elsewhere, toward an equalization of runs as between the odd and even years. The situation in respect to red salmon is not encouraging. The run was never large and the catches declined rapidly after the peak of 1918 to a low level that was maintained up to 1927 except for slightly larger catches in 1924 and 1925. Some allowance should be made, however, for the effect of legal restrictions on fishing at Coghill River as that was the chief red-salmon locality in the district although a stream on the eastern slope of Esther Island once produced a few thousand.

Coho and king salmon data are too fragmentary to warrant detailed consideration. Chums were fairly abundant in some years, notably 1918 and 1925, but in 1921 and 1923 none was taken, while in 1922 the catch was negligible. The commercially important fishery of this district is centered, of course, in the pink-salmon runs, and the catches as already indicated appear to be increasing in nearly all localities. Graphic Table No. 4 presents a picture of the pink and red salmon fisheries in this district.

TABLE 4.—Graphic table showing the catch of reds and pinks in the Port Wells district, 1917–1927

[Each letter represents the following number of fish: Reds, 2,000, and pinks, 100,000]

Year	Reds	Pinks
1917.....	mmmmMmmmmMmm	m
1918.....	mmmmMmmmmMmmmmmmMmmmm	mmmmMmm
1919.....	mmmmMmm	mm
1920.....	mmmm	mmmmMmmmmMmm
1921.....	mmmm	
1922.....	m	mmmmM
1923.....		m
1924.....	mmmmMmmmmMmm	mmmmMmmmmMmmmmMmmmmM
1925.....	mmmmMmm	mmmmMmm
1926.....	mm	mmmmMmmmmMmmmmMmm
1927.....	mm	mmmmMmmmmM

EAGLEK BAY DISTRICT

This small district, embracing a single locality between Port Wells and Unakwik Inlet, was set apart from all others because salmon taken in Eaglek Bay are presumably derived strictly from local runs, entirely separated from those to neighboring waters. The figures include a catch reported in 1917 from "Eayek" Bay, an undetermined locality, if not intended for Eaglek Bay. It is possible, of course, that some of the fish taken in the bay are casual visitors actually bound for other waters, but it

seems very probable that most of the fish taken here are of local origin. Pinks and chums are taken in commercial quantities and the record is unbroken from 1917 to 1927, except for 1921. The catch of pinks in the early and late years was relatively good, but from 1922 to 1925, inclusive, four poor catches were recorded, exclusive of 1921, a year in which no fishing was carried on. The catch in 1926 was one of the best on record and that of 1927 was good for an odd year, but it remains to be seen whether this is an indication of recovery from the unproductive period just preceding. This fishery has probably been conducted solely by means of purse seines as there is no evidence that traps were ever used. The catch of chums has been very irregular and has apparently declined, although the exceptional catch of 1925 may indicate that the fluctuations are economic rather than biological. The catches of cohos, kings, and reds were inconsequential and merit no discussion.

UNAKWIK INLET DISTRICT

This district extends from Kiniklik on the west to Granite Point on the east and the Naked Islands on the south. It includes five distinct localities, among them being Miners River, one of the best-known red-salmon streams of the sound. Aside from that fishery, exploitation of the district has developed in comparatively recent years.

Cedar Bay.—Cedar Bay is an arm of Wells Bay and is noted chiefly as a producer of pink salmon. Other species have been reported from the bay but not in sufficient numbers to constitute a fishery. Data are available for eight years from 1917 to 1927, omitting 1921, 1923, and 1925, and show wide fluctuations in catch from a high level of 145,530 in 1918 to a low level of 2,859 in 1927. The catches in 1920 and 1922 were far below that of 1918 but in more recent years have increased though they have never reached the level of 1918. Statistics for the odd years, covering only 1917, 1919, and 1927 give evidence of over-fishing and indicate a possibility of serious depletion. It appears probable that the run of the odd years is practically extinct, as a catch of only 2,859 fish after three cycles of unmolested escapement can not be regarded as an indication of an increasing supply.

Granite Point.—A trap was operated at this point in 1926 and 1927 and made good catches of pinks in both years. A few thousand chums and reds and a few hundred cohos were also taken. No information is available to show in which direction the salmon were moving when captured, so no conclusion can be reached as to whether they came from runs to Unakwik Inlet and Wells Bay or to more eastern localities. Analysis of such limited data is impracticable.

Miners River.—This river was regarded by Moser as capable of producing at least 10,000 red salmon annually. It was one of the first streams to be fished, yet the record of these early catches is lost in combination with those from other localities as none was credited directly to the river until 1904. It also appears that the locality was not fished in 1905, 1907, 1908, and 1920, and that it was abandoned after 1923. Except for three small catches of pinks at intervals of four and six years, a few kings in 1904, and 1 chum in 1923, Miners River has produced red salmon only. The catch has always been small, exceeding 9,000 just three times, and falling off gradually to 1,165 in 1923. Since 1911, the trend has declined regularly to 1921 when it reached the lowest point in 20 years. In 1925, Unakwik Inlet north of Jonah Bay was closed by departmental regulation to commercial salmon fishing thus ending all operations at Miners River. To what extent the catches of red salmon in Unakwik Inlet after 1917 were Miners River fish is not known, but in all probability some of them were bound to that stream, though captured in the lower part of the inlet. Figure 6 shows

graphically the catch and the trend of the catch of red salmon at this river from 1904 to 1923.

Unakwik Inlet.—The catches in this locality include some reported from Cowpen in 1922 and 1927, from Siwash Bay in 1917 and 1923, and from Unakwik Point in 1927. Salmon were first reported from this locality, exclusive of Miners River catches, in 1917, the year a cannery was first operated in the western part of the

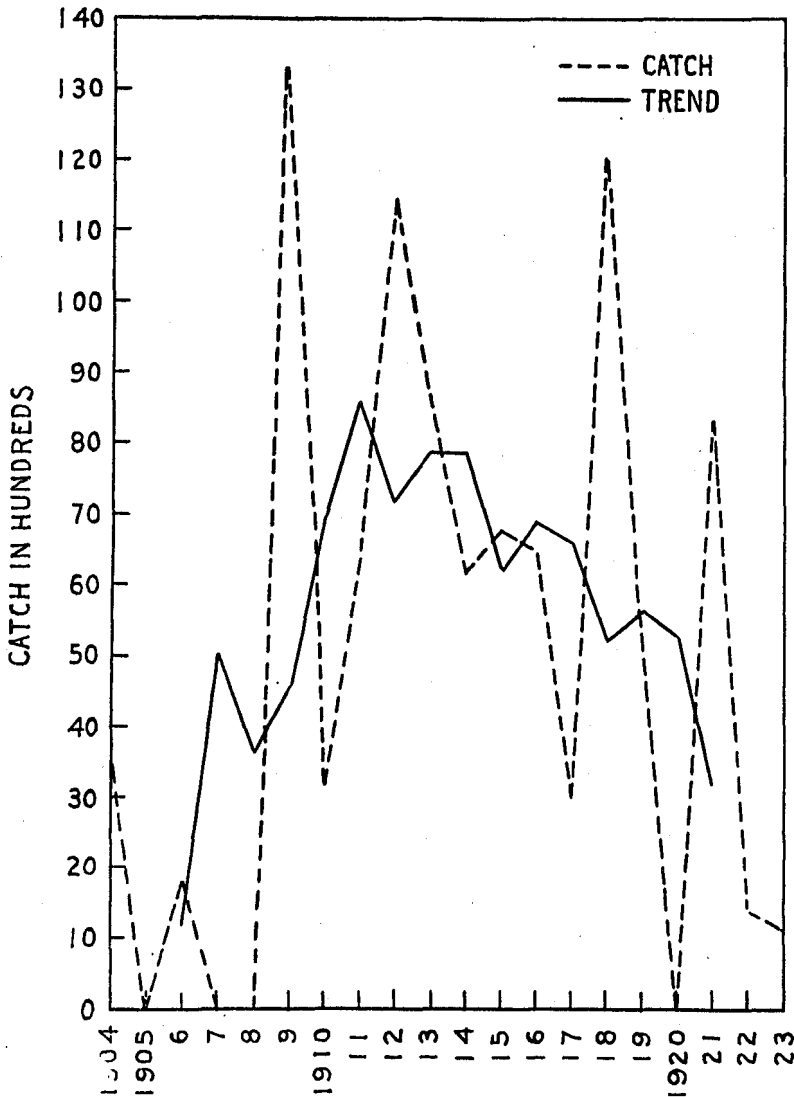


FIGURE 6.—Catch of red salmon at Miners River

sound. Apparently none was taken in 1918. In 1919, the catch in round figures was 6,500 chums, 7,800 pinks, and 3,200 reds. No catches were shown in 1920 and 1921 although a cannery was built and operated there in 1920. All catches by this company were reported, however, as merely coming from Prince William Sound. In the remaining six years, 1922 to 1927, the record appears to be complete, showing a large production of pinks, fair catches of chums in some years, and small yields of reds, cohos, and kings. Remarkable gains were made in the catch of pinks in the

even years from 1922 to 1926. Beginning with 104,140 in 1922 it rose in four years to the unparalleled total of 1,435,875 and made Unakwik Inlet one of the most productive localities of the sound. Even in the odd years, extraordinary gains were recorded as shown by a comparison of the catch of 88,134 in 1923 with that of 392,652 in 1927, emphasizing again the tendency toward equalization of pink-salmon runs in all years. No evidence of depletion is observed in this locality.

Wells Bay.—These data include a small catch made in 1927 at Fairmont. Situated just east of Unakwik Inlet and approached through the same entrance as the inlet, it might be supposed that, other things being equal, the runs of salmon to both localities would show no conspicuous differences in development, or that the locality which showed the larger catch when exploitation began in 1917 would continue to be the better field through succeeding years unless it had been overfished and the runs depleted. This however, has not been the case. When fishing began in this district, Wells Bay produced 15 times as many salmon as Unakwik Inlet, but in 1926, the year of exceptional runs on the sound, the inlet produced 54 times as many as the bay. From 1917 to 1924, the catch of both pinks and chums dropped with startling abruptness and then increased in 1925 only to be followed by another decline in the next two years. On the basis of available data, it may be assumed that the runs of both species at Wells Bay are seriously depleted. Other salmon have not been taken at this locality since 1922.

Disregarding the individual localities and considering Unakwik Inlet as a district, it would seem that, in so far as pinks and chums are concerned, conditions are satisfactory, and that reds are barely maintaining an even trend. Yet an examination of the data independently for each of the five localities leads clearly to the conclusion that the runs to Cedar Bay, Miners River, and Wells Bay are reduced to the danger point. The seriousness of the situation at Miners River was recognized in 1924. Immediately after the passage of the act of 1924 for the protection of the fisheries of Alaska, fishing in the vicinity of this stream was considerably restricted to give the red-salmon runs of that region a chance to rebuild themselves naturally.

GLACIER ISLAND DISTRICT

This district covers the coastal waters of the sound from Granite Point on the west to Point Freemantle on the east, including Glacier Island. Occasional catches were made outside of Long Bay which really harbors the only commercially valuable fishery of the district, but for purposes of this review, Billys Hole is considered separately because of its early exploitation. The unallocated catch in this district includes catches from Columbia Bay in 1917, from Granite Cove in 1922, and from Johnson Cove, probably intended for Jackson Cove, in 1927.

Billys Hole.—One of the oldest known red-salmon streams of the sound enters Long Bay from a small indentation on the west shore named Billys Hole. This place was fished as early as Miners River and Eshamy Creek, and before 1897 was rated as producing annually about 20,000 red salmon. No data are obtainable, however, showing the catches of salmon at Billys Hole until 1904. In that year, 3,000 reds were taken. In 1905, 1907, and 1908, catches were unallocated, but on the basis of its reputed value in 1897, it is probable that approximately 5,000 fish were caught in each of those years. An increasing yield from then until 1915 culminated in a catch of 15,775 in that year which marked the crest of a wave of production that then receded through successive years to 1924. The peak production of pinks was reached in 1917, that of chums in 1918, but thereafter the catch of both species followed the

decline of the reds. Billys Hole was closed to salmon fishing in 1924 and has remained closed ever since. The effect of this can not yet be ascertained.

