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Alaska Peninsula Salmon, 1997

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Pacific Seafood Processors Association

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Approved

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Director

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KEY WORDS

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

Alaska Peninsula Salmon, 1997

D. ROGERS AND K. RAMSTAD

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 (Fig. 1), which are collectively called the False Pass fishery or South Peninsula June fishery, target non-local sockeye salmon (*Oncorhynchus nerka*) primarily bound for Bristol Bay (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 salmon in August.

The salmon fisheries on the Alaska Peninsula have frequently been subjected 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 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 north coast of the Alaska Peninsula (the North 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 Bear Lake, the largest producer of sockeye salmon on the Alaska Peninsula.

This report summarizes the results of investigations in 1997. For the most part, this means adding one more line to existing data sets (Rogers 1996a, 1996b; Rogers and Ramstad 1997); however, some new observations were made at Bear Lake where we are describing the biological characteristics of the early and late runs as well as rearing conditions in the lake (Fig. 2). The data collected in connection with this study are expected to better our understanding of the population dynamics of Bear Lake sockeye and productivity characteristics of the system itself.

METHODS

False Pass

The accuracy of annual run estimates (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 (Fredin 1980). 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 (*O. gorbuscha*) 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 1997 catch and escapement statistics provided by Alaska Department of Fish & Game (ADFG) area management biologists.

Annual runs of chum salmon to North Pacific regions from 1970 to 1997 were estimated primarily from catch and escapement statistics that were presented in Rogers (1995). Sockeye salmon exploitation rates were used 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 available for a few recent years in the Yukon River and regressions of sonar count on spawning survey count were

used to estimate escapements in years when only spawning survey counts were available (Rogers 1994). 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 1997 False Pass catches (June 13–30) were sampled at the Peter Pan processing plant in King Cove. Fish were selected randomly from the processing line and measured for length (mid-eye to tail fork) and weight. Sex was determined from external appearance, and two scales were collected from the preferred region. Chum without scales in the preferred region were not included in the samples; these chum were usually the smaller fish. The first samples were collected from the June 19 catches and the last samples collected from the June 25 catches. Data from the field forms (date, location, scale card number, fish number, sex, length, and weight) were entered on to a computer file. Weights measured in pounds and ounces were transformed to kilograms.

Scales were aged and examined for focal scale resorbtion (holes) by an experienced scale reader who had been tutored by Brian Bigler (Wards Cove Packing Co., Seattle, Washington) (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. Weight–length scattergrams were examined for outliers, which were then removed prior to statistical analyses (e.g., means and standard deviations of lengths and weights, age compositions, and length–weight regressions). A condition factor was calculated from weight in grams divided by the cube of length in centimeters and then multiplied by 100.

Catch statistics for the False Pass fisheries of past years were obtained from Campbell et al. (1997). Mr. A.R. Shaul (ADFG, Kodiak, Alaska) provided preliminary catches by gear, area, and date for 1997. These preliminary catches were used to weight stratified means (length, weight, age compositions) to obtain the annual means for 1997.

North Peninsula

Bristol Bay run timing past Port Moller was estimated annually (1987–97) 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, and the sockeye and chum species composition.

The annual age compositions of sockeye caught in the North Peninsula fisheries were provided by weekly periods 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. 1997). 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 B. Cross (ADFG, Anchorage).

Sampling of adult early- and late-run Bear Lake sockeye salmon was repeated in 1997. A total of 35 and 34 adult female sockeye were collected for fecundity analysis from the early (6/24) and late (8/19) escapements, respectively. In addition, 15 adult female sockeye were collected from each of three sampling weeks during which the early and late runs are suspected to overlap in their time of return to Bear Lake (7/14, 7/25 and 7/29). Mid-eye to tail fork length and weight to the nearest gram were recorded. Each fish was assigned two maturity codes based on skin and flesh color as previously described in Rogers and Ramstad (1997). A scale and otolith was collected from each fish for aging. Eighty-three and 87 fin clips were collected from the early and late runs, respectively, and preserved in ethyl alcohol for genetic analysis. A remote temperature sensing unit deployed on 8/24/96 was retrieved on 8/20/97, and the average daily lake temperature was downloaded for analysis using HOBO software. The unit was deployed in approximately 2 m of water offshore from beach seine site #1 (Fig. 2). All temperatures recorded by the unit represent temperatures from this depth. Sampling was conducted at the Bear River ADFG weir in cooperation with ADFG weir staff.

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. In the past 10 years, the quota had been caught only 50% of the time and the catch had not reached 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 in past years: (1) preseason forecasts tending to be too low, (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, a low availability of Bristol Bay sockeye was the main factor. Despite fishing nearly every day, the 1994–96 catches were about 2 million fish short of the quotas. 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 a lower availability to the Shumagin and South Unimak fisheries. In 1997, an unusually small run arrived in Bristol Bay compared with preseason forecasts, the Port Moller test boat catches, and the catches made in the False Pass fisheries (Table 2).

The correlation between the catch per unit effort (CPUE) of sockeye salmon in the South Unimak fishery and the annual variation in the Western Alaska runs provides a method of forecasting the Bristol Bay run about 2 weeks in advance of its arrival in Bristol Bay (Eggers and Shaul 1987). Although the CPUE for sockeye in the South Unimak fishery was relatively low in 1997, the proportion of the Bristol Bay run that was caught in the fishery was exceptionally large (Figs. 3 and 4). The sockeye quota was easily reached in the Shumagin fishery and likely would also have been achieved in the South Unimak fishery had the purse seine fleet begun fishing before June 19. The CPUE values were highest in the earlier gill net-only fishing. The age composition of sockeye caught in 1997 False Pass fishery was very close to the age composition in the Bristol Bay run (Table 3).

The chum salmon percentage in the False Pass catch of 1997 was well below average whereas the chum salmon percentage in Western Alaska was a little above average (Table 4). Both runs were exceptionally small in 1997. Sockeye runs were the smallest since 1978 (Tables 5 and 6) and the Bristol Bay chum salmon runs were the smallest in 30 years. The percentage of chums was much higher than average in the Port Moller test boat catches in contrast to a lower than average percentage in the Bristol Bay runs. The Arctic/Yukon runs of chum salmon were a little below average in 1997 (Table 7); however, the Japanese hatchery returns were nearly as large as the record 1996 returns and total chum abundance in the North Pacific was the third largest on record (Table 8).

Age, Weight, and Length.—About 97% of the chum salmon caught in the 1997 South Unimak fishery and 95% caught in the Shumagin fishery were ages 0.3 and 0.4 and were, thus, typical of past years (Table 9). Chum salmon in 1997 were a little larger than in past years; however, condition factors were about average. The False Pass chums in 1997 were again much larger at each age than the average chum salmon in the Nushagak (Bristol Bay) catch (Table 10).

