KOGRUKLUK RIVER WEIR SALMON ESCAPEMENT REPORT, 2000

By

Paul Salomone

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AUTHOR

Paul Salomone is an Assistant Area Management Biologist for the Alaska Department of Fish and Game, Commercial Fisheries Division, P.O. Box 1467, Bethel, Alaska 99559-1467.

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ABSTRACT

The Holitna River is the largest salmon-producing tributary of the Kuskokwim River. In 1976, the Alaska Department of Fish and Game (ADF&G), recognizing the importance of this river system for salmon, established a weir on the Kogrukluk River, the main branch of the Holitna River. The weir site is located approximately 750 km from the mouth of the Kuskokwim River. In 2000 the weir became operational on 1 July and continued until 20 September. Estimated chinook salmon escapement was 3,310, the lowest recorded in the history of the project and 67% below the escapement goal. Estimated chum salmon escapement was 11,491, 61% below the escapement goal of 30,000. Estimated sockeye salmon escapement was 2,867, well below the recent average of about 9,000 fish. Estimated coho salmon escapement was 33,135, 32 % above the escapement goal of 25,000. The age, sex and length (ASL) composition of the chinook, chum and coho salmon escapements was estimated such that simultaneous 95% interval estimates of the age composition had a maximum width of 0.20. Carcass wash-out rate and timing by species was monitored. Variability in stream hydrological and meteorological conditions was recorded for potential environmental effects on salmon production and timing.

INTRODUCTION

The Holitna River is the largest salmon-producing tributary of the Kuskokwim River. Recorded evidence of salmon escapements in the Holitna has been documented since 1961 (Schneiderhan 1983, Burkey 1994), when the earliest aerial survey of the Holitna River was conducted. The importance of the Holitna River as a salmon producer and the necessity to more closely monitor salmon escapement motivated the Alaska Department of Fish and Game (ADF&G) to establish a weir on the Kogrukluk River, a tributary of the Holitna, in 1976 (Baxter 1976) (Figure 1).

Chinook *Oncorhynchus tshawytscha*, chum *O. keta*, sockeye *O. nerka*, coho *O. kisutch*, and pink salmon *O. gorbuscha* spawn in the Kogrukluk River. Kogrukluk River salmon escapements are a relatively small percentage of the overall escapement in the Kuskokwim River drainage. Salmon stocks are widely dispersed and Kuskokwim River drainage monitoring program is limited. It is believed that significant numbers of chinook, sockeye, chum and coho salmon pass the Kogrukluk River weir when compared to escapements in most other systems within the Kuskokwim River drainage (Burkey et al. 1999).

A unique feature of the Kogrukluk River weir is that it is currently the only site in the Kuskokwim River drainage with a history of enumerating sockeye salmon. Typical sockeye salmon rearing habitat, i.e. large volume lakes, is absent from the Kogrukluk River drainage, although there are some small headwater lakes with an unknown capacity for sockeye salmon production. Sockeye salmon have been observed spawning in the mainstem and in backwaters and sloughs. Sockeye salmon have been documented in several tributaries in the Kuskokwim Basin (Burkey and Salomone 1999) but little is known about these populations. The rearing ecology of these "river-type" sockeye salmon is unknown; apparently they have adapted to a lotic environment. In the Kuskokwim drainage, the contribution of these river-type sockeye salmon to the overall salmon population should not be overlooked. Wood et al. (1987) found that river-type sockeye contributed 39-48% to the total return of sockeye salmon to the Stikine River in 1984 and 1985.

The relative abundance of pink salmon is unknown in the Kogrukluk River because they are able to swim between the weir pickets, but the annual numbers observed are usually very low (less than 20). Considering that the Kogrukluk River weir is approximately 750 km from the mouth of the Kuskokwim River, these pink salmon are among the furthest-inland spawning pink salmon in the world (Morrow 1980, Groot and Margolis 1991).

Subsistence and commercial fishers who live along the Kuskokwim River place major cultural and economic importance on harvests of salmon. Commercial fisheries occur in two non-contiguous districts in the Kuskokwim River stretching from the river mouth to Chuathbaluk. The 10-year average (1990 to 1999) commercial harvest for both districts combined is approximately 23,000 chinook, 59,000 sockeye, 261,000 chum, and 469,000 coho salmon (Burkey et al. *In Prep*). The 1990 to 1999 average subsistence harvest of chinook, sockeye, chum, and coho salmon in the Kuskokwim River is approximately 83,000, 38,000, 75,000 and 38,000 respectively (Burkey et al. *In Prep*).

In the early 1980s, commercial fisheries management began to shift from a strategy emphasizing guideline-harvest-levels to an escapement based strategy. ADF&G established species-specific escapement objectives for streams that had sufficient historical information (Buklis 1993). In most cases, these objectives, later termed biological escapement goals (BEGs), represent simple averages or medians of historical information. The underlying principle in establishing BEGs was that the maintenance of average or above average spawning escapement should provide for sustained yield consistent with historical levels. Although commercial fishery harvests usually occur before many escapements can be fully assessed, postseason escapement assessments are useful for evaluating the effectiveness of fishery management plans and inseason management decisions.

In 1983, BEGs for the Kogrukluk River weir were established for chinook (10,000), chum (20,000), sockeye (2,000), and coho salmon (20,000). In 1984, BEGs were increased to 30,000 for chum salmon, and 25,000 for coho salmon. The Kogrukluk River weir is the only project in the Kuskokwim River drainage with a BEG for coho salmon.

In the winter of 2000 the escapement goal policy underwent the latest in a series of reviews that resulted in the reclassification of escapement goal definitions. The established goals at the Kogrukluk River weir were redefined as Sustainable Escapement Goals (SEGs), which are expressed as a range but have yet to be developed as ranges for this project. Specifically, "A level of escapement, indicated by an index or an escapement estimate that is known to provide for sustained yields over a 5 to 10 year period", is used in situations where a lack of stock specific catch estimates prohibits establishing a BEG. The SEG is the primary management objective for the escapement, unless an Optimal Escapement Goal or in-river escapement goal has been adopted by the Board of Fisheries. An SEG will be developed from the best available biological information by the Department of Fish and Game and will be stated as a range that takes into account data uncertainty. The department will seek to maintain escapements within the bounds of the SEG. A more detailed discussion of escapement goals is available in the Sustainable Fisheries Policy, Alaska Administrative Code section 5AAC. 39.222., Policy for the Management of Sustainable Salmon Fisheries.

Study Site

The Kogrukluk River is formed by surface runoff from the north side of the plateau that divides the Tikchik Lakes and Nushagak River drainages from the Kuskokwim River drainage. Beginning at a point about five miles from Nishlik Lake, the uppermost lake of the Tikchiks, the Kogrukluk River flows northerly for about 69 km before it joins the Chukowan River about 1.5 km above the site of Kashegelok village (Figure 1). The Kogrukluk River weir is located about 3 km upstream from the confluence with the Chukowan River and 1 km below the confluence of Shotgun Creek.

Project History

The Kogrukluk River weir has the longest operational history of current salmon escapement assessment projects in the Kuskokwim area, and has been operated under a number of different names by various project leaders. Salmon escapement was originally enumerated by means of a counting tower from 1969 to 1978. The tower was originally located about 2 km above the confluence of Shotgun Creek. The tower was moved in some years to different locations because of

annual changes in the river channel, but remained above the confluence of Shotgun Creek. Initial installation of a weir was attempted in 1971, but it was destroyed by high water early in the season. Tower (and weir) operation in this section of the Kogrukluk River has been hindered by log jams and shifting channels. The presence of a suitable weir site below the confluence of Shotgun Creek resulted in the replacement of the tower by a weir between 1976 and 1978. Because the weir was located below the confluence of Shotgun Creek, the tower and weir were operated concurrently from 1976 to 1978 to compare escapement estimates between projects. Only the 1978 operations provided an acceptable set of data from each project. In 1978, the tower counts of chinook, chum, and sockeye salmon were 56%, 37% and 47%, respectively, of the weir counts (Baxter 1979). Beginning in 1981, the weir operational period was extended to include coho salmon.

OBJECTIVES

The objectives of the Kogrukluk River weir project are to:

1. Enumerate the daily and total annual spawning escapement of chinook, chum, sockeye, and coho salmon, by sex.
2. Estimate the age, sex and length (ASL) composition of the chinook, chum and coho salmon escapements such that simultaneous 95% interval estimates of the age composition will have a maximum width of 0.20.
3. Monitor the carcass wash-out rate and timing by species.
4. Monitor variability in stream hydrological and meteorological conditions to provide information relating to potential environmental effects on salmon production and timing.

METHODS

Weir Operation

The weir consists of pickets made of 2 cm black iron pipe held in position by two angle-iron stringers (Figure 2). Each stringer is 3 m in length and perforated to receive about 45 pickets. The stringers are overlapped and braced by "A" shaped steel pipe support pods at each 3 m juncture to span the 70 m wide river. The triangular "A" pods are constructed of 3.8 cm black iron pipe (schedule 80) and Kee Klamps™[2]. The trap is constructed of pickets and stringers to dimensions of 1.8 m wide, 3 m long, and 1.2 m deep. It has a funnel shaped entrance and is placed just upstream of an opening in the weir. Other details of weir construction may be found in *Ignatti Weir Construction Manual* (Baxter 1981).

[2] Mention of brand or product names does not constitute an endorsement by Alaska Department of Fish and Game.

Salmon Counts

Between 0730 and 2400 hours, salmon were enumerated periodically from an observation position located either on a boardwalk on the weir or on top of the trap. If fish are not needed for ASL sampling, four or five pickets were pulled out of the weir to allow salmon to pass. Generally, salmon were allowed to pass 4 to 8 times a day, with the frequency depending on fish behavior and run magnitude. The weir and trap were normally closed from 2400 to 0730 hours because few salmon migrate upstream during this time. When ASL samples were needed, salmon were sampled from the trap and allowed to proceed upstream. Seven data categories were tallied on different counters. The various categories were: male chinook, jack chinook, female chinook, male chum, female chum, male sockeye, female sockeye, male coho, and female coho. Salmon carcasses that wash down the river and were stopped by the weir were counted by species during daily weir cleaning.

Escapement Estimation / Migration-Timing Database

Every year the Kogrukluk River weir has experienced one or more periods of ineffective operation because of high water levels or funding restrictions. Schneiderhan (1989) used an expansion method for estimating daily counts and, hence, total escapement. After the 1988 field season, he subjectively expanded the historical salmon counts to the historic earliest and latest operational dates to produce a run-timing database with as many years represented as possible. The criteria for accepting a given year for inclusion into the database at that time mandated that more than 50% of the estimates had to be derived from actual counts. The run-timing database then consisted of nine years of data for chinook, sockeye, and chum salmon (1976, 1978, 1979, 1981, 1982, 1984, 1985, 1986, and 1988) and eight years of data for coho salmon (1981-1988). For each species, the salmon migrations in each year were characterized as early, normal, or late depending on the relationship of each year's mean passage to the mean date of all years combined. Early-, normal- and late-run models were used in subsequent years to estimate missing or partial daily counts and total escapement (Appendix A). Since 1988, the migration-timing database has been updated annually and consists of daily and daily cumulative proportions of actual and estimated weir counts of each species for all years with "adequate" operational duration (Appendix B). In 1999 the acceptable criteria was changed. Only years where actual counts comprised more than 80% of the total estimated escapement were included in the database that is used to estimate escapement for days when the weir is not operational.

In 1991, the methodology for establishing run-timing models was altered. For each salmon species mentioned above, the historical daily proportions (from actual and estimated counts) were ranked across years. Run-timing models were then based on the 25th (late-run model), 50th (normal-run model), and 75th (early-run model) percentiles of the ranked daily proportions. This modeling method attempts to incorporate both the relative timing of the midpoint of the run and the rate at which the run develops (i.e., number of days between quartiles).

Before an appropriate model was chosen, the normal model was used to estimate missing daily counts. The sum of the model daily proportions, for days with actual counts during the current season, was assumed to be the proportion of the total escapement that was actually counted. Estimates of missing counts were calculated by multiplying the actual cumulative count by the ratio

of the daily model proportion to the total proportion assumed to have been actually counted. The final step was a subjective choice of the model. The model chosen was based on a visual "best-fit" of the actual data. This was accomplished by comparing midpoints of the normal model and the reconstructed run, and, to a lesser extent, by comparing the daily estimates to actual counts on days before and after. If the midpoint of the reconstructed run was closer to the midpoint of either the early or late model, then the estimates were again calculated with the appropriate model. No attempt was made to partition the estimated daily counts by sex.