Long Bay.—Records indicate that Long Bay, as distinguished from Billys Hole, was first fished in 1917 when 2,500 pink salmon, only, were taken. Fishing was not resumed until 1922, in which year a comparatively large number of pinks and a few thousand reds and chums were caught. In the next two years the catch of pinks and chums declined, while that of reds increased slightly. In 1925, reds declined but pinks and chums advanced. The catch of pinks was still larger in 1926, yet not equal to the catch of 1922. Reds and chums fell off. The catch of pinks in 1927 declined approximately 59 per cent which probably represented at that time the normal difference in runs of that species for even and odd years. More chums were taken than ever before, and the catch of reds again approached 3,000.

TOTAL, WESTERN PART

The development of the salmon fisheries in the western part of Prince William Sound was rapid. In a very few years after exploitation first began the district became an important producer, especially of pink salmon. This development is graphically shown in Table 5.

The general trend of the red-salmon catch has been downward since 1919; and yet at the end of 24 years of continuous fishing, the catches are approximately as great as during the early history of the fishery in spite of all the laws and regulations that have since been applied. Although some localities show reduced catches, others made larger yields and thus a general balance was maintained in that region. No material increase in the production of red salmon may be expected in this section as the streams used by this species are small, comparatively few, and largely of glacial origin, with low temperatures and probable limited capacity for the maintenance of the young salmon. Most of the streams of Prince William Sound are not lake fed, are relatively short, and produce chiefly the cheaper grades of salmon.

The pack of pink salmon has increased rapidly and steadily since the first catch was made in 1912. The abundance of pinks in this area was not even remotely realized until after several canneries were opened and commenced the regular exploitation of this fishery. The trend of the catch in both even and odd years ascended rapidly throughout the period covered by this report with the exception of a slight retardation during 1921 to 1923. There appears to be no indication of a diminishing supply of pinks.

Kings and cohos constitute minor fisheries of little value, though 1919 and 1920 show an unusual production of kings never approached before or since, and not explainable in the light of present data.

The catch of chums since 1916, the year in which that species was first reported, shows wide fluctuations, reaching its highest level in 1918 and its lowest in 1922, excepting 1921, when for economic reasons practically no fishing was carried on. Successively larger catches were noted in the next three years, 1923 to 1925, and since then remained fairly uniform. However, chums in the western part of the sound are not considered of great value and are taken chiefly incidental to other fishing operations.

TABLE 5.—Graphic table showing the catch of salmon in the western part of Prince William Sound, 1904–1927

[Each letter represents the following number of fish: Reds, 10,000; kings, 1,000; pinks, 200,000; chums, 10,000; and cohos, 10,000]

Year	Kings	Pinks	Cohos
1904	m		
1905			
1906			
1907			
1908			
1909			
1910			
1911			
1912		m	m
1913	m	m	m
1914		m	m
1915		m	m
1916	m	mm	
1917	m	mmmm	m
1918	m	mmmmMmm	mm
1919	mmmmMm	mm	mm
1920	mmmmM	mmmmMmmmmMmmmm	mmmmMm
1921		m	m
1922	m	mmmmMmm	m
1923	m	mmmmMm	m
1924	mm	mmmmMmmmmMmmmmMmmmmMm	mmmm
1925	mm	mmmmMmmmmM	mmmmM
1926	mm	mmmmMmmmmMmmmmMmmmmMmmmmMmm	mmmm
1927	mm	mmmmMmmmmMmmmmMm	mmmmMm

Year	Reds	Chums
1904	mmmmMmmmmMm	
1905	mmmmMmmmmM	
1906	mmmmMmm	
1907	mm	
1908	mmmmMmmmmMm	
1909	mmmmMmmmmMmmmmMm	
1910	mmmmMmm	
1911	mmmm	
1912	mmmmM	
1913	mmmmMmm	
1914	mmmmMmm	
1915	mmmmMm	
1916	mmmmMm	m
1917	mmmmMmmmmMmmmmMmmmm	mmmmMmmmmMmm
1918	mmmmMmmmmMmmmmMmmmmMm	mmmmMmmmmMmmmmMmmmmMmmmm
1919	mmmmMmmmmMmm	mmmmMmmmmMmmmmMm
1920	mmmmMmm	mmmmMmmmm
1921	mmmmMmm	m
1922	mmmmMmmmmMmm	mm
1923	mmmmMmmmmMmmmm	mmmm
1924	mmmmMm	mmmmMmm
1925	mmmmMmm	mmmmMmmmmMmmmmMmmmm
1926	mmmmMmmmmMmm	mmmmMmmmmMmmmmMmm
1927	mmmmMmmmmM	mmmmMmmmmMmmmmMmm

EASTERN PART

For purposes of this review the eastern part of Prince William Sound is divided into four districts, each composed of several localities which have produced large numbers of salmon. The line which separates the eastern part from the western part extends from Point Freemantle to Montague Point, the northern extremity of Montague Island.

VALDEZ ARM DISTRICT

The Valdez Arm district extends from Point Freemantle on the west to Bidarka Point on the east, including Bligh Island. It embraces eight localities in which several thousand salmon have been produced over a period of years, and it holds second place in salmon production among the districts of the eastern part of the sound.

The following combinations of catches have been made: Valdez Arm includes small catches reported from Ellamar Bay in 1917, 1925, and 1927; catches from Lowe River in 1917 and from Robe Lake in 1917 and 1918 are added to those from Port Valdez.

Bligh Island.—Fairly large catches of all species of salmon were made at Bligh Island by traps in 1926 and 1927, but the data cover only two years and therefore afford no basis for analysis. Five times as many salmon were taken in 1926 as in 1927, thus showing a greater disparity in the catches for these two years than was noted in several of the western localities. This striking difference applies more particularly to pinks than to the other species.

Galena Bay.—This bay is a tributary of Valdez Arm, indenting the eastern shore of the mainland, and is fed by several small streams. Its fisheries are mainly pink and chum salmon, but occasional catches of the other species have been made. The record shows that fishing began here in 1917 and was continued through 1927, with the exception of 1921 and 1922. The catch of pinks was good in 1917, contrary to the rule that usually applies in odd years; in fact this catch has been exceeded only twice, and more interesting still, it represented 68 per cent of the entire production of pinks in the Valdez Arm district in that year. In general, however, the better runs occurred regularly in the even years although after 1923 the runs in the odd years perceptibly improved. Chum-salmon catches show an early peak in 1918 with reduced catches in subsequent years including 1921, 1922, and 1923. After this, catches increased to a high level in 1925, since when they have again dropped.

Jack Bay.—Jack Bay indents the eastern shore of Valdez Arm near Valdez Narrows. It was fished from 1917 to 1927, inclusive, with the exception of 1921 and 1922, the general history of the fishery being similar to that of Galena Bay. A very few red salmon were caught every year except 1923; kings were taken in one year, and cohos in three years. The catch of chums fluctuated considerably, reaching its lowest level in 1923 and its highest in 1927, which was slightly above the level of 1926. The catch of pinks has fluctuated widely. No catches were reported in 1921 and 1922, but after this interruption the catch has increased rapidly in both even and odd years. Nothing suggestive of depletion of pinks and chums at Jack Bay can be seen in the data here considered.

Lowe Point.—In 1920 a trap was located at this point on the north shore of Port Valdez east of Shoup Bay. It made a fairly large catch of pink salmon and smaller catches of the other species. The location was not used again until 1927, but the results were very different, as only a few thousand salmon were taken. These data are kept separate for future use, although at present they have no significance.

Potato Point.—This point, also the site of a fish trap, is located on the western shore of Valdez Narrows. Good catches of salmon have been made here. Except in 1921, when the trap probably was not driven, there should be an unbroken record of catches from 1920 to 1927, as operation of the trap was not prohibited in any of those years. The record is confused, however, for the reason that in some seasons the catch was reported as coming from Valdez Bay, or Port Valdez, instead of Potato Point, thus leaving no adequate data for analysis through a period of consecutive years.

Sawmill Bay.—A few miles west of Valdez Narrows on the northern shore of Valdez Arm is a small indentation known as Sawmill Bay. A seine fishery has been conducted there since 1917, with the exception of two years, 1921 and 1922, as noted in respect to several other localities. Scattered catches of coho, king, and red salmon

were made, but chums and pinks were taken in fair quantities. A trap operated at the mouth of the bay probably accounts for the better catch in 1920 and in subsequent years. During the earlier years of its operation, the trap was driven directly in the entrance of the bay, but in later years was moved to a point north of the entrance, and doubtless has taken salmon which were not strictly Sawmill Bay fish. Accepting the data as given and disregarding the years of 1921 to 1923 when the fishing effort was reduced, it is found that the catch of chums has declined markedly and gives rather positive evidence of a depleted fishery at Sawmill Bay. The pink-salmon catch fluctuated widely between 1920 and 1927, reaching the lowest level in 1924, a year that shows large production in other localities of the sound. It improved, however, in the next three years—a fact which indicates that the early apparent reduction in catch was not due to depletion but either to faulty data or variations in fishing intensity of which there is no record.

Valdez Arm.—Before 1923, comparatively few salmon were taken directly in Valdez Arm. Fishing was confined largely to the smaller bays. However, as traps came into general use, locations were established in the more open waters and profitably operated. Due to this change in the character of fishing and the probable incorrect allocation of catches, fairly large numbers of pinks were reported from the arm in 1924 and 1926, while the catch in 1925 was a complete failure. The trend of the pink-salmon catches in Valdez Arm proper seems to be downward, especially in the even years when the runs were universally heavy. On the other hand, chums were taken in larger numbers than ever before, and, though the catches were small by comparison, they show a steady upward trend, except for the poor catch recorded for 1925. The best catch of reds was made in 1920, the poorest in 1927. Kings are rarely taken in any number, while the catch of cohos was extremely variable.

Port Valdez.—The upper part of Valdez Arm, inside Valdez Narrows, is Port Valdez. At its head are several streams, all fed at least in part by glaciers. Robe River, the outlet of Robe Lake, carries less glacier water than the others and may be considered as the only tributary of the port that supports a run of red salmon. Although reds have been in general more abundant than any other species, the catch has declined quite steadily from 1917 to 1927. In 1924, the largest catch of pink and chum salmon ever made in Port Valdez was reported, due perhaps to the inclusion of the catch of the trap at Potato Point. This record year was followed by three years of poor catches. In general it is apparent that the catch of all species in Port Valdez was rapidly declining during the years just preceding 1927—the last year considered in this report.

Table 6 shows in graphic form the catch of the salmon fisheries of the Valdez Arm district. The curves for both cohos and chums are very similar, showing good catches during the early and late years with a period of poor catches between. So far as these data indicate, the productivity of the coho and chum fisheries of this district may be viewed with uncertainty in the next few years. The red-salmon fishery, centered mainly in Port Valdez, is undoubtedly failing. The supply of pinks alone appears to be unaffected, the catches becoming better in the odd years as well as in the even. King salmon do not constitute an important fishery, the largest catch being only 451 in 1923.

