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Alaska Peninsula Salmon 2000

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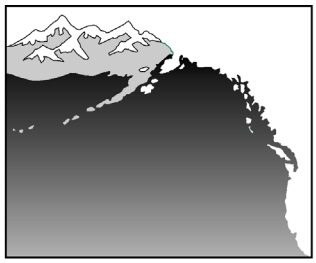

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ACKNOWLEDGMENTS

Kai Chamberlin and Jakoba Charles collected scales and made length measurements at King Cove. Brenda Rogers aged the chum salmon scales and examined them for scale holes. Many thanks go to Patti Nelson and Bob Murphy of the Alaska Department of Fish and Game's (ADFG) Kodiak office for providing much of the data necessary for this report.. Thanks also to Tom Vania and Fred Bue of ADFG for providing preliminary 2000 catch and escapement statistics.

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KEY WORDS

Bear Lake, Bristol Bay, chum salmon, False Pass, sockeye salmon

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Introduction

The salmon fisheries on the Alaska Peninsula have a long history dating back to the early 1900s. The June fisheries in the Shumagin Islands and south of Unimak Island, which are collectively called the False Pass fishery or South Peninsula June fishery, target on non-local sockeye salmon (*Oncorhynchus nerka*) primarily bound for Bristol Bay (Fig. 1) (Eggers et al. 1991, Rogers 1990). Non-local chum salmon (*O. keta*) are also caught by the purse seine and gillnet fleets. In recent years, the June fisheries have been restricted by quotas on both species. After June, most of the gillnet fleet moves to the north side of the Peninsula to target on local stocks of sockeye while the seine fleet targets primarily on pink (*O. gorbuscha*) salmon in August.

The salmon fisheries on the Alaska Peninsula have frequently been subject to proposed restrictions at annual meetings of the Alaska Board of Fisheries by fishermen from other areas of Alaska. Claims are often made that catches of non-targeted salmon, chum salmon in the June fishery, sockeye and coho (*O. kisutch*) salmon in the post-June fishery, and Bristol Bay sockeye in the north side fishery have significantly impacted other coastal fisheries.

Since 1992, we have (1) sampled the chum salmon catches in the False Pass fisheries to measure biological attributes (age, length, weight, condition), (2) estimated the annual runs of sockeye and chum salmon in the North Pacific, and (3) estimated the relative impact of the False Pass catches on coastal stocks. Since 1995, we have (1) examined the spatial and temporal distribution of Bristol Bay sockeye off the coast of the north side of the Alaska Peninsula, (2) compared the biological characteristics between local North Peninsula stocks and Bristol Bay stocks, (3) compared the age compositions in the two fisheries, and (4) investigated the salmon productivity of the North Peninsula with studies of the Bear Lake and Ilnik system sockeye salmon stocks.

This report summarizes the results of investigations in 2000. For the most part, this means adding one more line to existing data sets (Rogers et al. 1999); however, recent studies of the North Peninsula stocks by Ramstad (1998) and Witteveen (1998) have been followed by a new study of the spawning populations in Bear Lake.

Methods

False Pass

The accuracy of estimates of the annual runs (catch and escapement) of sockeye and chum salmon to major North Pacific regions varies considerably. Annual catch statistics for sockeye and chum salmon since the 1950s are fairly accurate (probably within 10%) for most North American regions and Japan, but less so for Russia. There are accurate annual escapement estimates for sockeye salmon for most runs since the mid-1950s, but estimates for chum salmon escapements are either lacking, inaccurate, or only available for recent years. For most regions of Alaska, except the Arctic-Yukon-Kuskokwim (A-Y-K), chum salmon runs coincide with more valuable sockeye or more numerous pink salmon runs and therefore receive less monitoring for escapement. However, chum salmon runs can be estimated in these situations from the chum salmon catch and the rate of exploitation on the targeted species (Rogers 1987). The most important statistics for management are usually the most recent statistics, and these are only available in preliminary form or in-house reports. This report relies heavily on 1999 and 2000 reports and unpublished data from management biologists. Much of these statistics is presented in the Appendix Tables 1-11.

Annual runs of chum salmon to North Pacific regions from 1970 to 1999 were estimated primarily from catch and escapement statistics presented in Rogers (1999). Sockeye salmon exploitation rates were utilized in Bristol Bay even though some aerial and sonar estimates of chum salmon escapement were available (Nushagak and Togiak). Sonar estimates of chum salmon escapement were not available for the Yukon River, but the total run in 2000 was estimated to be the smallest recorded by the Alaska Department of Fish & Game (ADFG). Expanded aerial survey and weir counts from selected spawning areas were used to estimate escapements in the Kotzebue, Norton Sound, and Kuskokwim regions. Aerial survey estimates were used for most estimates of chum salmon escapements to central Alaska; otherwise, assumed exploitation rates and chum salmon catches were used to estimate chum salmon runs.

Chum salmon from the 2000 False Pass catches (June 11–21) were sampled at the Peter Pan processing plant in King Cove. Fish were selected randomly from the pro-

cessing line and measured for length (mid-eye to tail fork). Weights were not taken in 2000 because the crew also had to collect scales from sockeye salmon as ADFG was unable to do so. Sex was determined from external appearance, and two scales were collected from the preferred region. The first samples were collected from the June 13 catches and the last samples collected from the June 26 catches. Data from the field forms (date, location, scale card number, fish number, sex, and length) were entered on a computer file.

Scales were aged and examined for focal scale resorbtion (holes) by an experienced scale reader who had been tutored by Mr. Brian Bigler (Wards Cove Packing Co., Seattle, Washington) on identification techniques (Bigler 1988, 1989). Ages and occurrences of scale holes were then added to the computer database. Data were stratified by location (South Unimak and Shumagin Is.), date, sex, and age.

Catch statistics for the False Pass fisheries of past years were obtained from Witteveen et al. (2000). Mr. A.R. Shaul (ADFG, Kodiak) provided preliminary catches by gear, area, and date for 2000. These preliminary catches were used to weight stratified means (length and age compositions) to obtain the annual means for 2000.

We also examined the composition and timing of the sockeye stocks from the statistics presented in Rogers (1990) due to questions about the timing of Ugashik stocks that enter the inshore fishery much later than the other Bristol Bay stocks.

North Peninsula

Bristol Bay run timing past Port Moller was estimated annually (1987–99) by combining inshore run statistics collected by ADFG (e.g., Stratton and Crawford 1994) with Port Moller test boat catches collected by Fisheries Research Institute (Rogers 1995). The test boat catches were also used to examine annual variation in the onshore–offshore distribution of the Bristol Bay run along the North Peninsula, the age composition of sockeye salmon, and the sockeye/chum species composition. The onshore–offshore distribution was measured by the percentage that the index catch at station 2 (the innermost station) contributed to the total daily index (the sum of the catches at stations 2, 4, 6, and 8).

The annual age compositions of sockeye caught in the North Peninsula fisheries were provided weekly for two subdistricts: Bear River (Harbor Point to Cape Seniavin) and Ilnik/Three Hills (Cape Seniavin to Strogonof Point). Age compositions from the subdistricts were averaged through July 11 by weighting the subdistrict compositions by the catch (Murphy et al. 2000). Age compositions for North Peninsula escapements were estimated by weighting the individual river age compositions by the number in the escapement, and age compositions in the Bristol Bay catches were calculated from annual run statistics provided by D. Gray (ADFG Anchorage) and ADFG (2000).

During 2000, our study of Bear Lake sockeye salmon continued with the beginning of a thesis by Chris Boatright. This work will follow up the work of Kristina Ramstad to understand the apparent high productivity of Bear Lake sockeye compared with the Bristol Bay lakes by comparing the life history and marine survival of early and late spawning stocks with productivity and environmental measures. Mr. Boatright and one technician made three visits to Bear Lake from June to November in 2000.

Remote temperature sensing units were deployed about 20–25 cm below the gravel surface on seven spawning grounds in 1999. These temperature units were recovered in spring 2000. The data were downloaded with Onset HOBO software and the units were redeployed and placed in the areas of densest spawning activity. This should allow us to examine thermal regimes and incubation times of Bear Lake's spawning grounds to determine when and why the early and late runs spawn where they do. The full 2000 season also allowed us to complete the field component of an adult tagging study. Over the course of both sockeye runs, 4,107 sockeye were tagged at the ADF&G weir. As fish were tagged, we simultaneously conducted surveys of the spawning grounds so both spatial and temporal distribution of spawners could be mapped. This study continued with the collection of data to address smolt outmigration dynamics based on ADFG sampling (1985–99) of 200 smolt per week for length, weight, and a scale. They conducted this sampling from the second week in June to the third week in August each year. We plan to choose 1,000 age-2 smolt scales per year and identify them by scale pattern analysis as early or late run progeny based on Ramstad's work.

Results

False Pass

Abundance

The False Pass sockeye salmon catch is regulated by a quota set at 8.3% of the forecasted Bristol Bay catch. Since the inception of a chum salmon cap in 1986, the quota has been caught only 40% of the time and the catch did not reach 8.3% of the actual Bristol Bay catch until 1997 (Table 1). Three factors contribute to the inability of the fishery to achieve an allotment of 8.3% of the Bristol Bay catch: (1) a tendency for underestimating preseason forecasts, (2) a high abundance of chum salmon with a low chum salmon cap (quota), and (3) the availability of migratory Bristol Bay sockeye. During 1994–96, the low availability of Bristol Bay sockeye was likely the main factor. While fishing occurred nearly every day, the 1994–96 catches were about 2 million fish short of the quotas. In 1997 and

1998, Bristol Bay sockeye appeared to be more available than usual as the catches exceeded 8.3% of the Bristol Bay catches, although they were still below the pre-season quotas. The 1999 run of 40 million was close to the recent 10-year average and much higher than the ADFG preseason forecast (25 million), and the quota was reached by June 21. In 2000 the catch was below the quota and 8.3% of the Bristol Bay catch (Table 2). The False Pass fishery depends only on those Bristol Bay sockeye that are returning from ocean rearing in the Gulf of Alaska (Rogers 1987). Most Bristol Bay sockeye begin their homeward migration west of the fishery (south of the Aleutian Islands). A shift in the oceanic distribution from east to west or a shift from a nearshore to an offshore migratory route would result in variable availability to the Shumagin and South Unimak fisheries from year to year. Low chum salmon abundance has also improved the sockeye catches in the False Pass fisheries.

Omitting the 1990 and 1994–96 observations as outliers, the catch-per-unit-effort (CPUE) of sockeye salmon at South Unimak explained 80% of the annual variation in the Bristol Bay runs. This correlation was very good and provided a method of forecasting the Bristol Bay run about 2 weeks in advance of their arrival in the bay (Eggers and Shaul 1987). Recent changes in the South Unimak fleet (effort by gear) may also have contributed to the recent poor correlation between CPUE and the size of the Bristol Bay run (Table 3). Purse seine effort was greatly reduced relative to drift gillnet effort following 1995 largely because purse seines did not fish in the early part of the season. Although the sockeye CPUE no longer appears reliable as a forecast tool (Fig. 2), the age composition of the sockeye salmon catch at False Pass has been useful in forecasting the Bristol Bay runs (Table 4). The ages in 2000 were close to the ages in Bristol Bay.

The chum salmon percentages in the False Pass catches of 1997–2000 were well below average whereas the chum salmon percentages in Western Alaska were a little above average in 1997–98 but below average in 1999 and 2000 (Table 5). Runs were exceptionally small in 1997–98 for both species. But the sockeye runs in 1999 and 2000 were relatively large combined with very small chum runs to most of Western Alaska. The Arctic/Yukon runs of chum salmon were again very small in 2000 (Tables 6–8); however, a preliminary estimate of the Japanese chum salmon return in 2000 indicates that the run was also well below average. No estimate was yet available for the 2000 Russian chum salmon run , so the run was estimated from the catch in metric tons.

Age and Length

The age-0.3 chum salmon in 2000 were again the most abundant age group and the chums were the largest observed since we began sampling in 1992 (Table 9). A chum salmon averaging 600 mm would weigh about 3.7 kg (8.1 lbs) whereas one averaging 615 mm would average about 3.9 kg (8.6 lbs). About 97% of the chum salmon caught in the 1999 and 2000 South Unimak and Shumagin fisheries were ages 0.3 and 0.4; however, age 0.3 chum salmon were especially prominent (Table 9). The age-0.3 chum salmon in 1999 were also about average in length. Summaries of the mean lengths by age are presented in Tables 10 and11 for 2000. The Nushagak River is the only chum salmon stock with reliable escapement and return statistics (Table 12). The Nushagak catch of 111,000 was the smallest recorded, and biological data (ages and lengths) indicated another small run with larger than average fish in 2000. All chum salmon returns since 1988 have been below the Ricker curve and the small escapements since 1996 would indicate small returns for the next 5 years (Fig. 3). Poor returns from recent years probably indicate poor marine survival since many of the recent returns have come from near optimum escapements.

Focal Scale Resorbtion

Murphy (1993) presented a summary of the incidence of focal scale resorbtion for chum salmon in the False Pass fisheries, including our preliminary results for 1992. Scales had only been examined from South Unimak in 1990 (600) and from the Shumagins in 1989 (302) and 1990 (298). In 2000, we collected two scales from only 361 chum salmon and only one scale was collected from the remaining 1,265 (Table 13). The final results for 2000 are not directly comparable with past years when two scales were examined for each fish. Only 0.6% of the combined 2000 chum salmon samples had holes whereas1.08% of the 1999 chum salmon had holes. During 1992–97, the mean was 1.66% with a range of 1.15% to 2.25%. In 1998, it was a record low of 0.64%. Thus, the 2000 samples equaled the lowest observed and indicated a lower than usual contribution of Asian chum salmon to the False Pass fishery in recent years.

If we assume that the incidence of focal scale resorbtion is zero in Alaskan stocks and approximately 11.8% in Asian stocks (Murphy 1993), then the Asian stock contribution has been close to the estimated 20% from the 1987 tagging and 22% to 35% from the genetic analysis by Seeb et al. (1997). To obtain more precise estimates of Asian stock contribution, we need a measure of the year-to-year variation in the incidence of “holes” in Asian stocks. From the tagging results in 1987 and the genetic sampling, we would expect the incidence of “holes” to be much greater in the Shumagin samples than in the South Unimak samples. Unfortunately, we had only three small scale samples from the Shumagins in 1999 and four small samples in 2000.

Stock Composition and Timing

There has been some speculation that the False Pass fish-

eries may fish some Bristol Bay stocks differently than other stocks because the timing of the runs to the Bay differs because the Ugashik and Togiak runs tend to be later than the other runs. This question was examined in Rogers (1990) with an analysis of the sockeye salmon tagging conducted in 1987 (Eggers et al. 1991). The tagging conducted in 1987 relied completely on recovery by the commercial fishery. In that year, there was little fishing on the large Kvichak run of 9.6 million (about one third of the total Bristol Bay run) until nearly the midpoint of the run. Thus, for sockeye tagged in the early part of the False Pass fisheries (June 13–20), there was little opportunity for recovery in the Naknek/Kvichak District (Fig. 4). Sockeye salmon were not fully vunerable to the Naknek/Kvichak fishery until approximately June 23–24 (Fig. 5) and perhaps for the Shumagin tagging, not until June 27 (Fig. 6). The number tagged on a given date is equal to the total tagged minus the recoveries in the False Pass fisheries. In 1987, 25% of the annual Naknek/Kvichak run had passed through that fishing district by July 1, through Egegik and Nushagak by June 29, and through Ugashik by July 5. On average, the Ugashik run is 4–6 days later than the other runs (Table 14). Given that there were only two fishing periods prior to July 9, 1987, it was surprising that 14 tags were recovered on June 13 and 19 (Fig. 7). This indicated that Ugashik sockeye passed through the early part of the South Unimak fishery. Excluding the Naknek/Kvichak District, the Ugashik sockeye were represented in the early tagged population approximately in proportion to their abundance in the Bristol Bay runs (Fig. 8). Chignik stocks were over represented in the Shumagin fishery while North Peninsula stocks were over represented in the South Unimak fishery. On the basis of tagging beginning on June 22, the Bristol Bay stocks were represented in the tagged population approximately in proportion to their abundance in the 1987 runs (Fig. 9). This later period also showed greater presence of North Peninsula and Chignik stocks in the Shumagin fishery than expected from the size of the runs.

Even though Ugashik is closer to the False Pass fisheries, the average travel times of tagged sockeye salmon from South Unimak to the inshore fisheries was 13.5 days for Naknek/Kvichak, 13.8 days for Egegik, and 16 days for Nushagak and Togiak, while Ugashik sockeye took 14.3 days. This indicates that Ugashik sockeye pass through the South Peninsula with other Bristol Bay stocks but spend some days in the Bay before entering the Ugashik fishing district. The average travel time to the prolonged North Peninsula fishery was nearly the same as Ugashik (14.5 days), whereas the travel time from the Shumagins to Chignik was only 12.2 days..

North Peninsula

During 2000, our study of Bear Lake sockeye salmon was greatly increased from the past 3 years as three trips to Bear Lake were made to study the distribution of spawning (tagging and recapture), install temperature recorders. and conduct some limnological sampling.

Abundance and Distribution

Rogers (1996) described the sockeye salmon fisheries along the north side of the Alaska Peninsula and the offshore migration of Bristol Bay salmon into the Bay and the inshore migration out of the Bay for Ugashik and North Peninsula stocks. The 2000 sockeye runs to the North Peninsula were below average but an improvement from 1998, especially for the late run to Bear Lake. As usual, most of the early catch was made during the first half of July. The runs to the north side of the Alaska Peninsula show some correlation as all runs were low in 1997 and 1998 and came back up in 1999.