In the Nushagak catch, annual mean lengths of 3-ocean chum salmon and 3-ocean sockeye salmon have been significantly correlated (1967–96, $r = 0.80$). Nushagak and other Bristol Bay sockeye have been smaller than average since the consecutive large runs that began in 1989 (Fig. 5). The annual sizes of Bristol Bay sockeye are density dependent (large numbers/small size) and temperature dependent (cold spring/small size), and for recent years, the small size has also caused some delay in maturation because fish have been spending a longer time at sea (Rogers and Ruggerone 1993). In the Nushagak catch, 3-ocean chum salmon tend to be shorter and lighter than 3-ocean sockeye salmon. Annual mean lengths of Nushagak chums have been more closely correlated with the numbers of sockeye in the western Alaska runs ($r = .77$) than have the mean lengths of Nushagak sockeye ($r = .75$). There was no significant correlation between chum salmon mean lengths and Nushagak chum or sockeye runs (Table 10). Chum and sockeye salmon returning to Bristol Bay over the past 8 years would likely have been even smaller if the spring weather since 1989 had not been warmer than normal. Water temperatures in Bristol Bay during late June and early July were exceptionally warm in 1997 (Fig. 6); however, this did not appear to have a positive effect on spring growth as both sockeye and chum salmon lengths were much below average.

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). The final results for 1997 are given in Table 11. For the combined samples, 1.15% of the 1992, 1.53% of 1993, 2.25% of 1994, 1.78% of 1995, and 1.52% of 1996 chum salmon had scale "holes" (Rogers 1996b). Thus, the 1997 samples, with a combined percentage of 1.75%, was typical of the past years.

Assuming that the incidence of focal scale resorbtion is zero in Alaskan stocks and approximately 11.8% in Asian stocks (Murphy 1993), the Asian stock contribution has been close to the estimated 20% from the 1987 tagging. To obtain more precise estimates of Asian stock contribu-

tion, we need a measure of the year-to-year variation in the incidence in Asian stocks. From the tagging results in 1987, we would expect the incidence of "holes" to be much greater in the Shumagin samples than in the South Unimak samples, which was the case in 1997 (South Unimak 1.62% and Shumagins 2.88%). The low availability of chum salmon in 1997 probably affected these percentages because the Japanese chum salmon abundance was at a record level.

North Peninsula

Abundance and Distribution.—Rogers (1996a) 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 1997 runs, while down somewhat from recent years (Fig. 7), were still large, and harvest rates were again high for Egegik (87%), Ugashik (69%), and the combined North Peninsula runs (74%). Harvest rates on the North Peninsula stocks were especially low during early June. and catches were below average in August as a result of a rather weak Bear River late run (Fig. 8).

The vulnerability of Bristol Bay sockeye to the North Peninsula fisheries from Port Moller to Ilnik is dependent on the offshore distribution and timing of the Bristol Bay run. The Port Moller test fishery offers some measure of offshore distribution. During June and early July 1997, it appeared that Bristol Bay sockeye were concentrated well offshore from the North Peninsula fishery since test boat catches were highest at the middle stations (4 and 6). The 1997 Bristol Bay run was approximately average in timing, which also would lead to a low vulnerability of Bristol Bay sockeye to the North Peninsula fisheries (Table 12). The reconstructed Bristol Bay run off Port Moller indicates that 87% of the run had passed Port Moller by July 4 in 1997 (Table 13).

Age Composition.—A comparison of the age compositions of sockeye salmon in the North Peninsula fisheries with the compositions in the offshore Port Moller test boat catches, the Bristol Bay inshore catches, and the North Peninsula escapements provides another measure of the possible contribution of Bristol Bay sockeye to the local fishery. The age compositions in the local escapements differ significantly among rivers. Bear and Nelson stocks have a preponderance of age 2.2 and 2.3 sockeye, while Sandy River sockeye are mostly ages 1.2 and 1.3 and Ilnik sockeye contribute a high percentage of age 0.3 fish (Table 14). These differences in age compositions were reflected in the 1997 catches in the Harbor Point to Strogonof Point districts as the freshwater age shifted from younger to older during the course of the season (Table 15). This shift in age generally corresponds with the timing of the contributing stocks. The August catch contained mostly ages 2.2 and 2.3 as did the late Bear River escapement (Table 16). The age composition of the sockeye caught in the offshore test fishery at Port Moller in 1997 again compared closely to the age composition in the inshore Bristol Bay catch; however, both differed from the age composition in the North Peninsula catch (Table 17). It was difficult to construct a weighted escapement age composition for the North Peninsula to match the catch because the fishery extends over a long coastline where stocks with differing ages contribute at different rates depending on the run timing. The estimated escapement age composition in 1997 was quite different than the composition in the June to early July catch.

Bear Lake.—Fecundity and genetic analyses using microsatellites are currently underway and are expected to be concluded shortly. Subsurface temperatures from Bear Lake ranged from 0.8°C on March 13, 1997, to 14.1°C on August 4, 1997, and they were below 4°C between December 9, 1996 and May 23, 1997. Water temperatures were elevated by approximately 2°C in 1997 at Bear Lake. Surface temperatures were 10°C and 12.5°C on 8/23/96 and 8/21/97, respectively. Similarly, the Hobo unit recorded the average subsurface temperature for mid- to late August 1996 at 10.5°C and for early to mid-August in 1997 at 13.2°C.

DISCUSSION

False Pass

The catch of chum salmon in the 1997 False Pass fishery (315,000) was well below the chum salmon cap of 700,000 as there was a below-average run of chum to Western Alaska but a near record Japanese chum run. There was a relatively small sockeye salmon run to Bristol Bay of 19 million, yet the False Pass fishery was almost able to catch the preseason quota. In a normal year, about 25% of maturing Bristol Bay sockeye return from the central and eastern Gulf of Alaska, and many of these pass through the Shumagin and South Unimak fishing districts (Rogers 1987). In 1990, 1994, 1995, and again in 1996, a smaller than normal proportion of the Bristol Bay run returned from the Gulf or the sockeye returning from the Gulf migrated farther offshore than normal. The percentage of chum salmon in the catch (16%) was below average in

1997 and comparable to the percentage of chums in Western Alaska (19%). There was a record abundance of Japanese chum salmon and large runs of chum to other areas; however, chum were not very available to the False Pass fishery in 1997.

North Peninsula

A combination of average run timing and an offshore distribution in early July made it very unlikely that Bristol Bay contributed a significant number of sockeye salmon to the North Peninsula fisheries in 1997. The age composition in the North Peninsula catch differed from the compositions in the offshore test boat catches and the Bristol Bay catches (which were very similar), also indicating a lack of a significant contribution of Bristol Bay sockeye to the local fishery.