TABLE 6.—Graphic table showing the catch of salmon in the Valdez Arm district of Prince William Sound 1917-1927

[Each letter represents the following number of fish: Reds, 2,000; pinks, 50,000; chums, 10,000; cohos, 1,000]

Year	Reds	Pinks
1917.....	mmmmMmmmmM	mmmmMm
1918.....	mmmmMmmmmM	mmmmM
1919.....	mmmmMmmmmM	mm
1920.....	mmmmMmmmm	mmmmMmmmmMmm
1921.....	mmmmMmmmm	mmmmM
1922.....	mmmmMmmmm	mmmm
1923.....	mmmmMmmmmMm	mmmmMmmmmMmmmmMmmmmMm
1924.....	mmmmMmm	mmmmMm
1925.....	mmmmMmm	mmmmMm
1926.....	mmmmMmm	mmmmMmmmmMmmmmMmmmmMmmmmMmm
1927.....	mmmmMm	mmmmMmm

Year	Chums	Cohos
1917.....	mmmmMm	mmmmMmmmmMm
1918.....	mmmmMmmmmMmmmmMmmmmM	mmmmMmmmmMmmmmMm
1919.....	mmmmMmmmm	mmmmMmmmmMm
1920.....	mmmmM	mm
1921.....	m	mmmm
1922.....	mm	mm
1923.....	mm	m
1924.....	mmmmMmm	mm
1925.....	mmmmMmmmmMmmmmMm	mmmmMmm
1926.....	mmmmMmmmmMmmmmMm	mmmmM
1927.....	mmmmMmmmmMmm	mmmm

PORT FIDALGO DISTRICT

This district covers the fisheries of the east coast of the sound from Bidarka Point southward to a point on the mainland approximately 1 mile north of Knowles Head, including Goose Island. Six localities are listed separately in this district in addition to Port Fidalgo itself.

Bidarka Point.—This point on the north side of the entrance to Port Fidalgo was occupied by a trap in 1919 and 1920 and again from 1925 to 1927, inclusive. The break in continuity of operations, covering a period of four years, 1921 to 1924, makes any attempt at analysis impossible. It appears probable from these meager statistics that relatively large numbers of pink salmon pass this point as the catch in 1926 was 221,361, and the catch in 1927 was also comparatively good. Fewer reds were taken in each successive year, chums fell off 50 per cent in two years, while the unimportant catch of cohos and kings was variable.

Port Fidalgo.—These data include catches reported from Boulder Bay in 1918 and 1925; from Goose Island in 1919, 1925, and 1927; from Landlocked Bay in 1917, 1918, 1919, 1925, and 1926; from Two Moon Bay in 1917 and 1918; and from Snug Corner Cove, which in turn includes Anchor Cove, in 1917 and 1927.

In the records of fishing in Prince William Sound from 1913 to 1927 are found many catches of salmon that were reported as coming from Port Fidalgo without reference to a stream or tributary bay. Part of these catches are accounted for in the operation of traps between Two Moon Bay and Snug Corner Cove and at the point on the east side of the entrance to Landlocked Bay. Some years were apparently good, others were poor. After 1924, fishing in Port Fidalgo was materially restricted by regulation, yet two of the largest catches in that locality were reported in 1926 and 1927, indicating that these fisheries have undergone no unfavorable change in a decade or more. The catches consist largely of pinks and chums with cohos next in importance and reds and kings negligible.

Fish Bay.—This small bay on the north side of Port Fidalgo has produced pink and chum salmon almost exclusively. The first pinks were taken in 1914, and catches were made in all succeeding years except 1916, 1920, and 1927. The catch was maintained at a fairly high level until 1919 when it suddenly dropped, due perhaps to economic conditions rather than biological causes. In 1923, it again reached a level comparable to that of preceding good years only to fall in 1924 to another extremely low figure, the reverse of conditions elsewhere in the sound where pink salmon are more abundant in even than in odd years. Another high point in production in 1925 was followed by a decline in 1926, yet the total for that year had been exceeded but twice in even years in this locality, 1914 and 1918. The catch in 1927 was again poor, only 1,374 pinks being taken. Chums were taken in increasing numbers from 1923 to 1925 but have since fallen off materially, due, perhaps, to an actual scarcity of fish rather than a change in the intensity of fishing. The catch of other species was too negligible for consideration.

Irish Cove.—Irish Cove is a small indentation on the south side of Port Fidalgo. It was fished intermittently from 1915 to 1923, producing at most a few thousand pink salmon. Since then no pinks have been caught in this locality. Cohos were taken in only three years, 1925 to 1927, the catch, though small, being progressively better in those years. The complete change of the fishery from pinks to cohos can not be explained at this time.

Porcupine Point.—This point marks the south side of the entrance to Port Fidalgo. In 1918, a trap was located there and made a catch of 217,026 salmon, predominantly pinks, though other species were rather evenly represented in proportion to the probable strength of the salmon runs to Prince William Sound. The suspension of operations from 1921 to 1923, inclusive, breaks the record of production, yet, upon resumption of fishing in 1924, little change in the fishery was evident as the total catch was 217,398, practically the same as was made six years earlier. The proportions were changed slightly as pinks had increased while the other species had declined. Because of the rather even catch by cycles, it is interesting to compare the totals for other years. The catch of all species in 1926 was 255,582, which is 38,184 more than that of 1924 when it was 217,398. In 1925, the total catch was 134,111 as against 135,737 in 1927—a difference of 1,626 in favor of the later year. A high degree of correlation at 2-year intervals is apparent in the catches for the last four years. The trend of the catch of both pinks and chums is apparently upward.

Sunny Bay.—This bay indents the north shore of Port Fidalgo between $146^{\circ} 10'$ and $146^{\circ} 20'$ west longitude. According to U. S. Coast and Geodetic Survey Chart No. 8550, it is unnamed, but locally it is known as Sunny Bay. Catch data are available for four years, 1919 and from 1923 to 1925, inclusive, showing that chums and pinks are the important species, with chums predominating. The total yield of all species for 1925 was 47,446, of which 63 per cent were chums, 36 per cent pinks, and 1 per cent cohos and reds. Fishing was not permitted in this bay at any time in 1926, and not after July 11 in 1927. Since it was primarily a chum-salmon district with a late run of fish, the close season became effective before any fishing could be done.

Whalen Bay.—On the southern shore of Port Fidalgo directly south of Sunny Bay is a short indentation known as Whalen Bay. Records show that it was fished 9 years in two periods of 4 and 5 years, respectively. The first period began in 1915 and ended in 1919 with no catch reported in 1916; the second, from 1923 to 1927. The catch consisted almost entirely of pinks and chums, fluctuating widely for both

species. The reduced yield in 1926 and 1927 presumably resulted from the closing order referred to in the discussion of Sunny Bay.

Viewing the Port Fidalgo district as a unit, it is obvious that pink salmon constitute its most valuable fishery resource. Other species are taken, chums leading but far below the level of the pinks. Table 7 gives a graphic picture of the salmon catches of the district down to 1927. The interesting feature is the upward trend in recent years for all species, particularly pinks. The small catch in 1922, following a year of no fishing, and the upset condition of trade in the salmon market from 1920 to 1924 were undoubtedly the causes of the reduced production for a few years beginning in 1919. It does not reflect the condition of the fisheries at the time but rather shows a material slackening of the fishing effort in that period to which may be due the larger runs of subsequent years.

TABLE 7.—Graphic table showing the catch of salmon in the Port Fidalgo district of Prince William Sound, 1913-1927

[Each letter represents the following number of fish: Reds, 1,000; pinks, 50,000; chums, 20,000; and cohos, 2,000]

Year	Reds	Pinks	Chums	Cohos
1913.....		mmmm		
1914.....		mmmm		
1915.....		mm		mmmm
1916.....		mm		
1917.....	m	mmmmM	mmmm	mm
1918.....	mmmmMmm	mmmmMmmmmMmm	mmmmMmmmmM	mmmmMm
1919.....	mmmm	mm	mmmm	mmmmMm
1920.....	mmmmMmmmm	mmmmM	mm	mm
1921.....				
1922.....		m		
1923.....	m	mmmm	m	
1924.....	mm	mmmmM	mmmmMm	mmm
1925.....	mmmmMm	mmmmMmm	mmmmMm	mmmmMm
1926.....	mmmmM	mmmmMmmmmMmmmmMmmmm	mmmm	mmmm
1927.....	mmmmM	mmmmMmmmm	mmmm	mmmmMmmmm

PORT GRAVINA AND ORCA BAY DISTRICT

This district includes all waters of the sound within a line from the southern boundary of Port Fidalgo district, described above, to a point 1 mile north of Shelter Bay on the west coast of Hinchinbrook Island, thence across the island to Point Steele on the east coast, and thence to Point Whitshed. Port Gravina and Orca Bay with their tributaries are by far the largest producers of pink, chum, and coho salmon of all the districts of Prince William Sound. Sixteen localities of recognized importance are found in the district. The following combinations were made in preparing the tables: Orca Bay includes catches reported from Orca Inlet in 1925, 1926, and 1927; from Government Rock in 1924, from Hinchinbrook Island in 1917, 1926, and 1927; from Hawkins Island in 1912 and 1916; from Nelsons Lagoon in 1917; and from Sheep Point in 1925. Port Gravina includes catches reported from Hell Fire Creek in 1914; from Bear Cove in 1915; from Toms Bay in 1914, 1915, and 1916; from Comfort Cove in 1915, 1917, and 1918; from Gravina Island in 1918; from Hells Hole in 1917 and 1918; from Devils Cove in 1918; from Tom Thumb Bay in 1918; and from Red Head in 1927. Anderson Bay includes a catch from Big Fred Bay in 1917; Simpson Bay, a catch from Bomb Point in 1927; and St. Matthew Bay, catches from Black Bay in 1915, 1916, 1918, and 1922.

Anderson Bay.—Two bays indent the north coast of Hinchinbrook Island, the westernmost being Anderson Bay. Pink salmon only were taken here in 1917, the year fishing began, but in 1918 all species except kings were taken, although there

was little difference in the total number of salmon caught. That marked the end of fishing until 1923, when the total catch was 2,784 pinks and chums. In 1924, however, the catch jumped to 228,777 pinks, 26,470 chums, and a few reds and cohos. The catch fell off again in 1925, increased again in 1926, and went still higher in 1927, yet did not even then equal the total of 1924, though the number of chums and cohos was larger than in any other year. Special mention should be made of the unusual catch of cohos in 1927, when 41,722 were reported by a single company. This catch was larger by several thousand than that of any other locality of the sound in any year and is wholly at variance with all earlier records, as the entire catch of cohos in Anderson Bay from 1917 to 1926, inclusive, was only 17. If this catch was correctly reported, it was made by a trap on the north shore of Hinchinbrook Island outside of Anderson Bay and came from the runs of cohos to the streams of the mainland on the north side of Orca Bay, or to Copper River. It is probable that this trap was operated later in the year than others in the same locality. Reds and kings have not been taken in appreciable numbers.

Bear Trap Bay.—This bay is a small indentation on the eastern shore near the head of Port Gravina. Data for six years show that the first catch was made here in 1915 and consisted of 13,725 pink salmon. In 1917 the bay was again fished and produced 22,439 salmon, of which 20,000 were pinks. It was then abandoned until 1923, but the catch in that year was barely 2,000 pinks and chums. No catch was reported in 1924. From 1925 to 1927, fishing was carried on each year with wide fluctuations in catch. The stream near the entrance of the bay is blocked 600 feet above its mouth by a high falls; and the streams at the head of the bay are short and extremely precipitous, providing only a small area for spawning. In the nature of things, Bear Trap Bay is not likely ever to be a large producer of salmon.

Canoe Passage.—Canoe Passage is a narrow, shallow waterway dividing Hawkins Island into two almost equal parts. Salmon in small numbers may use streams tributary to the passage, but in all probability the greater part of the catch from this locality was taken at the Orca entrance from runs passing along the coast to streams of the mainland. Pinks and chums and a few reds were caught here, the largest catch being 120,863 in 1926, almost five times as many as were captured in any other year. The passage gives no promise of developing a larger fishery than now exists.

Double Bay.—This name is frequently applied to two bays which indent the north shore of Hinchinbrook Island, but in this review it designates the easternmost bay between Hawkins Cut-off and Johnstone Point, the western one being Anderson Bay. Data are few and represent small catches for three years only, 1925 to 1927. Pinks and chums were taken, the best year being 1926.

