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# FALSE PASS CHUM SALMON, 1994

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Approved

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Director

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## KEY WORDS

sockeye salmon, chum salmon, False Pass, Bristol Bay, Arctic-Yukon-Kuskokwim

# INTRODUCTION

The salmon fisheries on the south side of the Alaska Peninsula have been the subject of controversy since nearly the time of their inception in 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 (*Oncorhynchus nerka*) salmon. Several studies, culminating in a 1987 tagging experiment by the Alaska Department of Fish and Game (ADF&G), have clearly demonstrated that most of the sockeye salmon caught in the False Pass fishery (about 80%) are bound for rivers in Bristol Bay (Eggers et al. 1991 and Rogers 1990). The non-Bristol Bay contributions to the sockeye salmon catches in 1987 were mainly North Peninsula stocks (7%) in the South Unimak catch and stocks from Chignik (20%), North Peninsula (10%) and Kodiak (9%) in the Shumagin catch. For management purposes, ADF&G has assumed that the entire False Pass sockeye salmon catch consists of Bristol Bay fish. Since 1975 the annual False Pass sockeye salmon catch has been based on a quota (guideline harvest) of 8.3% (Unimak, 6.8% and Shumagin, 1.5%) of the forecasted Bristol Bay and False Pass catch (McCullough et al. 1994). The average annual percent of the total Bristol Bay catch taken in the False Pass fishery over the past 10 yr was 5.3% (range: 2.9–7.3%). The fishery has thus been managed in a very conservative manner, especially considering the historical high abundance of sockeye salmon over the past 10 yr; however, the fishery is not without controversy because with the increase in sockeye salmon catch there was an increase in the catch of non-local chum (*O. keta*) salmon.

The 1987 tagging of chum salmon demonstrated that while Bristol Bay stocks still contributed the highest percentage to the False Pass catch (Unimak, 40%; Shumagin, 18%; and combined 38%), Asian stocks were the next major contributor in 1987 (Unimak 18%; Shumagin 39%; and combined 20%). Arctic and Yukon River stocks, for which there had recently been conservation concerns, were minor contributors to the 1987 False Pass chum salmon catch. However, it was argued to the Alaska Board of Fisheries that these northern stocks were in low abundance in 1987 and that their typical contribution to the False Pass catch was underestimated by the 1987 tagging. The fishery has operated with a chum salmon cap (second quota) since 1986 (with an exception in 1987) and the sockeye-targeted fishery has been closed early three times (1986, 1988 and 1991) because the chum cap was attained (McCullough et al. 1994). The resultant loss in sockeye salmon catch to the False Pass fishery for those 3 yr was 1.8 million fish, while the gain to the coastal runs of chum salmon to the Arctic and Yukon rivers was largely unmeasurable.

The potential impact of the False Pass fishery on a single stock or group of stocks will depend on the availability of the stock (the proportion migrating through the fishery) and the relative abundance of that stock and other contributing stocks; both are likely to vary from year to year. Our main purpose is to examine the year-to-year changes in chum salmon abundance with particular reference to (1) the abundance in 1987 and (2) a possible increase in the contribution of Asian chum salmon. In recent years, False Pass fishermen have noted a significant occurrence of chum salmon with a snake-like appearance. These chum salmon of poor condition (low weight for their length) are believed to originate from Japanese hatcheries, because Japan has increased production to the point of density-dependent growth. The occurrence of Asian chum salmon in the

False Pass fishery may also be assessed from the presence of scale holes (focal scale resorbtion) that are nearly unique to Asian stocks, both hatchery and wild (Bigler 1988 and 1989). The specific objectives for our work in 1994 were to (1) update estimates of chum salmon runs (catch + escapement) to North Pacific coastal regions, (2) measure the incidence of scale holes in the 1994 False Pass catch, and (3) examine frequency distributions of chum salmon condition factors from the 1994 catch.

## METHODS

The accuracy of estimates of the annual runs (catch and escapement) of sockeye and chum salmon to major North Pacific regions is quite variable. 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 1994 catch and escapement statistics provided by ADF&G area management biologists in fall 1994.

Annual runs of chum salmon to North Pacific regions from 1970 to 1994 were estimated primarily from catch and escapement statistics presented in Appendix Tables 1-9. 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 available for a few recent years in the Yukon River, and regressions of sonar count on spawning survey count were utilized 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 1994 False Pass catches (June 17–30) 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. The first samples were collected from the June 17 catches and the last samples collected from the June 26 catches. Data from the field forms (date, location, scale card number, fish number, sex, length, and weight) were entered on 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 Mr. Brian Bigler (Wards Cove Packing Co., Seattle, Washington) on the identification of focal scale resorbtion. 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. Frequency distributions of condition factors were then graphed and examined for possible bimodality.

Catch statistics for the False Pass fisheries of past years were obtained from McCullough et al. (1994) and Mr. A.R. Shaul (ADF&G, Kodiak, Alaska) provided preliminary catches by gear, area, and date for 1994. These preliminary catches were used to weight stratified means (length, weight, age compositions) to obtain the annual means for 1994.

# RESULTS

## ABUNDANCE

Most sockeye salmon caught in the False Pass area during June are bound for Bristol Bay and this fact was used by Eggers and Shaul (1987) to develop an inseason forecast about 10 d prior to the arrival of the fish in Bristol Bay (Fig. 1). I updated the data base used by Eggers and Shaul (Table 1), added it to their database, and calculated a new regression to predict the western Alaska (Bristol Bay, North Peninsula and Kuskokwim) run (Fig. 2). Sockeye salmon were difficult to catch in 1990 and again in 1994, probably because there were persistent offshore winds, so there was a low CPUE relative to the run. Omitting the 1990 and 1994 observations as outliers, the CPUE of sockeye salmon at South Unimak explained 61% of the annual variation in the western Alaska runs (64% if the CPUE at 50% of the quota was used). This correlation is very good considering that the majority of Bristol Bay sockeye do not pass through the Shumagin Islands and south of Unimak Island on their homeward migration (Rogers 1987). The age composition of the sockeye salmon catch at False Pass has also been useful in forecasting the Bristol Bay runs (Table 2). In contrast, the chum salmon catches at False Pass have shown no correlation with the chum salmon runs to western Alaska even though these stocks were the most abundant stocks in the 1987 tagging (Fig. 2). Chum salmon abundance in the 1990s has changed relative to 1987 as follows: decreased for Bristol Bay/North Peninsula; about the same for the A-Y-K region; and increased for Asian (primarily Japanese hatchery) stocks (Fig. 3).

The species compositions (sockeye and chum salmon only) in the False Pass catches and the western Alaska runs have shown some correlation that has changed over the years along with an increase in the production from Japanese hatcheries (Table 3 and Fig. 4). The chum salmon percentage in the False Pass catch of 1994 was a little above average, whereas the chum salmon percentage in western Alaska was lower than average and continued the trend since 1989. Sockeye salmon abundance in 1994 was the third highest in history and, while Bering Sea runs of chum

salmon were still below average, the Japanese hatchery returns and total chum abundance were the highest on record (Tables 4–6). The impact of Japanese chum salmon on the False Pass fishery is evident in the correlation between the differences in chum salmon percentages between False Pass and western Alaska as a function of the Japanese catch (hatchery return). The Japanese chum salmon catch explained 52% of the annual variation in the differences in False Pass and western Alaska chum salmon percentages (Fig. 4). With increases in Japanese hatchery chum salmon, the False Pass catches have contained a higher percentage of chum salmon than expected from the percentages of chum salmon in the western Alaska runs.

One would expect the annual catch of chum salmon in the False Pass fishery to be somewhat correlated with the catch of the more abundant and targeted sockeye salmon, and this was so until the imposition of chum salmon caps on the fishery (Fig. 5). For the years with a chum salmon cap, there was no apparent correlation between sockeye and chum salmon catches. A regression of False Pass chum salmon catch on the False Pass sockeye catch as a proportion of the Bristol Bay run has been used to predict the chum salmon catch given the sockeye salmon quota and Bristol Bay run (Eggers 1993a). Although there was a significant correlation for all years since 1977, there was no correlation when only years with a chum salmon cap were considered (Fig. 6). Assuming there is a chum salmon cap for 1995, there is at present no statistically significant relationship to predict the chum salmon catch given the sockeye quota and forecast for 1995.

ADF&G projections for 1994 chum salmon runs to the A-Y-K region were for below-average runs (Hilsinger 1993); however, some unusually high incidental catches of chum salmon in 1993 trawl fisheries and the small sizes of chums in 1993 seemed to point to a strong run of chum salmon in 1994 (Eggers 1993b and Rogers 1994). Chum salmon runs in 1994 were indeed very large to most areas in the Gulf of Alaska and in Asia, but not to the eastern Bering Sea; however, the A-Y-K region did record the largest chum run since 1989.

## AGE, WEIGHT, AND LENGTH

About 98% of the chum salmon caught in the 1994 South Unimak and Shumagin fisheries were ages 0.3 and 0.4; however, about 2% were age 0.5 and one fish was aged as 0.6 thus the chum salmon were a little older in the 1994 catch than in the prior 2 yr (Table 7 and Appendix Tables 12–13). Chum salmon in 1994 were intermediate in body size and condition compared with the fish in 1992 and 1993. The False Pass chums in 1994 were larger at each age than the average chum salmon in the Nushagak (Bristol Bay) catch (Table 8). Chum salmon aged 0.4 have tended to be larger in the False Pass catches than in the Nushagak catches in each year (1992–94); however, there has been no consistent difference in size between the two locations for age 0.3 chums.

In the Nushagak catch, 3-ocean chum salmon tend to be somewhat shorter and much lighter than 3-ocean sockeye at a given length; however, annual mean lengths of the two species have been significantly correlated (1967–1991, $r = 0.77$). Nushagak and other Bristol Bay sockeye have been smaller than average since the consecutive large runs that began in 1989. 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 as fish have been spending a longer time at sea (Rogers and Ruggerone 1993). In the Nushagak catch, 3-ocean chums tend to be shorter and lighter than 3-ocean sockeye salmon; however, annual mean lengths of the two species have been significantly correlated (1967–1994, r = .76). Nushagak and other Bristol Bay sockeye as well as Nushagak chum salmon have been smaller than average since the consecutive large runs that began in 1989 (Fig. 7). Annual mean lengths of Nushagak chum are even more closely correlated with the numbers of sockeye in the western Alaska runs than are the mean lengths of Nushagak sockeye (r = .76, chum; r = .73, sockeye).

## CONDITION FACTORS

The main purpose in calculating condition factors was to determine whether a group of fish with poor condition (thin body or low weight for the length) was present in the False Pass catch. Chum salmon with a condition factor <0.010 or >0.024 were removed as outliers (erroneous measurement) and the remaining observations were graphed by age, sex and date.

The condition factors of chum salmon with ages combined are shown by area (South Unimak and Shumagins), year, and sex in Figure 8. No instances of bimodal distributions have been evident; however, the condition of the chums caught in 1993 was considerably lower than in the other two years.

## 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 1994 are given in Table 9. About 4% of the chum salmon sampled in 1994 were removed as age, weight, length (AWL) outliers (e.g., too long or short for the age, or too heavy or light for the length). In 1992, 1.29% of the South Unimak chum salmon (2 scales examined with certain identification) and 0.52% of the Shumagin chum salmon had scale "holes" (Rogers 1993). In the 1993 samples, the results were similar for South Unimak (1.07%) but much higher for the Shumagin chum salmon (2.51%). For the combined samples, 1.15% of the 1992 chum salmon, 1.53% of 1993 and 2.25% of 1994 had scale "holes."

Assuming that the incidence of focal scale resorbtion is zero in Alaskan stocks and ~11.8% in Asian stocks (Murphy 1993), the Asian stocks contributed about 19% (23% including questionable) to the 1994 False Pass chum salmon catch, which is similar to the 20% estimate from the 1987 tagging. To obtain more precise estimates of Asian stock contribution. 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, as was the case in both 1993 and 1994.

# DISCUSSION

The catch of chum salmon in the 1994 False Pass fisheries (590,000) was well below the chum salmon cap of 700,000 and, even though there was a near record sockeye salmon run to Bristol Bay of 50 million, the False Pass fisheries could only catch about 1.5 million (less than half of the pre-season quota of 3.6 million). 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 and again in 1994, a smaller than normal proportion of the Bristol Bay run returned from the Gulf or the sockeye returning from the Gulf migrated further offshore than normal. The percentage of chum salmon in the catch (28%) was above average in 1994 and more than double the percentage of chums in western Alaska (12%). The record abundance of Japanese chums and the large runs of chums to other areas in the Gulf of Alaska undoubtedly influenced the catch of chums in the 1994 False Pass fisheries. Fishing strategies by ADF&G management and the False Pass fishermen to avoid areas and times of high chum salmon abundance have helped reduce catches of chum salmon in recent years; however, this has also made chum salmon catches and CPUE useless in forecasting either the abundance of chums in next year's False Pass catch or in the western Alaska runs.

We were unable again to detect the presence of poor-conditioned chum salmon (snakes) as reported by fishermen in past years. This may have been because they were simply not present in high enough numbers, or that poor condition has been common to all chum salmon stocks in recent years as a result of the very high abundance of both chum and sockeye in the North Pacific since 1989. During the 1990s there has been relatively little year-to-year change in the abundance of the various stock complexes that contribute to the False Pass fisheries. Compared with 1987, the year of the large tagging program, Bristol Bay chum salmon have been less abundant, A-Y-K chum salmon abundance has been about the same, and Asian (Japanese hatchery) chum salmon have increased in abundance.