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Figures

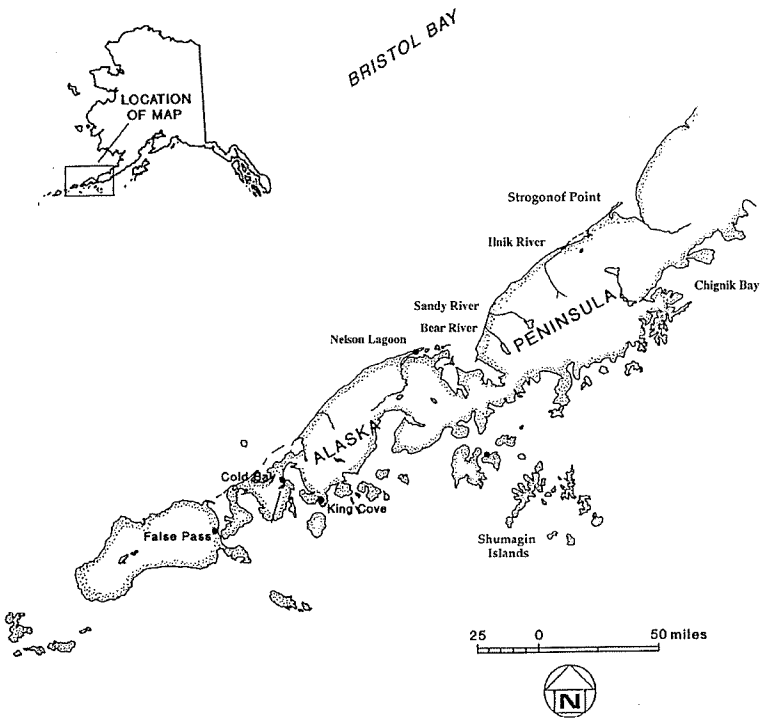

Figure 1. Bristol Bay and the Alaska Peninsula.

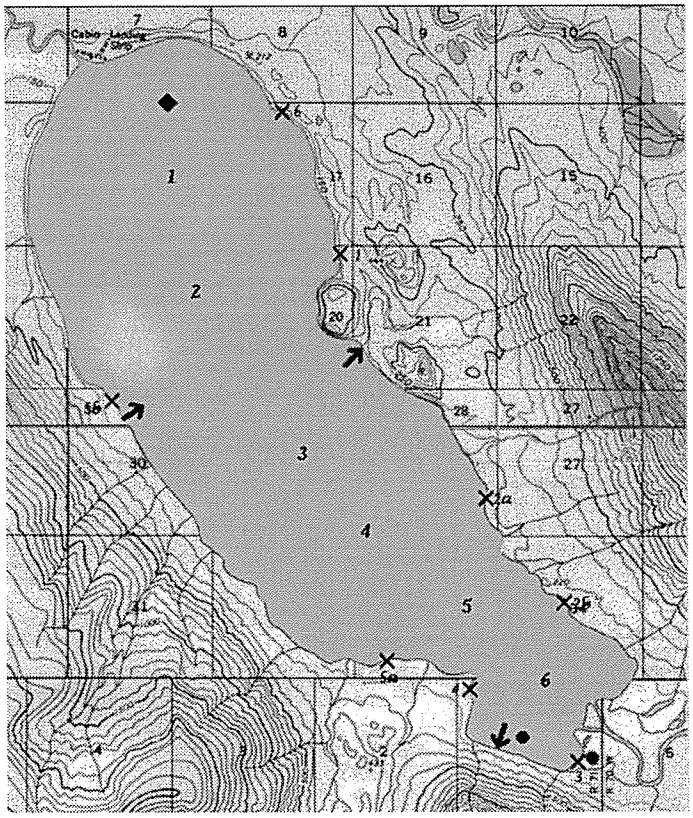

Figure 2. Sampling sites on Bear Lake: × = beach seining sites, ➜ = gillnet sites, ● = minnow trap sets, and ◆ = cage deployment); limnology sites are numbered.

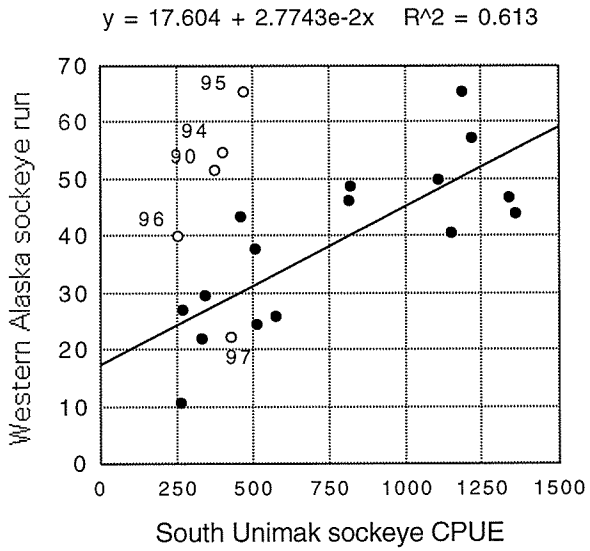

Figure 3. Western Alaska sockeye runs regressed on South Unimak catch per unit effort (CPUE).

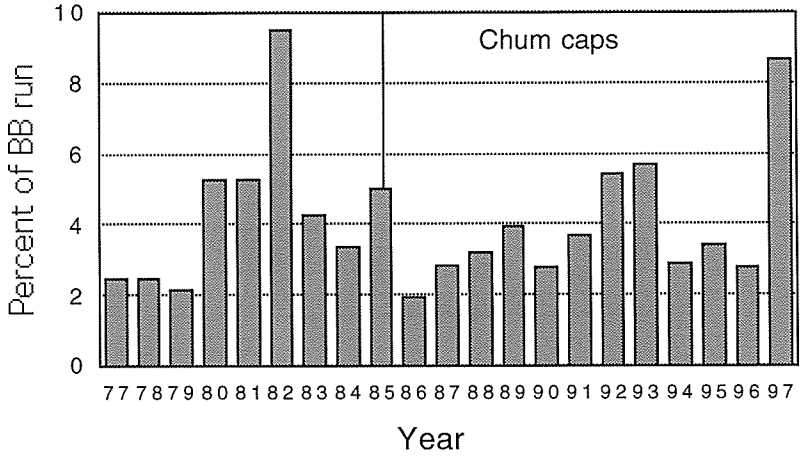

Figure 4. False Pass sockeye catch as a percent of the Bristol Bay run, 1977–97.

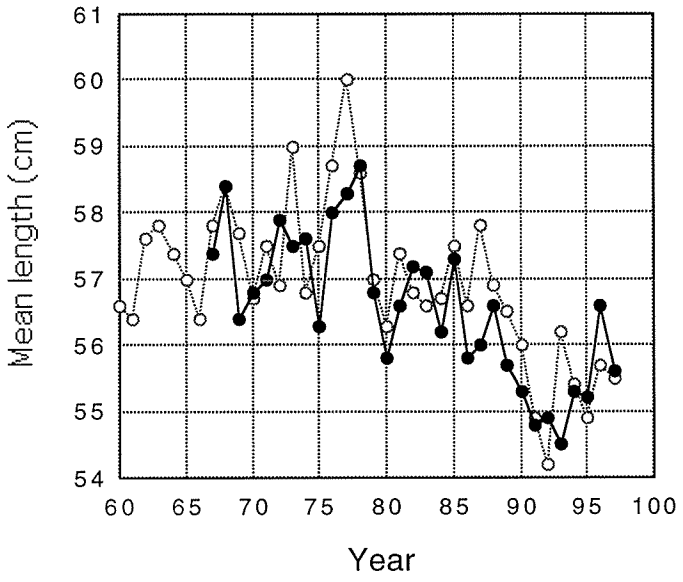

Figure 5. The annual mean lengths of 3-ocean sockeye and chum salmon in the Nushagak catches. o = sockeye (age 1.3); ● = chum (age 0.3)