The vulnerability of Bristol Bay sockeye salmon to the North Peninsula fisheries from Port Moller to Ilnik may be dependent on the offshore distribution and timing of the Bristol Bay run. The run past Port Moller was 4 days earlier than average in 2000, and 80% had passed Port Moller by June 30 (Table 14). The water temperatures in June off Port Moller were close to the average observed since 1972 and the Bristol Bay run was early in starting. The Port Moller test fishery offers some measure of offshore distribution. Throughout the 2000 migration past Port Moller, the sockeye were concentrated well offshore as the catches were consistently highest at station 10 and lowest at station 2 (Fig. 10). There has been no correlation between the distribution off Port Moller and the North Peninsula catches (Rogers 1999). We also have seen no correlation in the ages of sockeye off Port Moller and in Bristol Bay with the ages in the North Peninsula catch. The 2000 ages from ADFG show the typical pattern of a decreasing percentage of age 0.3.and an increase in the percentage of age 2.2 during the fishing season (Table 15). This pattern shows in the Bear Lake escapement as mostly age 2.2 in the late run and age 2.3 in the early run (Table 16). The presence of age-0.3 sockeye in the commercial catch comes from the early Ilnik and Sandy River runs (Table 17).

Bear Lake

We recovered 497 tags on the spawning grounds (12% of the tagged sockeye). Preliminary results support the hypothesis that Bear Lake's divergent runs are not only temporally isolated but also spatially isolated, with only a small margin of overlap on the spawning grounds. The data also suggest that Bear Lake's discreet spawning stocks display non-random return timing.

We also conducted limnological sampling at Bear Lake.

Zooplankton hauls to measure secondary production and vertical temperature profiles were maintained throughout the season, beginning June 21 and ending October 26. Vertical hauls were made every 2 weeks at four stations previously set by Honnold et al. (1996). Tows were made with a 0.5-m zooplankton net with #6 mesh starting at 60 m depth (except for station 1 at 45 m) and pulled to the surface. Remote temperature sensing units (Hobos) were used to monitor vertical temperature profiles. These units were strung on a line anchored to the bottom at station 2 and buoyed 3 m below the suface to keep the line vertical. From the surface, units were placed at 3, 6, 9, 12, 21, 24, 27, 40, and 60 m. Because we had an extended field season and an early publication of this report, very few results are presently in publishable form for the Bear Lake project.

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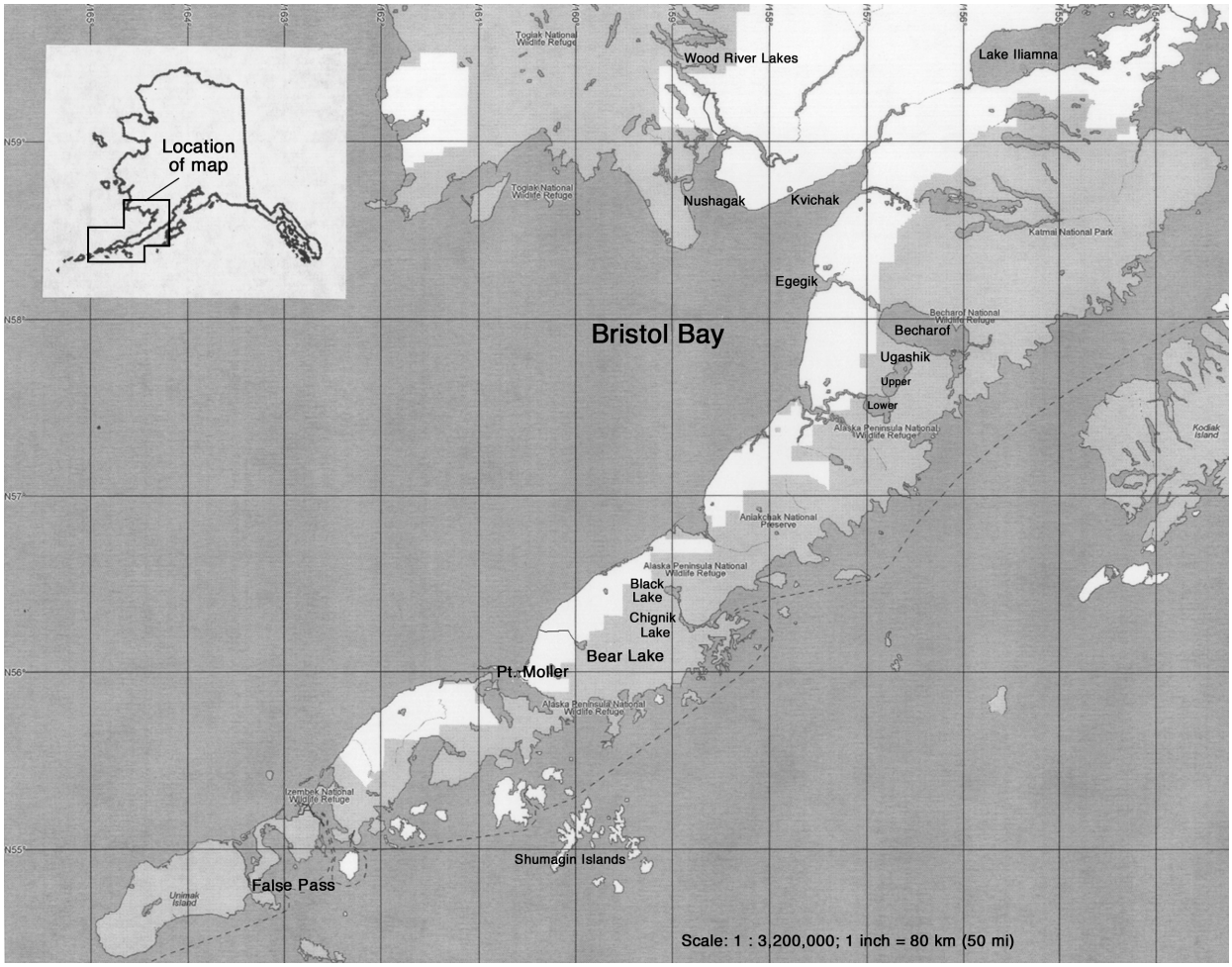

FIGURE 1. Map of Alaska Peninsula and Bristol Bay.

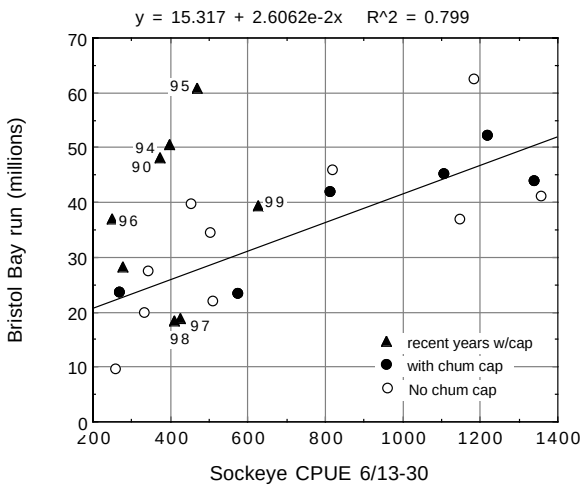

FIGURE 2. Regression of Bristol Bay run on sockeye CPUE at South Unimak.

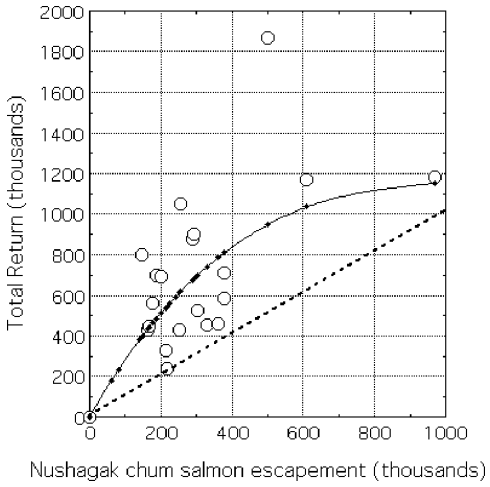

FIGURE 3. Escapement/return relationship for Nushagak chum salmon.

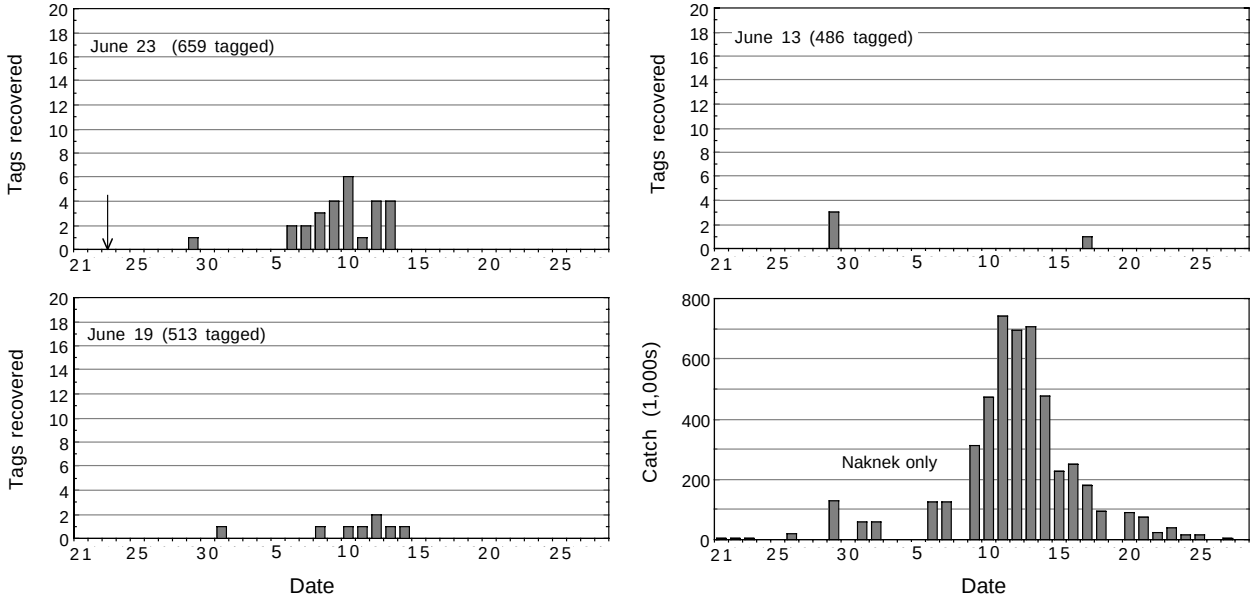

FIGURE 4. Numbers of sockeye released at South Unimak during June 13-23 and recovered in the Naknek/Kvichak fishery.

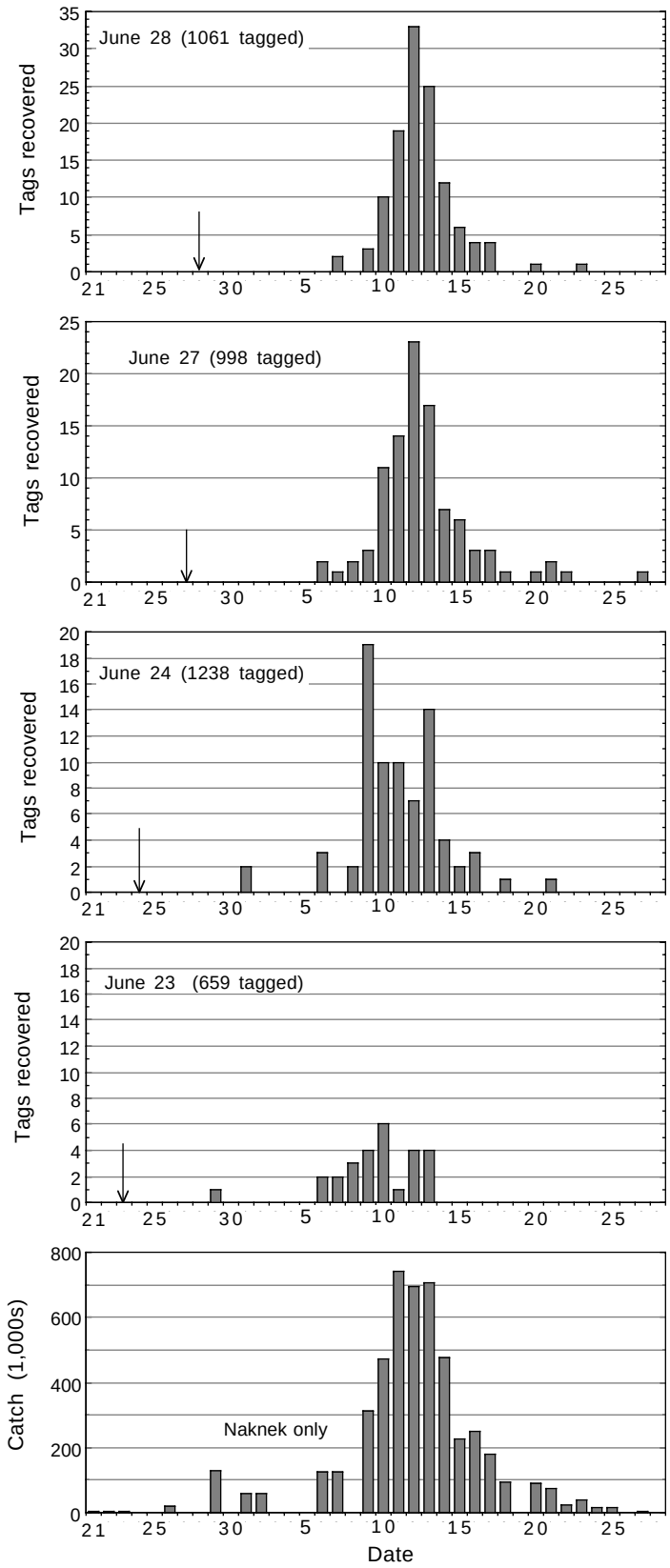

FIGURE 5. Numbers of sockeye released at South Unimak during June 23-28 and recovered in the Naknek/Kvichak fishery.

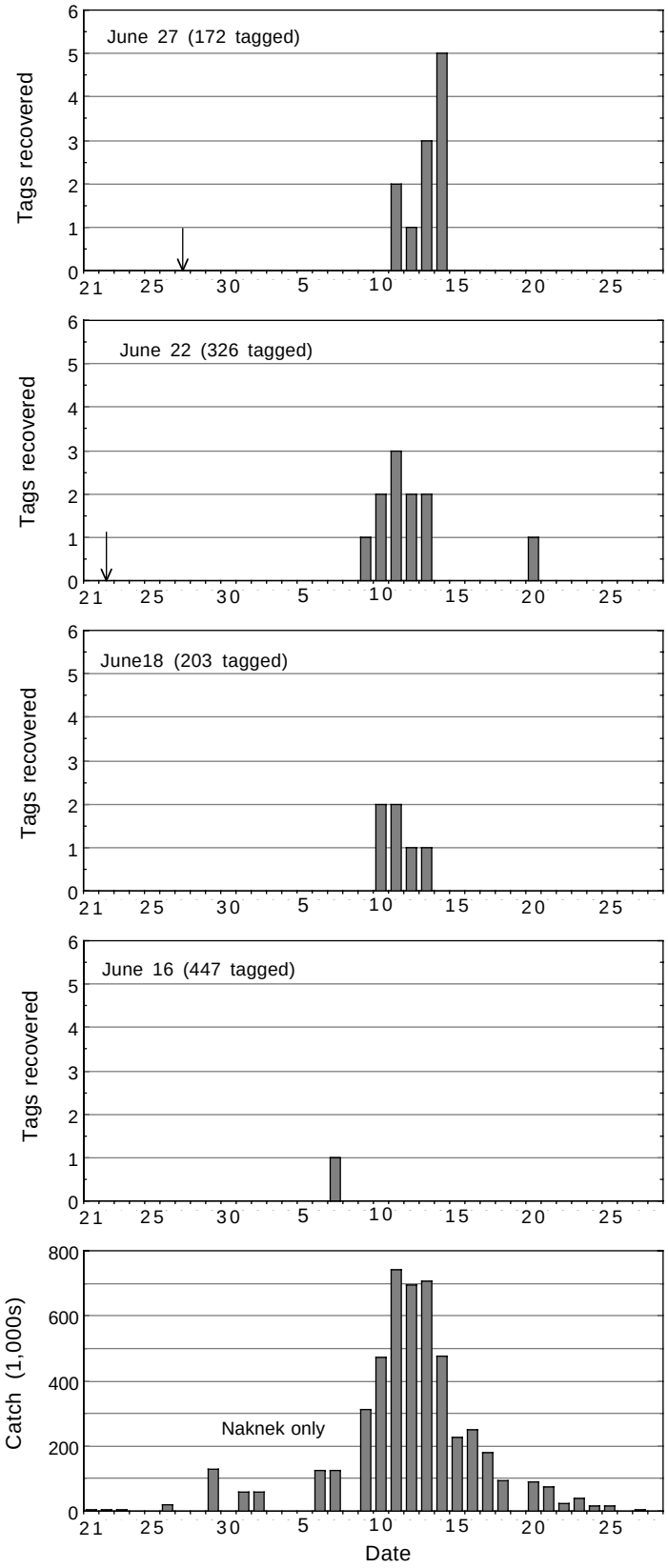

FIGURE 6. Numbers of sockeye released in the Shumagins during June 16-27 and recovered in the Naknek/Kvichak fishery.