Gravina Point.—Gravina Point is the end of the peninsula between Port Gravina and Orca Bay. Except in 1921 and 1923, catches were reported from this locality from 1918 through 1926. The largest catch of pink salmon at any locality in Prince William Sound, except Unakwik Inlet, was made at Gravina Point in 1924, nearly 900,000 being taken. Before that year catches were comparatively small and were composed

largely of pink salmon, although the other species were represented in most years. Traps accounted for practically the entire catch at Gravina Point which is merely a section of the coast where the runs, in good years, approach the shore in greater numbers than elsewhere. Certainly the presence of large numbers of salmon at this point is not induced by streams in the immediate locality, for there is none suitable for the use of spawning salmon. The obvious explanation is that salmon follow a migration route which brings them to the shore here and traps effectually intercept their passage, whether into Port Gravina or Orca Bay.

Hawkins Cut-off.—Hawkins Cut-off is the passage which separates Hawkins Island from Hinchinbrook Island. Several small salmon streams flow into it which in the aggregate support fair runs of pink and chum salmon while cohos are fairly numerous. Reds and kings are taken in negligible quantities. The Cut-off may also be a passageway for salmon entering the sound. Disregarding the insignificant catch of reds and kings in 1917, fishing in the Cut-off began in earnest in 1918 and resulted in a catch of 227,000 pinks, 35,000 chums, and 1,000 cohos. Thereafter, until 1924, considerable variation in the catch was noted from year to year, while in two years, 1921 and 1923, there was no catch at all. Fishing improved materially from 1925 to 1927 for pinks, chums, and cohos and with no indication of depletion of the runs.

Johnstone Point.—This point is on the northern shore of Hinchinbrook Island. If available data are reliable, fishing was carried on there irregularly from 1917 to 1922, the catch consisting largely of pink salmon. In 1924, after the new law became effective and a more exact allocation of catches was required, a decided change in the catches referred to this fishery was observed. In 1922, the last preceding year, the entire catch at this point was reported as 6,072 pink salmon; but the catch in 1924 was 394,431 pinks and 12,304 chums, and from then on the records are quite complete, showing large catches for each season through 1927 and a marked upward trend in respect to pink salmon especially.

Knowles Head.—The southern extremity of the peninsula between Port Fidalgo and Port Gravina is known as Knowles Head. The first catch of salmon was made at this point in 1918; though small, it was composed of all species, reds constituting about two-thirds of the total number. In 1919 a trap was driven at the point, making a much larger catch, with pinks predominating. Fishing was continued each year thereafter through 1927, except 1921. Catches of all species, except kings, were consistently good without conspicuous evidence of a falling trend. This is probably due to the fact that Knowles Head is a point where the runs of salmon seem to strike the shore before they are dispersed to the several streams of the eastern part of the sound. For that reason the catches at Knowles Head may continue to be relatively large unless there is a general failure of the runs.

Makaka Point.—This point is on the north coast of Hawkins Island near the north entrance of Hawkins Cut-off. It was fished in 1915, but the catches in that year, and in 1917 and 1918 when it was again fished, were small. For five years, 1919 to 1923, no fish were reported from this locality. Beginning in 1924 and continuing through 1927, better catches, mainly pinks, were made with the totals for 1927, an odd year, far in excess of those for any other season. Pink-salmon catches have increased rapidly in the latter years, indicating a change in the method of the fishery (or possibly in the movement of salmon). Such a marked increase was not shown at any other locality in the Port Gravina and Orca Bay district and its real significance is not known at this time.

Olsen Bay.—Olsen Bay is a small indentation on the north side of Port Gravina. Fishing for pink and chum salmon was probably begun here as early as at several other localities in the eastern part of Prince William Sound, but no separate record of catches was kept until 1918. In that year 28,132 chums and 79,341 pinks were caught. The catch was small in 1919 and there is no record at all of catches made during the next three years. From 1923 to 1927 data are available for each year, showing that the production of pinks in the odd years declined sharply while little change was noted in the even years. Chums were taken in larger numbers in 1925 than before or since, but the data are insufficient to warrant a conclusion in respect to the condition of this fishery. Other species are taken in such limited quantities as to be commercially valueless.

Orca Bay.—In area Orca Bay is the largest indentation on the east side of Prince William Sound. Little fishing was carried on directly in the bay which could not be or was not allocated to more localized waters; but in some years, especially in 1916 and 1926, rather large catches were reported only as coming from Orca Bay. However the records are seriously broken by gaps of from one to seven years, thus giving no data by consecutive years for analysis.

Port Gravina.—Port Gravina is the next bay north of Orca Bay. It has five small tributary bays and in addition is fed by one stream of fair size, entering at the head of the bay. Port Gravina was one of the first districts in the sound to be exploited, owing to the proximity of the canneries at Cordova, and operations have been much more continuous here than in many other localities. The catch consisted largely of pink salmon, although cohos and chums were taken in fair quantities. Wide fluctuations in the catch of pinks are apparent, some of which can be traced to economic conditions while others were doubtless due to biological causes as evidenced by the poor runs in certain years. More coho salmon were taken in 1927 than ever before; the catch of chums in the same year had been exceeded but twice, and then only in the years when fishing was most intense. The catch of pinks in 1927 was likewise better than in any other odd years except 1907, 1913, and 1915. As a producer of pinks, cohos, and chums Port Gravina seems to have maintained a good record and shows no indication that the runs have been impaired.

Sheep Bay.—Sheep Bay, the largest arm of Orca Bay, produces principally pinks and chums although there have been small scattered catches of all other species. It was fished each year from 1910 to 1927 except two—1919 and 1921. In the earlier years the catch of pinks varied markedly, irrespective of odd or even years, but since 1922 it has reached and held a much higher level, with 1927 showing not alone the largest production of pinks but also the greatest number of cohos and chums ever taken from that locality. The trend of the catch for these species is distinctly upward.

Simpson Bay.—Simpson Bay, also an arm of Orca Bay, is divided into two arms, the eastern one being the preferred seining ground. Fishing was apparently spasmodic until 1923, although the largest catch in this bay was reported in 1907. In the five years from 1923 to 1927 the catch of pink salmon twice exceeded 100,000, but in 1925 it was less than 10,000. The catches of chums and cohos during this period have also increased. Reds are taken in very limited numbers and kings not at all. The data indicate a marked increase in the intensity of fishing in recent years but so far without depletion.

St. Matthew Bay.—This bay is the largest arm on the north side of Port Gravina. From 1915, the year in which the first catch was reported from this place, until 1927, a period of 13 years, catch records are lacking for four years. No catch from this bay was reported for 1926 which was the banner year in practically all other localities of the sound. This lack is undoubtedly due to faulty data since 486,984 pink salmon were taken in 1924 in St. Matthew Bay. It is probable that salmon caught in this locality were credited either to Port Gravina, Orca Bay, or to Prince William Sound indiscriminately. As noted elsewhere the pink-salmon fishery is appreciably improving in the odd years. Data for other species are not sufficient to warrant detailed consideration

Windy Bay.—Windy Bay indents the north shore of Hawkins Island just east of the one hundred and forty-sixth meridian of west longitude. Available statistics show that fishing began here in 1910 and was carried on irregularly through 1927. Red and coho salmon were taken infrequently; chums were obtained to the extent of a few thousand in 1918 and again from 1924 to 1927, inclusive; and pinks in each year shown. The pink-salmon fishery is therefore the only commercially important one at Windy Bay. The catch has fluctuated some but after 18 years is apparently at almost the same level that was reached in 1910. No evidence of depletion is apparent.

TABLE 8.—Graphic table showing the catch of red, pink, chum, and coho salmon in the Port Gravina and Orca Bay district, 1904–1927

[Each letter represents the following number of fish: Reds, 1,000; pinks, 100,000; chums, 10,000; and cohos, 5,000]

Year	Reds	Pinks
1904.....		m
1905.....		
1906.....		
1907.....		mmmm
1908.....		m
1909.....		
1910.....		mm
1911.....		mm
1912.....	mm	mmmm
1913.....	m	mmmm
1914.....		m
1915.....	m	mmmm
1916.....		mmmmMmm
1917.....	mmmm	mm
1918.....	mmmmMmmmmMmm	mmmmMmmmm
1919.....	mmmmMm	mm
1920.....	mmmmMmmmmMmm	mmmm
1921.....		
1922.....	mmmmMm	mmmmMmm
1923.....	mmmmMmmmmMmm	mmmmM
1924.....	mmmmMmmmm	mmmmMmmmmMmmmmMmmmmMmmmmMmmmmM
1925.....	mmmmMmm	mmmmMmmmmMm
1926.....	mmmmMmmmmMmmmmMmmmm	mmmmMmmmmMmmmmMmmmmMmmmm
1927.....	mmmmMmmmm	mmmmMmmmmMmmmmM

Year	Chums	Cohos
1910.....		mmmm
1911.....		mmmmM
1912.....	m	mmmm
1913.....	m	
1914.....		mmmm
1915.....	m	m
1916.....	m	
1917.....	m	mmmm
1918.....	mmmmMmmmmMmmmmMmm	mmmm
1919.....	mmmmMmmmm	mmmmM
1920.....	mmmm	mmmm
1921.....		mm
1922.....	mm	mm
1923.....	mm	mm
1924.....	mmmmMmmmmMmmmm	mmmmMm
1925.....	mmmmMmmmmMmmmmMm	mmmm
1926.....	mmmmMmmmmMmm	mmmm
1927.....	mmmmMmmmmMmmmmMmmmmMmm	mmmmMmmmmMmmmmMmmmm

Table 8 gives a graphic picture of the catch of cohos, chums, pinks, and reds in the Port Gravina and Orca Bay district. Kings are not shown as the catches were comparatively insignificant. The peaks in production of pinks in 1916 and 1918 are directly traceable to the opening of several new canneries at that time. The low levels of the next few years, 1919 to 1923, were caused chiefly by the lighter runs of salmon in 1919 and the overproduction in 1920, resulting in a large surplus of canned salmon and a collapse of the market for pinks. By 1923 operations were again normal. Vastly higher peaks of production than ever before attained were reached in 1924 and 1926, while in 1925 and 1927, regarded as off years, the catch was far above the peaks of 1916 and 1918. The coho and chum fisheries also show larger returns in late years and an upward trend of the catch since 1921. In general, this is true of the red-salmon fishery, the largest catch in the history of the district being made in 1926.

HINCHINBROOK ENTRANCE DISTRICT

This district covers the waters of the western coast of Hinchinbrook Island from 1 mile north of Shelter Bay to Cape Hinchinbrook and the eastern coast of Montague Island from Montague Point to Cape Cleare. It embraces five localities which are treated separately in the statistical table, but as all of them except Port Etches were fished very irregularly before 1925 the data are too few for analysis. Catch records at Port Etches, which includes Constantine Harbor, are available for 10 years, though somewhat disconnected, and include catches reported from Chiefs Bay in 1913, from Constantine Harbor in 1927, from English Bay in 1918, from Garden Cove in 1923, from Nuchek (sometimes called Nutchek) in 1914 and 1917. The record for Zaikof Bay includes a catch reported in 1917 from "Kaikoff" Bay which was probably intended for Zaikof Bay. The unallocated catches in this district include salmon reported from Bear Cape in 1918 and 1927, from Seven Sisters in 1927, and from Wahnya Bay in 1917.

The first catch recorded at Port Etches was in 1913 and consisted entirely of pink salmon; in 1914, only a few hundred cohos were taken. Nothing more was done until 1917 in which year fishing was resumed and carried on for four years without interruption. The next catch was recorded in 1923, but there is no record of a catch in 1924. From 1925 to 1927 the record appears to be complete and shows a marked increase in the catch of all species, 1927 being an exceptionally good year for pinks in spite of the fact that closed areas for a mile or more were established off the mouth of the main tributary stream of Constantine Harbor and the one at the head of Port Etches.