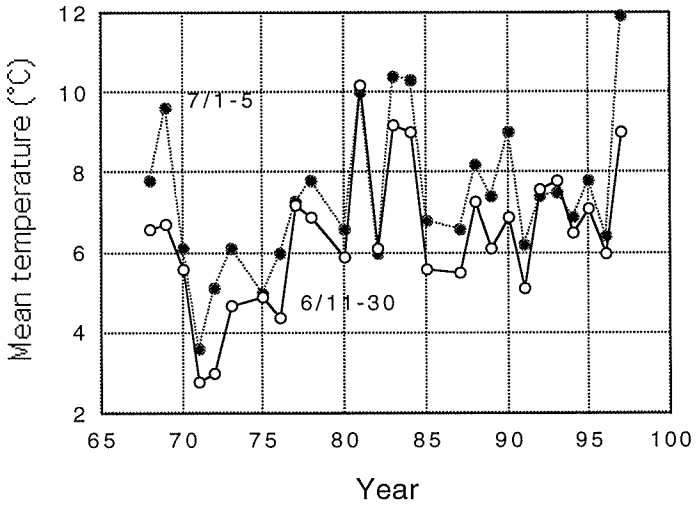

Figure 6. Surface temperatures off Port Moller during June 11-30 and July 1-5, 1968-97.

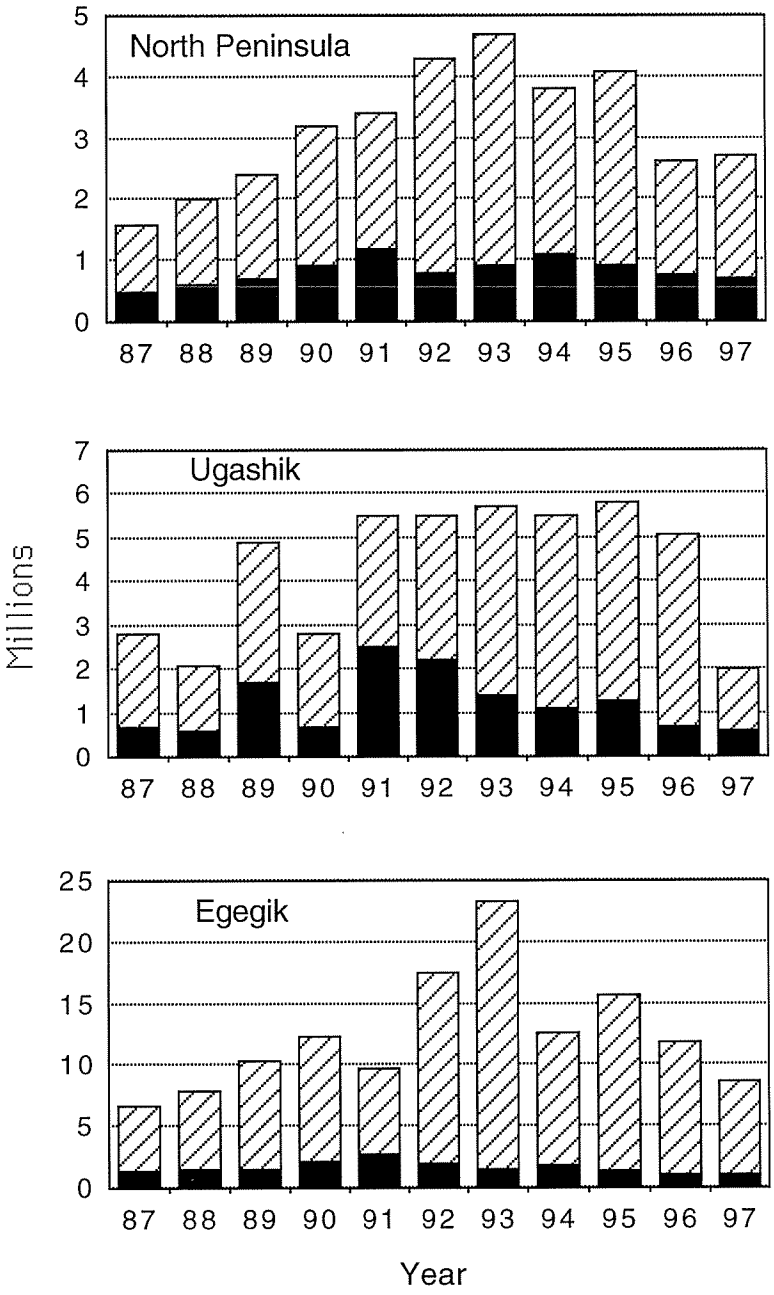

Figure 7. Annual sockeye salmon runs to Egegik, Ugashik, and the North Peninsula. Bars with solid fill = escapement; bars with pattern fill = catch.