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# FIGURES

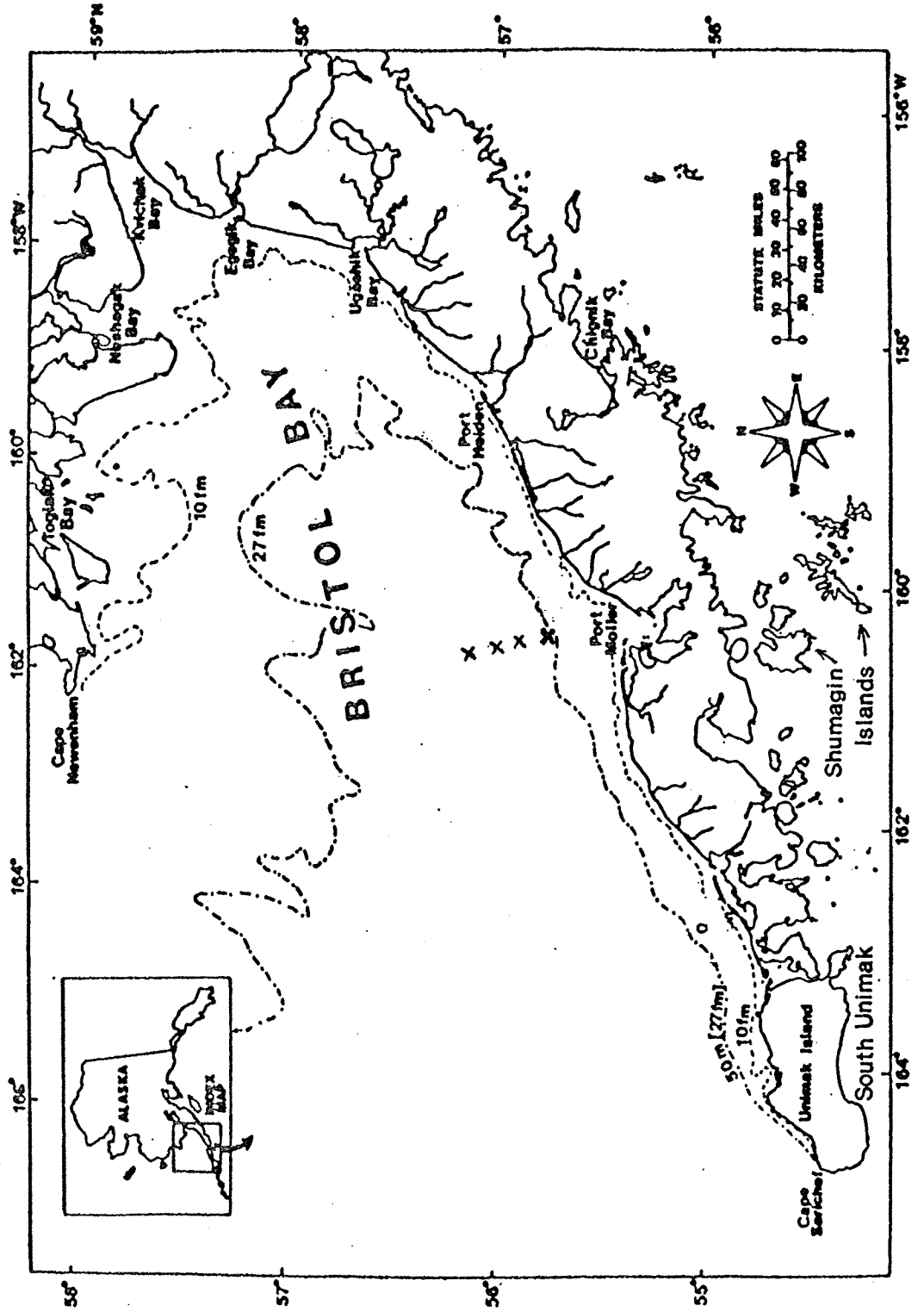


Figure 1. Bristol Bay and the Alaska Peninsula (x = Port Moller test boat stations).

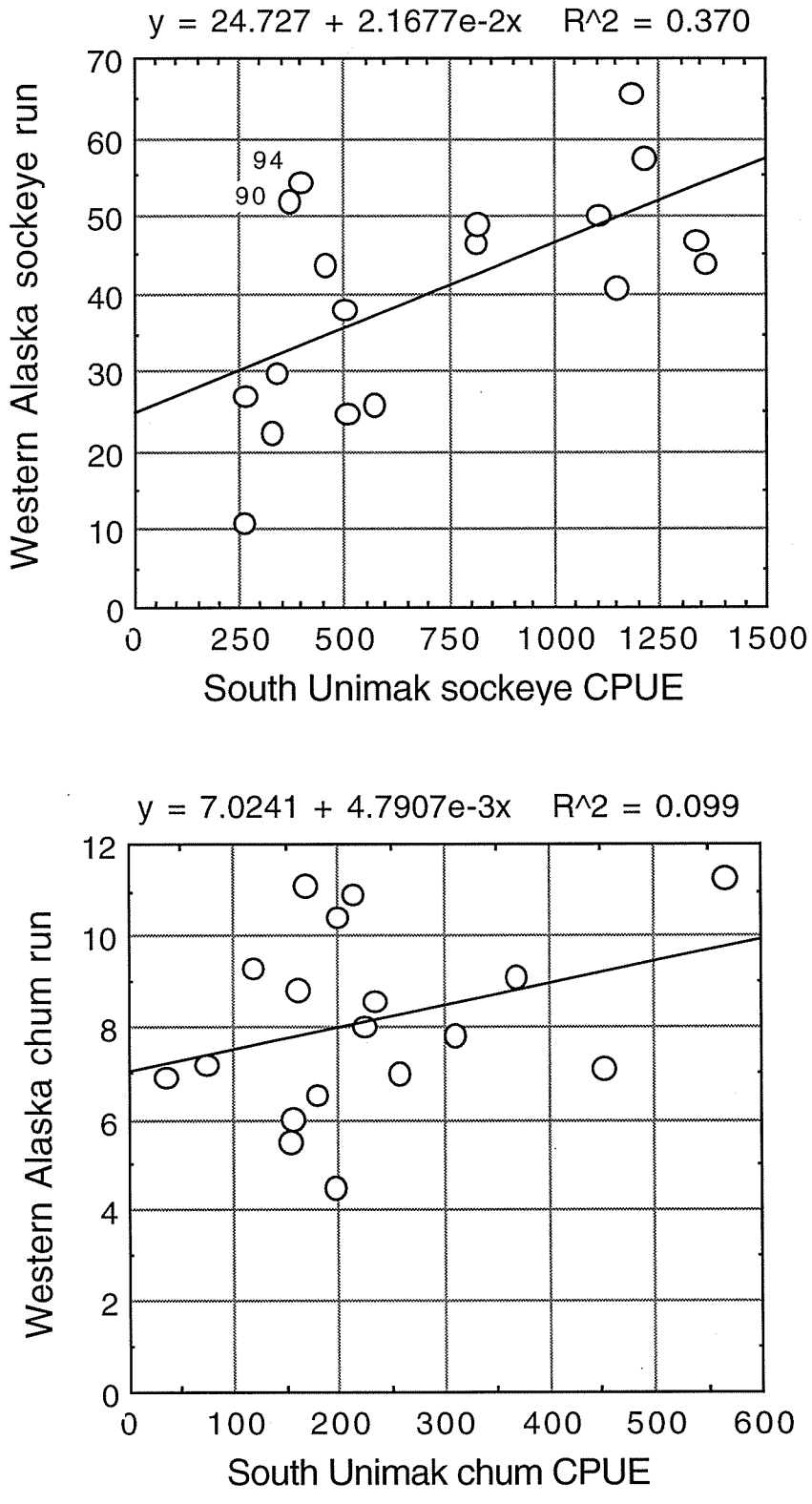


Figure 2. Western Alaska sockeye and chum salmon runs regressed on South Unimak CPUE.

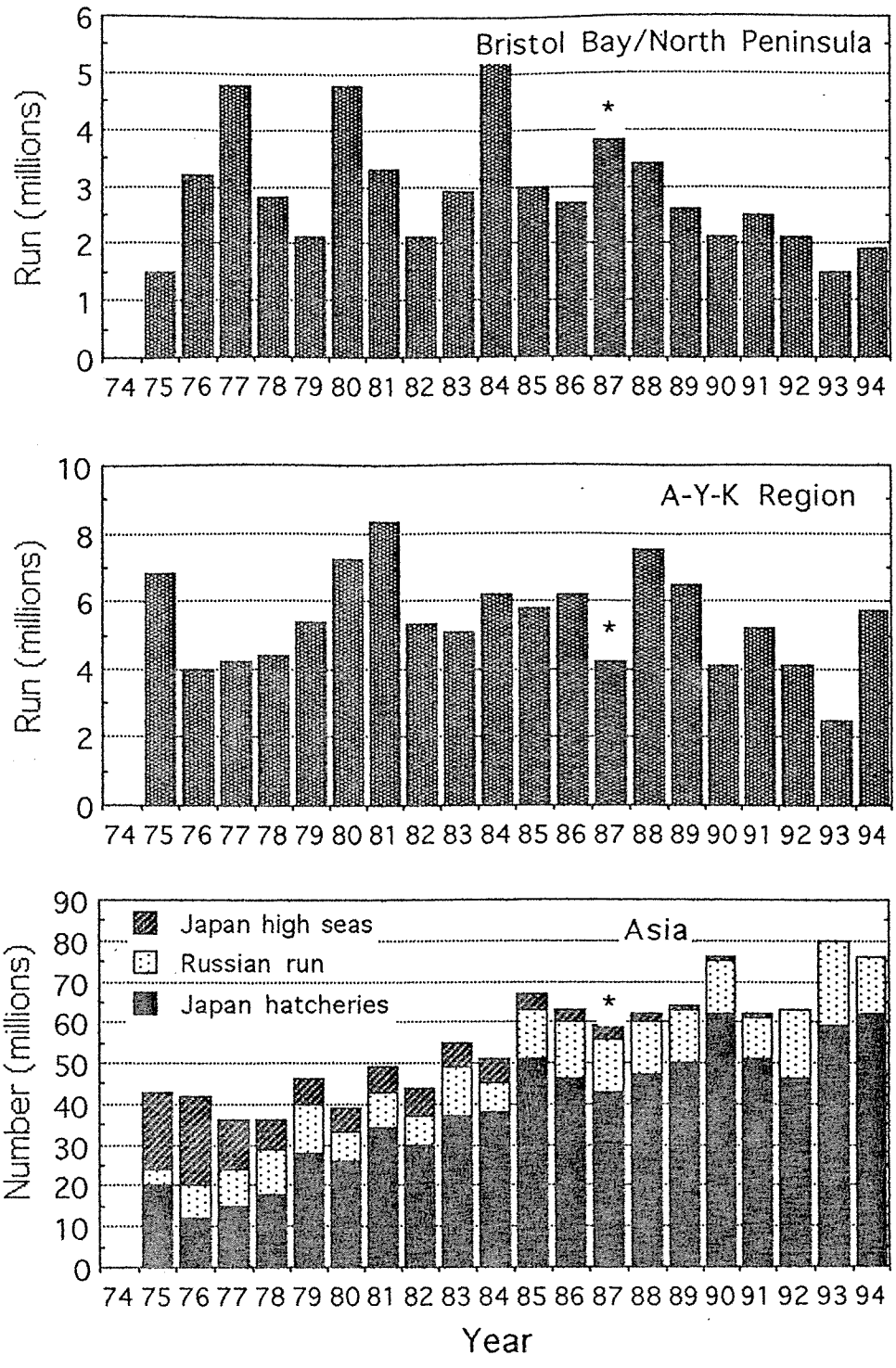


Figure 3. Chum salmon runs to Bristol Bay, A-Y-K and Asia, 1975–1994.

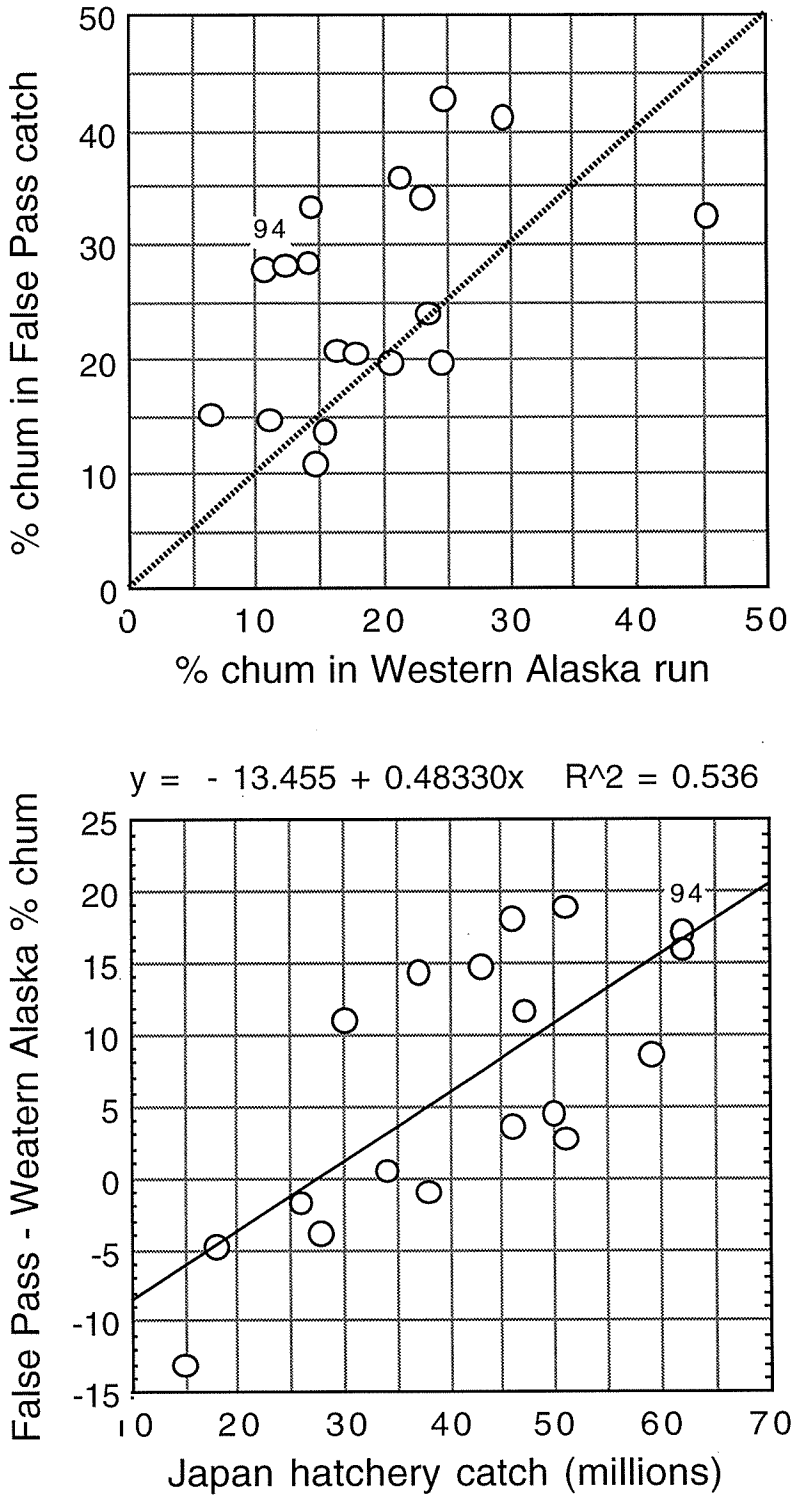


Figure 4. The percentage of chum salmon in the False Pass catch plotted on the percent chums in the Western Alaska run (bottom), and differences in the percent chum salmon in the False Pass catch and in the Western Alaska run regressed on Japanese hatchery catch (top).