The other localities which form this district are: Anchor Bay, a small indentation on the west coast of Hinchinbrook Island about 3 miles north of Bear Cape; Rocky Bay and Zaikof Bay on the north end of Montague Island; and Shelter Bay on the west coast of Hinchinbrook Island. Zaikof Bay is the most important of these localities and produced a catch of nearly 150,000 pink salmon in 1926.

TOTAL, EASTERN PART

The statistical history of the eastern part of Prince William Sound, taken as a whole, goes back much farther than the history of any one of its minor localities; but the early figures can not be taken without reservation as the catches of the sound and of the Copper River were inextricably mixed in the records. Moser's reports of 1899 and 1902 and the various reports of the Treasury agents give data on these fisheries back as far as 1889. The chief fishery in those days was for the red salmon of the Copper River; but the canneries were located on the eastern edge of Prince William Sound, after the first three or four years, and it is quite apparent from an examination of the data that allocation of catches as between the two districts was by no means accurately made. The data are otherwise confused also as, for instance, in the Treasury report on the salmon fisheries in Alaska for 1896, Tingle gives statistics of the salmon pack for only one of the two canneries that were operating in the sound in that year. In these he gives the catch of cohos as 219,073, a figure which is quite beyond belief and is, furthermore, exactly the sum of the catches of pinks and cohos as given by Moser (1899, p. 30) for the same company mentioned by Tingle (the Pacific Packing Co.). It seems quite certain, therefore, that Tingle's figure for the coho catch is in error. Moser's figures are undoubtedly much better but are given in detail for only two years so that it is impossible to determine what the catches by species actually were for the period previous to 1904 when the collection of data was begun by the Bureau of Fisheries. In view of these conditions it has seemed best not to attempt any arbitrary allocation but to give the data as they stand in the old records in a separate table. Because the more important elements of the catch in those days derived from the Copper River, the table will be found in the section dealing with the fisheries of that district. In compiling this table Moser's figures have been used for the years 1896 and 1897 and those given in the Treasury reports for the other years. Although there is no way in which the recorded catches can be accurately allocated, it is probable that the pinks were secured mainly in the eastern part of the sound and that some, at least, of the cohos (if indeed the fish recorded as cohos were actually of this species) came also from this district. Some of the red salmon were doubtless taken in the western part of the sound.

The table shows clearly that this section of the sound, from 1904 to 1914, inclusive, produced little else than pink salmon and that the largest catch of this species, 573,967, was made in 1904. It also shows that no salmon were caught in this region in 1905, 1906, and 1909 due in all probability to the allocation of catches in those years to the streams of the Copper River delta. During much of this period the field was fished by a single cannery at Orca; and the fishing effort remained almost constant, to which fact is undoubtedly due the rather uniform catch for many years. The fisheries of the eastern part of Prince William Sound since 1910 are shown graphically in Table 9. In 1916, the intensity of fishing changed abruptly with the establishment of more canneries, and the catch of all species of salmon except kings surpassed all previous records—five times more pinks being taken than ever before. Chums and reds, previously taken in small numbers, showed an even higher ratio of increase. The subsequent years, 1921 alone excepted, produced generally much larger catches of all species but there appears to be no indication of any material change or prospect of change in abundance in the near future. Some localities, as has been shown above, show reduced catches, but these are more than counter-balanced by increased catches in other places. It must be borne in mind, of course,

that many of these details may be erroneous due to faulty and incomplete data. The trend of the catches in the Valdez Arm district is upward for cohos, chums, and pinks, while in the other districts, it is upward for all species. Thus at the end of 1927, the fisheries of the eastern part of Prince William Sound, taken as a whole, were apparently never in more flourishing condition, and had never reached a higher level of productivity.

TABLE 9.—Graphic table showing the catch of salmon in the eastern part of Prince William Sound, 1910-1927

[Each letter represents the following number of fish: Reds, 10,000; kings, 200; pinks, 250,000; chums, 50,000; and cohos, 10,000]

Year	Reds	Kings	Pinks
1910			m
1911			m
1912	m		mm
1913	m	mmmm	mm
1914			m
1915	m		mm
1916	mmmm		mmmmMmmmmMmm
1917	mmmm	mm	mmmmMmmmm
1918	mmmmM	mmmm	mmmmMmmmmMmm
1919	mmmm	mmmmMmmmm	mmmm
1920	mmmmMm	mmmmMmmmmMmm	mmmmMmmmmMm
1921	mm		m
1922	mmmm	mm	mmmm
1923	mmmm	mmmm	mmmmMm
1924	mmmmMmmmmMm	mm	mmmmMmmmmMmmmmMmmmm
1925	mmmm	mmmmMmmmm	mmmmMmmmm
1926	mmmm	mmmm	mmmmMmmmmMmmmmMmmmmMmmmm
1927	mmmm	mmmm	mmmmMmmmmMmm

Year	Chums	Cohos
1910		mm
1911		mmmm
1912	m	mm
1913	m	
1914		mm
1915	m	m
1916	m	mmmmM
1917	mmmmMm	mmmmM
1918	mmmmMmmmmMmmmmMmmmmMmm	mmmmMmmmm
1919	mmmmMmmmm	mmmmmmM
1920	mmmm	mmmm
1921	m	m
1922	m	m
1923	mm	mm
1924	mmmmMmm	mmmm
1925	mmmmMmmmmMmm	mmmmM
1926	mmmmMmmmm	mmmmmmM
1927	mmmmMmmmmM	mmmmMmmmmMmmmmMmmmmM

TOTAL, PRINCE WILLIAM SOUND

The unallocated catch of Prince William Sound includes salmon reported from Seward Bay in 1922; from Cape Horn in 1922 and 1923; from King Salmon Bay in 1913, 1919, and 1923; from One Bay, Port Mole, Starboard Inlet, Unimack Bay, and Yackat Bay in 1917; from Sea Bay in 1918; and from Mine Bay in 1919. None of these localities could be located.

Prince William Sound is not a large producer of red salmon. The catch of this species from 1904 to 1927 is shown graphically in Figure 7. Wide and fairly regular fluctuations in the catches from year to year are apparent in this graph, but these fluctuations are not clearly periodic. This would, of course, be expected in a district where the catches are made up of fish belonging to a number of races no one of which dominates the situation in the district as a whole. The catches in some of the localities listed in the table are not necessarily related to any particular stream as several of the localities are merely points on the shore where traps intercepted salmon bound

elsewhere. In fact, outside of Eshamy Creek, Jackpot Bay, Miners River, and Billys Hole no red salmon were taken in the western part of the sound before 1917. Between 1914 and 1917 the number of canneries increased from 1 to 9 and the fishing effort was materially augmented. This development of the fishery disclosed the presence of red salmon in places not previously known to support runs of that species. Except in Valdez Arm, however, these catches of reds were not in sufficient numbers to have much significance. Still, it must be recognized that the distribution of red salmon in the sound regardless of the character of the streams in the several localities was very general. It is also interesting to note that notwithstanding the permanent

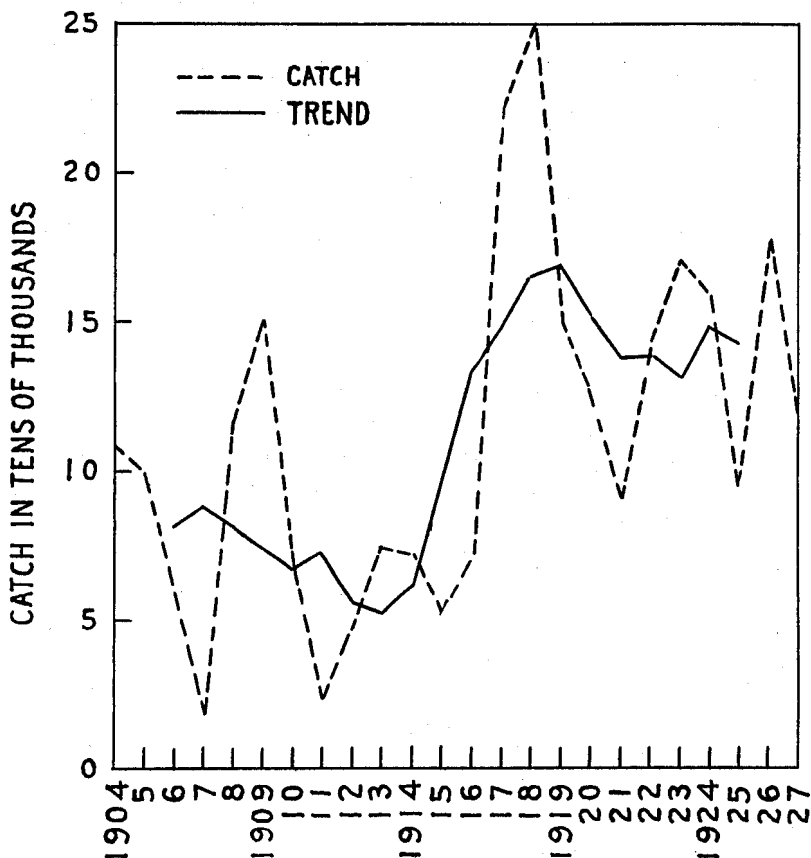


FIGURE 7.—Catch of red salmon in Prince William Sound

closing, in June, 1924, of the waters close to the better-known red-salmon streams, the average annual catch of reds in the four years from 1924 to 1927 was only about 10 per cent below the average for the eight years from 1916 to 1923.

It is also true that as the number of canneries increased the number of fishing appliances was multiplied several times. Beach seines increased from 9 in 1916 to 48 in 1917, purse seines from 21 to 49, gill nets from 19 to 69, and traps from none to 3. In the next three years progressively more appliances were put into operation, except seines which reached their maximum in 1918, until in 1920 the number of beach seines was 54, purse seines 63, gill nets 217, and traps 47. This was the period during which practically all regulations were set aside in order that large packs might be made for war-time food purposes. Intensive fishing resulted and the exploitation of the

fisheries was carried far beyond the development of earlier years. Then followed the postwar depression and the reduction of fishing activity which culminated in the practical abandonment of the fisheries in Prince William Sound in 1921 for all species except reds. With the beginning of economic readjustment in 1922, packing plants were reopened and fishing appliances again began to increase, so that by 1927, 12 canneries were packing salmon from the sound, and 6 beach seines, 95 purse seines, 8 gill nets, and 64 traps were used in making the catch. While the average catch of red salmon in the four years from 1924 to 1927 was fairly close to the average of the eight years immediately preceding, as already noted, it is undoubtedly true that the catch was maintained only by the greater fishing effort. From these facts it is quite apparent that the production of red salmon in Prince William Sound will never be large, due to the limitations of the areas available as spawning grounds, and that the yield of nearly 250,000 in 1918 probably represents the maximum productivity of reds in this district. Although the total catch figures show no marked depletion this is unquestionably due, at least in part, to the gradual spread of the fishery and consequent exploitation of new red-salmon resources. It seems probable that certain of the red-salmon runs have been depleted but that the present regulations will prevent further depletion.

The first recorded catch of pink salmon in Prince William Sound was made in 1896. Beginning then and continuing through 20 years, including 1915, the catch was very uniform, only once exceeding 500,000, while the average yield was close to 300,000. No catch at all was reported in 1905, 1906, and 1909. It is also noteworthy that before 1916 nearly the entire catch of pink salmon in this district came from the bays of the eastern part of the sound. Up to that time the rather weak market for pinks was adequately supplied by the canneries in southeastern Alaska and there was no inducement to pack them in the western districts where operating expenses were considerably higher. However, under changing conditions and the stress of war, the market for pinks was stimulated and in the next few years after 1915 the number of canneries on Prince William Sound increased rapidly, primarily to pack this heretofore neglected species. Eventually 15 canneries were operating here and the catch increased amazingly and quite steadily for 12 years; and this in a district which had been rated as exceptionally poor in salmon resources.