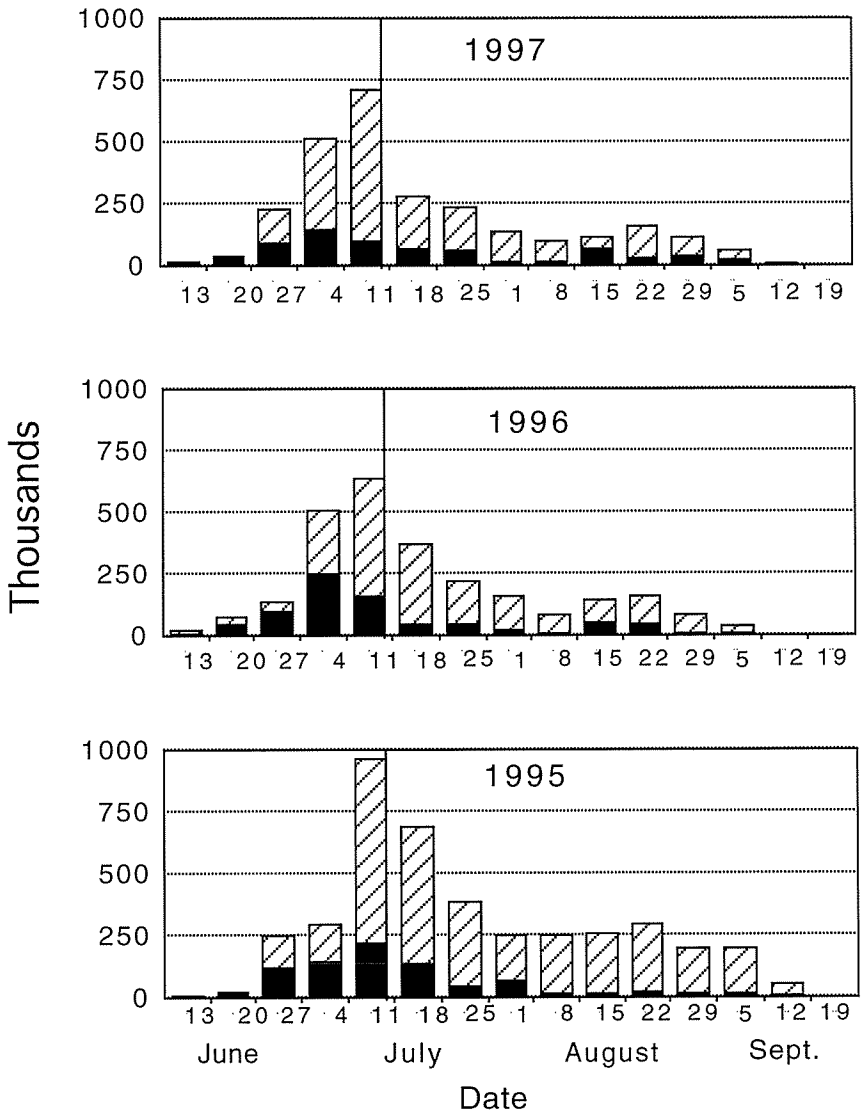

Figure 8. Northern District sockeye salmon catches and escapements, 1995-97. Bars with solid fill = escapement; bars with pattern fill = catch.

Tables

Table 1. False Pass fishery catches, the preseason quotas, and the 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	300	52
87	27.52	16.07	.79	.78	1.40	.02	-.61	443	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	3.86	-1.54	-1.76	537	700	-163
96	37.00	29.65	1.03	3.13	2.55	-2.10	-1.52	360	700	-340
97	18.89	12.26	1.65	2.25	1.15	-.60	.50	315	700	-385
87-96 average	43.09	29.98	1.62	2.27	2.62	-0.65	-1.00	523	633	-110

Table 2. False Pass sockeye catches, 1986-97 (numbers in millions of fish).

Year	Bristol Bay Run	Bristol Bay Catch	Uni-mak quota	Uni-mak catch	% of BB + FP catch	Shum-agin quota	Shum-agin catch	% of BB+FP catch	Total quota	Total catch	% of BB+FP catch	% of BB run
86	23.74	15.78	.907	.315	1.94	.200	.156	0.96	1.107	.471	2.90	1.98
87	27.52	16.07	.635	.653	3.87	.140	.141	0.84	.775	.794	4.71	2.89
88	23.42	13.99	1.263	.474	3.21	.279	.282	1.91	1.542	.756	5.13	3.23
89	44.05	28.73	1.199	1.348	4.42	.264	.397	1.30	1.463	1.745	5.73	3.96
90	48.11	33.52	1.087	1.091	3.13	.240	.256	0.73	1.327	1.347	3.86	2.80
91	41.91	25.82	1.573	1.216	4.44	.347	.333	1.22	1.920	1.549	5.66	3.70
92	45.13	31.88	1.959	2.046	5.96	.432	.412	1.20	2.391	2.458	7.16	5.45
93	51.84	40.46	2.375	2.367	5.45	.524	.608	1.40	2.899	2.975	6.85	5.74
94	50.54	35.22	2.938	1.001	2.73	.648	.460	1.25	3.586	1.461	3.98	2.89
95	60.89	44.43	2.987	1.451	3.12	.659	.654	1.41	3.646	2.105	4.52	3.46
96	36.92	29.57	2.564	.572	1.87	.566	.465	1.52	3.130	1.037	3.39	2.81
Average	41.28	28.68	1.772	1.139	3.65	.391	.379	1.25	2.162	1.518	4.90	3.54
97	18.89	12.26	1.840	1.198	8.61	.406	.450	3.24	2.246	1.648	11.85	8.72

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

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

Table 3. Comparison of the age compositions of sockeye salmon in Bristol Bay runs with age compositions from the False Pass fishery, inseason Port Moller test fishery, and the ADFG preseason forecast, 1990–97.

Year		Age composition (%) 1.2	2.2	1.3	2.3	all .2	all .3	Bristol Bay run (millions)
1990	ADF&G pre-f'cast	19	42	26	13	61	39	25.4
	Moller in-f'cast	10	36	22	28	47	53	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	13	14	54	15	28	72	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	7	30	34	25	37	61	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	35	64	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	6	43	21	27	49	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	49	15	20	64	36	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	12	52	25	19	81	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	12	27	32	25	39	59	35.0
	False Pass catch	19	44	23	11	64	36	
	Bristol Bay run	20	34	26	18	54	44	18.9

Age composition for Port Moller is through July 5, whereas the forecast is the one issued about July 2-3.
Forecasts and runs do not include jacks (1-ocean fish).

Table 4. Percent chums in chum and sockeye salmon catches and runs (in millions of fish), 1977–97.

	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	7.9	21.0	0.79	0.44	35.8	11.1	0.8	6.7
88	23.2	2.5	9.8	26.0	10.9	29.5	0.76	0.53	41.1	7.0	1.1	13.6
89	43.9	2.2	4.9	46.8	9.1	16.3	1.75	0.46	20.8	18.9	1.0	5.0
90	47.8	1.8	3.6	51.6	6.2	10.7	1.35	0.52	27.8	23.4	1.3	5.3
91	42.2	2.1	4.7	46.3	7.8	14.4	1.55	0.77	33.2	17.5	1.6	8.4
92	45.0	1.4	3.0	49.9	6.3	11.2	2.46	0.43	14.7	24.4	1.7	6.4
93	52.1	1.1	2.1	57.2	4.0	6.5	2.97	0.53	15.1	30.3	1.4	4.5
94	50.3	1.5	2.9	54.7	7.6	12.2	1.46	0.58	28.4	23.3	1.6	6.2
95	60.7	1.4	2.3	65.5	10.5	13.8	2.11	0.54	20.4	30.0	0.8	2.6
96	37.0	1.2	3.1	40.1	8.6	17.7	1.03	0.36	25.9	22.5	1.6	6.4
97	18.9	0.5	2.6	22.3	5.1	18.6	1.65	0.32	16.0	20.8	3.1	12.9
Means 83-96	41.2	2.0	5.2	45.2	8.3	16.4	1.60	0.52	26.7	19.7	1.5	7.3

Table 5. Annual sockeye salmon runs (millions) to the eastern Bering Sea (Western Alaska), 1970–97.

	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	3.13	22.3	1.64	5.9
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
90-96		.36	.67	6.72	20.61	14.74	5.14	47.89	3.95	52.2	1.85	2.9

Kuskokwim run estimated by catch/ 0.4 (1970-89) and catch/0.5 (1990-97).
South Peninsula percent= (SP catch*.85)/ (SP catch*.85+ WA total)*100.

Table 6. North Pacific runs (catch plus escapement; millions of fish) of sockeye salmon, 1970–97.

Year	Bristol Bay run	Alaska runs		Japan High Seas Catch	Russian run	N. Pacific total ryb	SE Alaska and British Columbia	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	42	16	0	13	71	15	86	49
97	19	24	17	0	8	49	22	71	34
Means									
70-79	18	20	6	6	2	33	11	45	39
80-89	36	40	15	2	6	63	15	77	51
90-97	44	50	18	0	10	78	20	98	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 7. Estimated runs of chum salmon (catch plus escapement; millions of fish) to the eastern Bering Sea, 1970–97.