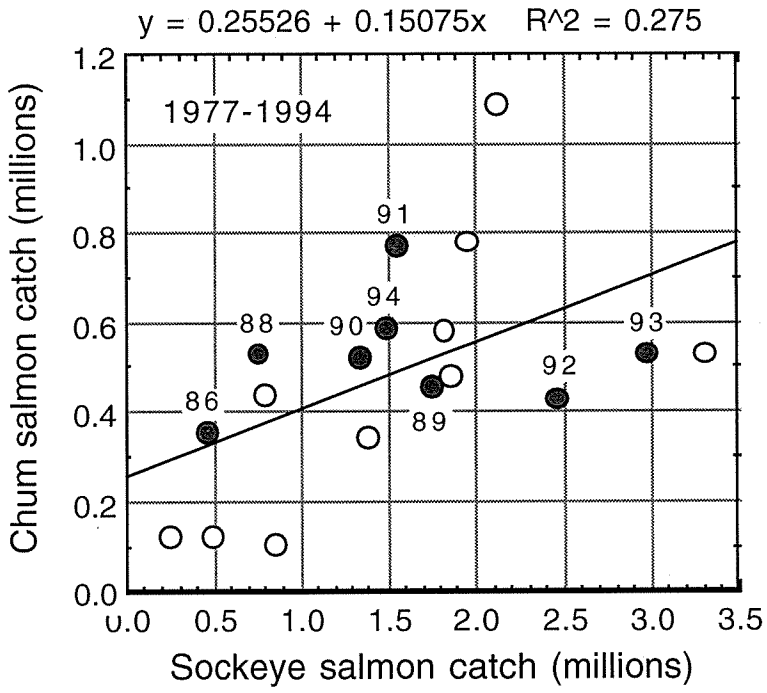


Figure 5. Annual chum salmon catch regressed on sockeye salmon catch in the False Pass fisheries (● = years with a chum salmon cap).

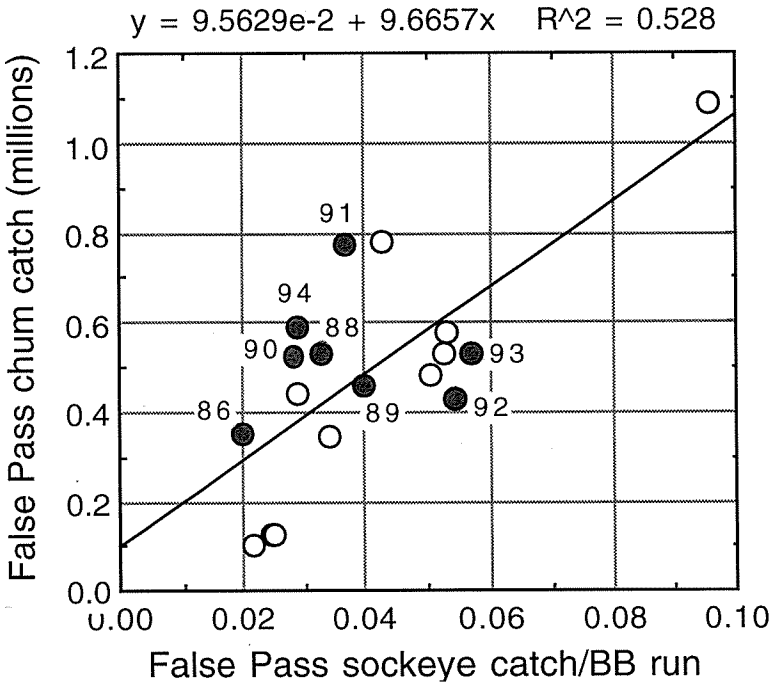


Figure 6. Regressions of False Pass chum salmon catch on the proportion that the sockeye catch was of the Bristol Bay run (● = years with a chum salmon cap).

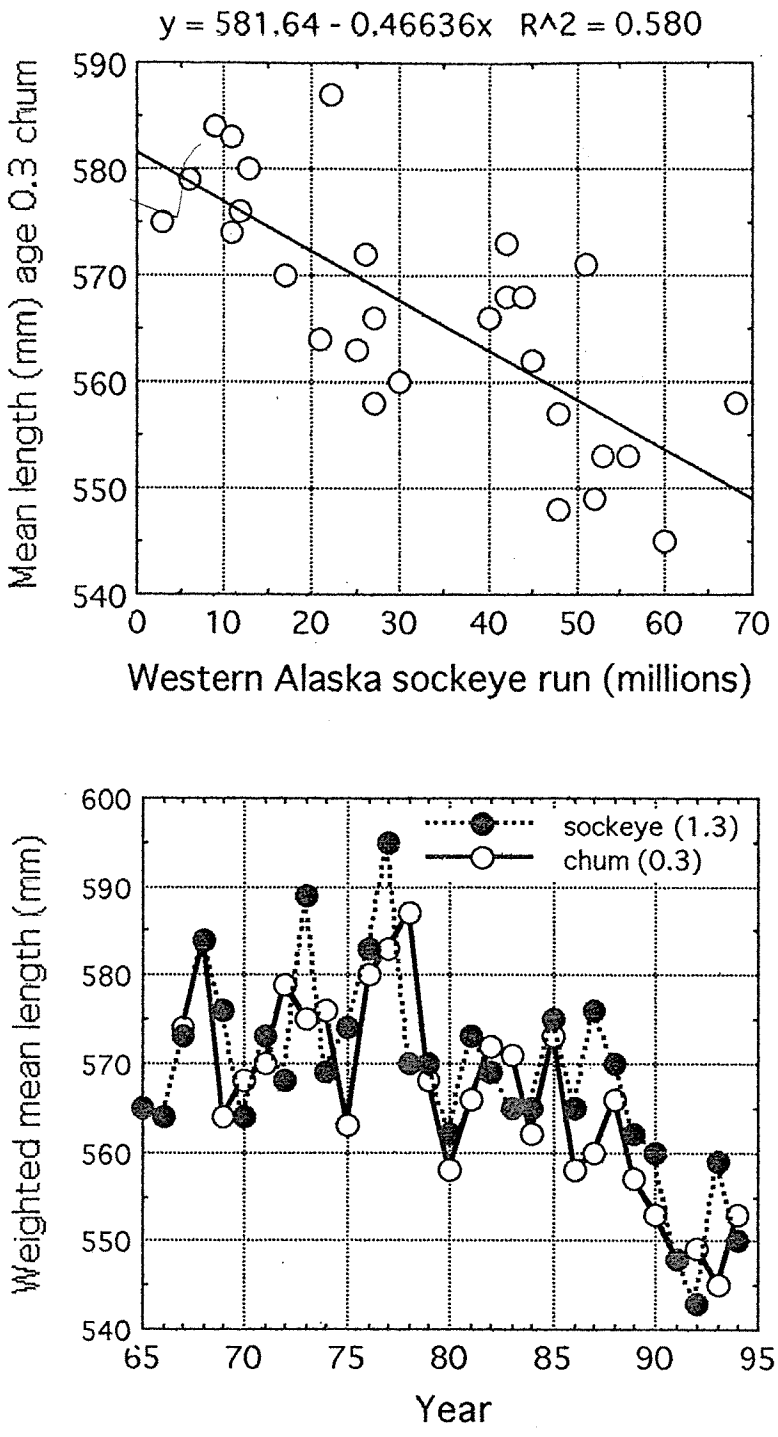


Figure 7. Regression of mean length of Nushagak age 0.3 chum salmon on number of sockeye salmon in the Western Alaska run (top) and the annual mean lengths of sockeye and chum salmon in Nushagak catches (bottom).

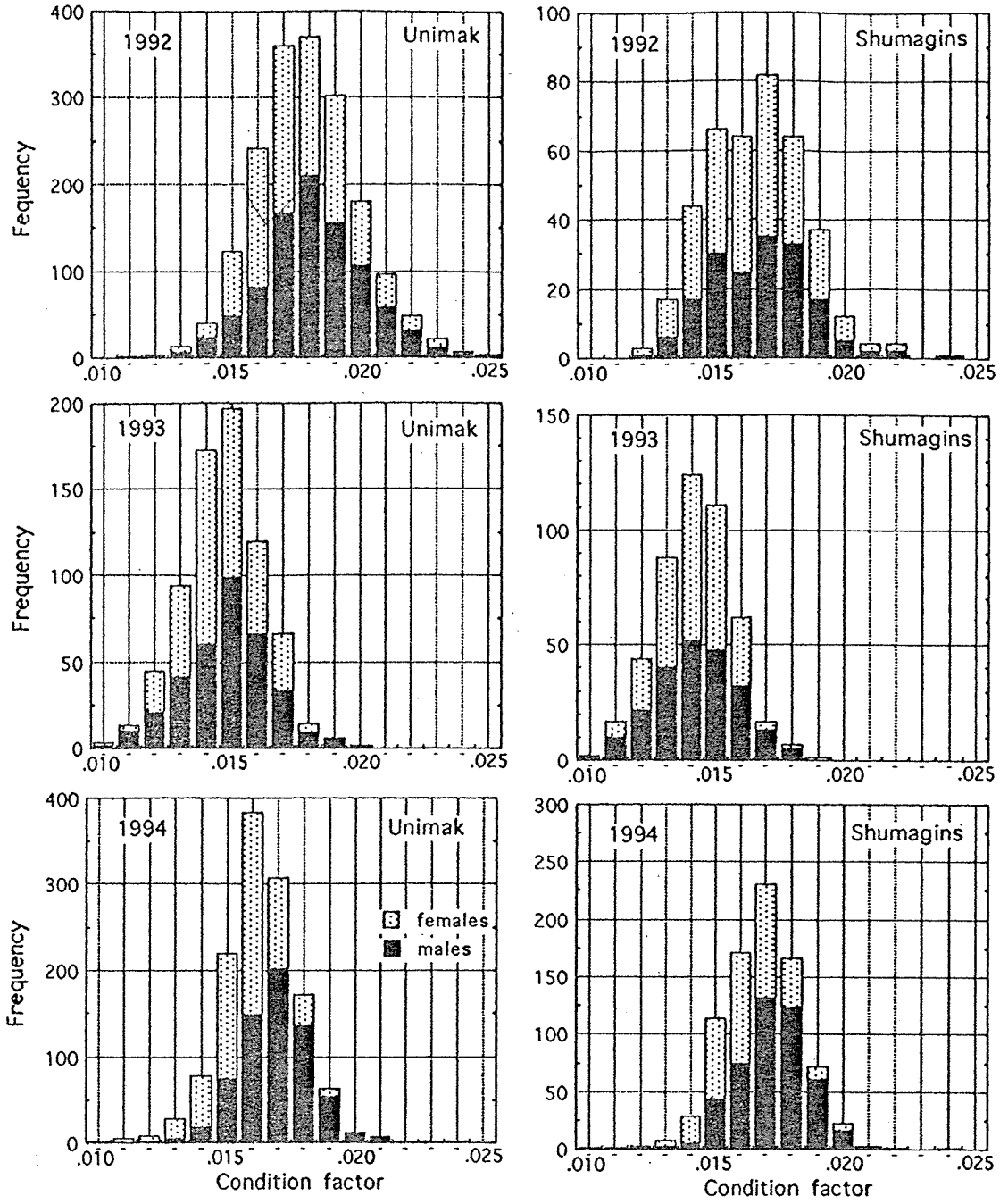


Figure 8. Frequency distributions of chum salmon condition factors in False Pass catches, 1992–94.