Pink salmon are widely distributed in the sound and enter practically every stream in the district. With few exceptions, the localities first to be fished have maintained a fairly even supply, while newer places, those that were not exploited before 1920, became, in a few seasons, the largest producers of the sound. The west coast of Montague Island is a striking illustration of this fact, as not until after 1919 were large catches reported from that shore, and they were due entirely to the operation of traps in those waters. Tagging experiments conducted in 1929⁶ indicate that salmon taken here do not come predominantly from runs destined to streams of Montague Island, but rather that Montague Strait is the favored passage through which salmon enter the sound and then disperse to all localities. No catch has ever been reported from the eastern shore of Montague Island, but the northeast coast of Montague and the western shore of Hinchinbrook Island have produced catches of salmon which presumably came from runs entering the sound through Hinchinbrook Entrance but which by no means equal the runs entering Montague Strait.

A graphic picture of the catch of pink salmon in Prince William Sound is shown in Figure 8. Since 1915, it is clear that there have been heavy runs on the even years

⁶ Thomson, loc. cit.

and smaller runs on the odd years, a phenomenon which has been observed repeatedly in other districts. Another fact of interest is that in 1921 the smallest catch of record in the sound was made, but it was not indicative of the size of the run in that year as no effort was made to take pinks owing to the depressed condition of the market from which recovery was only partial in 1922 and 1923. Disregarding these three years, the graph shows a strong upward trend of the fishery throughout the period 1915 to 1927, both good and lean years becoming steadily better. Even the odd year of 1927 was better by several hundred thousand salmon than any of the even years except 1924 and 1926. This increase in the catches of pinks in the odd year was quite

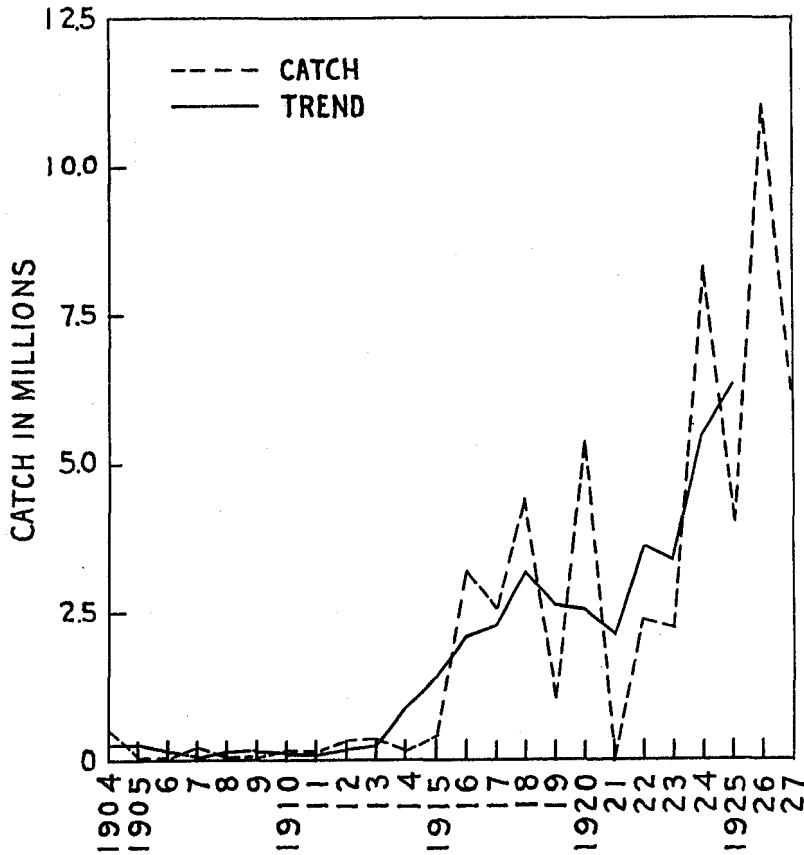


FIGURE 8.—Catch of pink salmon in Prince William Sound

general over a large part of Prince William Sound and in other districts to the westward as noted in Part II of this review. The increase in the catch in 1927 was unquestionably due to an increase in the actual abundance of fish and was thus due to biological rather than economic causes. Just what these causes were is unknown but it was suggested in Part II that they may have been associated with the unusually mild winter of 1925-26.

The coho salmon fisheries of Prince William Sound were possibly the first to be exploited, dating back to 1893, when development of the Copper River fisheries was begun. In the records from 1893 to 1900 (see table 10), it seems very probable that the reported catches of cohos in some years were composed largely of pinks. This supposition rests primarily upon the fact that from 1901 to 1909, a period of 9 years, no

cohos were reported from the sound. Casual development of the coho fishery began in 1910, as incidental to fishing for reds and pinks rather than as an independent fishery, and since then catches have been reported each year, wide fluctuations occurring at irregular intervals, indicating either poor runs, or lack of fishing effort. In 1913, 406 cohos were taken, of which 383 came from Eshamy Lagoon and the remaining 23 from Bay of Isles. This small catch is rather convincing evidence that in 1913, at least, no effort was made to take cohos anywhere in the sound, such catches as were made coming as the direct result of fishing at certain localities for reds and pinks, without any attempt to fish the runs of cohos in other localities where reds and pinks were not commercially obtainable. The real development of this fishery dates from 1916, and it gained proportionally with the increase in the number of canneries until in 1918 the catch totaled 100,247. In 1921 and 1922 catches were small, due to reduced fishing effort, but thereafter they increased rapidly and reached a total of 258,816 in 1927—the highest yield of cohos on record in the sound up to that time. In this connection it is interesting to note that the western part of the sound is in general a poor coho district; and that in the years of largest catches, traps on the west coast of Montague Island produced a large percentage of the total from that section. Seining in the bays is relatively much less productive of this species. This fact may indicate that cohos bound for streams in the eastern part of the sound enter through Montague Strait although it is possible that many are bound for Copper River and other streams in that region and have only entered Montague Strait en route. There is no evidence of depletion of the coho runs as the low production from 1921 to 1923 was certainly due not to scarcity of fish but rather to overproduction in the years just preceding.

The first reported catch of chums was made in 1912 and amounted to only a few hundred fish. The catch in the next three years was also insignificant, but in 1916 nearly 46,000 were taken. Thereafter, the catch was measured by hundreds of thousands (except in 1921 and 1922) reaching a total of 1,341,887 in 1918, while in four subsequent years it exceeded a half million fish. Roughly estimated, four-fifths of the entire chum catch came from the eastern part of the sound, though there was a far more general distribution of this species than there was of cohos. It is a fishery of comparatively recent exploitation, having been developed since 1916 along with the introduction of traps in the sound until in 1927 it ranked next to pinks in quantity of production. Chums were apparently fairly abundant in every year that a real effort has been made to catch them, and the fishery, at least through 1927, shows no sign of depletion.

COPPER RIVER

Several rivers flow into the ocean from the Pacific slope of Alaska between Point Whitshed at the eastern entrance of Prince William Sound and Point Martin, some 45 miles to the eastward. They are, from west to east, Eyak, Glacier, Copper, and Martin Rivers, the most important one being the Copper. Together they constitute with the adjacent coastal waters, what is here called the Copper River district. (See fig. 9.)

Copper River is the largest salmon stream of the southern coast of Alaska and with its many tributaries drains a large area in the south central part of Alaska where glaciers supply much of the water which eventually reaches the ocean through its channels. Due to this large quantity of glacial water, Copper River is a very muddy

stream through the summer months and is noticeably cloudy in the other seasons. Not all of its tributaries are discolored, however, as several clear streams form the headwaters of the rivers draining the Copper River basin. The entire river system abounds in lakes, many of which are more or less turbid, due to the action of galciers, yet in all this elaborate network of streams and lakes, favorable spawning grounds are comparatively limited and aggregate much less than in many smaller streams in other parts of the territory.

Through much of its length, the Copper is a swiftly flowing river heavily loaded with silt which is deposited at its mouth. In the course of years, a large delta has

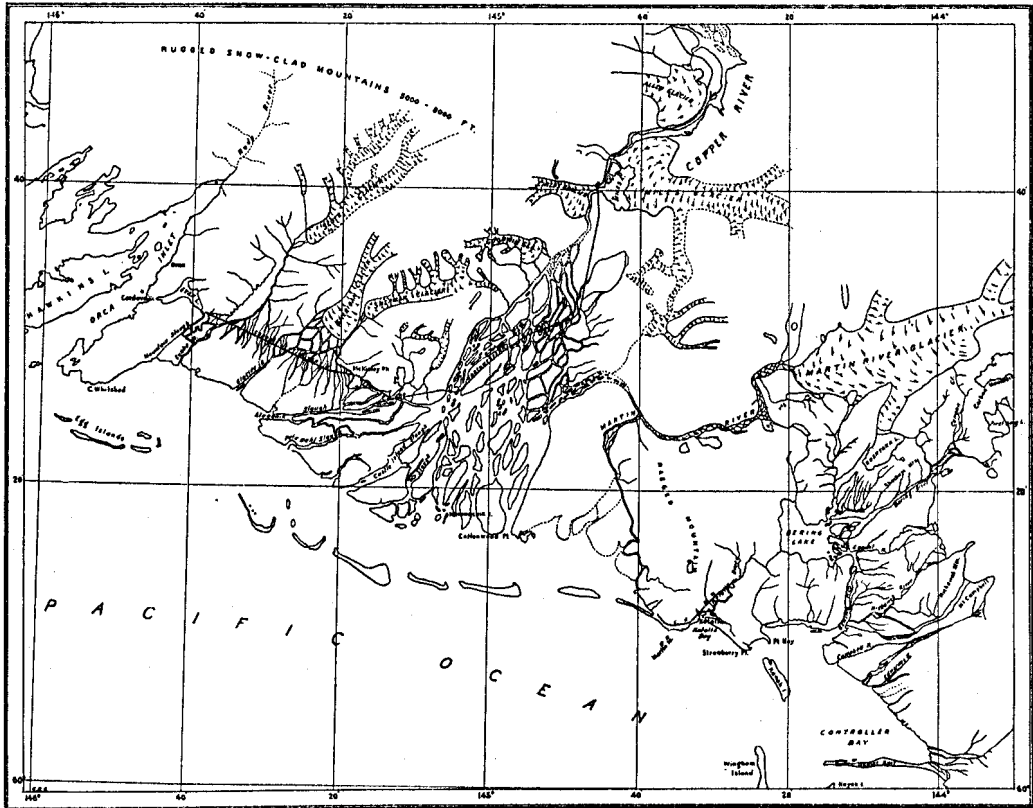


FIGURE 9.—Map of the Copper River and Bering River districts

thus been formed, spreading completely between the east and west boundaries of the district, while large quantities of silt have been swept into the eastern part of Prince William Sound through Orca Inlet. Conspicuous sand bars have also been formed across this stretch of coast about 4 miles out from the edge of the delta, giving further proof of the tremendous quantity of solid material being constantly brought down by the river. Through the delta thus formed, the river has maintained several channels in addition to the main outlet just west of Cottonwood Point. These channels, or sloughs as they are commonly called, and the mud flats between the sand bars and the delta, have been the principal fishing grounds in the Copper River district ever since exploitation of its runs of salmon began.

The river, notwithstanding its size and ramifications, is only a moderate producer of salmon, though its kings and reds are unsurpassed in quality anywhere in Alaska and always command a good price. These two factors, more than anything else, led early to a steady exploitation of the runs of kings and reds which threatened destruction of this valuable fishery.