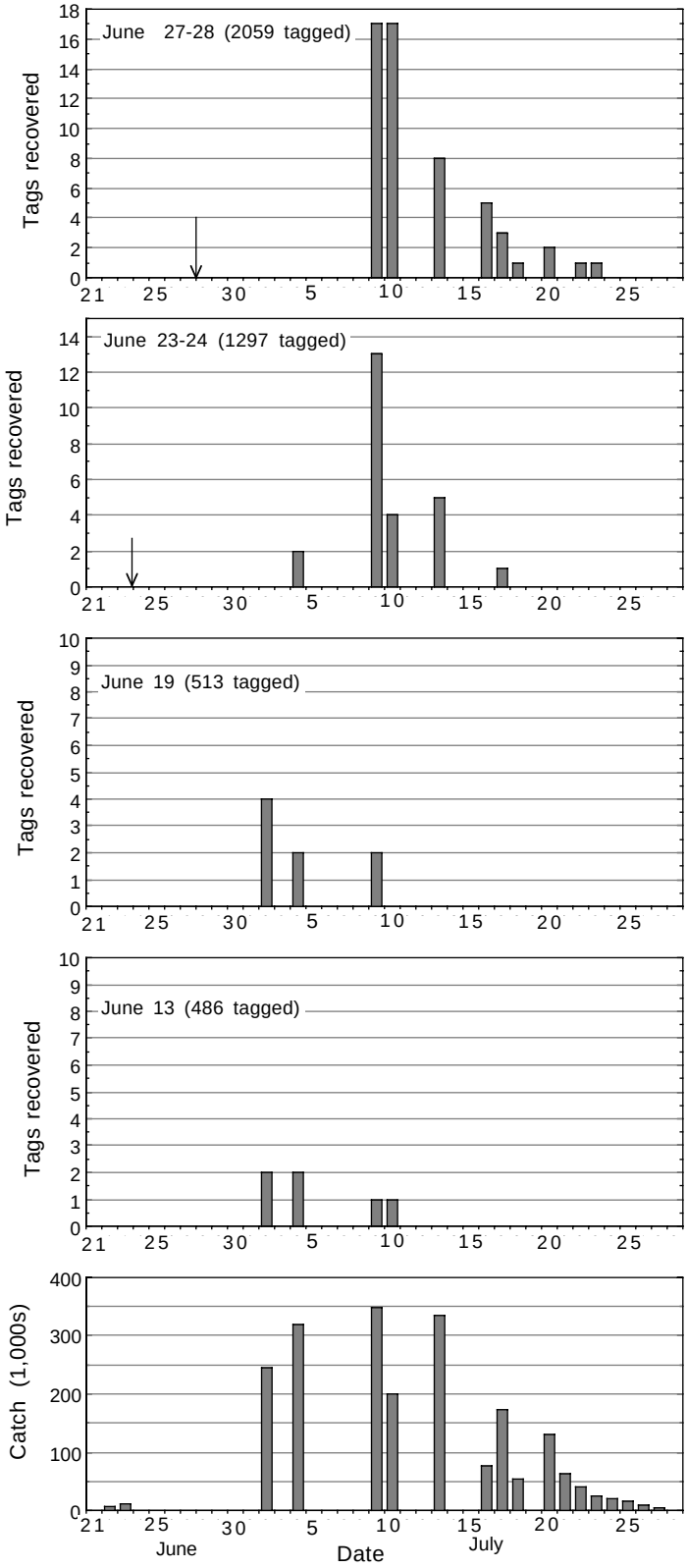

FIGURE 7. Numbers of sockeye released at South Unimak during June 13-28 and recovered in the Ugashik fishery.

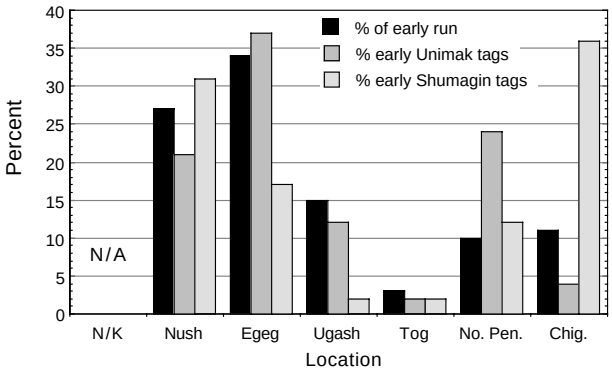

FIGURE 8. Stock and tag return compositions from tagging June 13-19.

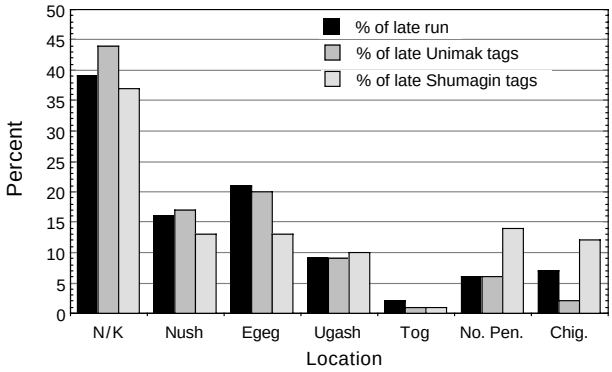

FIGURE 9. Stock and tag return compositions from tagging after June 22.

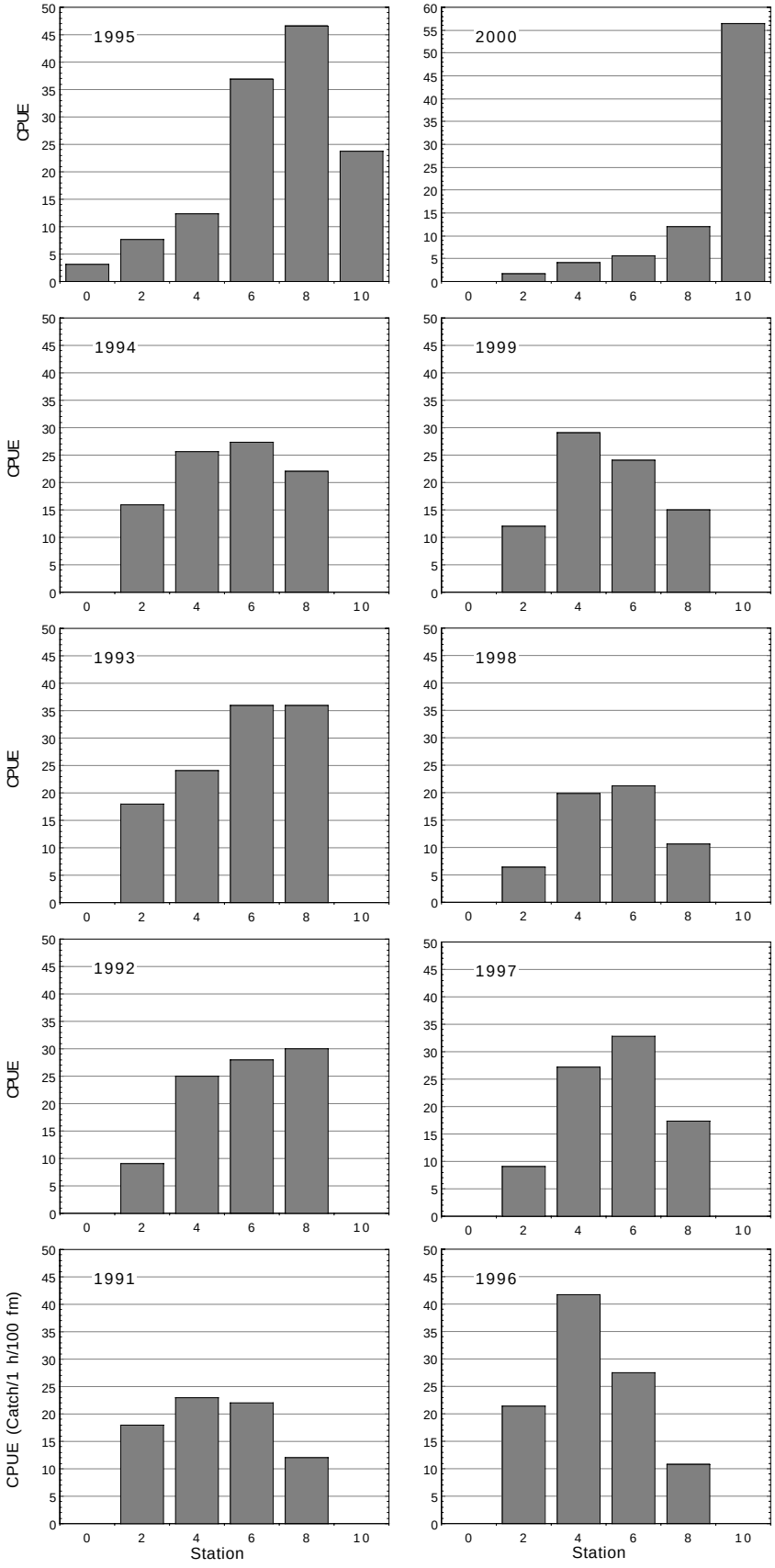

FIGURE 10. Distribution of sockeye average catches by station off Port Moller, 1991-2000.

TABLE 1. False Pass fishery catches, the pre-season quotas and actual Bristol Bay catches.

	Sockeye salmon (millions)									
	Bristol Bay		False Pass					Chum salmon (1,000s)		
Year	Run	Catch	Catch	Quota	8.3%	C-Q	C-8.3%	Catch	Cap	Catch-cap
77	9.72	4.88	.24	.24	.42	.00	-.19	116		
78	19.92	9.93	.49	.52	.86	-.04	-.38	122		
79	39.90	21.43	.85	1.10	1.85	-.25	-1.00	104		
80	62.49	23.76	3.21	3.07	2.24	.14	.97	509		
81	34.47	25.60	1.82	1.76	2.28	.06	-.46	564		
82	22.21	15.10	2.12	2.26	1.43	-.14	.69	1095		
83	45.91	37.37	1.96	1.79	3.26	.17	-1.30	786		
84	41.11	24.71	1.39	1.36	2.17	.03	-.78	337		
85	36.86	23.70	1.79	1.69	2.12	.11	-.33	434		
86	23.74	15.78	.47	1.11	1.35	-.64	-.88	352	400	-48
87	27.52	16.07	.79	.78	1.40	.02	-.61	443	0	0
88	23.42	13.99	.76	1.54	1.22	-.79	-.47	527	500	27
89	44.05	28.74	1.74	1.46	2.53	.28	-.79	455	500	-45
90	48.12	33.52	1.35	1.33	2.89	.02	-1.55	519	600	-81
91	41.91	25.82	1.55	1.92	2.27	-.37	-.72	773	600	173
92	45.22	31.88	2.46	2.39	2.85	.07	-.39	426	700	-274
93	52.22	40.46	2.97	2.90	3.60	.07	-.63	532	700	-168
94	50.58	35.22	1.46	3.59	3.04	-2.13	-1.58	582	700	-118
95	60.89	44.43	2.11	3.65	3.65	-1.54	-1.55	537	700	-163
96	37.00	29.57	1.03	3.13	2.54	-2.10	-1.51	360	700	-340
97	18.89	12.31	1.63	2.25	1.16	-.62	.47	322	700	-378
98	18.35	10.00	1.29	1.87	.94	-.58	.35	246	375	-129
99	39.50	25.90	1.38	1.30	2.26	.08	-.88	245	375	-130
00	28.30	20.50	1.25	2.01	1.81	-.76	-.56	240	350	-110
01				1.41					350	
86-00 average	37.31	25.61	1.48	2.04	2.23	-0.60	-0.75	437	527	-119

TABLE 2. False Pass sockeye catches, 1981–2000.

Year	Bristol Bay		Unimak	Unimak	% of	Shum-	Shum-	% of	Total	Total	% of	%	FP	
	Run*	Catch	quota	catch	BB + FP catch	agin quota	agin catch	BB+FP catch	quota	catch	BB+FP catch	of BB run	chum catch	Chum quota
81	34.3	25.60	1.442	1.470	5.36	.318	.351	1.28	1.760	1.821	6.64	5.31	.564	
82	22.0	15.10	1.850	1.668	9.69	.408	.451	2.62	2.258	2.119	12.31	9.63	1.095	
83	45.6	37.37	1.469	1.547	3.93	.324	.416	1.06	1.793	1.963	4.99	4.30	.786	
84	40.6	24.71	1.111	1.131	4.33	.245	.257	0.98	1.356	1.388	5.32	3.42	.337	
85	36.5	23.70	1.380	1.455	5.71	.305	.336	1.32	1.685	1.791	7.03	4.91	.434	
86	23.6	15.78	.907	.315	1.94	.200	.156	0.96	1.107	.471	2.90	2.00	.352	.400
87	27.3	16.07	.635	.653	3.87	.140	.141	0.84	.775	.794	4.71	2.91	.443	
88	23.2	13.99	1.263	.474	3.21	.279	.282	1.91	1.542	.756	5.13	3.26	.527	.500
89	43.9	28.73	1.199	1.348	4.42	.264	.397	1.30	1.463	1.745	5.73	3.97	.455	.500
90	47.8	33.52	1.087	1.091	3.13	.240	.256	0.73	1.327	1.347	3.86	2.82	.519	.600
91	42.2	25.82	1.573	1.216	4.44	.347	.333	1.22	1.920	1.549	5.66	3.67	.773	.600
92	45.1	31.88	1.959	2.046	5.96	.432	.412	1.20	2.391	2.458	7.16	5.45	.426	.700
93	52.1	40.46	2.375	2.367	5.45	.524	.607	1.40	2.899	2.974	6.85	5.71	.532	.700
94	50.3	35.22	2.938	1.001	2.73	.648	.460	1.25	3.586	1.461	3.98	2.90	.582	.700
95	60.8	44.43	2.987	1.451	3.12	.659	.654	1.41	3.646	2.105	4.52	3.46	.537	.700
96	37.0	29.57	2.564	.572	1.87	.566	.456	1.49	3.130	1.028	3.36	2.78	.360	.700
Average	43.0	29.97	1.858	1.222	3.82	.410	.400	1.27	2.268	1.622	5.10	3.69	.515	
97	18.9	12.31	1.840	1.179	8.46	.406	.449	3.22	2.246	1.628	11.68	8.62	.322	.700
98	18.3	10.00	1.529	.975	8.64	.336	.314	2.78	1.865	1.289	11.42	7.04	.246	.325
99	39.5	25.90	1.024	1.106	4.05	.226	.269	0.99	1.300	1.375	5.04	3.48	.245	.325
00	28.3	20.51	1.649	.890	4.09	.364	.355	1.63	2.013	1.245	5.72	4.40	.240	.325
01			1.156			.255			1.411					

Sources: Witteveen et al (2000) for False Pass and Bristol Bay area management reports.

* Bristol Bay run excluding jacks

South Unimak quota is 6.8% of forecasted Bristol Bay catch

Shumagin quota is 1.5% of forecasted Bristol Bay catch

Combined quota is 8.3% of forecasted catch

Gear depth limitations imposed from 1990 to present

Fishery closed early because chum salmon cap was reached in 1986, 88, and 91.

TABLE 3. Sockeye CPUE by gear in the South Unimak fishery.

	Effort (boat days)		Catch (1,000s)		CPUE (catch/boat days)		
Year	Purse seine	Drift gillnet	Purse seine	Drift gillnet	Purse seine	Drift gillnet	PS/GN
77	59	501	30	159	508	317	1.60
78	70	1000	77	333	1100	333	3.30
89	157	926	473	182	3013	197	15.33
80	408	946	2074	630	5083	666	7.63
81	481	1027	682	627	1418	611	2.32
82	581	1273	918	699	1580	549	2.88
83	280	533	798	392	2850	735	3.88
84	85	151	385	199	4529	1318	3.44
85	199	360	761	401	3824	1114	3.43
86	193	410	145	135	751	329	2.28
87	270	734	235	321	870	437	1.99
88	107	431	141	307	1318	712	1.85
89	159	351	735	434	4623	1236	3.74
90	482	1292	619	452	1284	350	3.67
91	280	549	650	539	2321	982	2.36
92	340	657	1192	766	3506	1166	3.01
93	392	657	1397	903	3564	1374	2.59
94	458	862	573	371	1251	430	2.91
95	498	1367	611	793	1227	580	2.11
96	289	1237	127	422	439	341	1.29
97	297	1544	175	897	589	581	1.01
98	137	1816	70	856	511	471	1.08
99	169	1066	226	790	1337	741	1.80
00	312	2015	115	723	369	359	1.03
Means 86-00	292	999	467	581	1597	673	2.18

TABLE 4. Comparison of age compositions of sockeye salmon in Bristol Bay runs with ages from the False Pass fishery, in-season Port Moller test boat and the ADF&G pre-season forecast 1987-2000.