Year	Kotz-ebue	Norton Sound	Yukon River Summer	Yukon River Fall	Arctic/ Yukon Region	Kusko-kwim	Togiak	Nush-agak	Naknek/ Kvichak	Egegik	Ugashik	Bristol Bay Total	North Alaska Penins.	S.P. June catch	Total Run
70	.60	.75	.92	.82	3.09	.60	.22	1.14	.22	.07	.09	1.74	.22	.44	6.0
71	.37	.44	.82	.80	2.43	.42	.24	.75	.24	.04	.02	1.29	.17	.51	4.7
72	.50	.30	.74	.59	2.13	.43	.38	.74	.30	.07	.06	1.55	.21	.52	4.7
73	.55	.35	1.36	.90	3.16	.69	.44	1.06	.59	.06	.07	2.22	.28	.20	6.5
74	1.27	.37	1.45	.99	4.08	.92	.14	.89	.51	.03	.07	1.64	.14	.00	6.8
75	.97	.44	2.87	1.78	6.06	.78	.18	.68	.47	.01	.07	1.41	.12	.10	8.4
76	.34	.19	1.82	.74	3.09	.90	.25	1.74	.74	.07	.03	2.83	.37	.41	7.5
77	.30	.44	1.49	.97	3.20	.97	.52	2.65	.74	.12	.01	4.04	.81	.12	9.1
78	.27	.47	2.04	.87	3.65	.79	.47	1.38	.37	.08	.01	2.31	.47	.12	7.3
79	.23	.27	1.71	1.63	3.84	1.57	.33	.85	.36	.06	.06	1.66	.37	.10	7.5
80	.92	.44	2.44	.98	4.78	2.45	.57	1.94	.55	.11	.17	3.34	1.47	.51	12.4
81	1.10	.48	3.79	1.28	6.65	1.62	.36	1.11	.47	.10	.06	2.10	1.24	.56	12.0
82	.61	.40	2.13	.76	3.90	1.38	.23	.57	.30	.12	.11	1.33	.79	1.10	8.2
83	.53	.62	2.14	1.05	4.34	.79	.45	1.01	.42	.14	.14	2.16	.74	.79	8.6
84	.57	.54	2.88	.86	4.85	1.31	.55	1.63	.81	.22	.31	3.52	1.67	.34	11.6
85	.70	.35	2.85	1.15	5.05	.74	.38	.91	.45	.15	.15	2.04	1.01	.43	9.2
86	.68	.34	3.41	.90	5.33	.89	.51	.88	.57	.12	.13	2.21	.51	.35	9.2
87	.18	.25	1.72	1.00	3.15	1.02	.81	.67	1.09	.18	.13	2.88	.88	.44	8.3
88	.57	.20	3.70	.75	5.22	2.24	.66	.70	.74	.30	.14	2.54	.89	.53	11.3
89	.46	.21	3.31	1.14	5.12	1.34	.49	.93	.53	.16	.13	2.24	.37	.46	9.4
90	.31	.20	1.64	.90	3.05	1.00	.22	.71	.65	.16	.04	1.78	.35	.52	6.6
91	.56	.28	2.16	1.02	4.02	1.17	.38	.75	.77	.10	.10	2.10	.49	.77	8.4
92	.44	.19	2.05	.63	3.31	.79	.23	.62	.38	.13	.09	1.45	.69	.43	6.6
93	.26	.26	1.23	.38	2.13	.26	.22	.63	.07	.05	.09	1.06	.54	.53	4.4
94	.33	.28	2.79	1.01	4.41	1.23	.35	.67	.32	.07	.06	1.47	.56	.58	8.1
95	.87	.38	3.67	1.50	6.42	1.82	.31	.58	.37	.07	.08	1.41	.86	.54	10.9
96	1.27	.29	2.81	1.20	5.57	.96	.30	.55	.17	.09	.12	1.23	.89	.36	8.9
97	.40	.28	1.68	.89	3.25	.57	.12	.32	.03	.02	.01	.50	.80	.31	5.4
Means															
70-79	.54	.40	1.52	1.01	3.47	.81	.32	1.19	.45	.06	.05	2.07	.32	.25	6.9
80-89	.63	.38	2.84	.99	4.84	1.38	.50	1.04	.59	.16	.15	2.44	.96	.55	10.0
90-97	.56	.27	2.25	.94	4.02	.98	.27	.60	.35	.09	.07	1.38	.65	.51	7.4

Total run includes 75% of South Peninsula June catch.

Table 8. North Pacific runs (catch plus escapement; millions of fish) of chum salmon, 1970–97.

Year	Bristol Bay run	Alaska runs		Japan catch		Russian run (catch/.5)	North Pacific total run	SE Alaska B.C. and Wash.	Total Pacific run	Percent Asia
		Western	Central	High seas	Coastal					
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	11.3	8.7	2	51	13	86	20	106	62
89	2.2	9.4	4.9	1	55	13	83	9	92	74
90	1.8	6.6	4.6	1	68	13	94	13	107	77
91	2.1	8.4	5.2	1	60	10	84	11	95	74
92	1.5	6.6	4.4	0	46	17	74	16	90	70
93	1.1	4.4	3.8	0	61	21	90	21	111	74
94	1.5	8.1	6.0	0	69	26	109	21	130	73
95	1.4	10.9	6.5	0	78	24	119	20	139	73
96	1.2	8.9	6.0	0	87	25	127	30	157	71
97	0.5	5.4	5.6	0	85	15	111	18	129	78
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
90-97	1.4	7.4	5.3	0.3	69	19	101	19	120	74

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).

Table 9. Summary of length, weight, and condition factors for chum salmon in the False Pass catches.

Location	Sex	Age	Sex/age percent 92–96 means	Sex/age percent 1997	Mean length (mm) 92–96 means	Mean length (mm) 1997	Mean weight (km) 92–96 means	Mean weight (km) 1997	Mean condition factor 92–96 means	Mean condition factor 1997
South Unimak	Male	0.2	0.7	0.5	513	484	2.07	1.74		
		0.3	25.9	25.2	569	571	3.13	3.03	1.67	1.60
		0.4	19.8	15.9	596	604	3.64	3.59	1.70	1.61
		0.5	1.0	0.7	618	618	4.00	3.84		
		0.6	0.0	0.2	652	686	5.20	5.72		
	Female	0.2	0.6	1.0	515	468	2.17	1.36		
		0.3	32.5	34.1	551	558	2.71	2.65	1.60	1.51
		0.4	18.6	21.6	576	589	3.12	3.20	1.62	1.55
		0.5	0.8	0.8	593	627	3.49	3.56		
		0.6	0.0	0.0	629	644	4.17	3.67		
	Comb.	0.2	1.3	1.5	513	473	2.09	1.49		
		0.3	58.4	59.3	559	564	2.89	2.81	1.63	1.55
		0.4	38.4	37.5	586	595	3.39	3.37	1.67	1.58
		0.5	1.8	1.5	605	623	3.74	3.70		
		0.6	0.1	0.2	648	665	4.98	4.70		
Shum-agin	Male	0.2	0.4	0.0	549		2.74			
		0.3	25.1	16.9	573	575	3.19	3.15	1.66	1.64
		0.4	22.9	19.3	601	615	3.67	3.96	1.65	1.69
		0.5	1.2	1.6	629	645	4.33	4.46		
		0.6	0.0	0.0	658		4.22			
	Female	0.2	0.2	0.5	531	530	2.42	2.63		
		0.3	29.3	34.0	556	573	2.75	2.96	1.58	1.54
		0.4	19.2	25.1	585	595	3.26	3.39	1.60	1.57
		0.5	1.5	2.6	620	618	3.80	3.96		
		0.6	0.1	0.0	630		4.81			
	Comb.	0.2	0.6	0.5	542	530	2.61	2.63		
		0.3	54.3	49.9	566	574	2.97	3.02	1.62	1.57
		0.4	42.1	44.4	594	604	3.48	3.64	1.63	1.62
		0.5	2.7	4.2	623	628	3.97	4.15		
		0.6	0.1	0.0	629		4.59			