Commercial fishing in Copper River began in 1889 with the establishment of two canneries on Wingham Island off the entrance to Controller Bay and two at Odiak, a bight on the north side of Orca Inlet nearest the southwest head of Eyak Lake. The plants on Wingham Island drew their salmon mainly from Copper and Martin Rivers, while those at Odiak obtained their supply almost entirely from Eyak Lake or the western part of the delta. In 1890, one cannery on Wingham Island was moved to Thin Point in western Alaska near the end of the peninsula; the other was moved to Kokinhenik Island directly in the mouth of Copper River in 1891 and continued to operate there until 1897 when it was permanently closed and dismantled. One cannery at Odiak operated until 1905 and was then sold to the Copper River & Northwestern Railway Co. which used it for other purposes; the second plant was moved in 1895 to Orca, a point on Orca Inlet about 4 miles west of Odiak and was operated each season thereafter through 1918. The Orca cannery was closed in 1919 and had not been reopened as late as 1927, though for nine years, 1906 to 1914, it had been the only cannery between Yakutat Bay and Cook Inlet and had undisputed possession of the entire field aside from the competition of a few salteries on Prince William Sound and a mild-curing station on Copper River just north of Abercrombie Canyon. Beginning in 1915 with the establishment of a cannery at Mile 55 on the Copper River & Northwestern Railway and one at Cordova, radical changes in the character of the fishery were inaugurated and there was then set in motion a new order of things which soon developed an intensive drain on the Copper River runs of king and red salmon. In five years the number of canneries grew from 1 to 9, one of which, as already indicated, was located several miles up the river and made its entire catch in Miles Lake and Abercrombie Canyon. Set nets were used in the lake and dip nets in the canyon. In the delta district, where set-net and drift-net fishing had been followed for years, staked nets were added and used extensively over the mud flats. Traps were also tried on the flats, but the district proved to be unsuited for that form of appliance.

The confusion of Copper River and Prince William Sound figures in the early catches has been fully discussed above in connection with the data for the eastern part of the sound. Table 10 gives the combined catches of the two districts for the years 1889 to 1903, inclusive. The catches of reds and kings are undoubtedly chiefly (and for several years exclusively) composed of Copper River fish. Probably most of the pinks were secured in the sound. The records of the catches of cohos are of doubtful value on account of the possibility of errors as to species and uncertainty as to the source of the catch. Although it has seemed best to keep the early figures separate from those collected by the bureau since 1904, it may be assumed with little chance for serious error that the data for kings and reds may be combined to give a complete statistical account of the catches of these two species. The salmon catches on the Copper River from 1904 to 1927 are given in Table 11 and may be taken as reliable and accurate within the limits reasonably applicable to such data.

TABLE 10.—*Salmon caught and fishing appliances used in the Prince William Sound and Copper River districts, 1889 to 1903*

Year	Cohos ¹	Pinks	Kings	Reds	Beach seines		Gill nets	
					Number	Number		
1889.....								
1890.....				242,790				
1891.....			5,491	411,190				
1892.....			6,185	710,740				
1893.....	72,000		8,674	792,690				
1894.....	17,000		8,494	710,000				
1895.....	142,937		10,248	507,630				
1896.....	31,862	308,180	1,407	714,595				
1897.....	25,605	302,290	2,044	371,487	5		10	
1898.....		375,246	1,850	417,171	12		10	
1899.....		212,907	4,682	527,122	12		10	
1900.....	88,175	50,565	3,462	748,310	2		10	
1901.....		313,806	6,558	781,438	2		10	
1902.....		375,408	2,500	800,044			10	
1903.....		398,926	4,600	814,345	2		10	

¹ Reported as cohos but probably mainly pinks.

The number of localities in the Copper River district has been reduced to four by combining all catches reported from Eyak Lake and Mountain Slough with Eyak River fish. Glacier and Martin River catches are given exactly as reported by the fishery operators. The Copper River catch includes all salmon caught in Abercrombie Canyon and Miles Lake, all salmon from the many sloughs of the delta, besides small lots reported from Big Softuk Bar, Boswell Bay, Copper River Flats, Cottonwood Point, Egg Island, Italian Flats, Kokinhenik Bar, Little River, Point Whitshed, San Island, Snag Point, and Softuk Bar. In the period from 1904 to 1914, when the district was occupied by a single cannery and fishing was confined largely to the sloughs, there was less chance of error in the allocation of catches than in subsequent years when fishing became more intensive and the mud flats were covered with staked nets. The general intermingling of all runs of salmon in the tidal sections of the district where much of the catch was made in later years rendered more definite allocation a hopeless undertaking if not an impossibility. Perhaps the most logical disposition would be to credit all salmon taken between Point Whitshed and Point Martin to Copper River, disregarding entirely Eyak, Glacier, and Martin Rivers. It is possible that most of the salmon reported as coming from these streams were Copper River fish, for it is recognized that the spawning grounds of Eyak Lake are extremely limited and can accommodate at most only a few thousand salmon, that Glacier River is equally deficient, and that Martin River is in reality a tributary of the Copper. In spite of these recognized deficiencies in the data it has seemed best to retain such details of the catch as have been given although analysis of the catches in the smaller localities can not be considered well founded.

TABLE 11.—*Salmon caught and fishing appliances used in the Copper River district, 1904 to 1927*

Year	Cohos	Chums	Pinks	Kings	Reds	Gill nets		Dip nets	Traps
						Number	Fathoms		
Copper River:									
1904				4,812	450,360				
1905				20,000	272,000				
1906				2,020	194,519				
1907				789	156,203				
1908					350,094				
1909				3,067	218,140				
1910	5,142			974	142,456				
1911	11,844			1,317	321,442				
1912	12,846			6,025	223,420				
1913				2,233	278,967				
1914	14,949			3,029	305,379				
1915	12,098			7,313	716,352				
1916	115,430	67	15,162	14,211	732,904				
1917	99,526		31,578	13,247	772,113				
1918	62,368	686	5,361	19,226	1,260,032				
1919	40,650			13,187	1,238,168				
1920	73,924			22,994	853,675				
1921	377			11,466	567,149				
1922				9,924	483,140				
1923			461	10,301	54,031				
1924	41,884	23	186	14,063	733,076				
1925	141,549		9	19,081	140,991				
1926	177,527		85	21,529	207,455				
1927	285,523		4	40,785	282,030				
Eyak River:									
1904					26,000				
1905					40,000				
1906					32	22,385			
1907					80	48,262			
1908						55,158			
1909						64,357			
1910	6,487					34,285			
1911	14,849				5	39,767			
1912	20,744				17	180,743			
1913						78,869			
1914	15,519					193,254			
1915			910		2	56,733			
1916	2,737				44	23,739			
1917	17,196		8,845		549	102,429			
1918	12,011				92	143,774			
1919	12,818				79	79,078			
1920					2	906			
1921						1,397			
1922					14	14,050			
1923					12	67,175			
1924	5				21	33,485			
1925	10,592	4	11		47	10,630			
1926	241				3	3,678			
1927	75,285				271	39,525			
Glacier River:									
1908					6,050				
1909					1,741				
1910	6,520					22,592			
1911	6,967				21	18,277			
1912	2,648				138	35,600			
1913					74	38,425			
1914	11,724				14	66,892			
1915				4	18	37,125			
1917	6,856				89	28,078			
1918					160	38,087			
1920					1	43			
1921						1,745			
1922					135	6,724			
1923				1	20	4,689			
1924					1,748	24,274			
1925	972				600				
1926	13				6	208			
1927	49,542				989	19,736			
Martin River:									
1904				202	16,270				
1905					8,000				
1906				113	48,474				
1907					59,092				
1908					55,112				
1909					32,450				
1910					22,660				
1911				15	28,073				
1912				1	16,537				
1913					8,653				
1914					5,434				
1915				1	8,518				
1916				4	12,888				
1917	2,495			35	17,198				
1918				149	50,463				
1919					11,397				
1922				2	1,861				

TABLE 11.—*Salmon caught and fishing appliances used in the Copper River district, 1904 to 1927—Continued*

Year	Cohos	Chums	Pinks	Kings	Reds	Gill nets		Dip nets	Traps
						Number	Fathoms		
Martin River—Continued.									
1923				6	808				
1925	263								
Total:									
1904				5,014	501,630	38			
1905				20,000	320,000	28			
1906				2,165	265,378	20			
1907				869	283,557	20	1,333		
1908					466,414	26	1,733		
1909				3,067	310,688	26	1,517		
1910	18,149			974	221,993	27	1,560		
1911	33,660			1,358	407,559	33	1,810		
1912	36,238			6,181	456,390	56	4,000	2	
1913				2,307	404,914	31	1,925	4	
1914	42,192			3,043	570,959	34	3,200		
1915	12,098		16,076	7,334	818,728	72	5,433		
1916	118,267	67	31,578	14,259	769,531	326	27,485	50	3
1917	126,073		8,845	13,930	919,818	501	36,914	70	4
1918	74,379	686	5,361	19,627	1,492,356	519	37,545	36	2
1919	53,468			13,266	1,328,643	691	54,025	35	2
1920	73,924			22,997	854,624	748	57,401	183	3
1921	377			11,466	570,291	471	35,700	165	1
1922				10,075	505,775	638	47,160		1
1923			462	10,339	625,875	663	47,025		
1924	41,889	23	186	15,862	790,835	488	40,500		
1925	153,376	4	20	19,728	160,721	497	31,124		
1926	177,781			85	21,338	555	33,450		
1927	410,350			42,045	341,201	495	30,950		

NOTE.—No catch was reported in the years not shown in the table.

Except in 1892 when all canneries in this district were idle there was no interruption of fishing from 1889 to 1927. For many years operations were unrestricted as the law of June 26, 1906, specifically exempted the waters of the delta of the Copper River and tributaries from its protective provisions. In 1912, Eyak Lake and its tributaries were closed to all commercial fishing for salmon, and a seasonal limitation was placed on fishing in Eyak River. Regulations affecting fishing in Copper River and throughout the delta district were made operative in 1918. They prohibited all fishing before June 1 of each year, established a weekly closed season, prescribed fishing appliances and distance interval between nets, prohibited all fishing in the river from the delta to Miles Lake and closed certain sections of Abercrombie Canyon and the entire river above the canyon to all operators except local residents taking salmon for domestic use. In 1919, the general closed season was extended 10 days, the length of nets in the delta section was reduced but in Miles Lake it was increased, the west and north shores of Miles Lake and the east side of the river above the lake and through the canyon were closed to all fishing. On September 1, 1921, all fishing in Copper River and its tributaries and within 500 yards of each mouth of the river was prohibited, bringing to a close the operations at Abercrombie Canyon and Miles Lake. After the passage of the new fishery law in June, 1924, the open season was advanced 20 days, making it possible for fishing to begin at midnight May 25 of each year; the 36-hour closed period provided by law was extended to 60 hours, stake nets were limited to 600 feet in length, and traps were prohibited. In 1925 all previous regulations were supplanted by a new order which became effective on January 1, prohibiting the capture of salmon in the Copper River district from July 11 to August 19; the use of nets of mesh less than 8½ inches before May 20; the use of stake nets, set or anchored gill nets, and traps at all times; all fishing within 500 yards of the grass banks of the delta; the use of gill nets attached to anchored boats or other equipment; authorizing the use of stake nets from the grass banks after August 10, and removing

all restrictions on the amount of fishing apparatus used by each boat after August 10. The same regulations were continued in 1926 except that the closed season was shortened $9\frac{1}{2}$ days, minor prohibitions in the use of $8\frac{1}{2}$ -inch mesh nets within 2 miles of the mouths of streams were added, and the weekly closed period was extended to 60 hours through July 10. In 1927 the weekly closed period was changed to 48 hours from May 20 to July 10, boats were limited to the use of 250 fathoms of net except that from May 20 to May 31 an additional 100 fathoms of $8\frac{1}{2}$ -inch mesh gill net could be used.

During this period of adjustment the catch of salmon fluctuated considerably from year to year, possibly due to the continually changing regulations and irrespective of the size of the runs. When the drastic regulations of 1925 became effective, the catch of red salmon dropped to the lowest level it had reached in the entire history of the Copper River fishery, only 160,721 being taken, and the catch in 1926, under a slight relaxation of the regulations, was only 211,311 reds, next to the lowest ever made. The catch had not fallen below half a million during the entire period from 1914 to 1924, inclusive.