Age, Sex and Length

Beginning in 1992, the age, sex and length (ASL) sampling plan was altered to a "pulse" sampling design described by Molyneaux and Dubois (1996). The goal of pulse sampling is to collect samples from each temporal stratum in as short a time as possible and from as many strata as possible. A minimum sample of three strata has been established for each species. Sample size goals for each time stratum were 210 chinook, 200 chum, and 170 coho salmon. Sockeye salmon were not sampled. These sample sizes were sufficient to construct simultaneous 95% interval estimates of the age composition having a maximum width of 0.20 using the methods of Bromaghin (1993). The recommended sample sizes were increased to account for the typical proportion of scale samples that are unusable. Within each stratum, a single species was sampled until the objective is achieved, after which another species was sampled.

ASL information was collected from salmon caught in the trap. Length was measured from mid-eye to fork-of-tail to the nearest 5 mm and sex was determined by inspection of external characteristics. After being sampled, salmon were released on the upstream side of the weir. Scales are taken from the preferred area (INPFC 1963) and mounted on gum cards. Gum cards were pressed in acetate using methods described by Clutter and Whitesel (1956). Scale impressions were viewed through a microfiche reader and age was determined by visual identification of annuli. Ages were recorded on mark-sense forms, which were also used to record sex and length data. Completed mark-sense forms were processed through an OPSCAN machine to produce ASCII computer files. These files were then summarized using various custom computer programs. Estimates of age, sex, and length compositions from each stratum were weighted by fish passage to provide estimates for the entire escapement (Molyneaux and Dubois 1999).

Meteorological and Hydrological Factors

Water temperature was measured to the nearest 1° C with a non-calibrated thermometer. Precipitation for the prior 24-hour period was measured to the nearest 1 mm using a standard precipitation gauge (10 to 1 ratio). The observer estimates the amount of cloud cover, wind speed and direction. Water level was measured to the nearest 5 mm from a meter stick set at an arbitrary point in the river. A standardized water level was obtained by measuring the distance between the water level and a benchmark height of 5 m (Baxter 1981). The time was recorded when the meteorological and hydrological measurements were made. Generally, measurements are taken at 1700 hours.

RESULTS

Weir Operation

The weir was installed and operational at 2030 hours on 1 July and pulled out because of rising water at 0630 hours 3 August. Water conditions remained high and made redeployment impossible until 7 August, when the weir was again made fish tight at 1900 hours. It remained operational until removed for the season on 20 September. The high water occurred during what is normally a break between the end of the chinook, chum, and sockeye migration and just before the beginning of the coho migration. As such, the number of fish that migrated past the site while the weir was not operational is thought to be minimal. Estimates for the days the weir was not operational within this period were derived from the historic run timing database. No estimates were made for periods of time before the weir became operational or after the weir was removed for the season. The operational period in 2000 provided fairly complete seasonal coverage of the migrations of all salmon species.

Salmon Counts and Estimates

Chinook Salmon

The actual count of chinook salmon was 2,127 males (which included 373 jacks) and 1,053 females (Table 1) for a total of 3,180 fish. Females comprised 32% of the actual counts. The midpoint of the migration occurred on 15 July, which was three days later than the historical median ("normal") date of 12 July (Figure 3). Using a late run-timing model (Table 2) to estimate passage for the period during which the weir was inoperative due to high water (3-7 August), an escapement estimate of 3,310 fish was calculated, the historic low for the project. A total of 130 fish were estimated using this method, 4% of the total. Peak days of passage were from 9-19 July, with the highest single day passage of 282 occurring on 12 July. A total of 379 chinook carcasses were recovered from the weir (Table 3).

Sockeye Salmon

The actual count of sockeye salmon was 1,855 males and 921 females (Table 1) for a total of 2,776 fish. Females comprised 33% of the actual counts. The midpoint of the run occurred on 20 July, seven days later than the historical median date of 13 July (Figure 4). Using a late-run model (Table 2) to estimate passage for the time the weir was inoperative due to high water (3-7 August) an estimated escapement of 2,865 fish was calculated. A total of 89 fish were estimated using this method, or 3% of the total. Days of peak passage were from 11-24 July with the highest single day passage of 238 fish occurring on 16 July. A total of 238 sockeye salmon carcasses were recovered on the weir (Table 3).

Chum Salmon

The actual count of chum salmon was 8,649 males and 2,063 females (Table 1) for a total of 10,712 fish. Females comprised 19% of the actual counts. The midpoint of the run occurred on 16 July,

four days later than the historical median date of 12 July (Figure 5). A late-run model (Table 2) was used to estimate passage for the days the weir was inoperative (3-7 August). An estimated escapement of 11,493 fish was calculated. A total of 414 fish were estimated using this method, 4% of the total. Days of peak passage were from 9-19 July, with the highest single day passage of 786 occurring on 16 July. A total of 2,570 chum salmon carcasses were recovered on the weir (Table 3).

Coho Salmon

The actual count of coho salmon was 19,501 males and 13,416 females (Table 1) for a total of 32,917. Females comprised 41% of the actual counts. In contrast to the other species, the coho run in 2000 was early. The midpoint occurred on 28 August, four days earlier than the mean date of 2 September (Figure 6). An early run-timing model (Table 2) was used to estimate counts for the inoperative period of 3-7 August. The number of fish estimated was 260 fish or less than 1% of the total escapement estimate of 33,177 fish. The midpoint of the run occurred on 28 August, which is four days earlier than the historical median date of the midpoint. The overall pattern of fish passage generally followed the early run model (Figure 3). Forty-four carcasses were counted, however project operation terminated well before most of the coho salmon could be expected to have died.

Age, Sex and Length

Chinook Salmon

ASL data were obtained from 98 live specimens in three temporal strata. The age composition of fish sampled was 9.9% age-1.2, 49.2% age-1.3, 39.1% age-1.4, and 1.8% age-1.5. The sex composition was 59% male and 41% female (Table 4). The mean lengths of females ages-1.3, -1.4, and -1.5, were 786 mm (n=7), 859 mm (n=30), and 825 mm (n=2). The mean lengths of males ages-1.2, -1.3, and -1.4, were 587mm (n=10), 671 mm (n=42), and 831 mm (n=7) (Table 5).

Chum Salmon

ASL data were obtained from 583 live specimens in four temporal strata. The age composition of fish sampled was 49.3% age-0.3 and 50.4% age-0.4. The sex composition of the ASL samples was 92% male and 8% female (Table 6). The mean lengths of females age-0.3 and -0.4 were 563 mm (n=47) and 581mm (n=34) respectively. The mean lengths of males age-0.3 and -0.4 were 582 mm (n=361) and 609 mm (n=129) respectively (Table 7).

Coho Salmon

A total of 604 live specimens from three temporal strata were sampled. Based on these samples the estimated age composition of the escapement was 1.0% age-1.1, 96.9% age-2.1, and 2.1% age-3.1. The sex composition was 70% male and 30% female (Table 8). The mean length of females age-1.1, -2.1, and -3.1 were 563 mm (n=2), 565 mm (n=178), and 586mm (n=6), respectively. The mean lengths of males age-1.1, -2.1, and -3.1 were 568 mm (n=4), 569 mm (n=408), and 571 mm (n=6), respectively (Table 9).

Meteorological and Hydrological Factors

Water levels were below average at the beginning of the season and stayed that way with the exception of the period between 1 August and 15 August (Figure 7).

Water temperatures were below historical values for most of the season, averaging 10.2 degrees for the season compared to 11.1 historically (Figure 8). This is probably because of limited solar warming due to a predominance of overcast days.

Rainfall was well below historical mean until early August, when it returned to near average amounts. Total rainfall was 112 mm for the season, which is 39% below the historical mean of 182 mm (Figure 9).

DISCUSSION

Annual Escapements

Chinook Salmon

Commercial fishing for chum salmon was again reduced on the Kuskokwim River in 2000 due to the low abundance of returning chum salmon. The relationship between commercial chum salmon harvest and incidental harvest of chinook salmon has been discussed in earlier reports in this series (Cappiello, 1997). It is assumed that, all other factors being equal, the commercial harvest of chinook salmon will vary as effort in the commercial chum salmon fishery varies.

The number of chinook counted at the weir during the 2000 season was the lowest on record for this project. Coverage of the chinook salmon escapement was almost complete in 2000. The commercial fishing season for chum salmon was reduced to just one opening, because of an extremely weak run. Lack of commercial fishing for chum salmon should have allowed the escapement goal of chinook salmon to be attained, had there been adequate numbers present. The chinook subsistence harvest of around 65,000 was near the lower end of the historical range and subsistence fishers reported having to fish more hours to fulfill their subsistence needs. In combination these factors indicate the chinook run was very weak in 2000. This was the second consecutive year that the chinook escapement goal was not met on the Kogrukluk River.

Sockeye Salmon

The sockeye salmon run was fully enumerated in 2000. The midpoint of the run was late and the total escapement estimate was near the lower end of the historical range of sockeye escapement for the weir. This was in direct contrast to reports from subsistence fishers about larger than normal sockeye returns. These reports may be more a factor of low abundance of other species than of increased abundance of sockeye salmon. The total passage of 2,865 was below recent year averages of approximately 9,000.

Annual escapements of sockeye salmon at the Kogrukluk River weir have been highly variable, ranging from 1,670 in 1978 to 29,358 fish in 1993. As with chinook salmon, sockeye salmon are not a targeted species in the commercial fishery and are caught incidentally during the directed chum salmon fishery. The Kogrukluk River weir is the only project currently operating in the Kuskokwim system that has a history of sockeye salmon assessment.

Chum Salmon

Coverage of the chum migration in 2000 was nearly complete. There was a minimal period at the beginning of the run when some fish likely went undocumented but this number is thought to be minor. The run was weak and had the second latest run-timing on record. With only one commercial opening during what is normally the chum salmon season in the lower river and the associated reduction in commercial harvest, the escapement of 11,493 fish still fell far below the escapement goal of 30,000 fish.

Reasons for yet another weak chum run in 2000 are not entirely clear. Discussion among staff has revolved around ocean conditions being poor for survival of Bering Sea stocks of salmon in particular, but definitive evidence is lacking. The 2000 run of chum salmon were at sea during the 1998 portion of the 97-98 El Nino and associated events. The fish that returned represent the survivors of conditions that probably affected salmon in an unfavorable manner. Whatever the cause, stocks of some species of salmon originating in Western Alaska, chum and chinook in particular, seem to have been affected more than stocks originating in other areas of the state. In the period between 1991 and 2000 the chum escapement goal of 30,000 has been met in 5 of 10 years in the Kogrukluk River. Continued close monitoring is essential, however, and continued careful management is necessary to reduce human-induced impact on stocks that are likely already stressed by natural conditions.

Coho Salmon

Commercial fishing for coho salmon in 2000 opened for 13 periods in the Kuskokwim River with a total harvest of approximately 261,000 fish. This is below the average harvest of 469,000 fish during the 1990s and was due in part to reduced processing capacity. In the winter of 2000 the Board of Fisheries adopted a regulation dividing fishing district W-1 into two sub-districts, one above Bethel and one below. Fishing periods were alternated between districts to provide a manageable and consistent level of supply to the sole processor buying fish for most of the season. Fishing effort was below historical averages and as a result the harvest was impacted. The 2000 Kogrukluk River coho salmon escapement was relatively well documented and coverage was judged to be complete. The escapement goal of 25,000 fish was exceeded by roughly 8,000. The escapement for the parent year of 1996 was the highest ever recorded in the history of the project, buoying the hopes of some for a large return during the 2000 season. However, the run appeared to be below average given the magnitude of the harvest, even considering that the escapement was above the goal. Still, the commercial harvest was the highest since 1998.

Age, Sex, and Length

Age compositions of escapements can be useful for developing stock-recruitment models, which can be used to project run size. Unfortunately this is not possible for any one spawning stock or the entire Kuskokwim River drainage because stock specific exploitation and total run size, for most years, is unknown. Still, age composition information can help predict the relative magnitude of future runs. Strong or weak returns from the younger returning adults may be indicative of the survival of those cohorts, hence, strength of spawner returns from those cohorts in following years. Such interpretations should be made with caution for several reasons: (1) there is a tendency in some species for the age compositions to shift towards younger fish as the run progresses, therefore, thoroughness of the sampling regimen is important, (2) disparate removal of age classes in the commercial and subsistence fisheries may occur, (3) seemingly high percentages of one age class could also be caused by low percentages of another, and (4) scale aging error within and among readers has not been fully assessed.