Year		Age composition (%) 1.2	2.2	1.3	2.3	all .2	all .3	Bristol Bay run (millions)
1987	ADF&G pre-f'cast	26	24	33	17	50	50	16.1
	Moller in-f'cast	49	19	19	12	68	31	26.0
	False Pass catch	35	13	33	14	49	51	
	Bristol Bay run	49	12	24	13	61	39	27.3
1988	ADF&G pre-f'cast	30	27	34	9	57	43	26.5
	Moller in-f'cast	17	20	48	12	37	60	22.0
	False Pass catch	23	42	23	9	66	33	
	Bristol Bay run	20	22	41	13	43	55	23.0
1989	ADF&G pre-f'cast	22	45	24	9	67	33	28.9
	Moller in-f'cast	13	45	22	17	58	39	37.0
	False Pass catch	8	62	13	15	70	28	
	Bristol Bay run	11	62	16	9	73	26	43.8
1990	ADF&G pre-f'cast	19	42	26	13	61	39	25.4
	Moller in-f'cast	10	37	24	26	48	52	56.0
	False Pass catch	16	37	20	25	53	45	
	Bristol Bay run	14	41	21	20	56	43	47.8
1991	ADF&G pre-f'cast	28	25	31	16	53	47	30.0
	Moller in-f'cast	12	14	55	13	28	71	37.0
	False Pass catch	21	33	36	6	54	46	
	Bristol Bay run	19	20	46	11	39	60	42.1
1992	ADF&G pre-f'cast	19	39	27	13	58	42	37.1
	Moller in-f'cast	8	35	31	22	43	53	45.0
	False Pass catch	6	35	25	30	42	58	
	Bristol Bay run	13	34	27	22	47	50	44.9
1993	ADF&G pre-f'cast	23	41	21	14	64	35	41.8
	Moller in-f'cast	7	27	19	44	34	65	42.0
	False Pass catch	14	46	14	23	61	38	
	Bristol Bay run	13	33	18	33	46	53	51.9
1994	ADF&G pre-f'cast	14	43	19	22	57	43	52.5
	Moller in-f'cast	7	42	20	28	50	50	46.0
	False Pass catch	8	34	33	22	42	57	
	Bristol Bay run	8	56	14	18	65	34	50.1
1995	ADF&G pre-f'cast	16	53	17	13	69	31	55.1
	Moller in-f'cast	14	51	15	19	65	34	49.2
	False Pass catch	19	57	12	11	76	24	
	Bristol Bay run	16	56	12	15	72	27	60.7
1996	ADF&G pre-f'cast	18	36	26	19	54	48	43.4
	Moller in-season	8	13	51	24	21	79	41.0
	False Pass catch	15	24	38	20	39	61	
	Bristol Bay run	10	13	51	24	23	76	36.9
1997	ADF&G pre-f'cast	22	31	25	20	53	47	33.6
	Moller in-season	9	26	33	27	36	62	35.0
	False Pass catch	19	44	23	11	64	36	
	Bristol Bay run	20	34	26	18	54	44	18.9
1998	ADF&G pre-f'cast	25	32	24	18	57	43	30.2
	Moller in-season	19	9	38	33	28	72	30.7
	False Pass catch	14	9	39	37	24	76	
	Bristol Bay run	34	13	29	22	47	52	18.2
1999	ADF&G pre-f'cast	26	41	25	8	67	34	24.9
	Moller in-season	43	26	21	8	69	30	35.3
	False Pass catch	56	18	22	3	74	25	
	Bristol Bay run	51	24	17	7	75	24	39.5
2000	ADF&G pre-f'cast	20	27	37	16	47	53	35.4
	Moller in-season	14	20	53	12	34	66	42.7
	False Pass catch	26	20	42	7	46	54	
	Bristol Bay run	18	10	57	15	28	72	28.3
Means	ADF&G pre-f'cast	22	36	26	15	58	42	34.4
	Moller in-season	16	27	32	21	44	55	38.9
	False Pass catch	20	34	27	17	54	45	
	Bristol Bay run	21	31	29	17	52	47	38.1

Age composition for Port Moller is for June 11-30 only, whereas the forecast is the one issued about July
Forecasts and runs do not include jacks (1-ocean fish).

TABLE 5. Percent chums in sockeye and chum salmon catches and runs, 1977-2000.

	Bristol Bay Run			Western Alaska Run			South Peninsula June Catch			Port Moller Test Boat CPUE		
Year	Sockeye	Chum	%C	Sockeye	Chum	%C	Sockeye	Chum	%C	Sockeye	Chum	%C
77	9.6	4.0	29.4	10.8	9.0	45.5	0.24	0.12	32.4	6.9	2.3	25.0
78	19.8	2.3	10.4	22.1	7.2	24.6	0.49	0.12	19.7	3.2	0.8	20.0
79	39.8	1.7	4.0	43.6	7.4	14.5	0.85	0.10	10.5	9.6	0.2	2.0
80	62.4	3.3	5.1	65.4	12.0	15.5	3.21	0.51	13.7	4.6	1.6	25.8
81	34.3	2.1	5.8	37.9	11.6	23.4	1.82	0.56	23.5	7.6	2.0	20.8
82	22.1	1.3	5.7	24.6	7.4	23.1	2.12	1.09	34.0	5.1	1.1	17.7
83	45.7	2.2	4.5	48.8	8.0	14.1	1.96	0.78	28.5	4.4	0.4	8.3
84	40.7	3.5	7.8	43.9	11.4	20.6	1.39	0.34	19.7	27.1	5.0	15.6
85	36.6	2.0	5.3	40.7	8.8	17.8	1.79	0.43	19.4	15.9	0.9	5.4
86	23.6	2.2	8.6	27.1	8.9	24.7	0.47	0.35	42.7			
87	27.3	2.9	9.5	29.7	8.0	21.2	0.79	0.44	35.8	11.1	0.8	6.7
88	23.2	2.5	9.8	26.0	10.8	29.3	0.76	0.53	41.1	7.0	1.1	13.6
89	43.9	2.2	4.9	46.8	9.0	16.1	1.75	0.46	20.8	18.9	1.0	5.0
90	47.8	1.7	3.4	51.6	6.2	10.7	1.35	0.52	27.8	23.4	1.3	5.3
91	42.2	2.0	4.5	46.3	7.6	14.1	1.55	0.77	33.2	17.5	1.6	8.4
92	45.0	1.4	3.0	49.9	6.2	11.1	2.46	0.43	14.7	24.4	1.7	6.4
93	52.1	1.0	1.9	57.2	3.9	6.4	2.97	0.53	15.1	30.3	1.4	4.5
94	50.3	1.3	2.5	54.7	7.5	12.1	1.46	0.58	28.4	22.7	1.5	6.2
95	60.7	1.4	2.3	65.5	10.6	13.9	2.11	0.54	20.4	30.0	0.8	2.6
96	37.0	1.2	3.0	40.1	8.6	17.7	1.03	0.36	25.9	22.5	1.6	6.4
97	18.9	0.6	2.9	22.1	4.9	18.1	1.63	0.32	16.2	20.8	3.2	13.3
98	18.4	0.8	4.1	20.6	4.6	18.3	1.29	0.25	16.2	13.8	1.6	10.4
99	39.4	1.0	2.6	42.3	4.1	8.8	1.35	0.25	15.6	19.0	1.0	5.0
00	28.3	0.5	1.7	31.3	2.7	7.9	1.25	0.24	16.1	15.9	1.4	8.1
Means 83-00	37.8	1.7	4.6	41.4	7.3	15.7	1.52	0.45	24.3	19.1	1.5	7.7

TABLE 6. Annual sockeye salmon runs to the eastern Bering Sea, 1970-2000.

	Kuskokwim		Bristol Bay runs					Bristol Bay	North Penin.	Total	South Peninsula June catch	
Year	Catch	Run	Togiak	Nushagak	Nak/Kvi	Egegik	Ugashik	Total	Run	Run	Number	%
70	.013	.03	.37	3.15	32.65	2.32	.91	39.40	.64	40.1	1.65	3.4
71	.006	.02	.42	2.61	9.37	1.94	1.48	15.82	.79	16.6	.46	2.3
72	.004	.01	.16	.91	2.85	1.39	.10	5.41	.37	5.8	.50	6.8
73	.005	.01	.21	.85	.79	.55	.04	2.44	.35	2.8	.25	7.0
74	.028	.07	.25	2.78	6.43	1.45	.06	10.97	.58	11.6	.00	0.0
75	.018	.05	.38	2.92	18.35	2.14	.44	24.23	.75	25.0	.24	0.8
76	.014	.04	.50	2.75	5.92	1.84	.53	11.54	1.17	12.7	.31	2.0
77	.019	.05	.42	1.84	4.69	2.47	.29	9.71	1.01	10.8	.24	1.9
78	.014	.04	.79	6.62	10.32	2.10	.09	19.92	2.11	22.1	.49	1.9
79	.039	.10	.69	6.40	27.43	3.29	2.10	39.91	3.55	43.6	.85	1.6
80	.043	.11	1.21	12.81	40.57	3.68	4.22	62.49	2.78	65.4	3.21	4.0
81	.106	.27	1.01	10.34	14.63	5.06	3.44	34.48	3.19	37.9	1.82	3.9
82	.096	.24	.94	7.93	7.54	3.48	2.32	22.21	2.15	24.6	2.12	6.8
83	.089	.22	.83	7.07	26.11	7.55	4.35	45.91	2.67	48.8	1.96	3.3
84	.081	.20	.52	3.81	26.50	6.36	3.93	41.12	2.56	43.9	1.39	2.6
85	.121	.30	.40	2.99	17.36	8.63	7.48	36.86	3.50	40.7	1.79	3.6
86	.142	.36	.58	4.85	6.28	6.01	6.02	23.74	3.04	27.1	.47	1.5
87	.171	.43	.66	5.15	12.27	6.63	2.82	27.53	1.77	29.7	.79	2.2
88	.150	.38	1.16	3.23	8.85	8.01	2.19	23.44	2.14	26.0	.76	2.4
89	.080	.20	.21	5.05	23.56	10.31	4.90	44.03	2.53	46.8	1.74	3.1
90	.204	.41	.52	5.71	26.36	12.28	2.89	47.76	3.45	51.6	1.35	2.2
91	.202	.40	.80	7.69	18.64	9.59	5.50	42.22	3.71	46.3	1.55	2.8
92	.194	.39	.80	5.19	15.89	17.62	5.53	45.03	4.44	49.9	2.46	4.0
93	.167	.33	.70	7.62	14.78	23.34	5.67	52.11	4.87	57.3	2.97	4.2
94	.191	.38	.50	5.86	25.83	12.70	5.45	50.34	3.96	54.7	1.46	2.2
95	.198	.40	.73	6.69	31.78	15.73	5.81	60.74	4.35	65.5	2.11	2.7
96	.120	.24	.67	8.30	11.02	11.92	5.10	37.01	2.88	40.1	1.03	2.1
97	.123	.25	.24	4.64	3.36	8.67	1.99	18.90	2.97	22.1	1.63	5.9
98	.129	.26	.36	5.40	6.30	4.67	1.62	18.35	1.98	20.6	1.29	5.1
99	.080	.16	.61	8.49	17.23	9.15	3.92	39.40	2.70	42.3	1.35	2.6
00	.100	.20	1.07	8.55	8.33	8.14	2.17	28.26	2.80	31.3	1.25	3.3
Means												
70-79		.04	.42	3.08	11.88	1.95	.60	17.94	1.13	19.1	.50	2.8
80-89		.27	.75	6.32	18.37	6.57	4.17	36.18	2.63	39.1	1.61	3.3
90-00		.31	.64	6.74	16.32	12.16	4.15	40.01	3.46	43.8	1.68	3.4

Kuskokwim run estimated by catch/ 0.4 (1970-89) and catch/0.5 (1990-00).
South Peninsula percent= (SP catch*.85)/ (SP catch*.85+ WA total)*100.

TABLE 7. North Pacific runs of sockeye salmon, 1970-2000.

Year	Bristol Bay run	Alaska Runs		Japan High Seas Catch	Russian Run	North Pacific Total Run	SE Alaska BC and Wash.	Total Pacific Run	Percent Western Alaska
		Western	Central						
70	39	42	7	10	3	62	9	71	59
71	16	17	6	7	2	32	12	44	39
72	5	6	5	7	1	19	8	27	22
73	2	3	4	6	1	14	15	29	10
74	11	12	4	5	1	22	14	36	33
75	24	25	3	5	2	35	7	42	60
76	12	13	7	6	1	27	10	37	35
77	10	11	10	3	3	27	13	40	28
78	20	22	9	3	4	38	14	52	42
79	40	44	7	3	3	57	12	69	64
80	62	68	8	3	4	83	7	90	76
81	34	40	10	3	4	57	15	72	56
82	22	26	14	3	3	46	20	66	39
83	46	51	15	2	5	73	10	83	61
84	41	45	14	2	7	68	11	79	57
85	37	42	15	1	8	66	23	89	47
86	24	27	17	1	6	51	18	69	39
87	27	30	22	1	8	61	11	72	42
88	23	27	17	<1	5	49	10	59	46
89	44	48	17	<1	6	71	24	95	51
90	48	53	18	<1	12	83	24	107	50
91	42	48	19	<1	8	75	20	95	51
92	45	52	23	0	10	85	18	103	50
93	52	60	19	0	10	89	29	118	51
94	50	56	16	0	8	80	20	100	56
95	61	67	17	0	10	94	12	106	63
96	37	41	20	0	13	74	15	89	46
97	19	24	18	0	9	51	22	73	33
98	18	23	14	0	8	45	7	52	44
99	39	44	20	0	8	72	5	77	57
2000	28	32	12	0	6	50	6	56	58
Means									
70-79	18	20	6	6	2	33	11	45	39
80-89	36	40	15	2	6	63	15	77	51
90-99	41	47	18	0	10	75	17	92	50

Western Alaska includes Bristol Bay, North Peninsula and 85% of South Peninsula catch.
Japan high seas catches since1992 are included in Russian run.

TABLE 8. North Pacific runs of chum salmon, 1970-2000.

Year	Bristol Bay run	Alaska Runs Western	Alaska Runs Central	Japan catch High seas	Japan catch Coastal	Russian Run (Catch/.5)	North Pacific Total Run	SE Alaska B.C. and Wash.	Total Pacific Run	% Asia
70	1.7	6.0	5.2	17	7	7	43	11	54	59
71	1.3	4.7	6.6	17	10	7	45	7	52	65
72	1.6	4.7	4.5	22	9	4	45	17	62	57
73	2.2	6.5	3.5	16	12	3	41	15	56	56
74	1.6	6.8	1.9	22	13	5	48	10	58	68
75	1.4	8.4	2.1	19	20	4	54	5	59	74
76	2.8	7.5	3.4	22	12	8	53	9	62	68
77	4.0	9.1	5.9	12	15	9	51	5	56	64
78	2.3	7.3	4.3	7	18	11	47	9	56	63
79	1.7	7.5	4.0	6	28	12	58	4	62	75
80	3.3	12.4	5.1	6	26	7	57	11	68	58
81	2.1	12.0	8.3	6	34	9	70	6	76	65
82	1.3	8.2	8.9	7	30	7	61	9	70	63
83	2.2	8.6	7.0	6	37	12	71	6	77	72
84	3.5	11.6	6.5	6	38	7	70	13	83	62
85	2.0	9.2	5.5	4	51	12	82	17	99	68
86	2.2	9.2	8.1	3	49	14	83	17	100	66
87	2.9	8.3	6.2	3	43	13	73	12	85	69
88	2.5	11.2	8.7	2	51	13	86	20	106	62
89	2.2	9.3	4.9	1	55	13	83	9	92	74
90	1.8	6.5	4.6	1	68	13	94	13	107	77
91	2.1	8.2	5.2	1	60	10	84	11	95	74
92	1.5	6.4	4.4	0	46	17	73	16	89	70
93	1.1	4.3	3.8	0	61	21	90	21	111	74
94	1.5	8.0	6.0	0	69	26	109	21	130	73
95	1.4	11.0	6.5	0	78	24	120	20	140	73
96	1.2	8.9	6.0	0	87	25	127	30	157	71
97	0.6	5.1	5.6	0	74	18	103	18	121	76
98	0.9	4.9	4.1	0	61	*16*	86	27	113	68
99	1.1	3.2	6.3	0	50	15	74	25	99	65
2000	0.5	2.7	9.7	0	39	10	61	*26*	87	56
Means										
70-79	2.1	6.9	4.1	16	14	7	48	9	58	65
80-89	2.4	10.0	6.9	4	41	11	74	12	86	66
90-99	1.3	6.7	5.3	0	65	18	96	20	116	72

Western Alaska includes Bristol Bay, North Peninsula, Yukon-Kuskokwim regions and 75% of June catch south of the Alaska Peninsula.

Japan high seas catches since 1992 included in Russian runs.

Japan coastal catch includes in-river catch (hatchery returns).

Russian runs since 1993 from aerial surveys for escapements plus catches.

2000 numbers are preliminary from agencies.

TABLE 9. Summary of lengths and ages for chum salmon in the False Pass catches.