# TABLES

Table 1. Sockeye and chum salmon catches in the South Unimak June fishery, 1986–94.

| Year | Date | Hours open | Catch (1,000s) Sockeye | Chum | % chum | Sockeye CPUE |
|---|---|---|---|---|---|---|
| 86 | 11 | 24 | 7 | 14 | 67 | 102 |
| (24) | 14 | 16 | 29 | 55 | 65 | 138 |
| Q=.9 | 16 | 6 | 31 | 35 | 53 | 383 |
| C=.3 | 18 | 12 | 92 | 102 | 53 | 562 |
| | 21 | 18 | 65 | 32 | 33 | 253 |
| cap=.4 | 23 | 24 | 20 | 7 | 26 | 116 |
| | 24 | 24 | 17 | 5 | 23 | 253 |
| | 25 | 24 | 24 | 8 | 24 | 276 |
| Sum | 13- | 124 | 278 | 244 | 47 | 268 |
| 87 | 10 | 18 | 14 | 16 | 53 | 80 |
| (27) | 11 | 20 | 18 | 22 | 55 | 155 |
| Q=.6 | 14 | 18 | 44 | 24 | 35 | 263 |
| C=.6 | 15 | 22 | 47 | 30 | 39 | 240 |
| no cap | 17 | 18 | 83 | 63 | 43 | 414 |
| | 18 | 16 | 66 | 54 | 45 | 322 |
| | 20 | 18 | 54 | 23 | 30 | 295 |
| | 21 | 24 | 96 | 48 | 33 | 463 |
| | 22 | 20 | 74 | 42 | 36 | 330 |
| | 25 | 12 | 44 | 24 | 35 | 706 |
| | 26 | 22 | 49 | 56 | 53 | 277 |
| Sum | 13- | 170 | 557 | 364 | 40 | 343 |
| 88 | 11 | 14 | 11 | 18 | 62 | 222 |
| (23) | 15 | 14 | 42 | 35 | 45 | 829 |
| Q=1.3 | 16 | 14 | 75 | 70 | 48 | 1190 |
| C= .5 | 18 | 6 | 56 | 49 | 47 | 788 |
| cap=.5 | 21 | 15 | 80 | 63 | 44 | 462 |
| | 22 | 9 | 35 | 26 | 43 | 719 |
| | 23 | 22 | 114 | 112 | 50 | 486 |
| | 27 | 16 | 46 | 87 | 65 | 328 |
| Sum | 13- | 96 | 448 | 442 | 50 | 573 |
| 89 | 10 | 16 | 144 | 82 | 36 | 885 |
| (44) | 16 | 16 | 350 | 145 | 29 | 1584 |
| Q=1.2 | 19 | 18 | 126 | 38 | 23 | 900 |
| C=1.3 | 20 | 22 | 434 | 119 | 22 | 1455 |
| cap=.5 | 23 | 12 | 259 | 20 | 7 | 1213 |
| Sum | 13- | 68 | 1169 | 322 | 22 | 1339 |
| 90 | 13 | 18 | 12 | 5 | 29 | 140 |
| (48) | 14 | 22 | 33 | 12 | 27 | 135 |
| Q=1.1 | 16 | 18 | 67 | 18 | 21 | 377 |
| C=1.1 | 17 | 24 | 145 | 42 | 22 | 519 |
| cap=.6 | 18 | 24 | 90 | 26 | 22 | 331 |
| | 19 | 24 | 33 | 9 | 21 | 181 |
| | 20 | 24 | 81 | 29 | 26 | 329 |
| | 21 | 24 | 118 | 57 | 33 | 417 |
| | 22 | 24 | 118 | 35 | 23 | 448 |
| | 23 | 24 | 104 | 47 | 31 | 354 |
| | 24 | 22 | 87 | 76 | 47 | 363 |
| | 26 | 18 | 166 | 91 | 35 | 600 |
| | 28 | 5 | 17 | 6 | 26 | 597 |
| Sum | 13- | 271 | 1071 | 453 | 30 | 373 |
| 91 | 15 | 14 | 121 | 45 | 27 | 574 |
| (42) | 17 | 14 | 51 | 27 | 35 | 319 |
| Q=1.6 | 18 | 14 | 104 | 49 | 32 | 600 |
| C=1.2 | 19 | 6 | 108 | 56 | 34 | 1494 |
| cap=.6 | 20 | 15 | 221 | 115 | 34 | 1040 |
| | 23 | 9 | 183 | 49 | 21 | 1783 |
| | 24 | 22 | 256 | 187 | 42 | 828 |
| | 25 | 16 | 143 | 137 | 49 | 642 |
| Sum | 13- | 110 | 1187 | 665 | 36 | 811 |
| 92 | 15 | 18 | 214 | 26 | 11 | 1208 |
| (45) | 16 | 24 | 132 | 21 | 14 | 610 |
| Q=2.0 | 17 | 24 | 245 | 37 | 13 | 888 |
| C=2.0 | 18 | 14 | 236 | 42 | 15 | 1229 |
| cap=.7 | 19 | 22 | 359 | 58 | 14 | 1075 |
| | 21 | 18 | 340 | 45 | 12 | 1307 |
| | 22 | 14 | 345 | 75 | 18 | 1348 |
| | 26 | 5 | 87 | 15 | 15 | 1445 |
| Sum | 13- | 139 | 1958 | 319 | 14 | 1105 |
| 93 | 13 | 16 | 284 | 38 | 12 | 1263 |
| (52) | 15 | 18 | 255 | 45 | 15 | 1351 |
| Q=2.9 | 16 | 24 | 305 | 43 | 12 | 1009 |
| C=2.9 | 17 | 18 | 304 | 39 | 11 | 1075 |
| cap=.7 | 19 | 18 | 350 | 51 | 13 | 1552 |
| | 20 | 22 | 492 | 68 | 12 | 1475 |
| | 22 | 12 | 203 | 73 | 26 | 1130 |
| | 26 | 18 | 50 | 3 | 6 | 1660 |
| | 27 | 22 | 112 | 13 | 10 | 848 |
| | 29 | 8 | 12 | 9 | 43 | 277 |
| Sum | 13- | 204 | 2367 | 382 | 14 | 1218 |
| 94 | 17 | 9 | 118 | 45 | 28 | 654 |
| (50) | 18 | 9 | 64 | 24 | 27 | 862 |
| Q=2.9 | 19 | 22 | 165 | 47 | 22 | 389 |
| C=1.0 | 20 | 7 | 51 | 18 | 26 | 864 |
| cap=.7 | 21 | 24 | 39 | 10 | 20 | 178 |
| | 22 | 24 | 93 | 26 | 22 | 407 |
| | 23 | 24 | 128 | 34 | 21 | 500 |
| | 24 | 24 | 63 | 20 | 24 | 256 |
| | 25 | 24 | 44 | 19 | 30 | 226 |
| | 26 | 24 | 39 | 19 | 33 | 250 |
| | 27 | 24 | 55 | 42 | 43 | 496 |
| | 28 | 24 | 65 | 54 | 45 | 560 |
| | 29 | 15 | 15 | 9 | 38 | 234 |
| | 30 | 15 | 5 | 2 | 29 | 151 |
| Sum | 13- | 287 | 944 | 369 | 28 | 399 |

Sockeye CPUE = catch/boat/24h; 1 purse seine = 3.28 drift gill nets (set nets excluded).
( ) = Bristol Bay run; Q = Unimak sockeye quota; C = Unimak sockeye catch; and
cap = total chum cap (Unimak & Shumagin) in millions.

Table 2. Comparison of the age compositions of sockeye salmon in Bristol Bay runs with age compositions from the False Pass fishery, in-season Port Moller test fishery, and the ADF&G pre-season forecast, 1987–94.

| 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 |
| | 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 |
| | False Pass catch | 23 | 42 | 23 | 9 | 66 | 33 | |
| | Bristol Bay run | 20 | 22 | 41 | 13 | 43 | 55 | 23 |
| 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 |
| | 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 |
| | 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 |
| | Moller in-f'cast | 12 | 14 | 55 | 13 | 28 | 71 | 37 |
| | 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 |
| | 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 |
| | 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 |
| | False Pass catch | 8 | 34 | 33 | 22 | 42 | 57 | |
| | Bristol Bay run | 8 | 56 | 14 | 18 | 65 | 34 | 50.1 |
| Means | ADF&G pre-f'cast | 22.625 | 35.75 | 26.875 | 14.125 | 58.375 | 41.5 | 32.2875 |
| | Moller in-season | 15.375 | 29.875 | 29.75 | 21.75 | 45.75 | 52.625 | 38.875 |
| | False Pass catch | 16.375 | 37.75 | 24.625 | 18 | 54.625 | 44.5 | |
| | Bristol Bay run | 18.375 | 35 | 25.875 | 17.375 | 53.75 | 45 | 41.3625 |

Age composition for Port Moller is for June 11-30 only, whereas the forecast is the one issued about July 2-3.
Forecasts and runs do not include jacks (1-ocean fish).

Table 3. Percent chums in chum and sockeye catches and runs (in millions), 1977–94.

| | 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 | 7.5 | 14.7 | 0.86 | 0.11 | 10.9 | 9.6 | 0.2 | 2.0 |
| 80 | 62.4 | 3.3 | 5.1 | 65.4 | 12.0 | 15.5 | 3.30 | 0.53 | 13.8 | 4.6 | 1.6 | 25.8 |
| 81 | 34.3 | 2.1 | 5.8 | 37.9 | 11.6 | 23.4 | 1.83 | 0.58 | 23.9 | 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 | 1.86 | 0.48 | 20.5 | 18.0 | 0.8 | 4.3 |
| 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 | 12.4 | 0.8 | 6.1 |
| 88 | 23.2 | 2.5 | 9.8 | 26.0 | 10.9 | 29.5 | 0.76 | 0.53 | 41.1 | 7.8 | 1.2 | 13.3 |
| 89 | 43.9 | 2.2 | 4.9 | 46.8 | 9.1 | 16.3 | 1.75 | 0.46 | 20.8 | 18.6 | 0.9 | 4.6 |
| 90 | 47.8 | 1.7 | 3.4 | 51.6 | 6.2 | 10.7 | 1.35 | 0.52 | 27.8 | 26.8 | 1.3 | 4.6 |
| 91 | 42.2 | 2.0 | 4.6 | 46.3 | 7.7 | 14.3 | 1.55 | 0.77 | 33.2 | 19.2 | 1.6 | 7.7 |
| 92 | 45.0 | 1.4 | 3.0 | 49.9 | 6.2 | 11.1 | 2.46 | 0.43 | 14.7 | 23.0 | 1.5 | 6.1 |
| 93 | 52.1 | 1.0 | 1.9 | 57.3 | 4.0 | 6.5 | 2.97 | 0.53 | 15.1 | 28.8 | 1.3 | 4.3 |
| 94 | 50.3 | 1.3 | 2.5 | 54.3 | 7.6 | 12.3 | 1.49 | 0.59 | 28.2 | 23.2 | 1.6 | 6.6 |
| Means 83-94 | 39.9 | 2.1 | 5.5 | 43.5 | 8.1 | 16.6 | 1.57 | 0.52 | 27.3 | 19.0 | 1.5 | 7.4 |

Table 4. Annual sockeye salmon runs (millions) to the eastern Bering Sea (western Alaska), 1970–94.

| | 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 | .66 | 40.1 | 1.68 | 3.4 |
| 71 | .006 | .02 | .42 | 2.61 | 9.37 | 1.94 | 1.48 | 15.82 | .79 | 16.6 | .61 | 3.0 |
| 72 | .004 | .01 | .16 | .91 | 2.85 | 1.39 | .10 | 5.41 | .37 | 5.8 | .52 | 7.1 |
| 73 | .005 | .01 | .21 | .85 | .79 | .55 | .04 | 2.44 | .35 | 2.8 | .26 | 7.3 |
| 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 | .86 | 1.7 |
| 80 | .043 | .11 | 1.21 | 12.81 | 40.57 | 3.68 | 4.22 | 62.49 | 2.78 | 65.4 | 3.30 | 4.1 |
| 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 | 1.86 | 3.7 |
| 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 | 1.76 | 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 | 4.80 | 57.2 | 2.97 | 4.2 |
| 94 | .122 | .24 | .50 | 5.86 | 25.83 | 12.70 | 5.45 | 50.34 | 3.94 | 54.5 | 1.48 | 2.3 |
| Means | | | | | | | | | | | | |
| 70-79 | | .04 | .42 | 3.08 | 11.88 | 1.95 | .60 | 17.94 | 1.13 | 19.1 | .52 | 2.9 |
| 80-89 | | .27 | .75 | 6.32 | 18.37 | 6.57 | 4.17 | 36.18 | 2.63 | 39.1 | 1.62 | 3.4 |
| 90-94 | | .36 | .66 | 6.41 | 20.30 | 15.11 | 5.01 | 47.49 | 4.07 | 51.9 | 1.96 | 3.1 |

Kuskokwim run estimated by catch/ 0.4 (1970-89) and catch/0.5 (1990-94).
South Peninsula percent= (SP catch*.85)/ (SP catch*.85+ WA total)*100.

Table 5. North Pacific runs of sockeye salmon, 1970–94, catch + escapement in millions.

| Year | Bristol Bay run | Alaska runs | | Japan high seas Catch | Russian Run | North Pacific total run | 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 | 11 | 86 | 18 | 104 | 50 |
| 93 | 52 | 60 | 19 | 0 | 11 | 90 | 29 | 119 | 50 |
| 94 | 50 | 56 | 15 | 0 | *9* | 80 | *17* | 97 | 58 |
| Means | | | | | | | | | |
| 70-79 | 18 | 20 | 6 | 6 | 2 | 33 | 11 | 45 | 39 |
| 80-89 | 36 | 40 | 15 | 2 | 6 | 63 | 15 | 77 | 51 |
| 90-93 | 47 | 53 | 20 | 0 | 11 | 84 | 23 | 106 | 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 6. North Pacific runs of chum salmon, 1970–94, catch + escapement in millions.

| 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 | S.P. | High seas | Coastal | | | | | |
| 70 | 1.7 | 5.6 | 5.1 | 0.5 | 17 | 7 | 7 | 43 | 11 | 54 | 59 |
| 71 | 1.3 | 4.3 | 6.4 | 0.7 | 17 | 10 | 7 | 45 | 7 | 52 | 65 |
| 72 | 1.6 | 4.3 | 4.5 | 0.6 | 22 | 9 | 4 | 45 | 17 | 62 | 57 |
| 73 | 2.2 | 6.3 | 3.5 | 0.2 | 16 | 12 | 3 | 41 | 15 | 56 | 56 |
| 74 | 1.6 | 6.8 | 1.9 | 0.0 | 22 | 13 | 5 | 48 | 10 | 58 | 68 |
| 75 | 1.4 | 8.4 | 2.1 | 0.1 | 19 | 20 | 4 | 54 | 5 | 59 | 73 |
| 76 | 2.8 | 7.2 | 3.4 | 0.4 | 22 | 12 | 8 | 53 | 9 | 62 | 68 |
| 77 | 4.0 | 9.0 | 5.9 | 0.1 | 12 | 15 | 9 | 51 | 5 | 56 | 64 |
| 78 | 2.3 | 7.2 | 4.3 | 0.1 | 7 | 18 | 11 | 47 | 9 | 56 | 63 |
| 79 | 1.7 | 7.5 | 4.0 | 0.1 | 6 | 28 | 12 | 58 | 4 | 62 | 75 |
| 80 | 3.3 | 12.0 | 5.1 | 0.5 | 6 | 26 | 7 | 57 | 11 | 68 | 58 |
| 81 | 2.1 | 11.6 | 8.3 | 0.6 | 6 | 34 | 9 | 70 | 6 | 76 | 65 |
| 82 | 1.3 | 7.4 | 8.8 | 1.1 | 7 | 30 | 7 | 61 | 9 | 70 | 62 |
| 83 | 2.2 | 8.0 | 7.0 | 0.8 | 6 | 37 | 12 | 71 | 6 | 77 | 72 |
| 84 | 3.5 | 11.4 | 6.5 | 0.3 | 6 | 38 | 7 | 70 | 13 | 83 | 62 |
| 85 | 2.0 | 8.8 | 5.5 | 0.5 | 4 | 51 | 12 | 82 | 17 | 99 | 68 |
| 86 | 2.2 | 8.9 | 8.1 | 0.4 | 3 | 46 | 14 | 80 | 17 | 97 | 65 |
| 87 | 2.9 | 8.0 | 6.2 | 0.4 | 3 | 43 | 13 | 73 | 12 | 85 | 69 |
| 88 | 2.5 | 10.9 | 8.6 | 0.5 | 2 | 47 | 13 | 82 | 20 | 102 | 61 |
| 89 | 2.2 | 9.1 | 4.9 | 0.5 | 1 | 50 | 13 | 78 | 9 | 87 | 74 |
| 90 | 1.7 | 6.2 | 4.7 | 0.5 | 1 | 62 | 13 | 88 | 13 | 101 | 76 |
| 91 | 2.0 | 7.7 | 5.3 | 0.8 | 1 | 51 | 10 | 76 | 11 | 87 | 73 |
| 92 | 1.4 | 6.2 | 4.3 | 0.4 | 0 | 46 | 17 | 73 | 16 | 89 | 70 |
| 93 | 1.0 | 4.0 | 4.3 | 0.5 | 0 | 59 | 21 | 89 | 21 | 110 | 73 |
| 94 | 1.3 | 7.6 | 6.1 | 0.4 | 0 | 62 | 14 | 90 | 21 | 111 | 70 |
| Means | | | | | | | | | | | |
| 70-79 | 2.1 | 6.7 | 4.1 | 0.3 | 16 | 14 | 7 | 48 | 9 | 58 | 65 |
| 80-89 | 2.4 | 9.6 | 6.9 | 0.6 | 4 | 40 | 11 | 73 | 12 | 85 | 66 |
| 90-94 | 1.5 | 6.3 | 4.9 | 0.5 | 0 | 56 | 15 | 83 | 16 | 100 | 72 |

Western Alaska includes Bristol Bay, North Peninsula and the Yukon-Kuskokwim region.
Japan coastal run does not include hatchery returns (brood stock) to Hokkaido and Honshu.
Japan high seas catches since 1992 included in Russian runs.