Comparisons between ASL data collected at the Kogrukluk River weir and other escapement projects should be made with the weir's location in mind. The Kogrukluk River weir is within the upper drainage area (altitude ~107 m) 205 km from the confluence of the Holitna and Kuskokwim Rivers. Most of the salmon that enter the Holitna River drainage spawn in the mainstem and tributaries downstream from the Kogrukluk River. How these factors come into play is uncertain, but most escapement assessment projects are located closer to the Kuskokwim River or Bay and downstream of major spawning grounds, hence may be more representative of the entire primary-tributary spawning aggregates. Comparisons made in this discussion are non-statistical.

Chinook Salmon

The male-female ratio from the ASL samples in 2000 was 59%-41%. A total of 98 live chinook salmon were sampled over the course of the migration (Table 4). Although of acceptable temporal scope the sample may not have represented the total escapement because of its small size. Obtaining ASL data from chinook salmon has always been problematic and this year was exacerbated by the overall low abundance. The sex ratio of the actual counts was 32% female (Table 1).

Chinook salmon aged-1.3 showed the only real difference from historical mean length in 2000. The historical mean length of male chinook salmon is 707 mm (n=2,472) and the 2000 fish averaged 671 mm (n=42). The mean length for females was 786 mm in 2000 (n= 7) while the historical mean is 790mm (n=790) (Table 5). All other age classes were very near the historical mean. Again, sample sizes are small and as such any significant differences may have gone undetected

Chum Salmon

Females comprised 8.5% of the ASL sample in 2000 (Table 6). Females comprised 21% of the actual counts (Table 1). The percentage of the actual counts represents an improvement over ratios from the last few years when the percentage of females was around 16%. The percentage

of females derived from the ASL data is slightly lower than the 1999 ratio. Once again, the disparity is not as significant as the continued low percentage, which for unexplained reasons has been exhibiting a downward trend in recent years (Molyneaux and DuBios 1999). A possible reason is that the project is located high in the Holitna drainage with a great deal of suitable chum salmon spawning habitat below the project site. Females may simply be selecting and using suitable spawning habitat prior to reaching the vicinity of the weir, then remaining near these areas before dying. Males may continue to move up the drainage, thus biasing the counts. This disparity may be more acute in years when abundance is low and competition among females for available spawning space is reduced. However, this is speculative. Sampling efforts would need to be conducted closer to the mainstem Kuskokwim River in order to determine if an abnormal ratio exists in the entire Holitna drainage.

Mean lengths of all age classes of chum salmon were very near historical values in 2000. This was true for both sexes. The exceptions are for age-0.2 females where the mean length was 527mm and the historical value was 544mm, and age-0.5 males, which had a mean of 633mm and historical value of 613mm, but the 2000 sample contained 3 and 2 fish respectively. Both of these age classes are usually present in low numbers.

Coho Salmon

The 2000 coho salmon run at the weir was 30% female according to the ASL data (Table 8). The actual counts were identified as 40% female (Table 1). Coho aged-2.1 comprised 97% of the run compared to the historical mean of 93% (Table 8).

Coho salmon lengths in 2000 were right at the mean historical values for males (569mm, n=408). Females were also very near the mean historical values of 567mm (565mm, n=178).

There has been a consistent difference between sex ratios of ASL data and observer derived ratios for all species passing the Kogrukluk River weir. Reasons for the disparity between ASL and observer data is unknown but may be due to some type of selectivity related to the location of the trap, to observer identification error, sample sizes or a combination of all three. A possible area of concern is that the Kogrukluk project is the only one currently being operated on the Kuskokwim drainage that has a comparative set of counts to ASL data. All the other projects rely on ASL information to apportion counts by sex. The quality of escapement is often judged by the ratio of males to females and if the current ASL methodology is flawed there could be a danger in placing unwarranted faith in the male-female ratios. A possible way to address this concern would be to institute a more systematic approach to obtaining ASL samples. The current technique is based loosely on passage and opportunity without much regard given to methods other than the "pulse" based strategy. This strategy basically mandates that a pulse of ASL data be collected in the shortest temporal span and that a minimum of three pulses be collected for a given species per season. This method has not been standardized, in terms of how and when sampling should occur, in fact because of operational nuances between projects may be incompatible with standardization. As another option, observer counts of fish by sex would be an interesting comparison to make but observer bias would be another variable to consider.

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Table 1. Actual daily and estimated counts of chinook, sockeye, chum and coho salmon, Kogrukluk River weir, 2000.
Bold italic numbers are estimates derived using run timing models.

	chinook				sockeye			chum			coho		
Date	male	jacks[a]	female	Totals	male	female	Totals	male	female	Totals	male	female	Totals
21-Jun													
22-Jun													
23-Jun													
24-Jun													
25-Jun													
26-Jun													
27-Jun													
28-Jun													
29-Jun													
30-Jun													
1-Jul													
2-Jul	1			1				22	5	27			0
3-Jul	34	4	8	42				56	5	61			0
4-Jul	36	5	4	40				84	37	121			0
5-Jul	73	15	22	95	4	6	10	146	44	190			0
6-Jul	149	22	30	179	8	6	14	205	85	290			0
7-Jul	87	13	21	108	2	10	12	347	123	470			0
8-Jul	39	10	7	46	5	12	17	325	112	437			0
9-Jul	141	17	48	189	11	30	41	419	108	527			0
10-Jul	86	15	38	124	39	52	91	500	125	625			0
11-Jul	167	35	67	234	85	84	169	541	157	698			0
12-Jul	193	22	89	282	119	98	217	504	145	649			0
13-Jul	114	19	35	149	21	14	35	347	82	429			0
14-Jul	109	21	43	152	15	7	22	303	99	402			0
15-Jul	135	21	51	186	72	31	103	391	139	530			0
16-Jul	146	19	75	221	194	91	285	594	192	786			0
17-Jul	106	22	44	150	108	42	150	362	129	491			0
18-Jul	70	17	32	102	80	89	169	387	151	538			0
19-Jul	60	8	43	103	54	36	90	372	132	504			0
20-Jul	32	8	19	51	60	34	94	264	74	338			0
21-Jul	39	14	38	77	154	69	223	317	66	383			0
22-Jul	62	17	51	113	145	73	218	247	93	340			0
23-Jul	35	11	43	78	112	35	147	257	49	306			0
24-Jul	42	6	51	93	97	16	113	219	32	251			0
25-Jul	32	4	25	57	19	3	22	145	25	170	3	0	3
26-Jul	13	4	17	30	64	14	78	192	29	221	2	0	2
27-Jul	14	2	39	53	92	11	103	180	23	203	2	1	3
28-Jul	12	3	13	25	54	9	63	181	23	204	1	0	1
29-Jul	9	1	10	19	41	4	45	131	8	139	1	0	1
30-Jul	7	1	7	14	30	4	34	147	14	161	1	3	4
31-Jul	16	2	25	41	69	11	80	177	28	205	7	3	10
1-Aug	10	4	14	24	25	2	27	94	6	100	1	0	1
2-Aug	20	5	17	37	31	1	32	77	8	85	6	3	9
3-Aug				***35***			***25***			***107***			***33***
4-Aug				***29***			***21***			***91***			***32***
5-Aug				***26***			***18***			***83***			***51***
6-Aug				***22***			***14***			***71***			***65***

[a] Chinook jacks included in male totals.

-continued-

Table 1. (page 2 of 2)

	chinook				sockeye			chum			coho		
Date	male	jacks[a]	female	Totals	male	female	Totals	male	female	Totals	male	female	Totals
7-Aug				***18***			***11***			***62***			***79***
8-Aug	1	0	3	4	0	1	1	6	3	9	71	23	94
9-Aug	0	0	7	7	8	2	10	21	5	26	133	59	192
10-Aug	8	2	2	10	7	2	9	18	11	29	229	96	325
11-Aug	2	0	1	3	5	5	10	9	6	15	174	56	230
12-Aug	1	0	2	3	1	6	7	13	4	17	465	185	650
13-Aug	5	4	4	9	2	4	6	20	14	34	719	153	872
14-Aug	4	0	2	6	6	1	7	8	3	11	787	180	967
15-Aug	3	0	2	5	3	3	6	2	2	4	560	243	803
16-Aug	0	0	1	1	3	0	3	3	3	6	237	108	345
17-Aug	0	0	0	0	2	0	2	2	4	6	60	34	94
18-Aug	0	0	0	0	0	1	1	5	17	22	332	227	559
19-Aug	1	0	0	1	1	0	1	3	5	8	795	356	1,151
20-Aug	3	0	0	3	1	0	1	0	1	1	739	360	1,099
21-Aug	0	0	0	0	1	0	1	1	0	1	770	473	1,243
22-Aug	0	0	1	1	1	0	1	0	0	0	748	395	1,143
23-Aug	2	0	0	2	1	0	1	0	0	0	709	342	1,051
24-Aug	0	0	0	0	0	1	1	1	0	1	701	364	1,065
25-Aug	0	0	1	1	0	1	1	0	0	0	436	156	592
26-Aug	0	0	0	0	0	0	0	3	3	6	298	110	408
27-Aug	1	0	1	2	0	0	0	0	0	0	1,175	706	1,881
28-Aug	3	0	0	3	0	0	0	0	0	0	1,606	1,067	2,673
29-Aug	0	0	0	0	0	0	0	0	0	0	1,621	1,445	3,066
30-Aug	1	0	0	1	0	0	0	0	0	0	1,260	1,304	2,564
31-Aug	1	0	0	1	0	0	0	0	0	0	739	677	1,416
1-Sep	0	0	0	0	0	0	0	0	0	0	556	549	1,105
2-Sep	0	0	0	0	0	0	0	0	0	0	502	362	864
3-Sep	0	0	0	0	1	0	1	0	0	0	405	322	727
4-Sep	0	0	0	0	0	0	0	0	0	0	226	200	426
5-Sep	1	0	0	1	1	0	1	0	0	0	260	292	552
6-Sep	0	0	0	0	1	0	1	0	0	0	676	670	1,346
7-Sep	0	0	0	0	0	0	0	1	0	1	365	431	796
8-Sep	0	0	0	0	0	0	0	0	0	0	288	314	602
9-Sep	1	0	0	1	0	0	0	0	0	0	201	244	445
10-Sep	0	0	0	0	0	0	0	0	0	0	130	150	280
11-Sep	0	0	0	0	0	0	0	0	0	0	164	294	458
12-Sep	0	0	0	0	0	0	0	0	0	0	100	170	270
13-Sep	0	0	0	0	0	0	0	0	0	0	87	103	190
14-Sep	0	0	0	0	0	0	0	0	1	1	37	65	102
15-Sep	0	0	0	0	0	0	0	0	0	0	41	29	70
16-Sep	0	0	0	0	0	0	0	0	0	0	16	17	33
17-Sep	0	0	0	0	0	0	0	0	0	0	23	16	39
18-Sep	0	0	0	0	0	0	0	0	0	0	18	25	43
19-Sep	0	0	0	0	0	0	0	0	0	0	7	17	24
20-Sep	0	0	0	0	0	0	0	0	0	0	11	17	28
21-Sep													
22-Sep													
23-Sep													
24-Sep													
Totals	2,127	373	1,053	***3,310***	1,855	921	***2,865***	8,649	2,063	***11,493***	19,501	13,416	***33,177***

[a] Chinook jacks included in male totals.

Table 2. Run timing models (cumulative proportion) used to calculate missing total and daily counts of salmon at the Kogrukluk River weir, 2000. Bold italic proportions were used to estimate days of missing fish passage.