In 1918 the catch was nearly a million and a half reds, 20,000 kings, 75,000 cohos, and a few hundred pinks and chums. This catch was produced by an aggregate of 37,500 fathoms of gill nets, 36 dip nets, and 2 traps. In 1920 the catches of all other species than reds was about the same as in 1918; but the catch of reds was much smaller, only a little over 850,000 in spite of the use of considerably more gear—57,400 fathoms of gill nets, 183 dip nets, and 3 traps. The regulations for these two years favored the season of 1918 as the longer closed season in 1920 and the closure of certain areas in the up-river fishing grounds naturally reduced the catch in that year, but it would seem that an increase of 52 per cent in the fishing effort would more than counterbalance the additional restrictions then applied although it is possible that the catch per unit of gear may have been materially decreased by the competition between units. (See Pt. I, p. 77.) A comparison of the catches in 1919 and 1920 under identical regulations and with practically the same amount of gear shows a difference of 36 per cent in favor of 1919. It is probable, therefore, that this smaller catch in 1920 was due to biological causes and reflected a smaller run of salmon in 1920.

Figure 10 shows in graphic form the catch of king and red salmon in the Copper River district for 39 years.

In respect to red salmon, the graph shows that the first noteworthy peak in production was reached in 1902 and 1903; this seems to be due entirely to the number of canneries operating rather than to the quantity of fish available, as with each increase or decrease in the number of operators the catch rose or fell correspondingly. After 1903 the catch immediately dropped to a much lower level for the simple reason that but one company was then operating. For the same reason it remained low during the next 10 years, the catch limit being fixed by the packing capacity of the cannery and not by the size of the run. In later years, with the introduction of more canneries, the size of the catch undoubtedly bore a direct relation to the size of the runs; and this continued until regulations changed the situation, affected operations, and reduced catches so as to leave no basis for determination of size of runs by measurement of catch in a single season. The number of kings and cohos taken in 1927 was nearly double that of any other year; chums and pinks are practically unknown in the district.

No definite evidence of serious depletion, therefore, can be seen in this district in spite of the greatly reduced catches of red salmon since 1924, since the catches of recent years have been made under totally different conditions. If the small catches

of 1925 to 1927 had been made under the same restrictions and regulations as were imposed in 1918 and 1919, with the gradually declining catches of the intervening years as further evidence, it might reasonably be held that the fishery had been rapidly depleted. However, this was not the case, and it appears more probable that the chief factors responsible for the reduced catch have been economic rather than biological. There have been, undoubtedly, some very poor runs in recent years, since not only have the commercial catches been poor but there has been a marked scarcity of salmon, as shown by the failure of fishing operations for local use in the

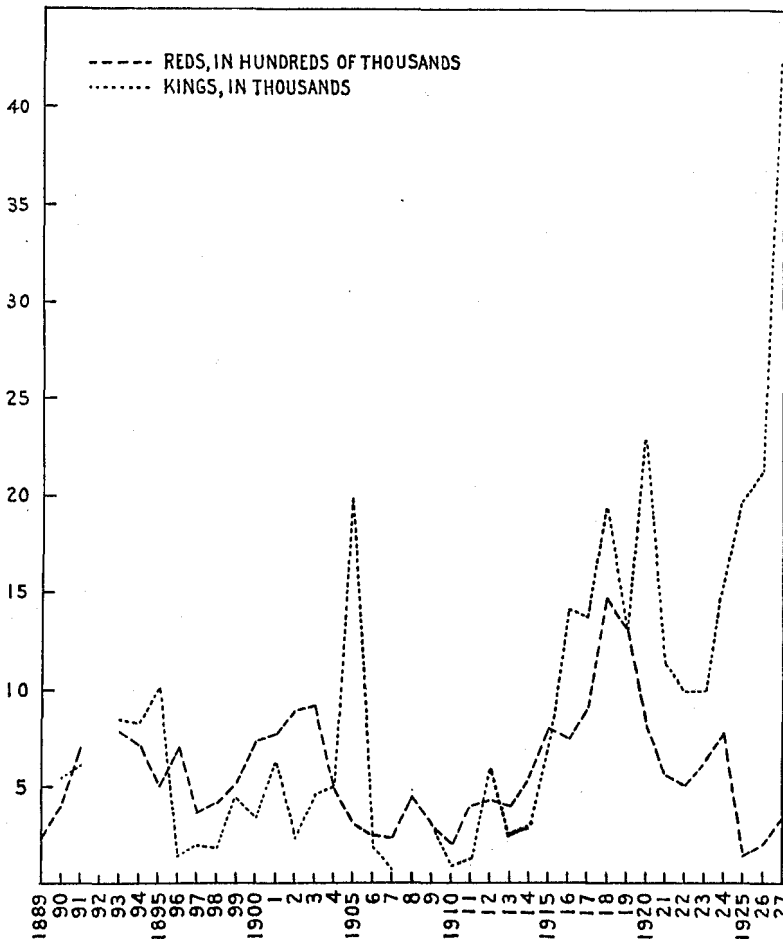


FIGURE 10.—Catch of king and red salmon in the Copper River district

upper river; but, so far as the present evidence goes, there is little indication of serious depletion.⁷

BERING RIVER

The Bering River district embraces the coastal waters of central Alaska from Point Martin on the west to Cape Suckling on the east, including Bering River, a tributary of Controller Bay which bay practically covers the coast from Point Martin to Okalee Spit and forms the principal fishing ground of the district. Bering River

⁷ A more detailed analysis of the statistics of the red-salmon fishery of the Copper River is being made by Seton H. Thompson and will be presented in a separate report. Although this analysis is incomplete as yet it may provide more evidence of depletion than has been apparent in the data presented in this report.

is the outlet of a few small lakes and also receives much of the discharge from the western part of Bering Glacier. About midway between the source and the mouth of the river is Bering Lake, a shallow body of water having an area of about 20 square miles. The lake is subject to tidal influence and is not regarded as an important spawning ground of red salmon, though it is probably used rather extensively by cohos. This district is shown in Figure 9.

Fishing began in this district in 1889 when two canneries were built on Wingham Island. Though both plants had abandoned this location by 1891, one going to Thin Point and the other to Kokinhenik Island at the mouth of Copper River, it is not likely that fishing at Bering River was discontinued. No records are available, however, to show that salmon were taken here before 1896, yet it seems very probable that the locality was fished regularly after canneries were once established, even in the years from 1907 to 1911, inclusive, when, according to records now obtainable, no catches were made. If the companies at Odiak and Orca found it profitable to fish this locality in 1904 and 1906 and since 1911, there is no reason to suppose that salmon were not obtainable there in commercial quantities in the intervening years. Such catches were undoubtedly reported as Copper River fish.

A cannery was built on Bering River in 1916, primarily to pack Bering and Copper River salmon. The district was also visited by fishermen from canneries more recently established at Cordova and was fished somewhat regularly by them for several years.

Prior to 1918, no restrictions on fishing in Bering River were imposed other than those provided in the general law. In that year a regulation was made effective which closed Bering Lake and the river above a point a few hundred feet northwest of the mouth of Gandil River, an eastern tributary of the Bering. This prohibition was continued through 1923. Under the law of 1924, restrictions were increased by an order extending the weekly closed period to 60 hours and prohibiting the use of staked nets more than 600 feet in length. In 1925, fishing was prohibited before May 26, and also from July 11 to August 19. From June 1 to July 10, the weekly closed period was extended to 48 hours; nets with mesh less than 8½ inches stretched measure were prohibited before June 1; and only drift gill nets not more than 200 fathoms in length were permitted at any time. Modifications were made in 1926 whereby the prohibition against fishing prior to May 26 was removed, the closed season was extended from July 10 to August 10, ending nine days earlier than in 1925. After August 10, each fishing boat was allowed to carry 350 fathoms of net. All fishing in the Bering River district was prohibited in 1927.

Table 12 gives a detailed statement of the catch of all species of salmon reported from the Bering River district from 1904 to 1926, consisting chiefly of red and coho salmon, though small numbers of kings were caught in several years. Occasionally pinks were taken in small quantities, but chums are practically never taken. It is evident from the number of nets operated from 1896 to 1915 that the district was not fished intensively. But the season of 1916 marked the beginning of an increased fishing effort, which reached a peak in 1918 but declined approximately 50 per cent in the following season. Thereafter it fluctuated considerably but rose again in 1922 almost to the level of 1918. The fishing effort in 1920 and 1921 resulted in exactly the same average catch per fathom of gill net in both years, which was 28.7 red salmon per unit. In 1917, 1918, and 1922, the years of maximum effort, the average catch per unit was only 13.9 red salmon. The largest catch of reds was made in 1923 when little more than half the gear used in 1918 produced approximately 90

per cent as many fish. It appears probable that these fluctuations in catch per unit of gear are due at least in part to the disturbing effect of competition between the units of gear and do not at all reflect corresponding fluctuations in actual abundance of fish.

TABLE 12.—Salmon caught and fishing appliances used in the Bering River district, 1896 to 1927

Year	Cohos	Chums	Pinks	Kings	Reds	Gill nets		Trips
						Number	Fathoms	
1896					23,980			
1897					39,269			
1898					30,383			
1899					27,072			
1900					106,167			
1904				400	123,400	20		
1906				111	54,074	5		
1912	8,000				41,023	10	1,000	
1913					38,519	15	1,250	
1914					10,202	1	50	
1915				4	105,614	15	1,050	
1916	51,938		14,492	7	141,278	83	7,740	
1917	78,412			321	163,357	105	11,325	
1918	80,218		3	772	139,021	141	13,400	
1919	76,729			72	139,792	65	6,650	
1920	63,865			120	162,582	50	5,650	
1921				3	120,667	60	4,200	
1922				72	131,179	96	13,210	1
1923	24,723		298	86	192,361	82	7,250	
1924	80,030			111	87,114	31	4,050	
1925	57,018		206	77	52,632	53	5,150	
1926	52,668		135	76	37,424	66	5,800	

NOTE.—The catch of red salmon from 1896 to 1900 was taken from Moser's report for 1900 and 1901 and represents the number of salmon caught by the Alaska Packers Association only. Another company was operating in the Bering River district but we have been unable to find any records of the catches made by it.

The table includes 14,032 cohos reported from Okalee River in 1919 and 12 kings and 15,233 reds from Controller Bay in 1922. No catches were reported in the years not shown in the table.

Table 13 shows graphically the catch of reds at Bering River from 1912 to 1926. Data for the earlier years were not included as the record was not continuous. Beginning with the intensive exploitation of this fishery in 1915, the catch increased steadily until 1918. This gradual rise was followed by mild fluctuations, the catch dropping in the odd years and ascending in the even years until 1923 when it reached its highest level. The smaller catch in 1921 can be traced to economic conditions which resulted in the temporary closing of the Bering River cannery so that the lower level of production in that year does not reflect the true condition of the fishery. In the next three years, it declined progressively to the lowest level reached in 12 years, due undoubtedly to the stringent regulations which were then enforced. There is no clear evidence of depletion in these data.

TABLE 13.—Graphic table showing the catch of red salmon in the Bering River district, 1912-1926

[Each letter represents the following number of fish: Reds, 10,000]

Year	Reds
1912	mmmmM
1913	mmmm
1914	mm
1915	mmmmMmmmmMm
1916	mmmmMmmmmMmmmmM
1917	mmmmMmmmmMmmmmMmm
1918	mmmmMmmmmMmmmmMmm
1919	mmmmMmmmmMmmmm
1920	mmmmMmmmmMmmmmMmm
1921	mmmmMmmmmMmm
1922	mmmmMmmmmMmmmm
1923	mmmmMmmmmMmmmmM
1924	mmmmMmmmm
1925	mmmmMm
1926	mmmm