Table 10. Age composition, mean length (mm), and weight (kg) 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	1.94	12.81
81	0.3			61.0	566	2.95	38.7	596	3.58	0.0	.80	1.11	10.34
82	1.3			44.2	572		53.5	576		1.0	.44	.57	7.93
83	2.0	535		34.5	571	3.18	61.5	585	3.45	2.0	.72	1.00	7.07
84	1.6	528		87.2	562	3.07	10.0	584	4.06	1.2	.85	1.57	3.81
85	32.7	572	2.92	54.4	573	3.19	12.4	571	2.96	0.5	.40	.91	2.99
86	0.3			85.2	558	2.93	14.5	574	3.39	0.0	.49	.88	4.85
87	0.0			40.2	560	3.02	57.3	582	3.37	2.5	.42	.67	5.15
88	6.9	535	2.65	62.3	566	3.07	30.0	580	3.40	0.8	.37	.70	3.23
89	0.4			82.0	557	2.82	17.3	577	3.35	0.3	.52	.93	5.05
90	0.5			78.8	553	2.87	20.2	587	3.47	0.5	.38	.71	5.71
91	2.3	526	2.47	67.4	548	2.71	30.3	573	3.18	0.0	.46	.75	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
Means 70-95	5.2	532	2.55	65.3	565	2.97	28.7	585	3.30	0.9	.48	1.01	5.11

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 1993-1997.

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

Table 11. Frequencies of focal scale resorption (holes) on chum salmon scales from the 1997 False Pass fisheries.

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	6/19	94	0	1	1.05	1	2.08	21	2	8.70	0	8.70
	6/20	168	1	0	0.59	1	1.17	30	0	0.00	1	3.22
	6/21	268	5	2	2.55	3	3.60	35	0	0.00	0	0.00
	6/22	126	0	0	0.00	1	0.79	18	1	5.26	0	5.26
	6/23	178	1	1	1.11	3	2.73	29	0	0.00	0	0.00
	6/24	171	2	2	2.29	0	2.29	30	0	0.00	0	0.00
	6/25	210	3	2	2.33	0	2.33	30	1	3.12	1	6.25
	Totals	1215	12	8	1.62	5	2.02	193	4	2.03	2	3.02
Shumagin Is.	6/20	65	2	1	4.41	0	4.41	18	0	0.00	0	0.00
	6/22	70	1	0	1.41	0	1.41	10	0	0.00	0	0.00
	Totals	135	3	1	2.88	0	2.88	28	0	0.00	0	0.00
False Pass	Combined	1350	15	9	1.75	5	2.10	221	4	1.78	2	2.64

Table 12. Timing of sockeye salmon runs for Bristol Bay and between Bristol Bay and Port Moller.

Year	Mean date of run (July)				Mean date at P.M.*	Days P.M. to B.B.	P.M. mean temp. (C) 6/11 to 7/5
	Egegik	Nak/Kvi	Nush.	Wt'd mean			
85	2.1	3.0	4.3	2.9	27.1	5.8	5.8
86	6.6	6.4	8.3	7.0			
87	3.4	5.5	4.3	4.7	25.5	9.2	5.7
88	1.5	2.0	5.1	2.3	26.8	5.5	7.5
89	3.4	1.4	3.0	2.1	27.0	5.1	6.3
90	6.0	5.0	6.4	5.5	28.0	7.5	7.3
91	4.1	3.6	5.4	4.1	25.8	8.3	5.3
92	5.4	5.0	6.0	5.3	26.7	8.6	7.6
93	0.3	0.6	1.4	0.6	25.3	5.3	7.7
94	6.4	7.0	8.0	7.0	28.0	9.0	6.6
95	4.4	5.0	4.0	4.7	26.3	8.4	7.3
96	1.4	3.6	3.6	2.8	25.9	6.9	6.1
97	2.6	4.4	5.4	3.7	27.1	6.6	9.5
Means 1987-96	3.6	3.9	4.7	3.9	26.5	7.4	6.7

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

Table 13. Estimates of the daily passage of sockeye salmon off Port Moller, 1987–97.

Date		Daily passage 0-70 mi (0–112 km) off coast (millions of fish)										
		87	88	89	90	91	92	93	94	95	96	97
June	11	.08	.07	.26	.07	.05	.26	.22	.04	.10	.15	.09
	12	.07	.12	.33	.03	.04	.12	.19	.07	.12	.20	.11
	13	.08	.19	.48	.05	.07	.21	.29	.09	.36	.20	.11
	14	.11	.30	.59	.10	.12	.34	.58	.10	.61	.21	.13
	15	.11	.45	.83	.10	.18	.64	1.09	.07	.91	.18	.19
	16	.19	.56	.97	.12	.30	.68	1.50	.10	.87	.34	.34
	17	.39	.69	.97	.17	.50	.92	1.31	.09	1.40	.65	.46
	18	.72	.74	1.29	.36	.74	.69	1.33	.26	1.99	.90	.50
	19	.89	.73	1.53	.72	1.01	.97	1.53	.74	2.49	1.18	.36
	20	1.16	.82	1.98	1.00	1.28	.98	2.12	1.42	2.44	1.37	.49
	21	1.08	.94	2.72	1.44	1.72	1.50	2.46	1.76	2.29	1.82	.58
	22	.99	.93	2.87	1.99	2.08	1.72	2.69	2.15	2.75	2.22	.81
	23	1.28	1.07	2.92	1.87	2.36	2.00	2.84	2.77	2.96	2.79	.79
	24	1.51	1.30	2.62	1.95	2.54	1.94	3.02	2.88	3.09	2.92	1.03
	25	1.97	1.72	2.79	2.61	2.64	2.25	3.57	2.89	3.14	2.69	1.07
	26	1.62	1.45	2.71	3.55	2.97	2.93	4.03	2.95	3.42	2.02	1.27
	27	1.63	1.19	2.19	4.06	2.82	3.34	4.08	3.48	3.68	1.92	1.35
	28	1.35	1.00	1.93	3.32	2.66	3.17	3.51	3.97	3.16	2.05	1.46
	29	1.19	.97	1.94	3.28	2.19	2.51	2.86	3.48	2.80	2.18	1.27
	30	1.06	.98	1.54	2.78	2.15	2.47	2.47	3.38	2.54	2.10	1.10
July	1	.91	.81	1.24	2.87	2.13	2.42	2.22	2.62	2.59	1.67	.92
	2	1.00	.76	1.02	2.07	2.14	2.54	1.97	2.17	2.56	1.39	.89
	3	1.15	.71	1.18	2.36	1.99	2.16	1.60	1.59	2.39	1.02	.63
	4	1.29	.66	1.37	1.75	1.73	1.76	1.20	1.51	2.13	.89	.55
	5	1.31	.70	1.37	1.84	1.39	1.35	.83	1.60	1.94	.81	.46
	6	1.11	.59	1.14	1.28	.99	1.13	.59	1.57	1.84	.66	.46
	7	.86	.68	.84	1.38	.73	1.08	.44	1.51	1.65	.54	.36
	8	.65	.58	.52	1.16	.58	.94	.34	1.31	1.27	.42	.26
	9	.42	.55	.48	.99	.56	.73	.25	1.03	.85	.35	.22
	10	.38	.35	.38	.67	.48	.49	.18	.64	.75	.32	.17
	11	.22	.27	.34	.58	.35	.24	.14	.45	.61	.25	.13
	12	.17	.17	.25	.41	.21	.16	.11	.40	.45	.15	.09
	13	.13	.11	.14	.28	.13	.10	.09	.35	.24	.07	.04
	14	.12	.08	.07	.17	.10	.07	.08	.24	.07	.04	.04
	15 +	.29	.18	.21	.34	.38	.16	.18	.39	.23	.21	.20
Totals		27	23	44	48	42	45	52	50	61	37	19