Table 7. Summary of length, weight, and condition factors for chum salmon in the False Pass catches.

| | | | Sex/age percent | | | Mean length (mm) | | | Mean weight (kg) | | | Condition factor | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Sex | Age | 92 | 93 | 94 | 92 | 93 | 94 | 92 | 93 | 94 | 92 | 93 | 94 |
| Unimak | Male | 0.2 | 0.4 | 1.0 | 0.4 | 491 | 488 | 498 | 1.75 | 1.41 | 1.88 | | | |
| | | 0.3 | 26.9 | 31.4 | 23.6 | 550 | 557 | 568 | 3.00 | 2.55 | 3.14 | .0179 | .0145 | .0169 |
| | | 0.4 | 21.8 | 17.0 | 26.7 | 579 | 591 | 589 | 3.62 | 3.14 | 3.50 | .0185 | .0151 | .0169 |
| | | 0.5 | 0.1 | 0.6 | 2.0 | 628 | 599 | 611 | 4.42 | 3.16 | 3.85 | | | |
| | | 0.6 | | | 0.1 | | | 652 | | | 4.90 | | | |
| | Female | 0.2 | 0.1 | 1.2 | 0.3 | 514 | 514 | 507 | 2.30 | 1.82 | 2.02 | | | |
| | | 0.3 | 29.7 | 35.4 | 26.8 | 543 | 545 | 546 | 2.83 | 2.35 | 2.59 | .0176 | .0143 | .0157 |
| | | 0.4 | 20.8 | 13.3 | 19.2 | 568 | 574 | 563 | 3.23 | 2.84 | 2.84 | .0178 | .0147 | .0158 |
| | | 0.5 | 0.2 | 0.1 | 0.9 | 573 | 582 | 587 | 3.58 | 2.90 | 3.13 | | | |
| | Comb. | 0.2 | 0.5 | 2.2 | 0.7 | 495.6 | 502.18 | 501.86 | 1.86 | 1.63 | 1.94 | | | |
| | | 0.3 | 56.6 | 66.8 | 50.4 | 546.33 | 550.64 | 556.3 | 2.91 | 2.44 | 2.85 | .0177 | .0144 | .0163 |
| | | 0.4 | 42.6 | 30.3 | 45.9 | 573.63 | 583.54 | 578.12 | 3.43 | 3.01 | 3.22 | .0182 | .0149 | .0164 |
| | | 0.5 | 0.3 | 0.7 | 2.9 | 591.33 | 596.57 | 603.55 | 3.86 | 3.12 | 3.63 | | | |
| | | 0.6 | | | 0.1 | | | 652 | | | 4.90 | | | |
| Shumagin | Male | 0.2 | 0.0 | 0.7 | 0.3 | | 519 | 567 | | 1.99 | 3.09 | | | |
| | | 0.3 | 23.7 | 27.6 | 27.1 | 547 | 554 | 575 | 2.74 | 2.49 | 3.29 | .0164 | .0142 | .0171 |
| | | 0.4 | 21.6 | 20.7 | 28.8 | 589 | 586 | 589 | 3.47 | 2.88 | 3.52 | .0167 | .0139 | .0169 |
| | | 0.5 | 0.2 | 1.0 | 1.2 | 651 | 632 | 618 | 5.44 | 3.47 | 4.12 | | | |
| | Female | 0.2 | 0.0 | 0.1 | 0.1 | | 534 | 532 | | 2.31 | 2.59 | | | |
| | | 0.3 | 32.0 | 33.2 | 21.2 | 543 | 547 | 550 | 2.62 | 2.31 | 2.71 | .0162 | .0139 | .0162 |
| | | 0.4 | 21.7 | 15.4 | 20.5 | 574 | 577 | 572 | 3.11 | 2.79 | 3.04 | .0163 | .0141 | .0161 |
| | | 0.5 | 0.8 | 1.3 | 0.8 | 609 | 662 | 595 | 3.39 | 4.25 | 3.33 | | | |
| | Comb. | 0.2 | 0.0 | 0.8 | 0.4 | | 520.88 | 558.25 | | 2.03 | 2.97 | | | |
| | | 0.3 | 55.7 | 60.8 | 48.3 | 544.7 | 550.18 | 564.03 | 2.67 | 2.39 | 3.04 | .0163 | .0140 | .0167 |
| | | 0.4 | 43.3 | 36.1 | 49.3 | 581.48 | 582.16 | 581.93 | 3.29 | 2.84 | 3.32 | .0165 | .0140 | .0166 |
| | | 0.5 | 1.0 | 2.3 | 2.0 | 617.4 | 648.96 | 608.8 | 3.80 | 3.91 | 3.80 | | | |

Table 8. 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 | .31 | .61 | 5.71 |
| 91 | 2.3 | 526 | 2.47 | 67.4 | 548 | 2.71 | 30.3 | 573 | 3.18 | 0.0 | .47 | .68 | 7.69 |
| 92 | 0.2 | 479 | | 55.2 | 549 | 2.80 | 44.1 | 565 | 2.97 | 0.4 | .31 | .55 | 5.19 |
| 93 | 0.2 | 502 | | 42.6 | 545 | 2.61 | 53.6 | 570 | 2.94 | 3.6 | .42 | .59 | 7.62 |
| 94 | 0.4 | 512 | | 51.2 | 553 | 2.81 | 47.0 | 562 | 2.83 | 1.5 | .29 | .49 | 5.86 |
| Means | | | | | | | | | | | | | |
| 70-94 | 5.1 | 532 | 2.56# | 65.8 | 566 | 2.98 | 28.3 | 586 | 3.31 | 0.7 | .48 | 1.01 | 5.05 |

Sources: Yuen and Nelson (1984), annual ADF&G reports on Bristol Bay salmon; e.g. Stratton and Crawford (1992); and B. Cross (ADF&G) for 1992-1994.

About 55% of catch in 1994 was with king gear; AWL statistics given for sockeye gear only.

Table 9. Frequencies of focal scale resorption (holes) on chum salmon scales from the 1994 False Pass fisheries.

| Location | Date | Number of normal scales | Number with holes | | Percent with holes (1 or 2) | Number with questionable holes (1 or 2) | Percent with holes including questionable |
|---|---|---|---|---|---|---|---|
| | | | one scale | both scales | | | |
| Unimak | 6/17 | 246 | 3 | 2 | 1.99 | 0 | 1.99 |
| | 6/18 | 154 | 1 | 0 | 0.65 | 0 | 0.65 |
| | 6/19 | 171 | 2 | 2 | 2.29 | 0 | 2.29 |
| | 6/22 | 222 | 4 | 1 | 2.20 | 0 | 2.20 |
| | 6/23 | 194 | 4 | 1 | 2.51 | 1 | 3.00 |
| | 6/24 | 184 | 6 | 0 | 3.16 | 0 | 3.16 |
| | 6/26 | 136 | 1 | 0 | 0.73 | 0 | 0.73 |
| | Totals | 1307 | 21 | 6 | 2.02 | 1 | 2.10 |
| Shumagin Is. | 6/18 | 34 | 0 | 1 | 2.86 | 1 | 5.56 |
| | 6/20 | 168 | 3 | 3 | 3.45 | 1 | 4.00 |
| | 6/21 | 74 | 2 | 1 | 3.90 | 0 | 3.90 |
| | 6/22 | 213 | 3 | 2 | 2.29 | 0 | 2.29 |
| | 6/23 | 67 | 0 | 0 | 0.00 | 0 | 0.00 |
| | 6/24 | 178 | 3 | 3 | 3.26 | 0 | 3.26 |
| | 6/26 | 170 | 3 | 0 | 1.73 | 2 | 2.86 |
| | Totals | 904 | 14 | 10 | 2.59 | 4 | 3.00 |
| False Pass | Combined | 2211 | 35 | 16 | 2.25 | 10 | 2.68 |

# APPENDIX

Appendix Table 1. Nushagak district chum and sockeye salmon statistics (numbers in 1,000s), 1966–94.

| | 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 | 657 | .74 | 2.93 | 2.95 | .57 | .56 | 3.01 | 3.17 |
| 87 | 416 | -- | 147 | -- | 564 | .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 | 306 | -- | 330 | | 636 | .48 | 2.87 | 2.95 | .64 | .62 | 3.05 | 2.76 |
| 91 | 466 | -- | 252 | | 698 | .67 | 2.71 | 2.77 | .65 | .69 | 2.86 | 2.58 |
| 92 | 313 | -- | 303 | | 616 | .51 | 2.80 | 2.88 | .63 | .56 | 2.71 | 2.42 |
| 93 | 415 | -- | 217 | | 632 | .66 | 2.61 | 2.80 | .68 | .70 | 3.01 | 2.67 |
| 94* | 293 | -- | 379 | | 672 | .44 | 3.06 | 3.35 | .67 | .59 | 2.84 | 2.72 |
| Means | | | | | | | | | | | | |
| 70-79 | 455 | 258 | | | 719 | .64 | | 3.09 | .42 | .37 | 3.21 | 2.91 |
| 80-89 | 568 | | 227 | | 878 | .67 | | 3.08 | .62 | .58 | 3.06 | 2.92 |
| 90-93 | 375 | | 276 | | 646 | .58 | | 2.85 | .65 | .64 | 2.91 | 2.61 |

Data sources: Yeun and Nelson (1984), ADF&G (1994), and personal comunication with ADF&G, Anchorage for 1992-94.

* 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.

Appendix Table 2. Bristol Bay chum salmon catches (in millions), sockeye exploitation and estimated chums runs (catch/exploitation rate).

| | 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 | .12 | .22 | .17 | .425 | .65 | .47 | .128 | .16 | .14 | .032 | .04 | .04 | 1.68 | 1.53 |
| 91 | .46 | .68 | .75 | .25 | .38 | .40 | .430 | .77 | .49 | .071 | .10 | .07 | .057 | .10 | .07 | 2.03 | 1.78 |
| 92 | .31 | .55 | .62 | .17 | .23 | .29 | .227 | .38 | .34 | .114 | .13 | .12 | .057 | .09 | .10 | 1.39 | 1.47 |
| 93 | .41 | .59 | .63 | .15 | .22 | .25 | .039 | .07 | .04 | .049 | .05 | .05 | .068 | .09 | .08 | 1.02 | 1.05 |
| 94 | .29 | .49 | .67 | .23 | .35 | .46 | .201 | .32 | .26 | .057 | .07 | .06 | .049 | .06 | .08 | 1.29 | 1.54 |
| 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 |
| 90-94 | .37 | .58 | .68 | .18 | .28 | .31 | .26 | .44 | .32 | .08 | .10 | .09 | .05 | .08 | .07 | 1.48 | 1.47 |

Source: ADF&G (1994), Stratton (1993) and Russell (1994).