Date	Late Run Timing chinook	Late Run Timing sockeye	Late Run Timing chum	Early Run Timing coho
01-Jul	0.028	0.006	0.021	0.000
02-Jul	0.043	0.011	0.033	0.000
03-Jul	0.061	0.017	0.052	0.000
04-Jul	0.087	0.032	0.078	0.000
05-Jul	0.121	0.048	0.100	0.000
06-Jul	0.160	0.069	0.131	0.000
07-Jul	0.191	0.103	0.166	0.000
08-Jul	0.222	0.140	0.206	0.000
09-Jul	0.265	0.171	0.265	0.000
10-Jul	0.324	0.206	0.338	0.000
11-Jul	0.362	0.244	0.382	0.000
12-Jul	0.427	0.311	0.441	0.000
13-Jul	0.502	0.357	0.489	0.000
14-Jul	0.578	0.396	0.537	0.000
15-Jul	0.627	0.445	0.584	0.000
16-Jul	0.687	0.501	0.627	0.000
17-Jul	0.743	0.547	0.669	0.000
18-Jul	0.782	0.612	0.707	0.000
19-Jul	0.816	0.673	0.747	0.000
20-Jul	0.845	0.729	0.768	0.000
21-Jul	0.874	0.775	0.801	0.000
22-Jul	0.895	0.816	0.820	0.000
23-Jul	0.916	0.845	0.843	0.000
24-Jul	0.933	0.882	0.852	0.000
25-Jul	0.942	0.903	0.859	0.000
26-Jul	0.952	0.916	0.871	0.000
27-Jul	0.957	0.927	0.881	0.000
28-Jul	0.963	0.948	0.895	0.000
29-Jul	0.969	0.958	0.909	0.000
30-Jul	0.974	0.965	0.921	0.000
31-Jul	0.977	0.972	0.930	0.000
01-Aug	0.979	0.979	0.940	0.001
02-Aug	0.981	0.984	0.951	0.001
03-Aug	***0.983***	***0.986***	***0.958***	***0.001***
04-Aug	***0.984***	***0.989***	***0.964***	***0.002***
05-Aug	***0.986***	***0.991***	***0.973***	***0.003***
06-Aug	***0.989***	***0.992***	***0.979***	***0.005***
07-Aug	***0.989***	***0.993***	***0.982***	***0.006***
08-Aug	***0.991***	***0.995***	***0.985***	***0.008***
09-Aug	0.992	0.996	0.987	0.010
10-Aug	0.993	0.996	0.990	0.015
11-Aug	0.994	0.997	0.991	0.021
12-Aug	0.995	0.998	0.992	0.027
13-Aug	0.996	0.998	0.994	0.032
14-Aug	0.997	0.999	0.995	0.035
15-Aug	0.997	0.999	0.996	0.043
16-Aug	0.998	0.999	0.997	0.054
17-Aug	0.998	0.999	0.998	0.063

-Continued-

Table 2. (page 2 of 2).

Date	Late Run Timing chinook	Late Run Timing sockeye	Late Run Timing chum	Early Run Timing coho
18-Aug	0.998	0.999	0.999	0.079
19-Aug	0.998	0.999	0.999	0.099
20-Aug	0.999	1.000	0.999	0.125
21-Aug	0.999	1.000	0.999	0.147
22-Aug	0.999	1.000	0.999	0.175
23-Aug	1.000	1.000	0.999	0.205
24-Aug	1.000	1.000	1.000	0.235
25-Aug	1.000	1.000	1.000	0.290
26-Aug	1.000	1.000	1.000	0.356
27-Aug	1.000	1.000	1.000	0.412
28-Aug	1.000	1.000	1.000	0.460
29-Aug	1.000	1.000	1.000	0.497
30-Aug	1.000	1.000	1.000	0.535
31-Aug	1.000	1.000	1.000	0.568
01-Sep	1.000	1.000	1.000	0.610
02-Sep	1.000	1.000	1.000	0.645
03-Sep	1.000	1.000	1.000	0.671
04-Sep	1.000	1.000	1.000	0.711
05-Sep	1.000	1.000	1.000	0.735
06-Sep	1.000	1.000	1.000	0.752
07-Sep	1.000	1.000	1.000	0.777
08-Sep	1.000	1.000	1.000	0.818
09-Sep	1.000	1.000	1.000	0.855
10-Sep	1.000	1.000	1.000	0.869
11-Sep	1.000	1.000	1.000	0.890
12-Sep	1.000	1.000	1.000	0.909
13-Sep	1.000	1.000	1.000	0.925
14-Sep	1.000	1.000	1.000	0.936
15-Sep	1.000	1.000	1.000	0.942
16-Sep	1.000	1.000	1.000	0.941
17-Sep	1.000	1.000	1.000	0.955
18-Sep	1.000	1.000	1.000	0.962
19-Sep	1.000	1.000	1.000	0.971
20-Sep	1.000	1.000	1.000	0.983
21-Sep	1.000	1.000	1.000	0.987
22-Sep	1.000	1.000	1.000	0.991
23-Sep	1.000	1.000	1.000	0.992
24-Sep	1.000	1.000	1.000	0.993
25-Sep	1.000	1.000	1.000	0.994
26-Sep	1.000	1.000	1.000	0.996
27-Sep	1.000	1.000	1.000	0.995
28-Sep	1.000	1.000	1.000	0.996
29-Sep	1.000	1.000	1.000	0.997
30-Sep	1.000	1.000	1.000	0.996
01-Oct	1.000	1.000	1.000	0.997
02-Oct	1.000	1.000	1.000	0.998
03-Oct	1.000	1.000	1.000	0.999
04-Oct	1.000	1.000	1.000	1.000
05-Oct	1.000	1.000	1.000	1.000

Table 3. Daily counts of chinook,sockeye, and chum carcasses at the Kogrukluk River weir, 2000. [A]

Date	Chinook	Sockeye	Chum
5-Jul			
6-Jul			1
7-Jul			0
8-Jul			3
9-Jul			1
10-Jul			3
11-Jul			4
12-Jul			5
13-Jul			11
14-Jul			12
15-Jul			15
16-Jul			34
17-Jul	1		45
18-Jul	0		48
19-Jul	0		56
20-Jul	0		73
21-Jul	0		94
22-Jul	0		144
23-Jul	0		194
24-Jul	0		104
25-Jul	0	1	154
26-Jul	1	0	199
27-Jul	2	0	176
28-Jul	1	0	159
29-Jul	3	0	124
30-Jul	1	0	104
31-Jul	5	1	109
1-Aug	25	0	169
2-Aug	24	1	137
3-Aug			
4-Aug			
5-Aug			
6-Aug			
7-Aug			
8-Aug	20	0	30
9-Aug	47	6	42
10-Aug	52	4	61
11-Aug	78	13	80
12-Aug	49	8	43
13-Aug	26	8	35
14-Aug			
15-Aug			
16-Aug	19	23	27
17-Aug	0	20	7
18-Aug	0	9	11
19-Aug	2	1	5
20-Aug	0	16	13
21-Aug	5	21	2
22-Aug	2	9	5
23-Aug			
24-Aug	0	12	2
25-Aug	2	10	4
26-Aug	2	4	4
27-Aug	1	14	2
28-Aug	2	12	0
29-Aug			
30-Aug	1	14	4
31-Aug	1	2	2
1-Sep	0	4	2
2-Sep	1	0	0
3-Sep	1	9	3
4-Sep	0	0	0
5-Sep	0	1	0
6-Sep	1	0	0
7-Sep	2	5	3
8-Sep	0	0	0
9-Sep	0	0	0
10-Sep	1	3	1
11-Sep	0	0	0
12-Sep	0	0	0
13-Sep	0	0	1
14-Sep	1	3	3
15-Sep	0	0	0
16-Sep	0	0	0
17-Sep	0	2	1
18-Sep	0	0	0
19-Sep	0	0	0
20-Sep	0	2	0
Total	379	238	2570

[a] Except Coho. In most years project operations are terminated before a majority of the coho salmon can be expected to have died.

Table 4. Escapement of chinook salmon partitioned by age, sex, and time stratum based on trap caught samples at the Kogruluk River weir, 2000.

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	1.1		1.2		1.3		1.4		1.5		Total	
				Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%
2000	7/07, 09	26	M	0	0.0	158	19.2	317	38.5	32	3.9	0	0.0	507	61.5
	(7/2 - 7/10)		F	0	0.0	0	0.0	95	11.5	222	26.9	57	2.1	317	38.5
			Subtotal	0	0.0	158	19.2	412	50.0	254	30.8	57	2.1	824	100.0
	7/11-14, 19	34	M	0	0.0	59	5.9	561	55.9	118	11.8	0	0.0	738	73.5
	(7/16 - 7/24)		F	0	0.0	0	0.0	29	2.9	177	17.6	59	5.9	265	26.5
			Subtotal	0	0.0	59	5.9	590	58.8	295	29.4	59	5.9	1,003	100.0
	7/28	11	M	0	0.0	0	0.0	180	36.4	45	9.1	0	0.0	225	45.5
	(7/31 - 9/13)		F	0	0.0	0	0.0	45	9.1	225	45.4	0	0.0	270	54.5
			Subtotal	0	0.0	0	0.0	225	45.5	270	54.5	0	0.0	495	100.0
	Season	98	M	0	0.0	327	9.9	1,387	41.9	231	7.0	0	0.0	1,945	58.8
			F	0	0.0	0	0.0	243	7.3	1,063	32.1	59	1.8	1,365	41.2
			Total	0	0.0	327	9.9	1,630	49.2	1,294	39.1	59	1.8	3,310	100.0
	Historical	6,534	M	333	0.3	16,174	16.8	32,327	33.6	13,697	14.3	432	0.4	63,080	65.9
	Total		F	0	0.0	245	0.3	5,608	5.8	24,904	25.9	2,242	2.3	33,010	34.1
			Total	333	0.3	16,419	17.1	37,935	39.5	38,601	40.2	2,674	2.8	96,085	100.0

Table 5. Mean length (mm) by sex and age based on samples of trap caught chinook salmon at the Kogrukluk River weir, 2000.

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	1.1	1.2	2.1	1.3	2.2	1.4	2.3	1.5
2000	7/07, 09 (7/2-7/10)	M	Mean Length		0	599		674		775		
			Std. Error		-	30		11		-		
			Range		-	555-710		620-720		775-775		
			Sample Size	0	0	5	0	10	0	1	0	0
		F	Mean Length					790		849		
			Std. Error					6		17		
			Range					780-800		785-910		
			Sample Size	0	0	0	0	3	0	7	0	0
	7/11-714 (7/11-7/15)	M	Mean Length			563		673		841		
			Std. Error			28		10		32		
			Range			535-590		595-770		775-925		
			Sample Size	0	0	2	0	19	0	43	0	0
		F	Mean Length					750		831		825
			Std. Error					-		9		5
			Range					750-750		810-860		820-830
			Sample Size	0	0	0	0	1	0	6	0	2
	7/16-7/17,19 (7/16-7/24)	M	Mean Length			583		661		850		
			Std. Error			11		13		-		
			Range			570-610		580-705		850-850		
			Sample Size	0	0	3	0	9	0	1	0	0
		F	Mean Length					750		868		
			Std. Error					30		14		
			Range					720-780		790-920		
			Sample Size	0	0	0	0	2	0	12	0	0

-continued-

Table 5. (page 2 of 2).

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	1.1	1.2	2.1	1.3	2.2	1.4	2.3	1.5
2000	7/28	M	Mean Length					680		830		
	(7/25 - 8/30)		Std. Error					30		-		
			Range					625-735		830-830		
			Sample Size	0	0	0	0	4	0	1	0	0
		F	Mean Length					860		876		
			Std. Error					-		26		
			Range					720-780		790-950		
			Sample Size	0	0	0	0	1	0	5	0	0
	Season	M	Mean Length		0	587		671		831		
			Range			535-710		580-770		775-925		
			Sample Size	0		10	0	42	0	7	0	0
		F	Mean Length					786		859		825
			Range					720-860		785-950		820-830
			Sample Size	0	0	0	0	7	0	30	0	2
	Historical	M	Mean Length		425	571		707	605	829	826	935
	Total		Range		355- 639	381- 760		481- 935	550- 660	530- 1100	777- 875	786- 1089
			Sample Size	0	12	1,029	0	2,472	2	870	2	53
		F	Mean Length			602		790		867		903
			Range			568- 635		613- 963		695- 1035		740- 1072
			Sample Size	0	0	6	0	291	0	1,587	0	203

Table 6. Escapement of chum salmon partitioned by age, sex, and time stratum based on trap caught samples for the Kogrukluk River weir, 2000.