Table 14. Age compositions of sockeye salmon from North Peninsula rivers in July, 1994–97.

		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		61
	Sandy	.008	.001		.012	.521			.077	.372	.005		.003		62
	Bear (early)	.002	.142			.046	.576			.032	.197			.005	247
	Nelson	.002	.065		.001	.139	.651	.005	.001	.054	.082				242
	Combined	.002	.083		.002	.130	.490	.002	.076	.098	.112	.001	.001	.002	612
97	Ilnik	.043			.048	.034	.001		.217	.403	.006	.234	.014		82
	Sandy	.099	.001		.017	.572	.005		.042	.260	.002		.001	.001	38
	Bear (early)	.006	.170			.056	.484	.001		.034	.249				215
	Nelson	.005	.023			.115	.617		.001	.107	.128	.001	.001		183
	Combined	.018	.079		.009	.111	.419	.000	.038	.135	.150	.037	.003	.000	518

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

Table 15. Age compositions in the Northern District by week, 1997.

Section	Week ending	2-ocean				3-ocean				4-ocean			Catch
		0.2	1.2	2.2	3.2	0.3	1.3	2.3	3.3	0.4	1.4	2.4	1,000s
Nelson Lagoon													
June	13		.063	.107		.069	.623	.132	.000	.006	.000		3
	20		.071	.168		.044	.517	.196	.002	.002	.000		7
	27		.062	.319		.026	.281	.311	.001		.001		57
July	4		.053	.345		.017	.205	.377	.002		.001		133
	11		.075	.449		.006	.169	.296	.000		.005		110
	18	.003	.083	.417		.016	.245	.230	.002		.004		35
	25	.003	.140	.329		.012	.278	.230	.001		.006	.001	22
Aug.	1	.005	.289	.177		.025	.345	.152	.000		.005	.000	9
	8	.006	.458	.072		.029	.362	.068	.000		.001	.000	4
	15	.009	.606	.040		.032	.263	.040	.002		.002	.000	3
	22	.009	.609	.039		.032	.261	.039	.002		.002	.000	1
Sept.	12												0
Total number		0	32	139	0	6	88	117	0	0	1	0	384
Proportion		.001	.072	.309	.000	.014	.195	.261	.001	.000	.002	.000	
Harbor Point to Strogonof Point													
June	27	.002	.041	.298	.000	.088	.267	.259	.002	.035	.007	.002	85
July	4	.001	.060	.315	.000	.050	.225	.323	.000	.016	.007	.002	238
	11	.000	.047	.296	.002	.030	.172	.437	.001	.007	.006	.002	503
	18	.001	.056	.235	.003	.037	.239	.406	.002	.008	.010	.003	183
	25	.000	.051	.207	.002	.049	.348	.323	.001	.001	.012	.004	155
Aug.	1	.002	.043	.287	.003	.037	.333	.275	.002	.001	.008	.004	110
	8	.002	.028	.419	.003	.039	.266	.229	.004	.002	.005	.002	81
	15	.001	.015	.681	.004	.018	.090	.179	.006	.001	.003	.002	49
	22	.001	.008	.696	.004	.018	.073	.194	.004	.000	.002	.001	131
	29	.000	.007	.773	.002	.004	.036	.175	.000	.000	.001	.001	77
Sept.	5	.000	.007	.783	.002	.003	.031	.173	.000	.000	.001	.001	38
Total number		1	69	604	3	60	337	546	3	12	11	4	1649
Proportion		.000	.029	.253	.001	.025	.141	.229	.001	.005	.005	.002	

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
Means	.043	.082	.056	.424	.375	.020	168	.019	.011	.096	.674	.174	.026	141

Table 17. Comparison of age compositions, 1994-97.

		Age composition				
Year	Location	1.2	2.2	1.3	2.3	Other
94	BB catch	.054	.534	.155	.225	.032
	Ugashik c	.046	.392	.077	.459	.026
	Ugashik e	.127	.660	.031	.161	.021
	PM catch	.059	.433	.206	.272	.030
	NP catch	.040	.154	.208	.546	.052
	NP escape.	.322	.141	.124	.280	.133
95	BB catch	.153	.548	.123	.163	.013
	Ugashik c	.291	.404	.112	.186	.007
	Ugashik e	.479	.314	.126	.075	.006
	PM catch	.142	.496	.151	.202	.009
	NP catch	.109	.250	.241	.375	.025
	NP escape.	.172	.203	.347	.245	.033
96	BB catch	.088	.127	.514	.248	.023
	Ugashik c	.028	.118	.586	.257	.011
	Ugashik e	.084	.073	.747	.074	.022
	PM catch	.075	.117	.522	.255	.031
	NP catch	.034	.204	.391	.317	.054
	NP escape.	.142	.403	.149	.148	.158
97	BB catch	.135	.372	.247	.212	.034
	Ugashik c	.084	.437	.291	.176	.012
	Ugashik e	.194	.452	.227	.097	.030
	PM catch	.122	.265	.321	.248	.044
	NP catch	.050	.301	.197	.386	.066
	NP escape.	.135	.385	.185	.200	.095

BB= Bristol Bay, PM=Port Moller, NP= North Peninsula

NP catch for Bear River and Ilnik/Three Hills sections through July 11 or14 only.

NP escapement for Ilnik, Sandy, and Bear River (early run).

Escapement age composition excludes jacks (1-ocean fish)