			Sex/age percent									Mean length (mm)								
Location	Sex	Age	92	93	94	95	96	97	98	99	00	92	93	94	95	96	97	98	99	00
South Unimak	Male	0.2	0.4	1.0	0.4	1.6	0.1	0.5	0.6	0.1	0.4	491	488	498	538	548	484	523	534	543
		0.3	26.9	31.4	23.6	21.2	26.4	25.2	28.2	23.5	20.0	550	557	568	580	588	571	591	581	600
		0.4	21.8	17.0	26.7	18.5	15.0	15.9	9.0	14.0	11.8	579	591	589	602	619	604	611	597	620
		0.5	0.1	0.6	2.0	2.0	0.5	0.7	0.4	0.5	0.3	628	599	611	619	634	618	634	617	634
		0.6			0.1		0.1	0.2						652		651	686			
	Female	0.2	0.1	1.2	0.3	1.2	0.1	1.0	0.5	0.0	1.1	514	514	507	517	525	468	542		521
		0.3	29.7	35.4	26.8	30.6	40.0	34.1	48.8	40.9	41.2	543	545	546	556	567	558	564	565	571
		0.4	20.8	13.3	19.2	23.9	16.0	21.6	11.9	20.7	24.9	568	574	563	581	594	589	586	577	598
		0.5	0.2	0.1	0.9	1.0	1.7	0.8	0.6	0.3	0.3	573	582	587	615	610	627	602	614	615
		0.6					0.1									629	644			
	Comb.	0.2	0.5	2.2	0.7	2.8	0.2	1.5	1.5	0.1	1.5	496	502	502	529	536	473	531	534	527
		0.3	56.6	66.8	50.4	51.8	66.4	59.3	77.0	64.4	61.2	546	551	556	566	575	564	574	571	580
		0.4	42.6	30.3	45.9	42.4	31.0	37.5	20.9	34.7	36.7	574	584	578	590	606	595	597	585	605
		0.5	0.3	0.7	2.9	3.0	2.2	1.5	1.5	1.5	0.6	591	597	604	618	615	623	615	615	625
		0.6			0.1		0.2	0.2						652		644	665			
Shum-agin	Male	0.2	0.0	0.7	0.3	1.0	0.0	0.0	2.2	0.0	1.4		519	567	561			563		552
		0.3	23.7	27.6	27.1	22.6	24.7	16.9	37.1	24.0	20.1	547	554	575	588	600	575	594	588	610
		0.4	21.6	20.7	28.8	23.4	20.2	19.3	6.7	14.1	19.9	589	586	589	604	637	615	632	616	630
		0.5	0.2	1.0	1.2	2.0	1.6	1.6	1.1	1.3	0.5	651	632	618	610	635	645	712	648	667
		0.6					0.1									658				
	Female	0.2	0.0	0.1	0.1	0.6	0.0	0.5	0.0	0.3	1.1		534	532	527		530		567	570
		0.3	32.0	33.2	21.2	28.4	31.9	34.0	41.6	40.4	27.8	543	547	550	563	577	573	571	569	581
		0.4	21.7	15.4	20.5	20.1	18.3	25.1	10.1	18.8	26.9	574	577	572	587	616	595	598	581	613
		0.5	0.8	1.3	0.8	1.7	3.0	2.6	1.1	1.0	2.2	609	662	595	604	630	618	678	582	647
		0.6				0.2	0.2								595	664				
	Comb.	0.2	0.0	0.8	0.4	1.6	0.0	0.5	2.2	0.3	2.5		521	558	548		530	563	567	560
		0.3	55.7	60.8	48.3	50.0	56.6	49.9	78.7	64.4	47.9	545	550	564	586	587	574	582	576	593
		0.4	43.3	36.1	49.3	43.5	38.5	44.4	16.8	32.9	46.8	581	582	582	596	627	604	612	596	620
		0.5	1.0	2.3	2.0	3.7	4.6	4.2	2.2	2.3	2.7	617	649	609	607	632	628	695	615	651
		0.6				0.2	0.3								595	662				

TABLE 10. Summary of AWL samples from South Unimak in 2000.

Date	Age	Sex	n	Length (mm) Mean	SD	Catch (1,000s)	prop.
13	0.3	M	18	591	30.9	1.9	.159
		F	39	565	25.0	4.0	.345
	0.4	M	16	616	26.1	1.7	.142
		F	37	596	26.6	3.8	.327
	0.5	M	1	640		0.1	.009
		F	2	629		0.2	.018
14	0.2	M	0			0.0	.000
		F	1	548		0.1	.005
	0.3	M	27	600	27.0	1.4	.141
		F	65	576	73.9	3.3	.340
	0.4	M	39	620	30.9	2.0	.204
		F	55	582	31.0	2.8	.288
	0.5	M	3	642		0.2	.016
		F	1	610		0.1	.005
15-17	0.3	M	49	600	23.1	3.6	.202
		F	101	573	29.6	7.5	.416
	0.4	M	31	624	24.0	2.3	.128
		F	62	591	32.0	4.6	.255
19-20	0.3	M	28	597	32.0	2.5	.153
		F	90	574	30.0	8.1	.492
	0.4	M	21	619	29.5	1.9	.115
		F	43	595	29.0	3.9	.235
	0.5	M	0			0.0	.000
		F	1	618		0.1	.005
21-22	0.2	M	0				
		F	3	544		0.2	.007
	0.3	M	89	603	30.3	5.2	.219
		F	155	576	27.5	9.0	.382
	0.4	M	37	622	35.8	2.2	.091
		F	117	599	25.1	6.8	.288
	0.5	M	2	668		0.1	.005
		F	3	600		0.2	.007
23-24	0.2	M	1	563		0.2	.007
		F	1	519		0.2	.007
	0.3	M	35	600	22.4	6.9	.238
		F	67	568	31.4	13.2	.456
	0.4	M	22	622	39.4	4.3	.150
		F	20	606		3.9	.136
	0.5	M	1	604		0.2	.007
		F					
25-26	0.2	M	1	522		0.6	.009
		F	3	521		1.7	.027
	0.3	M	22	601	42.6	12.4	.200
		F	44	570	31.7	24.9	.400
	0.4	M	10	616		5.7	.091
		F	29	601	40.7	16.4	.264
	0.5	M	0			0.0	.000
		F	1	597		0.6	.009
Combined	0.2	M	2	543		0.8	.004
		F	4	521		1.9	.011
	0.3	M	268	600		33.9	.200
		F	561	571		70.1	.412
	0.4	M	176	620		20.0	.118
		F	363	598		42.3	.249
	0.5	M	7	634		0.6	.003
		F	8	615		0.5	.003
Totals			1389			170.0	

TABLE 11. Summary of AWL samples from Shumagin Islands in 2000.

				Length (mm)		Catch	
Date	Age	Sex	n	Mean	SD	(1,000s)	prop.
14	0.2	F	1	587		0.3	.014
	0.3	M	12	607	24.7	3.3	.162
		F	25	583	20.5	6.9	.338
	0.4	M	16	628		4.4	.216
		F	17	615	36.8	4.7	.230
	0.5	M	1	675		0.3	.014
		F	2	644		0.6	.027
15	0.2	M	1	558		0.1	.009
		F	1	569		0.1	.009
	0.3	M	37	611	30.0	3.4	.336
		F	23	589	30.4	2.1	.209
	0.4	M	28	638	34.5	2.5	.255
		F	17	620	34.5	1.5	.155
	0.5	M	2	656		0.2	.018
		F	1	638		0.1	.009
16-18	0.2	M	2	551		0.9	.022
		F	1	560		0.4	.011
	0.3	M	17	610		7.4	.187
		F	24	577		10.4	.264
	0.4	M	16	628		6.9	.176
		F	29	611		12.6	.319
	0.5	M	0			0.0	.000
		F	2	650		0.9	.022
Combined	0.2	M	3	552		1.0	.014
		F	3	570		0.8	.011
	0.3	M	66	610		14.0	.201
		F	72	581		19.4	.278
	0.4	M	60	630		13.9	.199
		F	63	613		18.8	.269
	0.5	M	3	667		0.5	.007
		F	5	647		1.5	.022
Totals			275			69.8	

TABLE 12. Age composition, mean length and mean weight of chum salmon from Nushagak catches.

	age 0.2			age 0.3			age 0.4			0.5	Number (millions)		
											Chum salmon		Sockeye
Year	%	Length	Weight	%	Length	Weight	%	Length	Weight	%	catch	run	run
66	10.5		1.81	75.5		3.88	14.0		4.07	0.0	.13	.31	2.80
67	3.6	534	2.39	89.2	574	2.97	7.2	590	3.29	0.0	.34	.79	1.53
68	6.9	552	2.83	65.9	584	3.17	27.1	597	3.32	0.1	.18	.43	1.68
69	21.3	529	2.31	73.9	564	2.82	4.8	594	3.38	0.0	.21	.54	1.99
70	1.1	531	3.33	96.5	568	2.95	2.4	610	3.60	0.0	.44	1.14	3.15
71	5.5	542	2.28	68.5	570	2.91	26.0	585	3.15	0.0	.36	.84	2.61
72	8.2	551	2.72	67.9	579	3.09	23.5	590	3.14	0.4	.31	.74	0.91
73	0.2			71.6	575	3.08	26.7	592	3.39	1.5	.34	1.10	0.85
74	16.3	533	2.36	42.4	576	3.11	39.6	594	3.25	1.7	.16	.89	2.78
75	24.3	530	2.37	73.9	563	2.93	1.7	585	2.88	0.1	.15	.68	2.92
76	9.3	542	2.45	84.1	580	3.02	6.6	601	3.30	0.0	.80	1.74	2.75
77	3.1	553	2.52	93.3	583	3.26	3.6	596	3.53	0.0	.90	2.65	1.84
78	2.3	541	2.55	40.6	587	3.23	57.1	617	3.95	0.0	.65	1.38	6.62
79	6.7	532	2.33	62.8	568	2.93	29.9	599	3.33	0.6	.44	.85	6.40
80	0.9	523	2.29	98.3	558	2.94	0.8	588	3.01	0.0	.68	1.65	12.81
81	0.3			61.0	566	2.95	38.7	596	3.58	0.0	.80	.97	10.34
82	1.3			44.2	572		53.5	576		1.0	.44	.69	7.93
83	2.0	535		34.5	571	3.18	61.5	585	3.45	2.0	.72	.89	7.07
84	1.6	528		87.2	562	3.07	10.0	584	4.06	1.2	.85	1.21	3.81
85	32.7	572	2.92	54.4	573	3.19	12.4	571	2.96	0.5	.40	.69	2.99
86	0.3			85.2	558	2.93	14.5	574	3.39	0.0	.49	.66	4.85
87	0.0			40.2	560	3.02	57.3	582	3.37	2.5	.42	.56	5.15
88	6.9	535	2.65	62.3	566	3.07	30.0	580	3.40	0.8	.37	.56	3.23
89	0.4			82.0	557	2.82	17.3	577	3.35	0.3	.52	.90	5.05
90	0.5			78.8	553	2.87	20.2	587	3.47	0.5	.31	.64	5.71
91	2.3	526	2.47	67.4	548	2.71	30.3	573	3.18	0.0	.47	.70	7.69
92	0.2	479		55.2	549	2.80	44.1	565	2.97	0.4	.31	.62	5.19
93	0.2	502		42.6	545	2.61	53.6	570	2.94	3.6	.41	.63	7.62
94*	0.4	512		51.2	553	2.81	47.0	562	2.83	1.5	.29	.67	5.86
95	7.1	533	2.44	52.7	552	2.75	36.6	568	3.06	3.6	.36	.58	6.70
96	0.2	545		77.2	566	3.17	21.8	592	3.63	0.8	.32	.55	8.30
97	0.7	510		69.5	556	2.83	29.3	574	3.05	0.5	.18	.24	4.63
98	1.2	541		86.0	569	2.90	12.1	590	3.40	0.6	.24	.54	5.40
99	0.0			67.6	573	3.16	31.6	582	3.18	0.7	.13	.37	8.50
00	7.8	561		65.2	580	3.21	27.0	590	3.45	0.0	.11	.25	8.50
Means													
70-00	4.6	533	2.55	66.6	566	2.98	28.0	585	3.31	0.8	.43	.86	5.42

Sources: Yuen and Nelson (1984), annual ADF&G reports on Bristol Bay salmon; e.g. Stratton and Crawford (1994); and B. Cross (ADF&G) for 1993-1999.

*About 55% of catch made with king salmon gear. AWL statistics are for sockeye gear (7/1-21).

TABLE 13. Frequencies of focal scale resorption on chum salmon scales from the 2000 False Pass catches.

Location	Date	Number of normal scales (2)	Number with holes		Percent with holes (1 or 2)	Number with questionable holes (1 or 2)	Percent with holes including questionable	Number of normal scales (1)	Number with holes	Percent with holes	Number with question.	Percent including question.
			one scale	both scales								
Unimak	6/13	99	1	0	1.0	1	1.0	14	0	0.0	0	0.0
	6/14	171	1	0	0.6	1	1.2	14	0	0.0	0	0.0
	6/15	33	0	0	0.0	0	0.0	3	0	0.0	0	0.0
	6/16	0						133	0	0.0	0	0.0
	6/17	0						70	0	0.0	0	0.0
	6/19	0						108	0	0.0	0	0.0
	6/20	0						75	0	0.0	0	0.0
	6/21	0						147	0	0.0	1	0.7
	6/22	0						251	1	0.4	1	0.8
	6/23	0						104	1	1.0	0	1.0
	6/24	0						39	0	0.0	0	0.0
	6/25	0						71	0	0.0	1	1.4
	6/26	0						32	0	0.0	1	3.0
	Totals	303	2	0	0.7	2	1.3	1061	2	0.2	4	0.6
Shumagin Is.	6/14	58	0	0	0.0	0	0.0	1	0	0.0	0	0.0
	6/15	0						109	1	0.9	0	0.9
	6/16	0						59	1	1.6	2	4.8
	6/18	0						35	0	0.0	0	0.0
	Totals	58	0	0	0.0	0	0.0	204	2	1.0	2	1.9
False Pass	Combined	361	2	0	0.60	2	1.10	1265	4	0.31	6	0.78

TABLE 14. Timing of Bristol Bay sockeye runs and between Bristol Bay and Port Moller.

	Mean date of run (July)					Mean date	Days P.M. to	P.M. mean temp. (C)
Year	Egegik	Nak/Kvi	Nush.	Wt'd mean	Ugashik	at P.M.*	B.B.	6/11 to 7/5
85	2.1	3.0	4.3	2.9	7.0	27.1	5.8	5.8
86	6.6	6.4	8.3	7.0	8.4			
87	3.4	5.5	4.3	4.7	9.4	25.5	9.2	5.7
88	1.5	2.0	5.1	2.3	10.6	26.8	5.5	7.5
89	3.4	1.4	3.0	2.1	8.8	27.0	5.1	6.3
90	6.0	5.0	6.4	5.5	10.1	28.0	7.5	7.3
91	4.1	3.6	5.4	4.1	8.0	25.8	8.3	5.3
92	5.4	5.0	6.0	5.3	12.6	26.7	8.6	7.6
93	0.3	0.6	1.4	0.6	6.6	25.3	5.3	7.7
94	6.4	7.0	8.0	7.0	12.3	28.0	9.0	6.6
95	4.4	5.0	4.0	4.7	11.3	26.3	8.4	7.3
96	1.4	3.6	3.6	2.8	5.6	25.9	6.9	6.1
97	2.6	4.4	5.3	3.7	8.4	27.1	6.6	9.5
98	4.4	7.8	6.0	6.1	13.3	28.2	8.0	7.7
99	3.8	4.8	6.4	4.9	9.4	27.5	7.3	4.7
0	-0.6	2.1	2.5	1.3	5.5	22.5	8.0	7.1
Means 1987-99	3.6	4.3	5.0	4.1	9.7	26.8	7.4	6.9

* Date in June of 50% of index through July 5.

TABLE 15. Age compositions in the Northern District by week, 2000.

Section	Week ending	2-ocean				3-ocean				4-ocean			Catch 1,000s
		0.2	1.2	2.2	3.2	0.3	1.3	2.3	3.3	0.4	1.4	2.4	
Nelson Lagoon													
June	13	.000	.076	.127	.003	.076	.342	.366	.003	.000	.007	.004	4
	20	.000	.149	.262	.003	.032	.244	.305	.002	.000	.000	.003	13
	27	.000	.210	.322	.007	.018	.125	.314	.002	.000	.000	.002	39
July	4	.000	.213	.391	.005	.018	.112	.258	.002	.000	.000	.001	58
	11	.000	.208	.446	.003	.017	.118	.204	.002	.000	.000	.001	43
	18	.000	.190	.400	.002	.014	.201	.188	.003	.001	.000	.000	19
	25	.002	.188	.263	.001	.034	.346	.163	.001	.001	.002	.000	8
Aug.	1	.001	.165	.121	.001	.038	.510	.159	.000	.001	.004	.000	2
	8	.001	.148	.081	.002	.022	.569	.171	.000	.000	.003	.000	3
	15												0
	22												0
Sept.	12												0
Total number		0	38	69	1	4	30	47	0	0	0	0	189
Proportion		.000	.199	.363	.004	.021	.160	.249	.002	.000	.000	.001	
Harbor Point to Stoganof Point													
June	27		.073	.117	.000	.195	.306	.298	.002	.005	.003	.001	193
July	4		.110	.209	.000	.084	.301	.288	.002	.002	.003	.001	282
	11		.108	.304	.000	.034	.300	.247	.002	.001	.003	.001	247
	18		.068	.342	.002	.021	.316	.238	.002	.003	.006	.001	170
	25		.055	.494	.003	.015	.218	.207	.003	.001	.003	.001	89
Aug.	1		.068	.548	.005	.014	.172	.189	.002	.000	.001	.001	51
	8		.093	.650	.001	.007	.090	.156	.001	.000	.000	.001	41
	15		.057	.625	.002	.003	.083	.226	.002	.000	.000	.000	134
	22		.042	.642	.002	.002	.058	.253	.002	.000	.000	.000	173
	29		.036	.669	.001	.001	.055	.238	.001	.000	.000	.000	129
Sept.	5		.056	.632	.002	.000	.053	.255	.003	.000	.000	.000	142
Total number		0	123	684	2	77	339	416	3	2	4	1	1651
Proportion		.000	.075	.414	.001	.046	.206	.252	.002	.001	.002	.001	

Source: R. Murphy, ADF&G Kodiak

TABLE 16. Age compositions in early and late-run escapements to Bear Lake.