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 0.2 Esc.	0.2 %	0.3 Esc.	0.3 %	0.4 Esc.	0.4 %	0.5 Esc.	0.5 %	Total Esc.	Total %
2000	7/7 -7/11	181	M	0	0.0	1,589	34.7	2,570	56.1	23	0.5	4,183	91.3
			F	0	0.0	164	3.6	234	5.1	0	0.0	397	8.7
			Subtotal	0	0.0	1,753	0.4	2,804	0.6	23	0.0	4,580	100.0
	7/15 -7/21	181	M	2	1.1	1,873	42.4	2,281	51.6	0	0.0	4,154	94.0
			F	0	0.0	96	2.2	144	3.3	24	0.5	264	6.0
			Subtotal	2	0.0	1,969	44.6	2,425	54.9	24	0.5	4,418	100.0
	7/25 -7/31	181	M	3	17.0	894	51.8	659	38.2	0	0.0	1,553	90.0
			F	0	0.0	110	6.4	63	3.6	0	0.0	173	10.0
			Subtotal	3	0.0	1,004	58.2	722	41.8	0	0.0	1,726	100.0
	8/08 -8/11	40	M	2	5.0	835	53.7	533	34.3	0	0.0	1,368	88.0
			F	3	7.5	133	8.6	53	3.4	0	0.0	186	12.0
			Subtotal	5	0.0	968	62.3	586	37.7	0	0.0	1,554	100.0
	Season	583	M	7	1.2	6,219	45.0	6,407	46.4	23	0.1	12,650	91.5
			F	3	0.5	588	4.3	558	4.0	24	0.2	1,170	8.5
			Total	10	0.0	6,807	49.3	6,965	50.4	47	0.3	13,820	100.0
	Historical Total	8,487	M	1,762	0.4	158,397	36.8	142,315	33.1	3,746	0.9	306,202	71.2
			F	824	0.2	65,708	15.3	56,440	13.1	1,018	0.2	123,982	28.8
			Total	2,586	0.6	224,105	52.1	198,755	46.2	4,654	1.1	430,100	100.0

Table 7. Mean length (mm) by sex and age based on samples of trap caught chum salmon at the Kogrukluk River weir, 2000.

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
2000	7/27-7/11	M	Mean Length		583	615	645
			Std. Error		2	3	-
			Range		540-635	570-685	645-645
			Sample Size	0	79	79	1
		F	Mean Length		559	582	
			Std. Error		17	6	
			Range		500-620	520-620	
			Sample Size	0	6	16	0
	7/15-7/21	M	Mean Length	580	583	598	
			Std. Error	10	6	6	
			Range	570-590	505-645	545-675	
			Sample Size	2	114	28	
		F	Mean Length		567	587	
			Std. Error		5	5	
			Range		530-630	560-630	
			Sample Size	0	23	14	0
	7/25-7/31	M	Mean Length	570	582	597	620
			Std. Error	13	8	8	-
			Range	550-595	500-640	525-655	620-620
			Sample Size	3	143	20	1
		F	Mean Length		554	552	
			Std. Error		7	24	
			Range		515-580	525-600	
			Sample Size	0	11	3	
	8/08-8/11	M	Mean Length	535	578	600	
			Std. Error	5	6	20	
			Range	530-540	520-630	580-620	
			Sample Size	2	25	2	0
		F	Mean Length	527	537	570	
			Std. Error	7	9	-	
			Range	520-540	500-580	570-570	
			Sample Size	3	7	1	0
	Season	M	Mean Length	563	582	609	633
			Range	530-595	500-645	525-685	620-645
			Sample Size	7	361	129	2
		F	Mean Length	527	563	581	
			Range	520	500-630	520-630	
			Sample Size	3	47	34	2
	Historical Total	M	Mean Length	567	584	604	613
			Range	470- 654	360- 698	439- 721	540- 703
			Sample size	52	3,725	2,630	76
		F	Mean Length	544	562	579	576
			Range	468- 606	453- 670	450- 689	533- 654
			Sample size	21	1,138	800	28

Table 8. Escapement of coho salmon partitioned by age, sex, and time stratum based on trap caught samples for the Kogrukluk River weir, 2000.

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class									
				1.1		2.1		2.2		3.1		Total	
				Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%
2000	8/08-8/12	136	M	0	0.0	2,693	74.3	0	0.0	27	0.7	2,720	75.0
			F	0	0.0	907	25.0	0	0.0	0	0.0	907	25.0
			Subtotal	0	0.0	3,600	99.3	0	0.0	27	0.7	3,627	100.0
	8/16,8/19-8/21	159	M	141	1.9	5,608	74.9	0	0.0	47	0.7	5,796	77.4
			F	0	0.0	1,649	22.0	0	0.0	47	0.6	1,697	22.6
			Subtotal	141	1.9	7,257	96.9	0	0.0	94	1.3	7,493	100.0
	8/25,8/27	157	M	0	0.0	10,445	76.4	0	0.0	174	1.3	10,619	77.7
			F	87	0.6	2,959	21.7	0	0.0	0	0.0	3,046	22.3
			Subtotal	87	0.6	13,404	98.1	0	0.0	174	1.3	13,665	100.0
	9/04-9/06	152	M	55	0.7	3,736	44.7	0	0.0	110	1.3	3,900	46.7
			F	55	1.4	4,120	49.4	0	0.0	275	3.3	4,450	53.3
			Subtotal	110	1.3	7,856	94.1	0	0.0	385	4.6	8,350	100.0
	Season	604	M	196	0.6	22,482	67.8	0	0.0	358	1.1	23,036	69.5
			F	142	0.4	9,635	29.1	0	0.0	322	1.0	10,099	30.5
			Total	338	1.0	32,117	96.9	0	0.0	680	2.1	33,135	100.0
	Historical Total	3,560	M	3,374	1.8	110,985	58.0	6	0.0	5,184	2.7	119,666	62.5
			F	1,514	0.8	66,696	34.8	0	0.0	3,946	1.8	71,734	37.5
			Total	4,888	2.6	145,564	92.8	6	0.0	8,680	4.5	191,396	100.0

Table 9. Mean length (mm) by sex and age based on samples of trap caught coho salmon at the Kogrukluk River weir, 2000.

Year	Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	2.2	3.1
2000	8/08-8/12	M	Mean Length		561		570
			Std. Error		3		-
			Range		500-640		570-570
			Sample Size	0	101	0	1
		F	Mean Length		552		
			Std. Error		5		
			Range		500-600		
			Sample Size	0	34	0	0
	8/16,8/19-8/2	M	Mean Length	575	565		545
			Std. Error	3	2		-
			Range	570-580	490-620		545-545
			Sample Size	3	119	0	1
		F	Mean Length		563		610
			Std. Error		4		-
			Range		500-610		610-610
			Sample Size	0	35	0	1
	8/25,8/27	M	Mean Length		575		595
			Std. Error		2		25
			Range		520-630		570-620
			Sample Size	0	120	0	2
		F	Mean Length	555	569		
			Std. Error	-	4		
			Range	555-555	510-605		
			Sample Size	1	34	0	0
	9/04-9/06	M	Mean Length	550	564		
			Std. Error	-	4		-
			Range	575-575	505-630		
			Sample Size	1	68	0	0
		F	Mean Length	568	565		582
			Std. Error	3	3		9
			Range	550-580	485-625		555-605
			Sample Size	2	75	0	5
	Season	M	Mean Length	568	569		571
			Range	550-580	490-460		485-620
			Sample Size	4	408	0	6
		F	Mean Length	563	565		586
			Range	555-575	485-625		555-610
			Sample Size	2	178	0	6
	Historical Total	M	Mean Length	558	569	555	571
			Range	495- 670	435- 695	555- 555	480- 655
			Sample Size	100	2,194	1	113
		F	Mean Length	571	567		567
			Range	490- 610	465- 665		500- 650
			Sample size	36	1,232	0	79

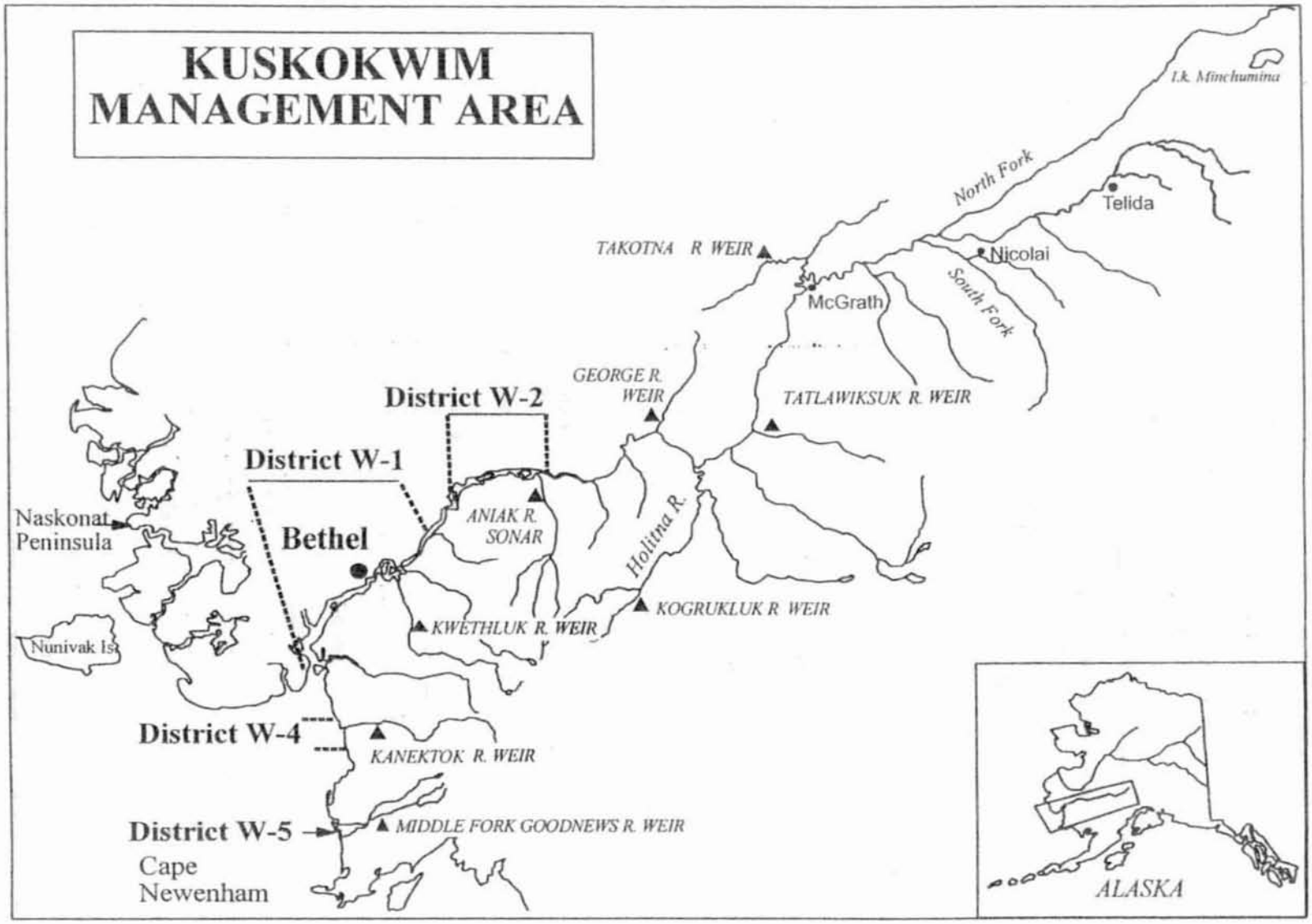

Figure 1. Kuskokwim Area map showing salmon management districts and escapement monitoring projects.