Appendix Table 3. Estimates of annual chum salmon runs to areas of central Alaska, 1970–94.

| | 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 | 0.57 | 0.28 | 0.85 | 0.46 | 0.23 | 0.69 | 0.92 | | 1.88 | 1.00 | | 1.43 | 0.23 | 0.10 | 0.33 | 5.18 |
| 71 | 0.75 | 0.34 | 1.09 | 0.35 | 0.47 | 0.82 | 1.54 | | 3.14 | 0.48 | | 0.69 | 0.57 | 0.17 | 0.74 | 6.48 |
| 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 | 0.08 | 0.21 | 0.29 | 0.01 | 0.12 | 0.13 | 0.32 | | 0.65 | 0.78 | | 1.11 | 0.73 | 0.55 | 1.28 | 3.47 |
| 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 | 0.13 | 0.33 | 0.46 | 0.08 | 0.21 | 0.29 | 0.74 | | 1.51 | 0.52 | | 0.74 | 0.37 | 0.08 | 0.45 | 3.45 |
| 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 | 0.48 | 0.60 | 1.08 | 0.12 | 0.10 | 0.22 | 0.81 | 0.64 | 1.45 | 0.65 | | 0.93 | 0.49 | 0.16 | 0.65 | 4.33 |
| 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 | 0.82 | 0.36 | 1.18 | 0.31 | 0.23 | 0.54 | 1.08 | 1.10 | 2.18 | 0.46 | | 0.66 | 0.41 | 0.09 | 0.50 | 5.06 |
| 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 | 1.18 | 0.39 | 1.57 | 0.39 | 0.26 | 0.65 | 1.26 | 1.36 | 2.62 | 1.63 | | 2.33 | 1.34 | 0.37 | 1.71 | 8.88 |
| 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 | 1.32 | 0.70 | 2.02 | 0.06 | 0.37 | 0.43 | 0.65 | 0.90 | 1.55 | 0.76 | | 1.09 | 1.20 | 0.23 | 1.43 | 6.52 |
| 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 | | 1.18 | 0.36 | | 0.51 | 0.96 | 0.41 | 1.37 | 4.66 |
| 91 | 0.82 | 0.59 | 1.41 | 0.26 | 0.47 | 0.73 | 1.03 | | 2.10 | 0.33 | | 0.47 | 0.33 | 0.25 | 0.58 | 5.29 |
| 92 | 0.89 | 0.34 | 1.23 | 0.22 | 0.57 | 0.79 | 0.66 | 0.53 | 1.19 | 0.38 | | 0.54 | 0.33 | 0.27 | 0.60 | 4.35 |
| 93 | 0.52 | 0.40 | 0.91 | 0.12 | 0.26 | 0.38 | 0.64 | 0.67 | 1.31 | 0.12 | | 0.17 | 1.19 | 0.27 | 1.46 | 4.23 |
| 94 | 1.78 | 0.60 | 2.38 | 0.21 | 0.37 | 0.58 | 0.70 | 0.55 | 1.25 | 0.30 | | 0.43 | 1.06 | | 1.35 | 5.99 |

Sources: Barrett et al. (1990), Quimby and Owen (1994), ADF&G (1988), McCullough et al. (1994), and Donaldson et al (1993).
Cook Inlet run estimated from catch and mean sockeye salmon harvest rate, 0.7 (Bucher 1994, Ruesch 1994, and King and Tarbox 1989).
Kodiak runs for 1970-76 and 1990-91 estimated from catch and mean harvest rate of .49 (1977-88).

Appendix Table 4. Catches of chum salmon in the Yukon River in thousands of fish, 1970–94.

| | Summer chum | | Fall chum | | | | Total | Total | | Escapement | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Commercial | | Subsistance | | comm- | 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 | 276 | 0 | 41 | 362 | 4 | 664 | 642 | 1306 | 826 | 596 | 1422 |
| 88 | 1620 | 312 | 137 | 30 | 160 | 3 | 1787 | 475 | 2262 | 1773 | 424 | 2197 |
| 89 | 1457 | 250 | 285 | 18 | 224 | 5 | 1760 | 479 | 2239 | 1604 | 606 | 2210 |
| 90 | 509 | 202 | 134 | 28 | 189 | 6 | 671 | 397 | 1068 | 932 | *547* | 1479 |
| 91 | 650 | 276 | 254 | 31 | 169 | 4 | 935 | 449 | 1384 | 1233 | *561* | 1794 |
| 92 | 544 | 232 | 19 | 19 | 111 | 2 | 582 | 345 | 927 | *1249* | *478* | 1727 |
| 93 | 140 | 112 | 0 | 8 | 77 | 6 | 148 | 195 | 343 | *884* | *524* | 1408 |
| 94 | 262 | *250* | 8 | 30 | *150* | 5 | 300 | 405 | 705 | *2288* | *831* | 3119 |

Sources: Schultz et al. (1994) and Rogers (1994).

## Appendix Table 5. Estimates of A-Y-K chum salmon runs (1,000s of fish), 1970–94.

| | 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 | | 603.92 | .51 | 3694.4 |
| 71 | 271 | | 821 | .33 | 264 | | 800 | .33 | 170 | 80 | 370 | .46 | 153 | 115 | 440.5 | .35 | 215 | | 421.57 | .51 | 2853.1 |
| 72 | 244 | | 739 | .33 | 196 | | 594 | .33 | 184 | 126 | 499 | .37 | 115 | 76 | 305 | .38 | 217 | | 425.49 | .51 | 2562.5 |
| 73 | 447 | | 1355 | .33 | 296 | | 897 | .33 | 394 | 62 | 549 | .72 | 131 | 86 | 346 | .38 | 354 | | 694.12 | .51 | 3841.1 |
| 74 | 818 | 632 | 1450 | .56 | 396 | 592 | 988 | .40 | 643 | 251 | 1270.5 | .51 | 168 | 81 | 370.5 | .45 | 471 | | 923.53 | .51 | 5002.5 |
| 75 | 922 | 1952 | 2874 | .32 | 383 | 1394 | 1777 | .22 | 579 | 156 | 969 | .60 | 221 | 86 | 436 | .51 | 400 | | 784.31 | .51 | 6840.3 |
| 76 | 788 | 1033 | 1821 | .43 | 233 | 504 | 737 | .32 | 184 | 63 | 341.5 | .54 | 104 | 36 | 194 | .54 | 457 | | 896.08 | .51 | 3989.6 |
| 77 | 695 | 791 | 1486 | .47 | 353 | 619 | 972 | .36 | 209 | 37 | 301.5 | .69 | 227 | 83 | 434.5 | .52 | 496 | | 972.55 | .51 | 4166.5 |
| 78 | 1275 | 766 | 2041 | .62 | 374 | 500 | 874 | .43 | 132 | 56 | 272 | .49 | 203 | 107 | 470.5 | .43 | 401 | | 786.27 | .51 | 4443.8 |
| 79 | 1016 | 696 | 1712 | .59 | 633 | 997 | 1630 | .39 | 158 | 28 | 228 | .69 | 160 | 45 | 272.5 | .59 | 457 | 855 | 1568.5 | .29 | 5411 |
| 80 | 1340 | 1104 | 2444 | .55 | 493 | 490 | 983 | .50 | 378 | 215 | 915.5 | .41 | 201 | 96 | 441 | .46 | 724 | 1328 | 2450.4 | .30 | 7233.9 |
| 81 | 1488 | 2300 | 3788 | .39 | 689 | 592 | 1281 | .54 | 700 | 159 | 1097.5 | .64 | 183 | 119 | 480.5 | .38 | 640 | 752 | 1617.6 | .40 | 8264.6 |
| 82 | 978 | 1156 | 2134 | .46 | 374 | 387 | 761 | .49 | 450 | 63 | 607.5 | .74 | 206 | 77 | 398.5 | .52 | 513 | 667 | 1380.1 | .37 | 5281.1 |
| 83 | 1235 | 902 | 2137 | .58 | 530 | 523 | 1053 | .50 | 186 | 139 | 533.5 | .35 | 334 | 115 | 621.5 | .54 | 442 | 269 | 791.7 | .56 | 5136.7 |
| 84 | 1097 | 1785 | 2882 | .38 | 415 | 450 | 865 | .48 | 336 | 94 | 571 | .59 | 154 | 154 | 539 | .29 | 632 | 522 | 1310.6 | .48 | 6167.6 |
| 85 | 1199 | 1648 | 2847 | .42 | 517 | 636 | 1153 | .45 | 534 | 68 | 704 | .76 | 144 | 81 | 346.5 | .42 | 322 | 321 | 739.3 | .44 | 5789.8 |
| 86 | 1480 | 1933 | 3413 | .43 | 318 | 583 | 901 | .35 | 532 | 59 | 679.5 | .78 | 156 | 75 | 343.5 | .45 | 489 | 310 | 892 | .55 | 6229 |
| 87 | 899 | 826 | 1725 | .52 | 407 | 596 | 1003 | .41 | 123 | 24 | 183 | .67 | 110 | 57 | 252.5 | .44 | 674 | 266 | 1019.8 | .66 | 4183.3 |
| 88 | 1932 | 1773 | 3705 | .52 | 330 | 424 | 754 | .44 | 367 | 82 | 572 | .64 | 113 | 35 | 200.5 | .56 | 1562 | 522 | 2240.6 | .70 | 7472.1 |
| 89 | 1707 | 1604 | 3311 | .52 | 532 | 606 | 1138 | .47 | 261 | 81 | 463.5 | .56 | 52 | 64 | 212 | .25 | 935 | 311 | 1339.3 | .70 | 6463.8 |
| 90 | 711 | 932 | 1643 | .43 | 357 | 547 | 904 | .39 | 171 | 55 | 308.5 | .55 | 74 | 52 | 204 | .36 | 632 | 279 | 994.7 | .64 | 4054.2 |
| 91 | 926 | 1233 | 2159 | .43 | 458 | 561 | 1019 | .45 | 255 | 124 | 565 | .45 | 96 | 73 | 278.5 | .34 | 595 | 442 | 1169.6 | .51 | 5191.1 |
| 92 | 776 | 1249 | 2025 | .38 | 151 | 478 | 629 | .24 | 303 | 53 | 435.5 | .70 | 92 | 40 | 192 | .48 | 525 | 207 | 794.1 | .66 | 4075.6 |
| 93 | 252 | 884 | 1136 | .22 | 91 | 524 | 615 | .15 | 86 | 67 | 253.5 | .34 | 63 | 77 | 255.5 | .25 | 143 | 89 | 258.7 | .55 | 2518.7 |
| 94 | 512 | 2288 | 2800 | .18 | 193 | 831 | 1024 | .19 | 168 | | 329 | .51 | 27 | 99 | 274.5 | .10 | 449 | 604 | 1234.2 | .36 | 5661.7 |
| means | | | | | | | | | | | | | | | | | | | | | |
| 70-79 | 678 | 978 | 1522 | .43 | 340 | 768 | 1009 | .34 | 283 | 103 | 540 | .54 | 161 | 96 | 402.2 | .43 | 378 | 855 | 807.63 | .49 | 4280.5 |
| 80-89 | 1336 | 1503 | 2839 | .48 | 461 | 529 | 989 | .46 | 387 | 98 | 633 | .61 | 165 | 87 | 383.55 | .43 | 693 | 527 | 1378.1 | .51 | 6222.2 |
| 90-94 | 635 | 1317 | 1953 | .33 | 250 | 588 | 838 | .28 | 197 | 75 | 378 | .51 | 70 | 68 | 240.9 | .31 | 469 | 324 | 890.26 | .54 | 4300.3 |

Norton Sound and Kotzebue escapements estimated by index x 2.5
Kuskowkwim district escapement estimated by index x 1.3 (1979-94) and the average harvest rate (.51).
Sources: Anderson et al (1994), Lean (1994), Schultz et al (1994)

Appendix Table 6. Catches of chum salmon (1,000s of fish) 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 | 279 | 119 | 3626 |
| 79 | 142 | 138 | 1148 | 296 | 1724 | 220 | 440 | 196 | 38 | 12 | 66 | 16 | 12 | 429 | 161 | 3314 |
| 80 | 366 | 181 | 1375 | 559 | 2481 | 300 | 682 | 205 | 79 | 36 | 700 | 12 | 20 | 445 | 165 | 5125 |
| 81 | 677 | 170 | 1773 | 483 | 3103 | 230 | 795 | 356 | 88 | 36 | 709 | 23 | 13 | 397 | 157 | 5907 |
| 82 | 416 | 183 | 953 | 323 | 1875 | 151 | 435 | 198 | 84 | 53 | 331 | 34 | 23 | 394 | 190 | 3768 |
| 83 | 176 | 319 | 1329 | 295 | 2119 | 323 | 725 | 352 | 127 | 105 | 349 | 10 | 15 | 433 | 147 | 4705 |
| 84 | 320 | 146 | 1100 | 489 | 2055 | 337 | 850 | 447 | 178 | 211 | 805 | 16 | 8 | 406 | 143 | 5456 |
| 85 | 521 | 135 | 1240 | 225 | 2121 | 203 | 397 | 210 | 127 | 132 | 667 | 13 | *9* | 471 | 97 | 4447 |
| 86 | 261 | 147 | 1340 | 349 | 2097 | 270 | 488 | 263 | 95 | 111 | 271 | 36 | *9* | 455 | 140 | 4235 |
| 87 | 109 | 102 | 664 | 603 | 1478 | 419 | 416 | 447 | 145 | 101 | 369 | 14 | 8 | 638 | 71 | 4106 |
| 88 | 353 | 107 | 1787 | 1444 | 3691 | 470 | 69 | 98 | 90 | 44 | 393 | 14 | 6 | 472 | 118 | 5465 |
| 89 | 256 | 43 | 1762 | 802 | 2863 | 203 | 446 | 309 | 129 | 84 | 157 | 5 | *9* | 474 | 133 | 4812 |
| 90 | 163 | 65 | 676 | 523 | 1427 | 116 | 306 | 425 | 128 | 32 | 126 | 8 | *9* | 391 | 109 | 3077 |
| 91 | 240 | 87 | 936 | 502 | 1765 | 249 | 466 | 430 | 71 | 57 | 191 | 15 | *9* | 445 | 93 | 3791 |
| 92 | 289 | 83 | 584 | 437 | 1393 | 174 | 313 | 227 | 114 | 57 | 332 | 14 | *9* | 343 | 88 | 3064 |
| 93 | 71 | 54 | 150 | 95 | 370 | 153 | 415 | 39 | 49 | 68 | 130 | 15 | *9* | 189 | 48 | 1485 |
| 94 | 153 | 18 | 300 | 361 | 832 | 232 | 293 | 201 | 57 | 49 | 81 | *15* | *9* | *405* | 88 | 2262 |
| Means | | | | | | | | | | | | | | | | |
| 70-79 | 267 | 146 | 731 | 197 | 1341 | 169 | 455 | 167 | 36 | 8 | 83 | 16 | 14 | 271 | 182 | 2740 |
| 80-89 | 346 | 153 | 1332 | 557 | 2388 | 291 | 530 | 289 | 114 | 91 | 475 | 18 | 12 | 459 | 136 | 4803 |
| 90-94 | 183 | 61 | 529 | 384 | 1157 | 185 | 359 | 264 | 84 | 53 | 172 | 13 | 9 | 355 | 85 | 2736 |

Yukon River includes Canadian catches. Italics for estimates of missing data.
Other catches through 1990 are from INPFC Statistical Yearbooks (e.g., INPFC1993) and 1991-1994 catches are preliminary from ADF&G.
Anderson et al. (1994), Schultz et al. (1994), McCullough et al. (1994), and Stratton (1993).