	Early run (through July 11)						Escape-ment	Late run (August 2 to end)						Escape-ment
Year	1.2	1.3	2.1	2.2	2.3	other	(1000s)	1.2	1.3	2.1	2.2	2.3	other	(1000s)
85	.062	.136	.094	.541	.152	.015	202	.012	.006	.045	.826	.103	.008	156
86	.056	.071	.002	.439	.428	.004	121	.005	.013	.015	.734	.233	.000	98
87	.030	.201	.001	.537	.225	.006	117	.020	.037	.002	.554	.387	.000	81
88	.000	.077	.011	.230	.682	.000	117	.007	.011	.134	.550	.297	.001	140
89	.020	.001	.071	.269	.573	.066	135	.017	.001	.077	.787	.111	.007	178
90	.154	.020	.013	.368	.390	.055	147	.039	.008	.002	.854	.073	.024	232
91	.032	.336	.046	.512	.069	.005	293	.110	.020	.101	.681	.067	.021	65
92	.038	.037	.055	.577	.271	.022	168	.003	.003	.150	.712	.104	.028	194
93	.015	.038	.009	.323	.593	.022	194	.013	.008	.193	.439	.316	.031	194
94	.012	.072	.055	.271	.548	.042	163	.000	.018	.005	.831	.094	.052	173
95	.036	.003	.075	.386	.485	.015	130	.007	.006	.148	.659	.176	.004	84
96	.045	.034	.122	.581	.212	.006	188	.010	.006	.163	.467	.211	.143	97
97	.056	.034	.170	.484	.249	.007	215	.010	.003	.207	.667	.096	.017	145
98	.002	.047	.072	.382	.447	.050	225	.016	.004	.089	.700	.183	.008	190
99	.059	.106	.034	.508	.285	.008	232	.020	.006	.011	.671	.179	.113	131
00	.299	.063	.030	.274	.330	.004	185	.069	.089	.088	.641	.104	.009	91
Means	.057	.080	.054	.418	.371	.020	177	.022	.015	.089	.673	.171	.029	141

TABLE 17. Age compositions of sockeye salmon from North Peninsula rivers in July 1994-2000.

		1-ocean			2-ocean				3-ocean			4-ocean			Escape.
Year	River	1.1	2.1	3.1	0.2	1.2	2.2	3.2	0.3	1.3	2.3	0.4	1.4	2.4	1,000s
94	Ilnik					.083			.350	.317	.033	.017	.117	.083	75
	Sandy	.017	.002		.001	.899	.019		.001	.060	.001		.001		115
	Bear (early)	.006	.060			.012	.477			.057	.366		.002	.020	262
	Nelson		.047			.020	.843	.005		.010	.069		.004	.001	325
	Combined	.005	.040		.000	.153	.516	.002	.034	.063	.156	.002	.014	.015	777
95	Ilnik				.022	.129	.010		.125	.650	.037	.015	.012		38
	Sandy	.033			.006	.320	.030			.603	.007				124
	Bear (early)	.000	.112			.027	.424			.006	.416		.006	.009	221
	Nelson	.001	.086		.001	.013	.826	.002		.014	.056			.002	338
	Combined	.006	.075		.003	.076	.523	.001	.007	.146	.157	.001	.002	.004	721
96	Ilnik				.006	.033	.006		.676	.259		.013	.007		62
	Sandy	.008	.001		.012	.521			.077	.372	.005		.003		64
	Bear (early)	.002	.142			.046	.576			.032	.197			.005	247
	Nelson	.002	.065		.001	.139	.651	.005	.001	.054	.082				250
	Combined	.002	.082		.002	.131	.490	.002	.076	.098	.112	.001	.001	.002	623
97	Ilnik	.043			.048	.034	.001		.217	.403	.006	.234	.014		83
	Sandy	.099	.001		.017	.572	.005		.042	.260	.002		.001	.001	38
	Bear (early)	.006	.170			.056	.484	.001		.034	.249				253
	Nelson	.005	.023			.115	.617		.001	.107	.128	.001	.001		190
	Combined	.017	.084		.008	.107	.425	.000	.035	.128	.156	.035	.002	.000	564
98	Ilnik	.002	.000		.044	.451	.000		.262	.231	.001	.008	.001		42
	Sandy	.059	.000		.034	.527	.003		.035	.338	.000				50
	Bear (early)	.006	.148		.000	.062	.387		.000	.054	.343				232
	Nelson	.007	.138		.000	.128	.376		.001	.127	.223				165
	Combined	.011	.117		.007	.165	.311		.026	.123	.238	.001	.000		489
99	Ilnik	.002	.000		.021	.096	.000		.266	.585	.001	.021	.008		75
	Sandy	.027	.001		.024	.693	.014		.118	.121	.002				58
	Bear (early)	.010	.070	.001	.000	.089	.523	.001	.000	.076	.227			.003	223
	Nelson	.002	.040		.000	.052	.810		.006	.038	.050		.002		202
	Combined	.008	.043	.000	.005	.139	.504	.001	.050	.135	.109	.003	.002	.000	558
00	Ilnik	.000	.000	.000	.018	.019	.002	.000	.444	.457	.037	.010	.013	.000	95
	Sandy	.014	.003	.000	.024	.463	.019	.000	.197	.274	.006	.000	.000	.000	40
	Bear (early)	.000	.038	.000	.000	.265	.352	.001	.000	.068	.275	.000	.001	.000	169
	Nelson	.002	.002	.000	.000	.356	.495	.008	.004	.039	.093	.000	.001	.000	183
	Combined	.002	.014	.000	.005	.267	.310	.003	.104	.150	.138	.002	.003	.000	487

Source: P. Nelson, C. Hicks,and R Murphy ADF&G Kodiak

APPENDIX TABLE 1. Chum salmon escapement estimates in the AYK, 1994-2000.

Stock	River	Year						
		1994	1995	1996	1997	1998	1999	2000
Yukon summer	Pilot station sonar		3638		1411	746	939	433
	Andrdeafsky east weir	201	172	109	51	68	32	24
	Andrdeafsky west							
	Anvik sonar	1129	1339	933	609	472	441	206
	Rodo	48	47	77	3			
	Nulato tower	145	237	137	158	49	30	24
	Gisasa weir	51	137	158	32	18	10	11
	Kaltag tower		77	51	48	8	5	7
	Clear Creek tower		117	101	76		11	19
	Chena tower/tagging		4	13	9	6	9	4
	Salcha tower/tagging	39	31	75	36	17	23	21
	Salcha aerial		1	10				
Yukon fall	Toklat	74	55	19	15	1		
	Delta	23	21	14	8			
	Chandalar sonar		281	208	200	69		
	Sheenjek sonar	153	235	248	80	33		
	Fishing Branch weir	65	52	77	30	12		
	Canada main stem tags	102	158	123	95			
	South Koyukuk weir		19	22				
Kuskokwim	Kogrugluk weir	46	31	48	8			11
	Aniak sonar	388		302	263	278		146
	Tuluksak weir	16						
	Goodnews weir	35	34	40	17	28		15
	Kanektok air	10	16	7	3			
	Kanektok tower			71	51			
	Kwithlok tower/weir			27	11			12
	George weir			18	6			3
	Tatalawiksuk weir							7
	Taketka tower		3	3	2			1
Kotzebue	Noatak		147	307	no surveys	no surveys	59	
	Ely		8	30				
	Kelly River and lake		8	1			3	
	Squirrel		10	11	5		14	
	Salmon		14	24	2		5	
	Tutuksuk		4	22	1		3	
	Upper Kobuk		36	75	10		27	
Norton Sound	Sinuk	1	3	2			2	
	Nome	<1	2	1		2	<1	1
	Flambeau	5	7	5			<1	1
	Eldorado	5	9	21		14	2	3
	Fish	17	13	6			<1	
	Kachavik							
	Boston	4	4	4			0	
	Niukluk	16	25	10		46	1	
	Kwiniuk tower	33	43	28	20	24	8	12
	Tubutulik		17	11				
	North		1	10		2	2	
	Shaktoolik		9	7		6	2	

APPENDIX TABLE 2. Bristol Bay chum salmon catches, sockeye exploitation and estimated chum runs.

	Nushagak			Togiak			Nak/Kvi			Egegik			Ugashik			Bristol Bay run	
Year	Chum catch	Catch/ expl.	ADFG Run	Chum catch	Catch/ expl.	ADFG Run	Chum catch	Catch/ expl.	ADFG Run	Chum catch	Catch/ expl.	ADFG run	Chum catch	Catch/ expl.	ADFG run	Catch/ expl.	ADFG
70	.44	1.14	.71	.10	.22	.34	.120	.22		.044	.07		.018	.09		1.75	
71	.36	.75	.59	.12	.24	.35	.151	.24		.027	.04		.014	.02		1.29	
72	.31	.74	.51	.18	.38	.35	.116	.30		.042	.07		.010	.06		1.53	
73	.34	1.06	.54	.20	.44	.36	.124	.59		.023	.06		.006	.07		2.22	
74	.16	.89	.26	.08	.14	.24	.041	.51		.004	.03		.002	.07		1.64	
75	.15	.68	.23	.09	.18	.20	.080	.47		.004	.01		.002	.07		1.41	
76	.80	1.74	1.30	.15	.25	.55	.318	.74		.047	.07		.010	.03		2.82	
77	.90	2.65	1.51	.27	.52	.77	.340	.74		.083	.12		.004	.01		4.03	
78	.65	1.38	.94	.27	.47	.67	.185	.37		.044	.08		.001	.01		2.31	
79	.44	.85	.61	.22	.33	.51	.196	.36		.038	.06		.012	.06		1.65	
80	.68	1.94	1.65	.30	.57	.71	.205	.55	.21	.079	.11		.036	.17	.05	3.35	
81	.80	1.11	.97	.23	.36	.56	.356	.47	.43	.088	.10		.036	.06	.04	2.11	
82	.43	.57	.69	.15	.23	.24	.198	.30	.21	.084	.12	.10	.053	.11	.11	1.34	1.35
83	.73	1.01	.89	.32	.45	.49	.352	.42	.36	.127	.14	.14	.105	.14	.14	2.17	2.02
84	.85	1.63	1.21	.34	.55	.54	.447	.81	.50	.178	.22	.20	.211	.31	.38	3.52	2.83
85	.40	.91	.68	.20	.38	.42	.210	.45	.23	.127	.15	.13	.132	.15	.16	2.04	1.62
86	.49	.88	.66	.27	.51	.60	.263	.57	.30	.095	.12	.10	.111	.13	.12	2.21	1.78
87	.42	.67	.56	.42	.81	.78	.447	1.09	.46	.145	.18	.17	.101	.13	.13	2.88	2.10
88	.37	.70	.56	.47	.66	.88	.296	.74	.36	.238	.30	.25	.095	.14	.15	2.53	2.20
89	.52	.93	.90	.20	.49	.35	.311	.53	.32	.136	.16	.14	.085	.13	.10	2.24	1.81
90	.38	.61	.71	.10	.18	.17	.422	.65	.47	.123	.15	.14	.032	.04	.04	1.64	1.53
91	.46	.68	.75	.25	.38	.40	.443	.79	.49	.076	.11	.07	.060	.11	.07	2.07	1.78
92	.40	.71	.62	.18	.24	.29	.167	.28	.34	.121	.14	.12	.057	.09	.10	1.46	1.47
93	.50	.72	.63	.14	.21	.25	.044	.08	.04	.071	.07	.05	.073	.10	.08	1.17	1.05
94	.33	.56	.67	.23	.35	.46	.219	.35	.26	.063	.07	.06	.052	.07	.08	1.40	1.53
95	.39	.55	.58	.22	.31	.39	.236	.37	.39	.068	.07	.06	.063	.08	.07	1.38	1.49
96	.32	.47	.55	.21	.30	.32	.124	.17	.27	.083	.09	.09	.103	.12	.13	1.15	1.36
97	.18	.32	.24	.05	.11	.15	.009	.05		.053	.06		.016	.02		.56	
98	.21	.43	.54	.07	.18	.17	.082	.12		.029	.03		.008	.02		.78	
99	.12	.18	.37	.11	.17	.23	.273	.48		.075	.09		.071	.12		1.04	
00	.11	.15	.25	.14	.20		.050	.08		.020	.02		.020	.03		.48	
Means																	
70-81	.50	1.24	.82	.18	.34	.47	.19	.46		.04	.07		.01	.06		2.18	
82-89	.53	.91	.77	.30	.51	.54	.32	.61	.34	.14	.17	.15	.11	.15	.16	2.36	1.96
90-99	.33	.52	.57	.16	.24	.28	.20	.33	.32	.08	.09	.08	.05	.08	.08	1.27	1.46

Source: ADF&G (2000)

APPENDIX TABLE 3. Estimated chum salmon runs to areas of Central Alaska, 1970-2000.

	South Peninsula			Chignik			Kodiak			Cook Inlet			Prince William Sound			Total
Year	Catch	Escape.	Run	Catch	Escape.	Run	Catch	Escape.	Run	Catch	Escape.	Run	Catch	Escape.	Run	run
70	0.55	0.28	0.83	0.46	0.23	0.69	0.92		1.88	1.00		1.43	0.23	0.10	0.33	5.16
71	0.86	0.34	1.20	0.35	0.47	0.82	1.54		3.14	0.48		0.69	0.57	0.17	0.74	6.59
72	0.21	0.25	0.46	0.08	0.19	0.27	1.16		2.37	0.71		1.01	0.05	0.30	0.35	4.46
73	0.09	0.21	0.30	0.01	0.12	0.13	0.32		0.65	0.78		1.11	0.73	0.55	1.28	3.48
74	0.07	0.26	0.33	0.03	0.15	0.18	0.25		0.51	0.42		0.60	0.09	0.20	0.29	1.91
75	0.03	0.19	0.22	0.02	0.13	0.15	0.08		0.16	0.97		1.39	0.10	0.05	0.15	2.07
76	0.12	0.33	0.45	0.08	0.21	0.29	0.74		1.51	0.52		0.74	0.37	0.08	0.45	3.44
77	0.13	0.77	0.90	0.11	0.15	0.26	1.07	0.98	2.05	1.38		1.97	0.57	0.15	0.72	5.90
78	0.42	0.60	1.02	0.12	0.10	0.22	0.81	0.64	1.45	0.65		0.93	0.49	0.16	0.65	4.27
79	0.38	0.41	0.79	0.18	0.18	0.36	0.36	0.80	1.16	0.87		1.24	0.33	0.10	0.43	3.98
80	0.84	0.36	1.20	0.31	0.23	0.54	1.08	1.10	2.18	0.46		0.66	0.41	0.09	0.50	5.08
81	1.20	0.38	1.58	0.58	0.24	0.82	1.35	0.98	2.33	1.17		1.67	1.75	0.15	1.90	8.30
82	1.17	0.39	1.56	0.39	0.26	0.65	1.26	1.36	2.62	1.63		2.33	1.34	0.37	1.71	8.87
83	0.92	0.45	1.37	0.16	0.10	0.26	1.09	1.09	2.18	1.27		1.81	1.03	0.39	1.42	7.04
84	1.31	0.70	2.01	0.06	0.37	0.43	0.65	0.90	1.55	0.76		1.09	1.20	0.23	1.43	6.51
85	0.91	0.50	1.41	0.03	0.06	0.09	0.43	0.96	1.39	0.78		1.11	1.31	0.19	1.50	5.50
86	1.40	0.54	1.94	0.18	0.05	0.23	1.13	1.17	2.30	1.19		1.70	1.68	0.23	1.91	8.08
87	0.93	0.62	1.55	0.13	0.08	0.21	0.68	0.85	1.53	0.48		0.69	1.91	0.34	2.25	6.23
88	1.38	0.50	1.88	0.27	0.36	0.63	1.43	0.95	2.38	0.94		1.34	1.84	0.59	2.43	8.66
89	0.54	0.31	0.85	0.00	0.14	0.14	0.02	1.53	1.55	0.14		1.00	0.99	0.32	1.31	4.85
90	0.72	0.35	1.07	0.27	0.25	0.52	0.58	0.53	1.11	0.36		0.51	0.96	0.41	1.37	4.58
91	0.80	0.59	1.39	0.26	0.47	0.73	1.03	1.04	2.07	0.33		0.47	0.33	0.25	0.58	5.24
92	0.88	0.34	1.22	0.22	0.57	0.79	0.68	0.59	1.27	0.38		0.54	0.33	0.27	0.60	4.42
93	0.51	0.40	0.91	0.12	0.26	0.38	0.59	0.26	0.85	0.12		0.17	1.19	0.27	1.46	3.77
94	1.59	0.58	2.17	0.21	0.37	0.58	0.74	0.61	1.35	0.30		0.43	1.06		1.51	6.04
95	1.18	0.73	1.91	0.38	0.35	0.73	1.52	0.52	2.04	0.53		0.76	0.76		1.09	6.53
96	0.42	0.61	1.03	0.10	0.35	0.45	0.54	0.74	1.28	0.16		0.23	2.39	0.58	2.97	5.96
97	0.29	0.81	1.10	0.16	0.59	0.75	0.52	0.46	0.98	0.09		0.13	2.22	0.37	2.59	5.55
98	0.47	0.74	1.21	0.13	*0.40*	0.53	0.32	0.37	0.69	0.10		0.14	1.27	*0.30*	1.57	4.14
99	0.60	0.73	1.33	0.14	*0.40*	0.54	0.91	*0.90*	1.81	0.18		0.26	1.96	*0.35*	2.31	6.25
00	0.79	0.40	1.19	0.13	*0.40*	0.53	1.18	*0.80*	1.98	0.20		0.29	5.09	*0.60*	5.69	9.68
Means																
70-79	0.29	0.36	0.65	0.14	0.19	0.34	0.73	0.81	1.49	0.78		1.11	0.35	0.19	0.54	4.13
80-89	1.06	0.48	1.54	0.21	0.19	0.40	0.91	1.09	2.00	0.88		1.34	1.35	0.29	1.64	6.91
90-99	0.75	0.59	1.33	0.20	0.40	0.60	0.74	0.60	1.35	0.26		0.36	1.25	0.35	1.61	5.25

Sources: Barrett et al (1990), Quimby and Owen (1994), ADF&G (1988), Campbell et al (1997), and Donaldson et al (1993).
C. Swanton (ADF&G, personal comunication)
Cook Inlet run estimated from catch and mean sockeye salmon harvest rate,0.7.
Kodiak runs for 1970-76 and 1990-91 estimated from catch and mean harvest rate of .49 (1977-88).
South Peninsula catch for post-June only(Witteveen et al 2000).