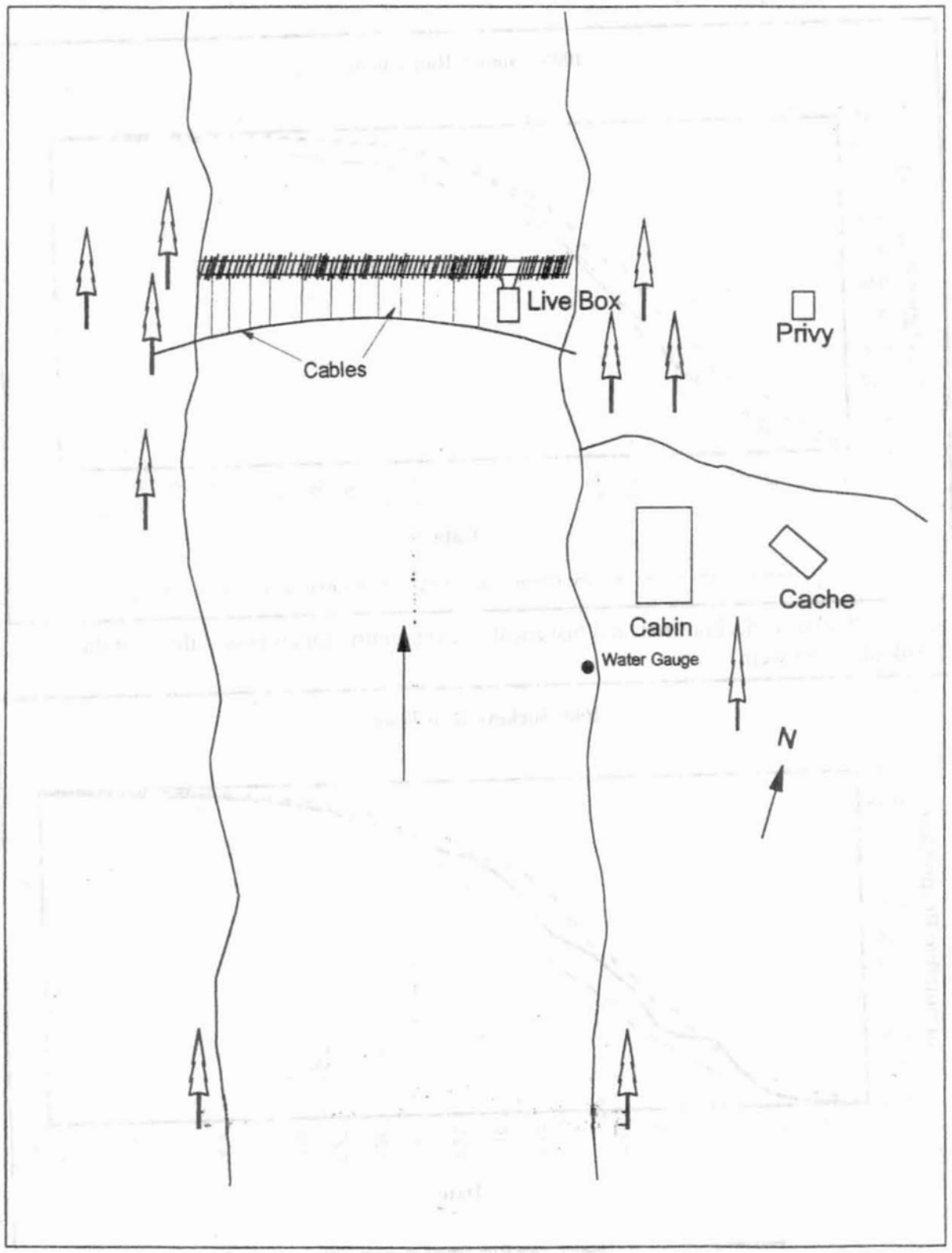

Figure 2. Schematic of the Kogrukluk River weir.

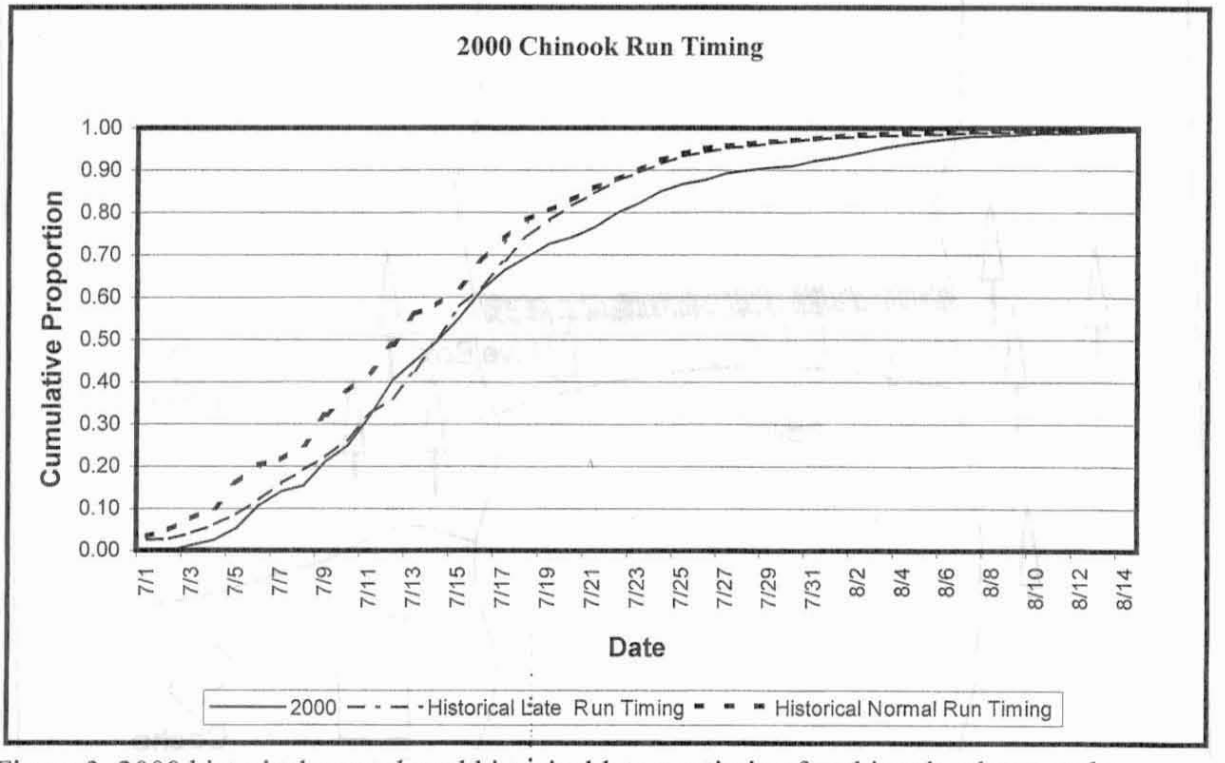

Figure 3. 2000 historical normal, and historical late run timing for chinook salmon at the Kogrukluk River weir.

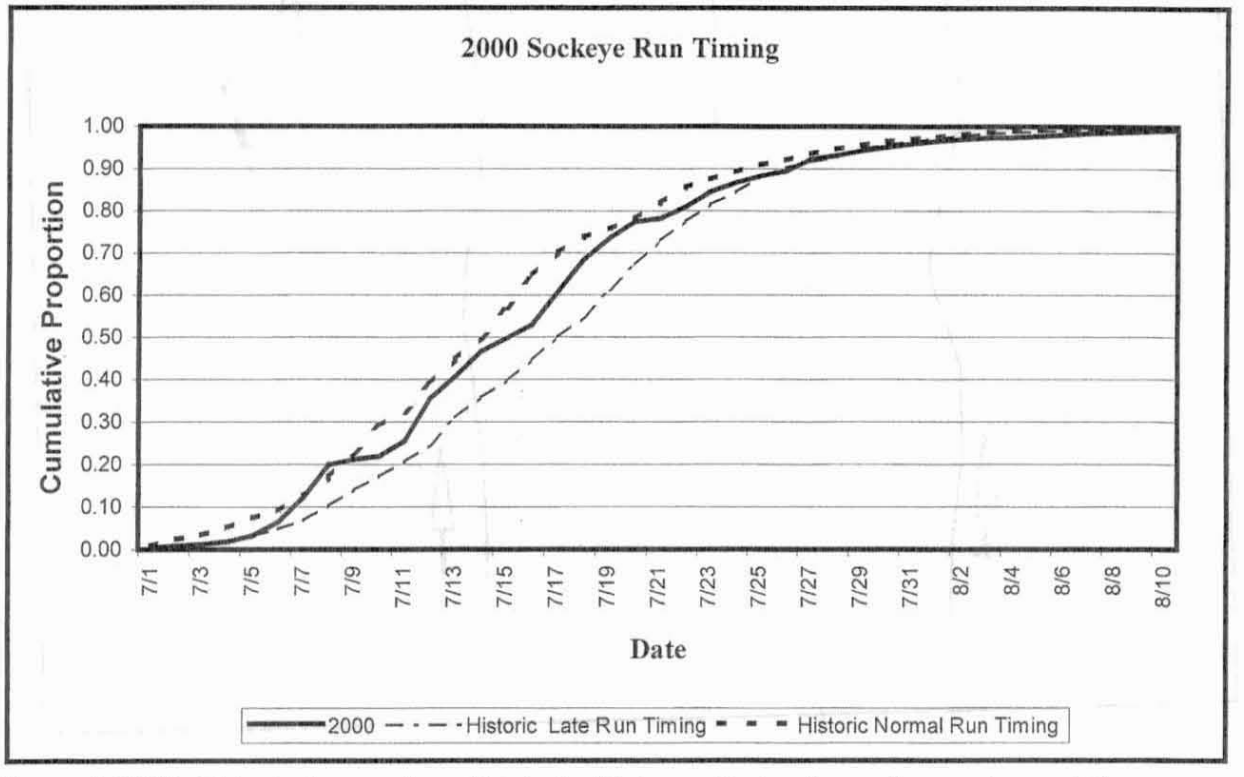

Figure 4. 2000, historical normal, and historical late run timing for sockeye salmon at the Kogrukluk River weir.

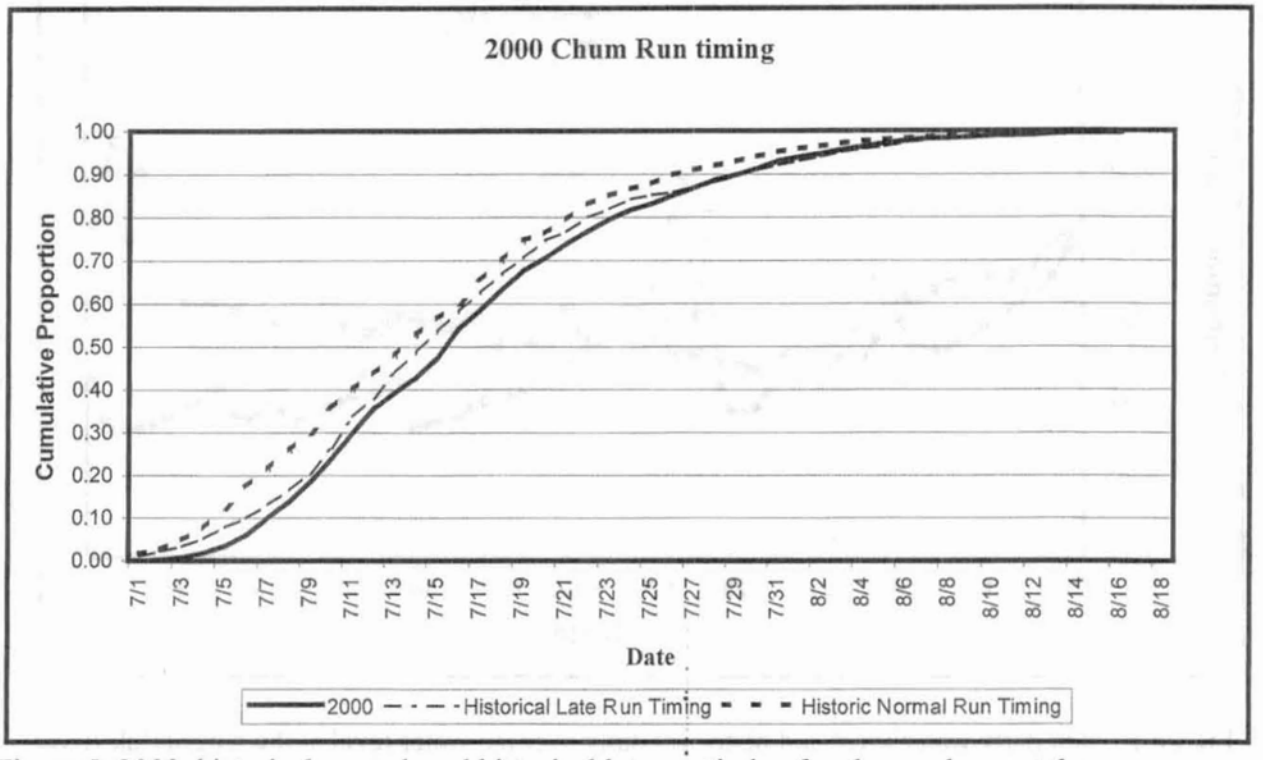

Figure 5. 2000, historical normal, and historical late run timing for chum salmon at the Kogrukluk River weir.