Appendix Table 7. Annual catches of chum salmon (commercial + subsistence, millions of fish) in Bering Sea fisheries.

| Year | Kotze-bue | 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 | .21 | .08 | .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 | .10 | .11 | 1.23 | .27 |
| **87** | **.12** | **.11** | **1.30** | **1.53** | **.67** | **.42** | **.42** | **.45** | **.15** | **.10** | **1.54** | **.37** |
| 88 | .37 | .11 | 2.26 | 2.74 | 1.56 | .47 | .37 | .30 | .24 | .09 | 1.47 | .39 |
| 89 | .26 | .05 | 2.24 | 2.55 | .94 | .20 | .52 | .31 | .14 | .08 | 1.25 | .16 |
| 90 | .17 | .07 | 1.07 | 1.31 | .63 | .12 | .31 | .42 | .13 | .03 | 1.01 | .13 |
| 91 | .26 | .10 | 1.38 | 1.74 | .60 | .25 | .47 | .43 | .07 | .06 | 1.28 | .19 |
| 92 | .30 | .09 | .93 | 1.32 | .52 | .17 | .31 | .23 | .11 | .06 | .88 | .33 |
| 93 | .09 | .06 | .34 | .49 | .14 | .15 | .42 | .04 | .05 | .07 | .73 | .13 |
| 94 | .17 | .03 | .70 | .90 | .45 | .23 | .29 | .20 | .06 | .05 | .83 | .08 |
| Means | | | | | | | | | | | | |
| 70-79 | .28 | .16 | 1.00 | 1.44 | .38 | .17 | .46 | .17 | .03 | .01 | .83 | .08 |
| 80-89 | .36 | .16 | 1.79 | 2.32 | .69 | .29 | .57 | .31 | .13 | .10 | 1.40 | .48 |
| 90-94 | .20 | .07 | .88 | 1.15 | .47 | .18 | .36 | .26 | .08 | .05 | .95 | .17 |

Appendix Table 8. Western and central Alaska chum salmon runs, 1970–94, in millions of fish.

| | 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 | .7 | .7 | .7 | 3.1 | 1.9 | 6.4 | 11.5 | 6.1 |
| 72 | 1.5 | .2 | 2.6 | 4.3 | .6 | .4 | 1.0 | 2.4 | .7 | 4.5 | 9.4 | 6.4 |
| 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 | .5 | 1.5 | 1.1 | 1.4 | 1.5 | 5.5 | 14.8 | 3.4 |
| 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 | 7.5 | 10.9 | .5 | 2.4 | 1.3 | 2.4 | 2.5 | 8.6 | 20.0 | 2.5 |
| 89 | 2.2 | .4 | 6.5 | 9.1 | .5 | 1.3 | 1.0 | 1.6 | 1.0 | 4.9 | 14.5 | 3.4 |
| 90 | 1.7 | .4 | 4.1 | 6.2 | .5 | 1.4 | .5 | 1.2 | 1.6 | 4.7 | 11.4 | 4.4 |
| 91 | 2.0 | .5 | 5.2 | 7.7 | .8 | .6 | .5 | 2.1 | 2.1 | 5.3 | 13.8 | 5.8 |
| 92 | 1.4 | .7 | 4.1 | 6.2 | .4 | .6 | .5 | 1.2 | 2.0 | 4.3 | 10.9 | 3.7 |
| 93 | 1.0 | .5 | 2.5 | 4.0 | .5 | 1.5 | .2 | 1.3 | 1.3 | 4.3 | 8.8 | 5.7 |
| 94 | 1.3 | .6 | 5.7 | 7.6 | .4 | 1.4 | .4 | 1.3 | 3.0 | 6.1 | 14.1 | 2.8 |
| Means | | | | | | | | | | | | |
| 70-79 | 2.1 | .3 | 4.3 | 6.7 | .3 | .5 | 1.1 | 1.5 | 1.0 | 4.1 | 11.0 | 2.6 |
| 80-89 | 2.4 | 1.0 | 6.2 | 9.6 | .6 | 1.6 | 1.3 | 2.0 | 1.9 | 6.9 | 17.1 | 3.3 |
| 90-94 | 1.5 | .5 | 4.3 | 6.3 | .5 | 1.1 | .4 | 1.4 | 2.0 | 4.9 | 11.8 | 4.5 |

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) | | | |
| Year(s) | Okhotsk Sea | Bering Sea | Total | Okhotsk Sea | Bering Sea | Total | USSR/Japan coastal | High-seas Mothership | High-seas Landbased | Asia Total |
| 1925-29 | 52.53 | 10.65 | 63.18 | 15.01 | 2.88 | 17.89 | 14.50 | 0 | 0 | 32 |
| 1930-39 | 62.72 | 14.39 | 77.11 | 17.92 | 3.89 | 21.81 | 19.67 | 2.19 | 4.56 | 48 |
| 1940-49 | 46.82 | 14.45 | 61.27 | 13.38 | 3.91 | 17.28 | 6.42 | 1.01 | 2.63 | 27 |
| 1950-59 | 46.07 | 7.83 | 53.90 | 13.16 | 2.12 | 15.28 | 3.52 | 9.87 | 3.66 | 32 |
| 1960-69 | 24.87 | 4.91 | 29.78 | 7.11 | 1.33 | 8.43 | 4.85 | 7.48 | 9.66 | 30 |
| 70 | 14.70 | 4.50 | 19.20 | 2.78 | .89 | 3.67 | 7.20 | 9.64 | 7.53 | 28 |
| 71 | 13.48 | 3.33 | 16.81 | 2.68 | .73 | 3.41 | 10.19 | 9.97 | 6.78 | 30 |
| 72 | 8.65 | 3.12 | 11.77 | 1.72 | .48 | 2.20 | 8.64 | 13.37 | 8.84 | 33 |
| 73 | 7.45 | 2.52 | 9.97 | 1.09 | .59 | 1.68 | 11.57 | 7.86 | 7.75 | 29 |
| 74 | 9.83 | 2.81 | 12.64 | 1.75 | .58 | 2.33 | 12.98 | 9.28 | 12.35 | 37 |
| 75 | 8.38 | 3.39 | 11.77 | 1.14 | .84 | 1.98 | 19.90 | 7.37 | 11.76 | 41 |
| 76 | 13.13 | 2.45 | 15.58 | 3.23 | .74 | 3.97 | 12.39 | 10.44 | 11.43 | 38 |
| 77 | 14.28 | 6.17 | 20.45 | 2.65 | 1.64 | 4.29 | 15.19 | 6.00 | 6.23 | 32 |
| 78 | 19.17 | 8.04 | 27.21 | 3.74 | 1.66 | 5.40 | 18.18 | 3.80 | 3.49 | 31 |
| 79 | 9.87 | 9.93 | 19.80 | 3.54 | 2.60 | 6.14 | 27.96 | 3.28 | 2.86 | 40 |
| 80 | 8.58 | 5.98 | 14.56 | 2.01 | 1.50 | 3.51 | 25.70 | 3.10 | 3.17 | 35 |
| 81 | 8.37 | 6.51 | 14.88 | 2.36 | 2.34 | 4.70 | 33.54 | 2.54 | 3.09 | 44 |
| 82 | 8.07 | 6.21 | 14.28 | 1.62 | 1.75 | 3.37 | 29.95 | 3.22 | 3.52 | 40 |
| 83 | 6.85 | 15.25 | 22.10 | 1.87 | 4.35 | 6.22 | 37.07 | 3.08 | 2.61 | 49 |
| 84 | 4.39. | 9.35 | 13.74 | 1.20 | 2.52 | 3.72 | 37.79 | 3.28 | 2.52 | 47 |
| 85 | 13.93 | 11.34 | 25.27 | 2.84 | 3.37 | 6.21 | 50.93 | 2.84 | 1.57 | 62 |
| 86 | 12.76 | 14.77 | 27.53 | 2.87 | 4.16 | 7.03 | 46.02 | 1.93 | 1.04 | 56 |
| 87 | 13.50 | 13.76 | 27.26 | 2.96 | 3.48 | 6.44 | 42.66 | 1.82 | 1.09 | 52 |
| 88 | 16.30 | 10.50 | 26.80 | 4.25 | 2.47 | 6.72 | 47.21 | .89 | .91 | 56 |
| 89 | 16.00 | 8.50 | 24.50 | 4.11 | 2.33 | 6.44 | 50.40 | .61 | .75 | 58 |
| 90 | 13.89 | 13.18 | 27.07 | 3.28 | 3.40 | 6.68 | 62.27 | .50 | .65 | 70 |
| 91 | 14.05 | 3.66 | 17.71 | 3.65 | 1.29 | 4.94 | 51.00 | .00 | .00 | 56 |
| 92 | 11.20 | 6.40 | 17.60 | 2.89 | 1.88 | 4.77 | 41.65 | .00 | 5.51 | 52 |
| 93 | 15.59 | 7.38 | 22.97 | 4.74 | 2.35 | 7.09 | 61.05 | .00 | 3.65 | 72 |
| 94 | | | 22.94 | | | 6.55 | 62.19 | .00 | 4.00 | 73 |

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 1989-1992 from TINRO (Vladivostok, Russia). Catches in number of fish from JFA via TINRO to numbers (INPFC 1979). 1994 Japan catch from Y. Ishida (JFA)

Japanese catches through 1990 from INPFC Statistical Yearbooks,1991 from Y. Ishida (JFA), 1992-93 from JFA through NPAFC.

1992-4 Japan landbased catch is within Russian 200 mi zone.

Appendix Table 10. Estimates of annual sockeye salmon runs to areas of central Alaska, 1970–94.

| Year | South Peninsula | | | Chignik | | | Kodiak | | | Cook Inlet | | | Prince William Sound | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Catch | Escape. | Run | Catch | Escape. | Run | Catch | Escape. | Run | Catch | Escape. | Run | Catch | Escape. | Run | run |
| 70 | 0.03 | 0.02 | 0.05 | 1.82 | 0.66 | 2.48 | 0.92 | | 1.88 | 0.75 | 0.30 | 1.05 | 1.24 | 0.52 | 1.76 | 7.22 |
| 71 | 0.13 | 0.02 | 0.15 | 1.32 | 0.90 | 2.22 | 0.48 | | 0.98 | 0.66 | 0.70 | 1.36 | 0.74 | 0.46 | 1.20 | 5.91 |
| 72 | 0.04 | 0.01 | 0.05 | 0.44 | 0.56 | 1.00 | 0.22 | | 0.45 | 0.94 | 0.73 | 1.67 | 0.98 | 0.33 | 1.31 | 4.48 |
| 73 | 0.03 | 0.01 | 0.04 | 0.97 | 0.78 | 1.75 | 0.17 | | 0.35 | 0.70 | 0.69 | 1.39 | 0.47 | 0.45 | 0.92 | 4.45 |
| 74 | 0.08 | 0.10 | 0.18 | 0.80 | 0.72 | 1.52 | 0.42 | | 0.86 | 0.52 | 0.45 | 0.97 | 0.74 | 0.22 | 0.96 | 4.49 |
| 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 | 0.01 | 0.09 | 0.10 | 1.33 | 0.89 | 2.22 | 0.64 | | 1.31 | 1.72 | 0.88 | 2.60 | 1.01 | 0.22 | 1.23 | 7.46 |
| 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 | 0.26 | 0.05 | 0.31 | 1.15 | 0.70 | 1.85 | 0.63 | 1.41 | 2.04 | 0.99 | 0.94 | 1.93 | 0.37 | 0.33 | 0.70 | 6.83 |
| 80 | 0.27 | 0.05 | 0.32 | 0.95 | 0.59 | 1.54 | 0.65 | 1.83 | 2.48 | 1.64 | 1.22 | 2.86 | 0.21 | 0.62 | 0.83 | 8.03 |
| 81 | 0.30 | 0.05 | 0.35 | 2.29 | 0.74 | 3.03 | 1.29 | 1.40 | 2.69 | 1.55 | 1.33 | 2.88 | 0.78 | 0.65 | 1.43 | 10.38 |
| 82 | 0.17 | 0.04 | 0.21 | 1.78 | 0.92 | 2.70 | 1.20 | 1.60 | 2.80 | 3.39 | 1.41 | 4.80 | 2.36 | 0.81 | 3.17 | 13.68 |
| 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 | 0.47 | 0.05 | 0.52 | 3.60 | 0.87 | 4.47 | 1.95 | 1.47 | 3.42 | 2.38 | 1.43 | 3.81 | 1.30 | 0.75 | 2.05 | 14.27 |
| 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 | 0.63 | 0.10 | 0.73 | 2.25 | 0.70 | 2.95 | 4.38 | *1.71* | 6.09 | 4.99 | 1.72 | 6.71 | 1.85 | 0.97 | 2.82 | 19.30 |
| 94 | 0.63 | *0.10* | 0.73 | 1.62 | 0.80 | 2.42 | 2.83 | *1.10* | 3.93 | 3.64 | 1.93 | 5.57 | 1.51 | 0.90 | 2.41 | 15.06 |
| Means | | | | | | | | | | | | | | | | |
| 70-79 | 0.07 | 0.05 | 0.12 | 1.22 | 0.75 | 1.97 | 0.53 | 1.23 | 1.21 | 1.19 | 0.75 | 1.94 | 0.76 | 0.35 | 1.10 | 6.34 |
| 80-89 | 0.48 | 0.05 | 0.53 | 1.88 | 0.79 | 2.67 | 1.72 | 1.83 | 3.55 | 4.56 | 1.68 | 6.25 | 1.20 | 0.73 | 1.93 | 14.93 |
| 90-93 | 0.78 | 0.11 | 0.88 | 2.19 | 0.82 | 3.01 | 4.88 | 1.87 | 6.75 | 5.14 | 1.59 | 6.73 | 1.57 | 0.81 | 2.38 | 19.74 |

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), McCullough et al. (1994), and Donaldson et al. (1993).
Kodiak runs for 1970-76 estimated from catch and mean harvest rate of .49 (1977-88).