APPENDIX TABLE 4. Catches of chum salmon in the Yukon River in thousands of fish, 1970-2000.

			Fall chum							Escapement		
	Summer chum		Commercial		Subsistance		Total comm-	Total subsis-		Sum-		
Year	Commercial	Subsistance	U.S.	Canada	U.S.	Canada	ercial	tance	Total	mer	Fall	Total
70	137	167	210	2	56	2	349	225	574			
71	100	171	190	2	57	15	292	243	535			
72	136	108	152	3	36	5	291	149	440			
73	286	161	232	3	54	7	521	222	743			
74	590	228	290	3	94	9	883	331	1214	*632*	*592*	1224
75	710	212	275	2	87	19	987	318	1305	*1952*	*1394*	3346
76	601	187	156	1	72	4	758	263	1021	*1033*	*504*	1537
77	535	160	258	4	83	8	797	251	1048	*791*	*619*	1410
78	1078	197	247	3	95	7	1328	299	1627	*766*	*500*	1266
79	820	196	378	9	233	13	1207	442	1649	*696*	*997*	1693
80	1068	272	298	9	173	13	1375	458	1833	*1104*	*490*	1594
81	1280	208	478	15	189	7	1773	404	2177	*2300*	*592*	2892
82	717	261	225	11	133	5	953	399	1352	*1156*	*387*	1543
83	995	240	308	26	193	3	1329	436	1765	*902*	*523*	1425
84	866	231	211	23	175	6	1100	412	1512	*1785*	*450*	2235
85	934	265	270	36	206	5	1240	476	1716	*1648*	*636*	2284
86	1189	291	140	11	164	3	1340	458	1798	1933	583	2516
87	623	270	0	41	362	4	664	636	1300	826	596	1422
88	1620	199	137	30	159	3	1787	361	2148	1773	424	2197
89	1457	167	285	18	231	5	1760	403	2163	1604	606	2210
90	509	116	134	28	185	6	671	307	978	932	*547*	1479
91	650	119	254	31	169	4	935	292	1227	1233	*561*	1794
92	544	125	19	19	111	2	582	238	820	*1314*	*478*	1792
93	140	105	0	8	77	6	148	188	336	*1068*	292	1360
94	259	132	8	30	130	8	297	270	567	2120	831	2951
95	874	119	283	39	170	1	1196	290	1486	2519	1051	3570
96	677	103	108	20	150	*5*	805	258	1063	1946	943	2889
97	228	*130*	58	9	*125*	*5*	295	260	555	1349	693	2042
98	30	*100*	0	*0*	*100*	*5*	30	205	235	1052	438	1490
99	47	*100*	2	*5*	*120*	*5*	54	225	279	952	*400*	1352
00	7	*0*	0	0	*25*	*5*	7	30	37	668	*300*	968

Source: Schultz et al (1994), Rogers (1994), Bergstrom, Schultz and Borba (1996), Schultz (1997), Gray (1998) ADF&G reports to Ak BOF

APPENDIX TABLE 5. Estimates of A-Y-K chum salmon runs, 1970-2000.

	Yukon summer				Yukon fall				Kotzebue				Norton Sound				Kuskokwim				Total
Year	Catch	Escape.	Run	u	Catch	Escape.	Run	u	Catch	Esc Idx	Run	u	Catch	Esc Idx	Run	u	Catch	Esc Idx	Run	u	Run
70	304		921	.33	270		818	.33	174	170	599	.29	130	249	752.5	.17	308		604	.51	3694.4
71	271		821	.33	264		800	.33	170	80	370	.46	153	115	440.5	.35	215		422	.51	2853.1
72	244		739	.33	196		594	.33	184	126	499	.37	115	76	305	.38	217		425	.51	2562.5
73	447		1355	.33	296		897	.33	394	62	549	.72	131	86	346	.38	354		694	.51	3841.1
74	818	632	1450	.56	396	592	988	.40	643	251	1270.5	.51	168	81	370.5	.45	471		924	.51	5002.5
75	922	1952	2874	.32	383	1394	1777	.22	579	156	969	.60	221	86	436	.51	400		784	.51	6840.3
76	788	1033	1821	.43	233	504	737	.32	184	63	341.5	.54	104	36	194	.54	457		896	.51	3989.6
77	695	791	1486	.47	353	619	972	.36	209	37	301.5	.69	227	83	434.5	.52	496		973	.51	4166.5
78	1275	766	2041	.62	374	500	874	.43	132	56	272	.49	201	107	468.5	.43	401		786	.51	4441.8
79	1016	696	1712	.59	633	997	1630	.39	158	28	228	.69	150	45	262.5	.57	457	855	1569	.29	5401
80	1340	1104	2444	.55	493	490	983	.50	378	215	915.5	.41	201	96	441	.46	724	1328	2450	.30	7233.9
81	1488	2300	3788	.39	689	592	1281	.54	700	159	1097.5	.64	202	119	499.5	.40	640	752	1618	.40	8283.6
82	978	1156	2134	.46	374	387	761	.49	450	63	607.5	.74	206	77	398.5	.52	513	667	1380	.37	5281.1
83	1235	902	2137	.58	530	523	1053	.50	186	139	533.5	.35	333	115	620.5	.54	442	269	792	.56	5135.7
84	1097	1785	2882	.38	415	450	865	.48	336	94	571	.59	154	154	539	.29	632	522	1311	.48	6167.6
85	1199	1648	2847	.42	517	636	1153	.45	534	68	704	.76	144	81	346.5	.42	322	321	739	.44	5789.8
86	1480	1933	3413	.43	318	583	901	.35	532	59	679.5	.78	166	75	353.5	.47	489	310	892	.55	6239
87	893	826	1719	.52	407	596	1003	.41	123	24	183	.67	110	57	252.5	.44	674	266	1020	.66	4177.3
88	1819	1773	3592	.51	330	424	754	.44	367	82	572	.64	112	35	199.5	.56	1562	522	2241	.70	7358.1
89	1624	1604	3228	.50	532	606	1138	.47	261	81	463.5	.56	53	64	213	.25	935	311	1339	.70	6381.8
90	625	932	1557	.40	353	547	900	.39	171	55	308.5	.55	85	52	215	.40	632	279	995	.64	3975.2
91	769	1233	2002	.38	458	561	1019	.45	255	124	565	.45	115	73	297.5	.39	595	442	1170	.51	5053.1
92	669	1249	1918	.35	151	478	629	.24	303	53	435.5	.70	103	40	203	.51	525	207	794	.66	3979.6
93	245	947	1192	.21	91	292	383	.24	88	67	255.5	.34	63	77	255.5	.25	143	89	259	.55	2344.7
94	391	2284	2675	.15	176	831	1007	.17	168	64	328	.51	43	99	290.5	.15	449	604	1234	.36	5534.7
95	993	2667	3660	.27	493	1051	1544	.32	307	227	874.5	.35	84	128	404	.21	784	*800*	1824	.43	8306.5
96	780	2006	2786	.28	287	943	1230	.23	96	470	1271	.08	45	102	300	.15	362	463	964	.38	6550.9
97	358	1284	1642	.22	197	693	890	.22	159	*98*	404	.39	59	*100*	309	.19	139	319	554	.25	3798.7
98	130	873	1003	.13	105	438	543	.19	71	*98*	316	.22	30	129	352.5	.09	339	350	794	.43	3008.5
99	147	761	908	.16	132	400	532	.25	155	*70*	330	.47	22	18	67	.33	145	300	535	.27	2372
00	32	409	441	.07	30	300	330	.09	178	*80*	378	.47	16	25	79	.20	100	172	324	.31	1551.1
means																					
70-79	678	978	1522	.43	340	768	1009	.34	283	103	540	.54	160	96	401	.43	378	855	808	.49	4279.3
80-89	1315	1503	2818	.47	461	529	989	.46	387	98	633	.61	168	87	386.4	.43	693	527	1378	.51	6204.8
90-99	615	1552	2167	.29	287	627	914	.30	215	98	461	.48	82	78	278	.32	521	404	1046	.53	4865.6

Norton Sound and Kotzebue escapements estimated by index x 2.5

Kuskowkwim district escapement estimated by index x 1.3 (1979-2000) and the average harvest rate (.51).

Sources: Anderson et al (1994), Lean (1994), Schultz et al (1994), reports to BOF, and B. Cross (personal communication).

APPENDIX TABLE 6. Catches of chum salmon on the Bering Sea coast of Alaska.

	A-Y-K Region					Bristol Bay					North	Subsistence catch				Western
Year	Kotze-bue	Norton Sound	Yukon River	Kusko-kwim	Total	Togiak	Nush-agak	Naknek/ Kvichak	Egegik	Ugashik	Alaska Peninsula	Kotze-bue	Norton Sound	Yukon River	Kusko-kwim	Alaska Total
70	159	107	347	61	674	101	435	120	44	18	50	*15*	23	225	247	1952
71	155	131	290	99	675	124	360	151	27	15	64	*15*	22	243	116	1812
72	169	101	288	97	655	179	310	116	42	10	85	*15*	14	149	120	1695
73	379	124	518	185	1206	195	336	124	23	6	156	*15*	7	222	179	2469
74	628	164	883	194	1869	81	158	41	4	2	34	*15*	4	331	277	2816
75	564	213	987	224	1988	87	153	80	4	2	9	*15*	8	318	176	2840
76	160	96	758	233	1247	154	801	318	47	10	74	24	8	263	224	3170
77	193	200	797	298	1488	271	900	340	83	4	129	16	27	251	198	3707
78	119	189	1292	282	1882	275	652	185	44	1	164	13	12	299	119	3646
79	142	138	1148	296	1724	220	440	196	38	12	66	16	12	442	161	3327
80	366	181	1375	559	2481	300	682	205	79	36	700	12	20	458	165	5138
81	677	170	1773	483	3103	230	795	356	88	36	709	23	28	404	157	5929
82	416	183	953	323	1875	151	435	198	84	53	331	34	19	399	190	3769
83	176	319	1329	295	2119	323	725	352	127	105	349	10	*14*	436	147	4707
84	320	146	1100	489	2055	337	850	447	178	211	805	16	*16*	412	143	5470
85	521	135	1240	225	2121	203	397	210	127	132	667	13	*19*	476	96	4461
86	261	147	1340	349	2097	270	488	263	95	111	271	36	*19*	458	143	4251
87	109	102	664	603	1478	419	416	447	145	101	369	14	*15*	636	71	4111
88	353	107	1787	1444	3691	470	371	296	238	95	393	14	*15*	361	154	6098
89	256	43	1760	802	2861	203	524	311	136	85	157	5	*10*	403	146	4841
90	163	65	671	523	1422	103	378	422	123	32	126	8	20	307	131	3072
91	240	87	935	502	1764	247	464	443	76	60	191	15	28	292	96	3676
92	289	84	582	437	1392	176	399	167	121	57	342	14	19	238	99	3024
93	73	54	148	95	370	145	506	44	71	73	135	15	*9*	188	62	1618
94	153	18	297	361	829	232	328	219	63	52	84	*15*	25	270	77	2194
95	291	43	1196	707	2237	223	390	236	68	63	99	*16*	41	290	69	3732
96	82	10	805	298	1195	207	324	124	83	103	67	*16*	35	258	91	2503
97	143	34	295	67	539	47	181	9	53	16	97	*16*	25	*260*	*72*	1315
98	55	16	29	267	367	68	209	82	29	8	70	*16*	14	*100*	*72*	1035
99	139	8	49	73	269	109	120	273	75	71	50	*16*	14	*100*	*72*	1169
00	160	6	7	50	223	141	111	53	16	22	91	*18*	*10*	*20*	*50*	755
Means																
70-79	267	146	731	197	1341	169	455	167	36	8	83	16	14	274	182	2743
80-89	346	153	1332	557	2388	291	568	309	130	97	475	18	18	444	141	4878
90-99	163	42	501	333	1038	156	330	202	76	54	126	15	23	230	84	2334

Yukon River includes Canadian catches. Italics for estimates of missing data.

Other catches through 1996 are from INPFC Statistical Yearbooks (e.g. INPFC,1993) and annual reports. 2000 catches are preliminary from ADF&G. Bristol Bay from ADF&G (2000). A-Y-K region from reports to BOF and ADF&G staff.

APPENDIX TABLE 7. Annual catches of chum salmon in Bering Sea fisheries.

Year	Kotz-ebue	Norton Sound	Yukon River	Arctic/ Yukon Region	Kusko-kwim	Togiak	Nush-agak	Naknek/ Kvichak	Egegik	Ugashik	Bristol Bay Total	North Alaska Penins.
70	.17	.13	.57	.87	.31	.10	.44	.12	.04	.02	.72	.05
71	.17	.15	.53	.85	.22	.12	.36	.15	.03	.02	.68	.06
72	.18	.12	.44	.74	.22	.18	.31	.12	.04	.01	.66	.08
73	.39	.13	.74	1.26	.36	.20	.34	.12	.02	.01	.69	.16
74	.64	.17	1.20	2.01	.47	.08	.16	.04	.00	.00	.28	.03
75	.58	.22	1.30	2.10	.40	.09	.15	.08	.00	.00	.32	.01
76	.18	.10	1.02	1.30	.46	.15	.80	.32	.05	.01	1.33	.07
77	.21	.23	1.05	1.49	.50	.27	.90	.34	.08	.00	1.59	.13
78	.13	.20	1.57	1.90	.40	.28	.65	.18	.04	.00	1.15	.16
79	.16	.15	1.58	1.89	.46	.22	.44	.20	.04	.01	.91	.07
80	.38	.20	1.82	2.40	.72	.30	.68	.20	.09	.04	1.31	.70
81	.70	.18	2.17	3.05	.64	.23	.80	.36	.09	.04	1.52	.71
82	.45	.21	1.35	2.01	.51	.15	.44	.20	.08	.05	.92	.33
83	.19	.33	1.76	2.28	.44	.32	.72	.35	.13	.11	1.63	.35
84	.34	.15	1.51	2.00	.63	.34	.85	.45	.18	.21	2.03	.80
85	.53	.14	1.71	2.38	.32	.20	.40	.21	.13	.13	1.07	.67
86	.30	.16	1.80	2.26	.49	.27	.49	.26	.09	.11	1.22	.27
87	**.12**	**.11**	**1.30**	**1.53**	**.67**	**.42**	**.42**	**.45**	**.15**	**.10**	**1.54**	**.37**
88	.37	.11	2.15	2.63	1.56	.47	.37	.30	.24	.09	1.47	.39
89	.26	.05	2.16	2.47	.94	.20	.52	.31	.14	.08	1.25	.16
90	.17	.07	.98	1.22	.63	.10	.38	.42	.12	.03	1.05	.13
91	.26	.10	1.23	1.59	.60	.25	.46	.44	.07	.06	1.28	.19
92	.30	.09	.82	1.21	.52	.18	.40	.17	.12	.06	.93	.34
93	.09	.06	.34	.49	.14	.14	.51	.04	.07	.07	.83	.14
94	.17	.03	.57	.77	.45	.23	.33	.22	.06	.05	.89	.08
95	.31	.06	1.49	1.86	.78	.22	.39	.24	.07	.06	.98	.10
96	.10	.03	1.06	1.19	.36	.21	.32	.12	.08	.10	.84	.07
97	.16	.03	.55	.74	.14	.05	.18	.01	.05	.02	.31	.10
98	.07	.03	.24	.34	.34	.07	.21	.08	.03	.01	.39	.07
99	.16	.02	.28	.46	.15	.11	.12	.27	.07	.07	.64	.05
00	.18	.02	.06	.26	.10	.14	.11	.05	.02	.02	.34	.09
Means												
70-79	.28	.16	1.00	1.44	.38	.17	.46	.17	.03	.01	.83	.08
80-89	.36	.16	1.77	2.30	.69	.29	.57	.31	.13	.10	1.40	.48
90-98	.18	.06	.81	1.05	.44	.16	.35	.19	.07	.05	.83	.14

APPENDIX TABLE 8. Western and Central Alaska chum salmon runs, 1970-2000, in millions.