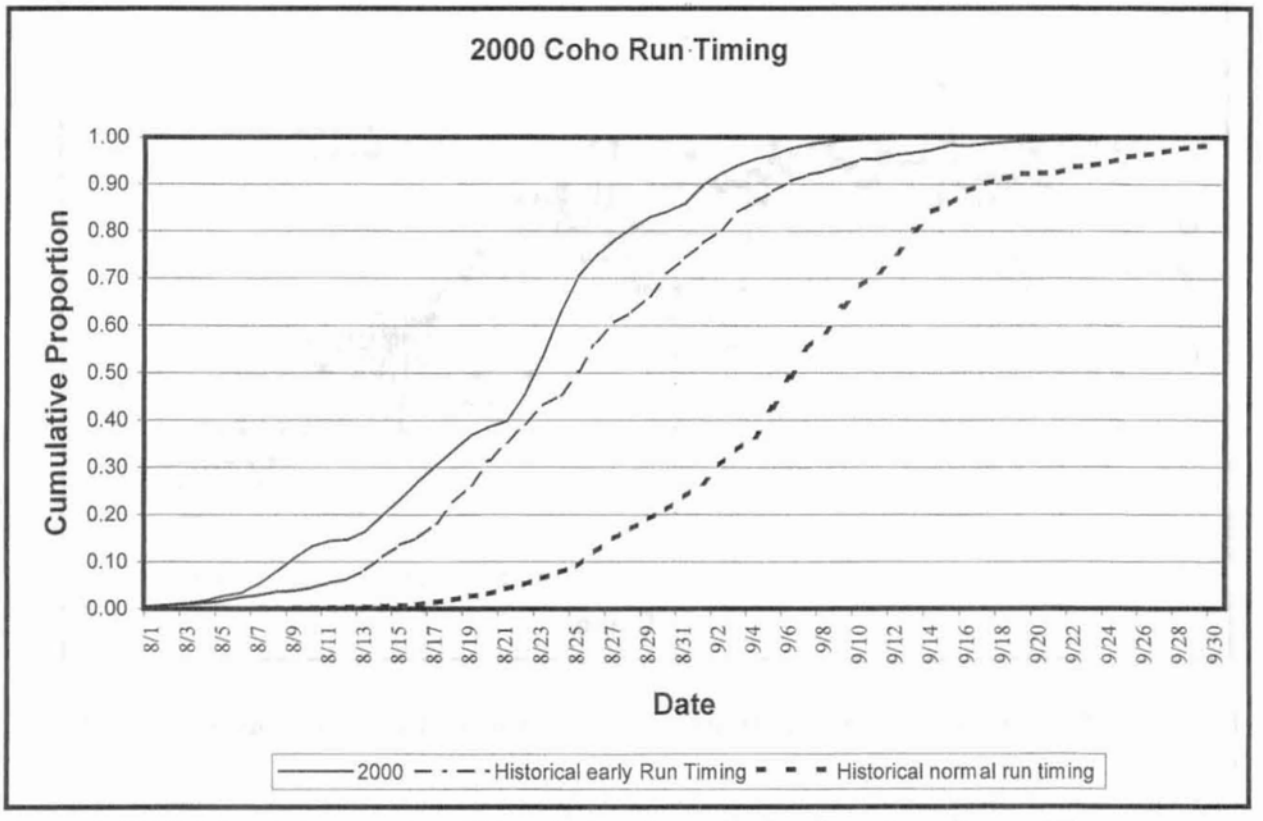

Figure 6. 2000, historical normal, and historical early run timing for coho salmon at the Kogrukluk River weir.

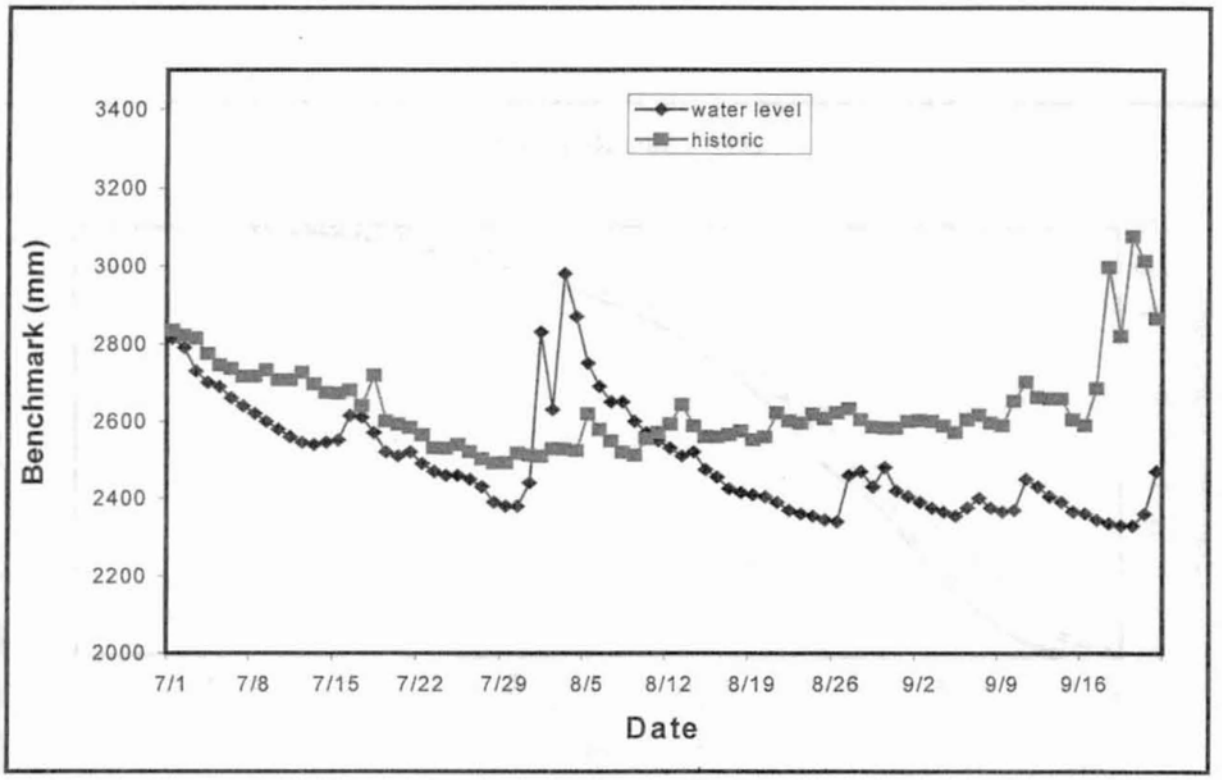

Figure 7. 2000 daily water level and historical daily average water level at the Kogrukluk River weir.

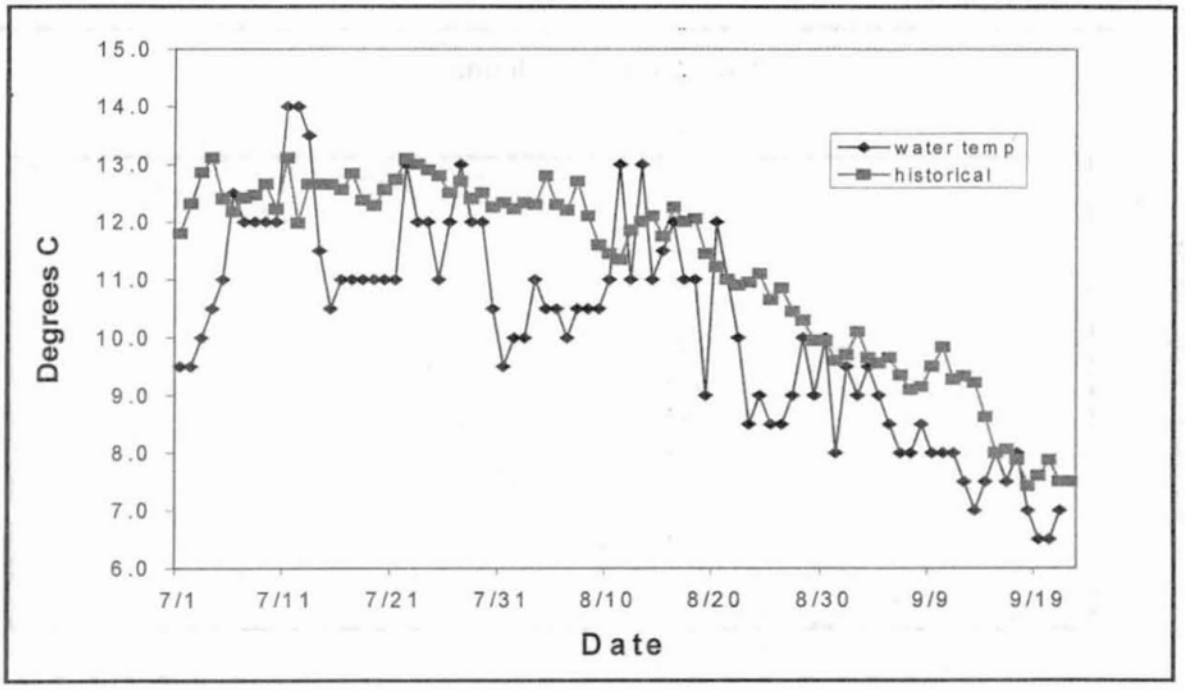

Figure 8. 2000 daily and historical daily average water temperatures at the Kogrukluk River weir.

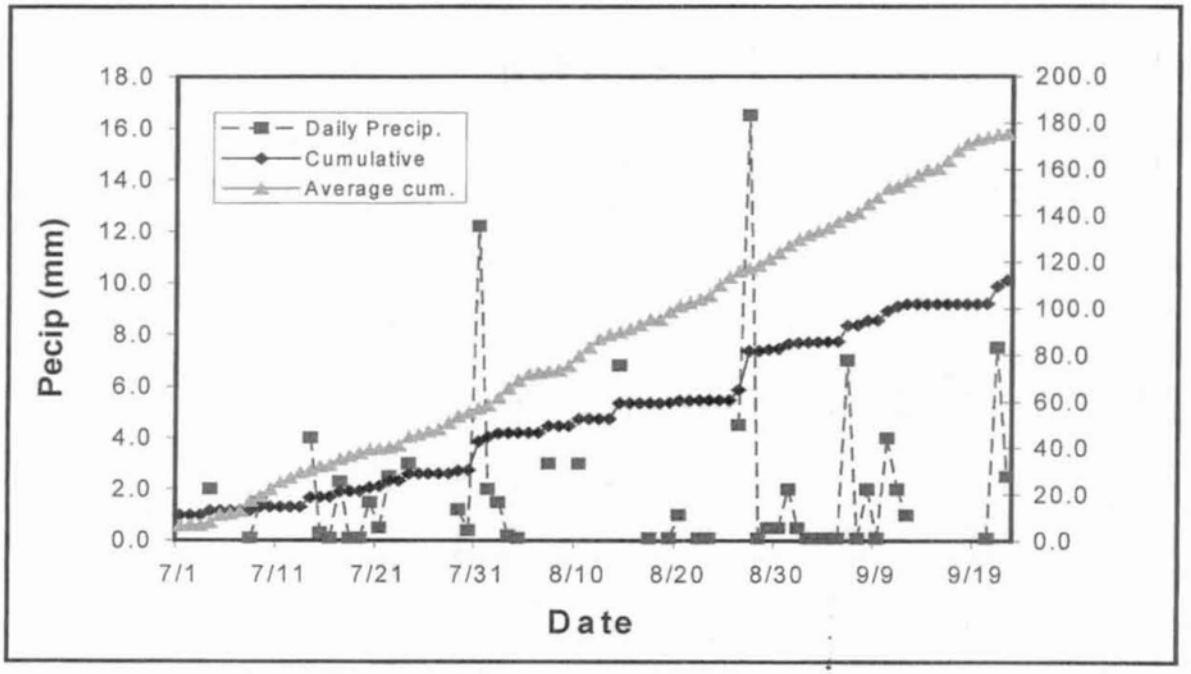

Figure 9. 2000 and historical average seasonal precipitation at the Kogrukluk River weir.

Appendix A. Factor table for historical salmon escapement estimates, Kogrukluk River 1976-2000.