Appendix Table 11. Russian catches of chum salmon (1,000s of fish).

| | District catch (from JFA via TINRO) | | | | | | | | Total no. | Total (1,000s m.t.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | East | West | North | Coastal | | | | Fredin | VINRO | TINRO | FAO |
| Year | Anadyr | Kamch. | Kamch. | Okhot. | Okhot. | Sahkal. | Amur | Total | 1980 | 1988 | 1992 | annual |
| 51 | | | | | | | | | 22135 | | | |
| 52 | | 2394 | 2394 | | | 2000 | 2524 | 9312 | 11650 | | | |
| 53 | | 879 | 2030 | | | 1152 | 2467 | 6528 | 8969 | | | |
| 54 | | 1606 | 4242 | | | 758 | 1167 | 7773 | 13902 | | | |
| 55 | | 3212 | 5061 | | | 1606 | 2929 | 12808 | 17355 | | | |
| 56 | | 3575 | 3485 | | | 1000 | 3476 | 11536 | 20285 | | | |
| 57 | | 1114 | 654 | | | 1654 | 1357 | 4779 | 8472 | | | |
| 58 | | 1030 | 343 | | | 696 | 2378 | 4447 | 7274 | | | |
| 59 | | 2216 | 2538 | | | 240 | 2727 | 7721 | 10062 | | | |
| 60 | | 1107 | 972 | | | 265 | 3837 | 6181 | 11283 | | | |
| 61 | | 1222 | 801 | | | 216 | 3664 | 5903 | 9513 | | | |
| 62 | | 1395 | 600 | 712 | 1617 | 409 | 4509 | 9242 | 9242 | | | |
| 63 | | 958 | 350 | 476 | 2226 | 386 | 4053 | 8449 | 9449 | | | |
| 64 | | 966 | 303 | 500 | 698 | 448 | 3557 | 6472 | 6472 | | | |
| 65 | | 616 | 340 | 308 | 2270 | 461 | 4526 | 8521 | 8521 | | | |
| 66 | | 593 | 205 | 447 | 2403 | 220 | 4005 | 7873 | 7873 | | | |
| 67 | | 674 | 66 | 343 | 808 | 171 | 3051 | 5113 | 5113 | | | |
| 68 | | 255 | 63 | 192 | 39 | 589 | 3308 | 4446 | 4446 | | | |
| 69 | 562 | 309 | 78 | 10 | 67 | 175 | 818 | 2019 | 1457 | | | |
| 70 | 573 | 320 | 190 | 157 | 711 | 208 | 1506 | 3665 | 3092 | | | |
| 71 | 542 | 185 | 66 | 150 | 424 | 532 | 1507 | 3406 | 3460 | | | |
| 72 | 309 | 171 | 42 | 99 | 70 | 510 | 1000 | 2201 | 1382 | 11.8 | | |
| 73 | 274 | 312 | 33 | 9 | 25 | 187 | 835 | 1675 | 1402 | 10.0 | | |
| 74 | 345 | 231 | 80 | 93 | 137 | 438 | 1001 | 2325 | 1888 | 12.6 | | |
| 75 | 570 | 267 | 17 | 101 | 147 | 305 | 571 | 1978 | 1800 | 12.8 | | |
| 76 | 354 | 382 | 24 | 100 | 89 | 790 | 2236 | 3975 | 2730 | 15.6 | | |
| 77 | 335 | 1308 | 46 | 51 | 99 | 984 | 1464 | 4287 | 4500 | 20.4 | | |
| 78 | 450 | 1205 | 130 | 172 | 224 | 1857 | 1358 | 5396 | | 27.2 | | |
| 79 | 552 | 2048 | 97 | 154 | 220 | 1845 | 1226 | 6142 | | 19.8 | | |
| 80 | 437 | 1060 | 57 | 125 | 258 | | 1572 | 3509 | | 14.0 | | 14.8 |
| 81 | 653 | 1688 | 113 | 96 | 177 | 705 | 1270 | 4702 | | 12.4 | | 12.9 |
| 82 | 751 | 1001 | 94 | 138 | 402 | | 987 | 3373 | | 11.4 | | 10.8 |
| 83 | 887 | 3468 | 37 | 227 | 431 | | 1172 | 6222 | | 18.7 | | 19.0 |
| 84 | 813 | 1710 | 133 | 196 | 405 | | 464 | 3721 | | 13.7 | | 13.7 |
| 85 | 566 | 2801 | 1451 | 116 | 669 | | 611 | 6214 | | 20.6 | 25.3 | 23.5 |
| 86 | 675 | 3482 | 795 | 173 | 759 | | 1144 | 7028 | | | 27.5 | 23.4 |
| 87 | 925 | 2550 | 641 | 90 | 614 | 730 | 885 | 6435 | | | 27.3 | 23.7 |
| 88 | 1043 | 1423 | 574 | 155 | 356 | 753 | 2415 | 6719 | | | 26.8 | 30.5 |
| 89 | 561 | 1766 | 284 | 98 | 724 | 1123 | 1886 | 6442 | | | 24.5 | 21.7 |
| 90 | 220 | 3182 | 441 | 136 | 743 | 925 | 1038 | 6685 | | | 27.1 | |
| 91 | 540 | 753 | 273 | 343 | 332 | 978 | 1724 | 4943 | | | 17.7 | |
| 92 | 563 | 1314 | 371 | 0 | 971 | 405 | 1148 | 4772 | | | 17.6 | |
| 93 | 1322 | 1032 | 293 | 733 | 1534 | 621 | 1553 | 7088 | | | 23.0 | |
| 94 | | | | | | | | | | | 22.9 | |

1992-93 from TINRO (1993, 1994).

Appendix Table 12. Summary of AWL samples from south Unimak, 1994.

| | | | Chum salmon body size | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Length (mm) | | Weight (kg) | | Condition | | Catch |
| Date | Age | Sex | n | Mean | SD | Mean | SD | Mean | SD | (1,000s) |
| 17-18 | 0.2 | M | 3 | 497 | | 1.68 | | .0133 | | 0.5 |
| | | F | 2 | 480 | | 1.75 | | .0155 | | 0.3 |
| | 0.3 | M | 91 | 566 | 27 | 3.10 | .53 | .0169 | .0017 | 15.5 |
| | | F | 109 | 546 | 26 | 2.60 | .48 | .0157 | .0014 | 18.6 |
| | 0.4 | M | 97 | 584 | 29 | 3.41 | .70 | .0169 | .0015 | 16.5 |
| | | F | 94 | 562 | 29 | 2.82 | .44 | .0158 | .0013 | 16.0 |
| | 0.5 | M | 6 | 626 | | 4.12 | | .0168 | | 1.0 |
| | | F | 5 | 588 | | 3.16 | | .0154 | | 0.9 |
| 19-20 | 0.2 | M | 1 | 500 | | 2.13 | | .0170 | | 0.4 |
| | | F | 1 | 515 | | 2.09 | | .0150 | | 0.4 |
| | 0.3 | M | 35 | 560 | 31 | 2.98 | .54 | .0166 | .0012 | 14.0 |
| | | F | 46 | 544 | 29 | 2.51 | .53 | .0154 | .0016 | 18.4 |
| | 0.4 | M | 53 | 591 | 32 | 3.56 | .69 | .0171 | .0014 | 21.2 |
| | | F | 38 | 562 | 37 | 2.85 | .60 | .0158 | .0013 | 15.2 |
| | 0.5 | F | 1 | 582 | | 3.22 | | .0160 | | 0.4 |
| 21-22 | 0.3 | M | 53 | 576 | 28 | 3.29 | .57 | .0170 | .0012 | 9.4 |
| | | F | 50 | 544 | 77 | 2.56 | .50 | .0157 | .0022 | 8.9 |
| | 0.4 | M | 57 | 587 | 30 | 3.47 | .67 | .0169 | .0013 | 10.1 |
| | | F | 56 | 559 | 23 | 2.74 | .40 | .0156 | .0013 | 9.9 |
| | 0.5 | M | 7 | 612 | 22 | 3.75 | .48 | .0164 | .0012 | 1.2 |
| | | F | 4 | 584 | 46 | 2.98 | .66 | .0149 | .0007 | 0.7 |
| 23-24 | 0.2 | F | 1 | 555 | | 2.54 | | .0150 | | 0.1 |
| | 0.3 | M | 97 | 572 | 30 | 3.19 | .57 | .0169 | .0012 | 12.7 |
| | | F | 106 | 549 | 29 | 2.62 | .48 | .0157 | .0014 | 13.8 |
| | 0.4 | M | 110 | 593 | 28 | 3.52 | .60 | .0167 | .0014 | 14.3 |
| | | F | 39 | 567 | 30 | 2.87 | .50 | .0156 | .0014 | 5.1 |
| | 0.5 | M | 11 | 599 | | 3.77 | | .0174 | | 1.4 |
| | | F | 3 | 597 | | 3.25 | | .0157 | | 0.4 |
| | 0.6 | M | 1 | 652 | | 4.90 | | .0180 | | 0.1 |
| 25-26 | 0.3 | M | 40 | 571 | 25 | 3.19 | .55 | .0170 | .0012 | 11.8 |
| | | F | 41 | 550 | 22 | 2.66 | .35 | .0159 | .0010 | 12.1 |
| | 0.4 | M | 32 | 590 | 27 | 3.52 | .47 | .0171 | .0011 | 9.4 |
| | | F | 18 | 569 | 34 | 3.01 | .67 | .0161 | .0012 | 5.3 |
| | 0.5 | M | 6 | 612 | | 3.82 | | .0166 | | 1.8 |
| Combined | | | | | | | | | | |
| | 0.2 | M | | 498.32 | | 1.88 | | .0149 | | 0.9 |
| | | F | | 507.31 | | 2.02 | | .0152 | | 0.9 |
| | 0.3 | M | | 568.29 | | 3.14 | | .0169 | | 63.3 |
| | | F | | 546.49 | | 2.59 | | .0157 | | 71.7 |
| | 0.4 | M | | 589.09 | | 3.50 | | .0169 | | 71.6 |
| | | F | | 562.63 | | 2.84 | | .0158 | | 51.5 |
| | 0.5 | M | | 611.2 | | 3.847 | | .0168 | | 5.5 |
| | | F | | 587.27 | | 3.1308 | | .0154 | | 2.4 |
| | 0.6 | M | | 652 | | 4.90 | | .0180 | | 0.1 |
| Totals | | | 1314 | | | | | | | 267.9 |

Appendix Table 13. Summary of AWL samples from the Shumagin Islands, 1994.

| Date | Age | Sex | n | Length (mm) Mean | Length (mm) SD | Weight (kg) Mean | Weight (kg) SD | Condition Mean | Condition SD | Catch (1,000s) |
|---|---|---|---|---|---|---|---|---|---|---|
| 17-18 | 0.3 | M | 10 | 583 | 28 | 3.43 | .69 | .0172 | .0012 | 1.4 |
| | | F | 10 | 553 | 44 | 2.82 | .56 | .0166 | .0014 | 1.4 |
| | 0.4 | M | 7 | 592 | 30 | 3.65 | .73 | .0174 | .0011 | 1.0 |
| | | F | 8 | 555 | 28 | 2.73 | .46 | .0158 | .0007 | 1.1 |
| | 0.5 | M | 1 | 587 | | 3.27 | | .0160 | | 0.1 |
| 19-20 | 0.2 | M | 1 | 588 | | 3.49 | | .0170 | | 0.2 |
| | 0.3 | M | 50 | 575 | 27 | 3.28 | .59 | .0170 | .0012 | 11.9 |
| | | F | 38 | 553 | 27 | 2.78 | .44 | .0163 | .0010 | 9.1 |
| | 0.4 | M | 56 | 580 | 31 | 3.28 | .75 | .0163 | .0014 | 13.4 |
| | | F | 29 | 572 | 23 | 3.00 | .44 | .0159 | .0014 | 6.9 |
| | 0.5 | M | 2 | 622 | | 4.02 | | .0165 | | 0.5 |
| | | F | 1 | 588 | | 3.27 | | .0160 | | 0.2 |
| 21-22 | 0.3 | M | 70 | 576 | 25 | 3.34 | .55 | .0173 | .0013 | 5.1 |
| | | F | 66 | 546 | 70 | 2.62 | .52 | .0159 | .0020 | 4.8 |
| | 0.4 | M | 79 | 591 | 30 | 3.54 | .67 | .0169 | .0013 | 5.7 |
| | | F | 77 | 564 | 25 | 2.86 | .50 | .0158 | .0015 | 5.6 |
| | 0.5 | F | 2 | 619 | | 4.08 | | .0165 | | 0.1 |
| 23-24 | 0.2 | M | 1 | 524 | | 2.27 | | .0160 | | 0.1 |
| | | F | 1 | 532 | | 2.59 | | .0170 | | 0.1 |
| | 0.3 | M | 74 | 577 | 27 | 3.31 | .58 | .0170 | .0014 | 8.5 |
| | | F | 48 | 551 | 29 | 2.69 | .48 | .0161 | .0018 | 5.5 |
| | 0.4 | M | 61 | 594 | 30 | 3.66 | .69 | .0173 | .0014 | 7.0 |
| | | F | 55 | 572 | 30 | 3.07 | .54 | .0163 | .0014 | 6.3 |
| | 0.5 | M | 7 | 617 | | 4.29 | | .0184 | | 0.8 |
| | | F | 5 | 592 | | 3.16 | | .0152 | | 0.6 |
| 25-26 | 0.3 | M | 46 | 570 | 27 | 3.22 | .63 | .0172 | .0013 | 7.0 |
| | | F | 38 | 549 | 29 | 2.68 | .48 | .0161 | .0013 | 5.7 |
| | 0.4 | M | 59 | 597 | 34 | 3.74 | .78 | .0173 | .0015 | 8.9 |
| | | F | 38 | 585 | 32 | 3.29 | .63 | .0163 | .0013 | 5.7 |
| | 0.5 | M | 1 | 638 | | 4.26 | | .0160 | | 0.2 |
| Combined | | | | | | | | | | |
| | 0.2 | M | | 567 | | 3.09 | | .0167 | | 0.4 |
| | | F | | 532 | | 2.59 | | .0170 | | 0.1 |
| | 0.3 | M | | 575 | | 3.29 | | .0171 | | 33.8 |
| | | F | | 550 | | 2.71 | | .0162 | | 26.4 |
| | 0.4 | M | | 589 | | 3.52 | | .0169 | | 35.9 |
| | | F | | 572 | | 3.04 | | .0161 | | 25.6 |
| | 0.5 | M | | 618 | | 4.12 | | .0174 | | 1.6 |
| | | F | | 595 | | 3.33 | | .0156 | | 1.0 |
| Totals | | | 941 | | | | | | | 124.8 |