	Western Alaska				South	Central Alaska					West./	Percent
Year	Bristol Bay	North Penin.	AYK Region	TOTAL	Penin. June C	PWS	Cook Inlet	Kodiak	Chignik/ So. Penin.	TOTAL	Central TOTAL	South Penin.
70	1.7	.2	3.7	5.6	.5	.3	1.4	1.9	1.5	5.1	11.2	4.5
71	1.3	.2	2.9	4.4	.5	.7	.7	3.1	2.0	6.5	11.4	4.4
72	1.5	.2	2.6	4.3	.5	.4	1.0	2.4	.7	4.5	9.3	5.4
73	2.2	.3	3.8	6.3	.2	1.3	1.1	.7	.4	3.5	10.0	2.0
74	1.6	.1	5.0	6.7	.0	.3	.6	.5	.5	1.9	8.6	0.0
75	1.4	.1	6.8	8.3	.1	.1	1.4	.2	.4	2.1	10.5	1.0
76	2.8	.4	4.0	7.2	.4	.5	.7	1.5	.7	3.4	11.0	3.6
77	4.0	.8	4.2	9.0	.1	.7	2.0	2.0	1.2	5.9	15.0	0.7
78	2.3	.5	4.4	7.2	.1	.7	.9	1.4	1.3	4.3	11.6	0.9
79	1.7	.4	5.4	7.5	.1	.4	1.2	1.2	1.2	4.0	11.6	0.9
80	3.3	1.5	7.2	12.0	.5	.5	.7	2.2	1.7	5.1	17.6	2.8
81	2.1	1.2	8.3	11.6	.6	1.9	1.7	2.3	2.4	8.3	20.5	2.9
82	1.3	.8	5.3	7.4	1.1	1.7	2.3	2.6	2.2	8.8	17.3	6.4
83	2.2	.7	5.1	8.0	.8	1.4	1.8	2.2	1.6	7.0	15.8	5.1
84	3.5	1.7	6.2	11.4	.3	1.4	1.1	1.6	2.4	6.5	18.2	1.6
85	2.0	1.0	5.8	8.8	.4	1.5	1.1	1.4	1.5	5.5	14.7	2.7
86	2.2	.5	6.2	8.9	.4	1.9	1.7	2.3	2.2	8.1	17.4	2.3
87	2.9	.9	4.2	8.0	.4	2.2	.7	1.5	1.8	6.2	14.6	2.7
88	2.5	.9	7.4	10.8	.5	2.4	1.3	2.4	2.5	8.6	19.9	2.5
89	2.2	.4	6.4	9.0	.5	1.3	1.0	1.6	1.0	4.9	14.4	3.5
90	1.8	.4	4.0	6.2	.5	1.4	.5	1.2	1.6	4.7	11.4	4.4
91	2.1	.5	5.0	7.6	.8	.6	.5	2.1	2.1	5.3	13.7	5.8
92	1.5	.7	4.0	6.2	.4	.6	.5	1.2	2.0	4.3	10.9	3.7
93	1.1	.5	2.3	3.9	.5	1.5	.2	1.3	1.3	4.3	8.7	5.8
94	1.5	.6	5.5	7.5	.6	1.5	.4	1.3	2.8	6.0	14.1	4.2
95	1.4	.9	8.3	10.6	.5	1.1	.8	2.0	2.6	6.5	17.6	2.8
96	1.2	.9	6.5	8.6	.4	3.0	.2	1.3	1.5	6.0	15.0	2.7
97	.6	.5	3.8	4.9	.3	2.6	.1	1.0	1.9	5.6	10.8	2.8
98	.8	.8	3.0	4.6	.2	1.6	.1	.7	1.7	4.1	8.9	2.2
99	1.0	.7	2.4	4.1	.2	2.3	.3	1.8	1.9	6.3	10.6	1.9
0	.5	.6	1.6	2.7	.2	5.7	.3	2.0	1.7	9.7	12.6	1.6
1												
Means												
70-79	2.1	.3	4.3	6.7	.3	.5	1.1	1.5	1.0	4.1	11.0	2.3
80-89	2.4	1.0	6.2	9.6	.6	1.6	1.3	2.0	1.9	6.9	17.0	3.3
90-99	1.3	.6	4.5	6.4	.4	1.6	.4	1.4	1.9	5.3	12.2	3.6

APPENDIX TABLE 9. Annual catches of chum salmon by Asian fisheries.

	Russia						Japan			
	Catch (1,000s m.t.)			Catch (millions of fish)			Catch (millions of fish)			
	Okhotsk	Bering		Okhotsk	Bering		USSR/Japan	High-seas		Asia
Year(s)	Sea	Sea	Total	Sea	Sea	Total	coastal	Mothership	Landbased	Total
1925-29	52.53	10.65	63.18	15.01	2.88	17.89	14.5	0	0	32
1930-39	62.72	14.39	77.11	17.92	3.89	21.81	19.7	2.19	4.56	48
1940-49	46.82	14.45	61.27	13.38	3.91	17.28	6.4	1.01	2.63	27
1950-59	46.07	7.83	53.90	13.16	2.12	15.28	3.5	9.87	3.66	32
1960-69	24.87	4.91	29.78	7.11	1.33	8.43	4.9	7.48	9.66	30
1970-79	11.89	4.63	16.52	2.43	1.08	3.51	14.4	8.1	7.9	34
1980-89			21.09	2.61	2.83	5.44	41.0	2.3	2.0	51
1990-99										
70	14.70	4.50	19.20	2.78	.89	3.67	7.2	9.64	7.53	28
71	13.48	3.33	16.81	2.68	.73	3.41	10.2	9.97	6.78	30
72	8.65	3.12	11.77	1.72	.48	2.20	8.6	13.37	8.84	33
73	7.45	2.52	9.97	1.09	.59	1.68	11.6	7.86	7.75	29
74	9.83	2.81	12.64	1.75	.58	2.33	13.0	9.28	12.35	37
75	8.38	3.39	11.77	1.14	.84	1.98	19.9	7.37	11.76	41
76	13.13	2.45	15.58	3.23	.74	3.97	12.4	10.44	11.43	38
77	14.28	6.17	20.45	2.65	1.64	4.29	15.2	6.00	6.23	32
78	19.17	8.04	27.21	3.74	1.66	5.40	18.2	3.80	3.49	31
79	9.87	9.93	19.80	3.54	2.60	6.14	28.0	3.28	2.86	40
80	8.58	5.98	14.56	2.01	1.50	3.51	25.7	3.10	3.17	35
81	8.37	6.51	14.88	2.36	2.34	4.70	33.5	2.54	3.09	44
82	8.07	6.21	14.28	1.62	1.75	3.37	30.0	3.22	3.52	40
83	6.85	15.25	22.10	1.87	4.35	6.22	37.1	3.08	2.61	49
84	4.39	9.35	13.74	1.20	2.52	3.72	37.8	3.28	2.52	47
85	13.93	11.34	25.27	2.84	3.37	6.21	50.9	2.84	1.57	62
86	12.76	14.77	27.53	2.87	4.16	7.03	46.0	1.93	1.04	56
87	13.50	13.76	27.26	2.96	3.48	6.44	42.7	1.82	1.09	52
88	16.30	10.50	26.80	4.25	2.47	6.72	51.0	.89	.91	60
89	16.00	8.50	24.50	4.11	2.33	6.44	55.0	.61	.75	63
90	13.89	13.18	27.07	3.28	3.40	6.68	68.0	.00	1.15	76
91	14.05	3.66	17.71	3.65	1.29	4.94	60.0	.00	.84	66
92	11.20	6.40	17.60	2.89	1.88	4.77	46.0	.00	.00	51
93	15.59	7.38	22.97	4.74	2.35	7.09	61.0	.00	.00	68
94	20.92	7.20	28.12	6.34	2.18	8.52	69.0	.00	.17	78
95	22.62	5.62	28.24	6.44	1.74	8.18	78.0	.00	.17	86
96	11.84	3.70	15.54	3.53	1.18	4.71	87.0	.00	.17	92
97	14.74	3.53	18.27	4.40	1.10	5.50	85.0	.00	.17	91
98	21.19	3.95	25.14	6.50	1.30	7.80	59.3	.00	.20	67
99	16.65	6.99	23.64	3.50	2.10	5.60	52.0	.00	.20	58
0	19.18	13.35	32.53	5.79	4.21	10.00	*20.0*	.00	*.15*	30

Bering Sea is East Kamchatka plus the Anadyr River; all other runs included in Okhotsk Sea.

Sources: Russian catches (m.t.) through 1988 from VINRO (Moscow, USSR) and 1989-1991 from TINRO (Vladivostok, Russia). Catches for 1992-2000 from reports to NPAFC.

Japanese catches through 1992 from INPFC Statistical Yearbooks and do not include freshwater catches.

Japan catches 1997-99 from annual reports to NPAFC and 2000 is a preliminary estimate.

APPENDIX TABLE 10. Estimates of annual sockeye salmon runs to areas of Central Alaska, 1970-2000.

	South Peninsula			Chignik			Kodiak			Cook Inlet			Prince William Sound			Total
Year	Catch	Escape.	Run	Catch	Escape.	Run	Catch	Escape.	Run	Catch	Escape.	Run	Catch	Escape.	Run	run
70	0.06	0.02	0.08	1.82	0.66	2.48	0.92		1.88	0.75	0.30	1.05	1.24	0.52	1.76	7.25
71	0.22	0.02	0.24	1.32	0.90	2.22	0.48		0.98	0.66	0.70	1.36	0.74	0.46	1.20	6.00
72	0.05	0.01	0.06	0.44	0.56	1.00	0.22		0.45	0.94	0.73	1.67	0.98	0.33	1.31	4.49
73	0.06	0.01	0.07	0.97	0.78	1.75	0.17		0.35	0.70	0.69	1.39	0.47	0.45	0.92	4.48
74	0.17	0.10	0.27	0.80	0.72	1.52	0.42		0.86	0.52	0.45	0.97	0.74	0.22	0.96	4.58
75	0.00	0.05	0.05	0.43	0.62	1.05	0.14		0.29	0.71	0.47	1.18	0.55	0.16	0.71	3.28
76	0.02	0.09	0.11	1.33	0.89	2.22	0.64		1.31	1.72	0.88	2.60	1.01	0.22	1.23	7.47
77	0.06	0.06	0.12	2.14	0.95	3.09	0.62	1.27	1.89	2.15	1.44	3.59	0.94	0.49	1.43	10.12
78	0.07	0.06	0.13	1.83	0.72	2.55	1.07	1.00	2.07	2.78	0.86	3.64	0.51	0.27	0.78	9.17
79	0.28	0.05	0.33	1.15	0.70	1.85	0.63	1.41	2.04	0.99	0.94	1.93	0.37	0.33	0.70	6.85
80	0.37	0.05	0.42	0.95	0.59	1.54	0.65	1.83	2.48	1.64	1.22	2.86	0.21	0.62	0.83	8.13
81	0.32	0.05	0.37	2.29	0.74	3.03	1.29	1.40	2.69	1.55	1.33	2.88	0.78	0.65	1.43	10.40
82	0.18	0.04	0.22	1.78	0.92	2.70	1.20	1.60	2.80	3.39	1.41	4.80	2.36	0.81	3.17	13.69
83	0.52	0.06	0.58	2.44	0.87	3.31	1.23	1.30	2.53	5.24	1.48	6.72	0.91	0.76	1.67	14.81
84	0.53	0.05	0.58	3.60	0.87	4.47	1.95	1.47	3.42	2.38	1.43	3.81	1.30	0.75	2.05	14.33
85	0.29	0.05	0.34	1.14	0.75	1.89	1.84	2.55	4.39	4.34	1.75	6.09	1.46	0.79	2.25	14.96
86	0.69	0.05	0.74	1.98	0.77	2.75	3.19	2.00	5.19	5.02	1.35	6.37	1.29	0.68	1.97	17.02
87	0.46	0.04	0.50	2.43	0.80	3.23	1.81	1.68	3.49	9.75	2.62	12.37	1.74	0.80	2.54	22.13
88	0.72	0.07	0.79	0.90	0.68	1.58	2.70	1.30	4.00	7.15	1.76	8.91	0.77	0.66	1.43	16.71
89	0.91	0.08	0.99	1.30	0.94	2.24	1.29	3.17	4.46	5.17	2.49	7.66	1.18	0.78	1.96	17.31
90	1.04	0.10	1.14	2.44	0.77	3.21	5.25	1.60	6.85	3.77	1.45	5.22	0.91	0.70	1.61	18.03
91	0.57	0.12	0.69	2.47	1.04	3.51	5.70	2.20	7.90	2.50	1.46	3.96	1.74	0.76	2.50	18.56
92	0.87	0.10	0.97	1.61	0.77	2.38	4.17	1.97	6.14	9.28	1.74	11.02	1.77	0.80	2.57	23.08
93	0.64	0.10	0.74	2.25	0.70	2.95	4.38	1.71	6.09	4.99	1.72	6.71	1.85	0.97	2.82	19.31
94	0.54	0.12	0.66	1.62	0.80	2.42	2.88	2.04	4.92	3.64	1.93	5.57	1.51	0.90	2.41	15.98
95	0.82	0.13	0.95	1.72	0.75	2.47	4.49	1.84	6.33	3.14	1.51	4.65	1.52	0.76	2.28	16.68
96	0.47	0.07	0.54	1.91	0.74	2.65	4.92	1.80	6.72	4.05	1.59	5.64	3.00	1.04	4.04	19.59
97	0.57	0.10	0.67	0.76	0.78	1.54	2.47	1.79	4.26	4.32	2.13	6.45	4.13	1.30	5.43	18.35
98	0.88	0.09	0.97	1.05	0.70	1.75	3.62	1.78	5.40	1.47	1.63	3.10	1.72	1.04	2.76	13.98
99	1.64	0.10	1.74	3.12	0.70	3.82	4.65	1.81	6.46	3.19	1.50	4.69	2.04	*1.20*	3.24	19.95
00	0.79	*0.09*	0.88	1.77	0.83	2.60	2.91	1.43	4.34	0.82	1.30	2.12	1.43	*0.80*	2.23	12.17
Means																
70-79	0.10	0.05	0.15	1.22	0.75	1.97	0.53	1.23	1.21	1.19	0.75	1.94	0.76	0.35	1.10	6.37
80-89	0.50	0.05	0.55	1.88	0.79	2.67	1.72	1.83	3.55	4.56	1.68	6.25	1.20	0.73	1.93	14.95
90-98	0.71	0.10	0.81	1.77	0.78	2.54	4.21	1.86	6.07	4.13	1.68	5.81	2.02	0.92	2.94	18.17

Cook Inlet includes Upper and Lower Cook Inlet management areas; PWS includes Copper & Bering rivers.

Sources: Barrett et al (1990), Quimby and Owen (1994), ADF&G (1988), Campbell et al (1997), and Donaldson et al (1993) and other reports to BoF.

Kodiak runs for 1970-76 estimated from catch and mean harvest rate of .49 (1977-88).

APPENDIX TABLE 11. Nushagak District chum and sockeye salmon statistics, 1966-2000.

	Chum salmon								Sockeye salmon			
		Escapement				Rate of	Mean weight (kg)		Rate of exploitation		Mean weight (kg)	
Year	Catch	Air/tower	Sonar	Adjusted	Run	exploit.	age .3	all fish	age .3	all fish	age .3	all fish
66	129	80			209	.62	3.88	3.88	.49	.42	3.06	2.84
67	338	200			538	.63	2.97	2.97	.51	.43	3.02	2.62
68	179	100			279	.64	3.17	3.19	.48	.42	3.30	3.03
69	214	130			344	.62	2.82	2.76	.38	.39	3.05	2.56
70	435	273			708	.61	2.95	2.97	.46	.38	2.86	2.60
71	360	226			586	.61	2.91	2.95	.53	.43	3.11	2.90
72	310	195			505	.61	3.09	3.06	.58	.42	2.98	2.50
73	336	200			536	.63	3.08	3.16	.34	.31	3.46	3.50
74	158	100			258	.61	3.11	3.06	.14	.18	3.06	2.50
75	153	80			233	.66	2.93	2.79	.22	.22	3.17	2.90
76	801	500			1301	.62	3.02	2.98	.50	.46	3.39	3.00
77	900	609			1509	.60	3.26	3.25	.36	.34	3.60	3.50
78	652	293			945	.69	3.23	3.63	.54	.47	3.39	2.85
79	440	100	166	--	606	.73	2.93	3.01	.50	.52	3.09	2.87
80	682	1053	332	969	1651	.41	2.94	2.94	.37	.35	2.96	2.97
81	795	--	143	177	972	.82	2.95	3.19	.74	.72	3.17	3.08
82	435	--	230	256	691	.63		3.00	.76	.75	3.09	3.09
83	725	--	106	164	889	.82	3.18	3.34	.81	.73	3.00	2.71
84	850	--	362	--	1212	.70	3.07	3.16	.55	.54	3.00	2.91
85	397	--	214	288	685	.58	3.19	3.07	.51	.44	3.11	2.56
86	488	--	168	200	688	.71	2.93	2.95	.57	.56	3.01	3.17
87	416	--	147	--	563	.74	3.02	3.14	.77	.63	2.97	2.91
88	371	--	186	--	557	.67	3.07	3.09	.49	.53	3.17	3.00
89	523	--	378	--	901	.58	2.82	2.91	.58	.56	3.08	2.78
90	378	--	330		708	.53	2.87	2.95	.64	.62	3.05	2.76
91	464	--	252		716	.65	2.71	2.77	.65	.69	2.86	2.58
92	399	--	303		702	.57	2.80	2.88	.63	.56	2.71	2.42
93	506	--	217		723	.70	2.61	2.80	.68	.70	3.01	2.67
94*	328	--	379		707	.46	3.06	3.35	.67	.59	2.84	2.72
95	390	--	213		603	.65	2.75	2.85	.71	.65	2.74	2.36
96	324	--	225		549	.59	3.17	3.27	.71	.69	3.01	2.67
97	181	--	61		242	.75	2.83	2.89	.60	.57	2.98	2.70
98	209	--	300		509	.41	2.90	2.96	.50	.55	2.83	2.17
99	120	--	242		362	.33	3.16	3.16	.77	.74	2.91	2.44
00	111	--	141		252	.44	3.21	3.28	.78	.75	3.01	2.68
Means												
70-79	455	258			719	.63	3.05	3.09	.42	.37	3.21	2.91
80-89	568		227		881	.65	3.02	3.08	.62	.58	3.06	2.92
90-99	330		252		582	.57	2.89	2.99	.66	.64	2.89	2.55

Data sources: Yeun and Nelson (1984), ADF&G (2000), and personal comunication with ADF&G, Anchorage for 2000.

* About 54% of chum catch in 1994 was made with large mesh king salmon gear. Wts. with sockeye gear = 2.81 kg & 2.83 kg.