	Chinook				Sockeye				Coho[a]				Chum			
Year	T[b]	Count	Prop. Missed	Est'd Total	T[b]	Count	Prop. Missed	Est'd Total	T[b]	Count	Prop. Missed	Est'd Total	T[b]	Count	Prop. Missed	Est'd Total
1976	L	5,500	0.0142	5,579	N	2,302	0.0103	2,326					N	8,046	0.0087	8,117
1977	(N)	763	0.6077	1,945	(N)	732	0.5527	1,637					(N)	7,404	0.6192	19,443
1978	N	13,102	0.0413	13,667	N	1,646	0.0144	1,670					N	47,099	0.0213	48,125
1979	N	10,104	0.1088	11,338	N	2,432	0.0746	2,638					L	13,959	0.2495	18,599
1980		676	c	6,572		403	c	3,200						5,638	c	41,777
1981	E	16,052	0.0362	16,655	E	17,691	0.0208	18,066	N	11,450	0.0004	11,455	E	56,262	0.0192	57,365
1982	E	5,325	0.5156	10,993	E	11,729	0.3219	17,297	N	35,582	0.0586	37,796	N	40,549	0.3672	64,077
1983	(N)	1,032	0.6551	2,992	(N)	375	0.6812	1,176	L	8,327	0.0247	8,538	(N)	3,248	0.6547	9,407
1984	N	4,928	0.0000	4,928	N	4,133	0.0000	4,133	E	25,304	0.0830	27,595	N	41,484	0.0000	41,484
1985	L	4,034 0	0.0682	4,619	L	4,344	0.0034	4,359	E	14,318	0.1291	16,441	L	13,851	0.0769	15,005
1986	L	2,922	0.4200	5,038	N	3,252	0.2301	4,224	E	14,717	0.3461	22,506	N	11,980	0.1846	14,693
1987		d		4,063		d		973	N	19,756	0.1343	22,821		d		17,422
1988	N	7,677	0.0974	8,505	E	4,235	0.0368	4,397	N	11,722	0.1325	13,512	E	28,498	0.2793	39,540
1989	N	4,908	0.5889	11,940	N	2,599	0.5527	5,811				e	N	15,543	0.6070	39,540
1990	N	10,097	0.0118	10,218	N	8,382	0.0029	8,406	L	2,736	0.5538	6,132	N	26,555	0.0078	26,765
1991	N	6,132	0.2189	7,850	N	14,450	0.1218	16,455	L	7,059	0.2915	6,132	L	21,331	0.1181	24,188
1992	N	6,397	0.0530	6,755	L	7,328	0.0210	7,540	(N)	2,715	0.8958	26,057	N	32,051	0.0602	34,105
1993	N	10,516	0.1473	12,332	N	27,219	0.0729	29,358	(N)	4,437	0.7837	20,517	N	26,926	0.1559	31,899
1994	(E)	8,310	0.4543 1	15,227	L	5,676	0.6001	14,192	(E)	27,461	0.2085	34,695	(E)	23,756	0.4490	46,635
1995	E	18,856	0.0860	20,630	N	10,581	0.0377	10,996	E	17,492	0.3721	27,861	N	28,292	0.0923	31,265
1996	E	13,734	0.0327	14,199	N	15,221	0.0107	15,385	E	47,011	0.0701	50,555	E	47,010	0.0306	48,495
1997	E	13,112	0.0131	13,286	N	13,059	0.0014	13,078	L	11,611	0.0511	12,237	L	7,902	0.0071	7,958
1998	(L)	3,009	0.7515	12,107	(L)	5,321	0.6828	16,773	L	22,614	0.0710	24,348	(L)	13,104	0.6429	36,441
1999	L	5,472	0.0176	5,570	L	5,777	0.0015	5,864	L	10,094	0.1994	12,609	L	13,497	0.0233	13,820
2000	L	3,180	0.0393	3,310	L	2,778	0.0310	2,867	E	32,875	0.0070	33,135	L	11,077	0.0360	11,491

a Coho migrations were not monitored prior to 1981

b The timing model used for estimating missed counts depends on the distribution of the mean date of migration (E-early, N-normal, L- late). The use of () indicates assumed timing.

c From Baxter (1980); insufficient data to estimate escapements using time series techniques.

d Except for coho, escapements were estimated from a ratio of unknown 1987 escapement and known 1987 aerial assesments to known 1988 escapement and known 1988 aerial assesment. Coho escapments estimated using time series techniques.

e Heavy rain and high river levels allowed only two days of counts during the coho migration.

Appendix B.1. Historical cumulative estimated escapement of chinook salmon at the Kogrukluk River we... for years with adequate data.

Date	1976(L)	1978(N)	1979(N)	1981(E)	1984(N)	1985(L)	1988(N)	1990(N)	1992(N)	1993(N)	1995(E)	1996(E)	1997(E)	1999 (L)	2000 (L)
	5,579	13,667	11,338	16,655	4,928	4,619	8,505	10,218	6,755	12,332	20,630	14,199	13,286	5,570	3,310
17-Jun				*0*											
18-Jun		*0*		*1*											
19-Jun		*1*		*3*	1			*1*		*1*	*2*		*1*		
20-Jun		*3*	*0*	*8*	1			*1*	*1*	*2*	*4*	*1*	*2*		
21-Jun		*6*	*1*	*18*	1			*3*	*2*	*4*	*6*	*3*	*4*		
22-Jun		*11*	*3*	*38*	1			*6*	*4*	*8*	*12*	*7*	*8*		
23-Jun		*19*	*7*	*78*	3			*13*	*9*	*17*	*29*	*19*	*17*		
24-Jun		*29*	*15*	*158*	4	0	*0*	*25*	*17*	*31*	*52*	*35*	*32*		
25-Jun		*49*	*30*	*318*	6	1	*3*	*47*	*31*	*57*	*95*	*65*	*60*		
26-Jun		*99*	*60*	*418*	7	*3*	*8*	*72*	*47*	*87*	*146*	*102*	*94*		
27-Jun		*179*	*105*	*738*	11	*6*	*18*	*121*	*79*	*146*	*243*	*170*	*161*		
28-Jun		*279*	*130*	1,072	68	*11*	*48*	127	*123*	*227*	*380*	*265*	212		
29-Jun	0	391	*205*	1,605	155	*21*	*98*	150	*190*	*349*	*588*	*412*	822		
30-Jun	5	456	*290*	2,167	200	*41*	*178*	269	*259*	*474*	*794*	492	1,418		
01-Jul	21	798	*420*	2,784	515	*61*	*228*	318	*331*	*724*	*1,211*	756	1,925	*6*	
02-Jul	23	916	576	3,688	819	*111*	*338*	781	586	*1,017*	*1,727*	1,754	2,097	*8*	1
03-Jul	41	1,401	683	4,567	1,073	*231*	*553*	1,142	973	1,623	2,040	2,585	3,024	*10*	43
04-Jul	56	2,205	941	5,307	1,212	*276*	*828*	1,321	1,136	1,985	4,064	2,982	3,611	*15*	83
05-Jul	126	2,834	1,312	6,308	1,309	*311*	1,177	1,748	1,371	2,642	5,526	4,446	4,636	*58*	178
06-Jul	169	3,179	1,694	7,388	1,547	*333*	1,642	2,201	1,445	3,350	7,305	6,134	5,426	*75*	357
07-Jul	235	3,432	2,003	8,603	1,721	*393*	2,338	2,456	1,590	4,226	8,611	7,922	6,568	128	465
08-Jul	392	4,051	2,393	9,376	1,865	499	2,921	3,298	1,728	4,941	9,744	8,802	7,054	169	511
09-Jul	704	4,935	2,736	10,423	2,030	618	3,492	3,449	2,545	5,821	10,423	9,485	7,762	225	700
10-Jul	1,165	5,606	3,355	11,406	2,053	1,034	4,176	4,677	2,870	6,825	12,249	10,037	7,981	373	824
11-Jul	1,512	6,307	3,817	12,155	2,157	1,200	4,880	5,205	3,301	7,508	13,046	10,376	8,205	572	1,058
12-Jul	1,786	6,939	4,577	12,681	2,442	1,445	5,538	6,206	3,786	8,161	14,760	10,794	8,737	830	1,340
13-Jul	2,502	7,536	5,509	13,172	2,704	1,750	6,030	6,317	3,924	8,849	15,524	11,509	9,040	1,034	1,489
14-Jul	2,814	8,149	6,491	13,630	3,028	2,019	6,625	6,704	4,229	9,275	15,899	12,024	9,592	1,321	1,641
15-Jul	3,065	8,822	7,039	14,190	3,359	2,165	7,075	7,759	4,637	9,642	16,145	12,306	9,990	1,450	1,827
16-Jul	3,312	9,549	7,739	14,642	3,635	2,493	7,386	8,406	4,802	10,051	16,919	12,487	10,314	1,805	2,048
17-Jul	3,599	10,201	8,409	15,021	3,860	2,668	7,536	8,624	5,128	10,385	17,608	12,724	10,691	2,136	2,198
18-Jul	4,023	10,689	8,873	15,343	3,965	2,967	7,639	9,032	5,408	10,796	17,981	12,951	11,168	2,262	2,300
19-Jul	4,306	11,250	9,228	15,641	4,064	3,226	7,763	9,092	5,603	10,958	18,456	13,211	11,525	2,657	2,403
20-Jul	4,400	11,725	9,562	15,884	4,201	3,403	7,810	9,189	5,747	11,230	18,730	13,299	11,917	2,878	2,454
21-Jul	4,792	11,996	9,907	16,071	4,325	3,554	7,917	9,386	5,914	11,430	18,996	13,479	12,263	3,666	2,531
22-Jul	4,982	12,298	10,085	16,254	4,436	3,626	8,025	9,487	6,079	11,489	19,358	13,577	12,471	3,931	2,644
23-Jul	5,153	12,501	10,216	16,372	4,525	3,730	8,109	9,615	6,238	11,590	19,509	13,633	12,581	4,161	2,722
24-Jul	5,235	12,800	10,524	16,450	4,594	3,900	8,165	9,672	6,341	11,678	19,643	13,710	12,634	4,396	2,815

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Appendix B.1. (page 2 of 2).

Date	1976(L)	1978(N)	1979(N)	1981(E)	1984(N)	1985(L)	1988(N)	1990(N)	1992(N)	1993(N)	1995(E)	1996(E)	1997(E)	1999 (L)	2000(L)
25-Jul	5,322	12,980	***10,640***	16,492	4,630	4,016	8,211	9,709	6,425	11,730	19,863	13,809	12,668	4,825	2,872
26-Jul	5,378	13,094	***10,780***	16,533	4,674	4,146	8,249	9,764	6,458	11,806	20,022	13,840	12,768	4,906	2,902
27-Jul	5,428	13,186	***10,846***	16,564	4,704	4,212	8,276	9,799	6,484	11,883	20,157	13,865	12,781	5,019	2,955
28-Jul	5,448	13,258	***10,944***	16,600	4,741	4,290	8,292	9,843	6,511	12,004	20,224	13,892	12,862	5,087	2,980
29-Jul	5,476	13,322	***10,999***	16,631	4,773	4,345	8,319	9,913	6,541	***12,080***	20,291	13,944	12,899	5,180	2,999
30-Jul	5,500	13,381	***11,037***	16,655	4,799	4,373	8,350	9,960	6,561	***12,110***	20,367	14,043	12,946	5,268	3,013
31-Jul	***5,518***	***13,433***	***11,070***		4,821	4,406	8,373	10,016	6,582	12,129	20,394	14,062	12,982	5,320	3,054
01-Aug	***5,533***	***13,467***	***11,112***		4,837	4,441	***8,390***	10,061	6,599	12,143	20,418	14,078	13,002	5,374	3,078
02-Aug	***5,545***	***13,487***	***11,147***		4,859	4,476	***8,400***	10,103	6,624	12,150	20,443	14,090	13,032	5,415	3,115
03-Aug	***5,554***	***13,519***	***11,173***		4,877	4,500	8,404	10,132	6,634	12,166	20,490	14,099	13,057	5,439	***3,150***
04-Aug	***5,560***	***13,543***	***11,180***		4,889	4,507	8,416	10,143	***6,643***	12,191	20,511	14,106	13,070	5,457	***3,179***
05-Aug	***5,563***	***13,559***	***11,195***		4,893	4,521	8,422	10,157	***6,653***	12,214	20,522	14,108	13,088	***5,480***	***3,205***
06-Aug	***5,566***	***13,577***	***11,209***		4,896	4,535	8,429	10,168	***6,661***	12,234	20,532	14,114	13,107	***5,497***	***3,227***
07-Aug	***5,567***	***13,604***	***11,212***		4,900	4,537	8,435	10,174	***6,674***	12,263	20,536	14,122	13,120	5,504	***3,245***
08-Aug	***5,568***	***13,624***	***11,230***		4,908	4,555	8,445	10,183	***6,687***	12,284	20,551	14,132	13,130	5,514	3,249
09-Aug	***5,570***	***13,635***	***11,239***		4,911	4,563	8,448	10,190	***6,702***	12,295	20,561	14,134	13,153	5,518	3,256
10-Aug	***5,575***	***13,643***	***11,258***		4,912	4,582	8,449	10,192	***6,709***	12,310	***20,571***	14,148	13,181	5,520	3,266
11-Aug	***5,577***	***13,653***	***11,272***		4,915	4,595	8,454	10,202	6,716	12,315	***20,581***	***14,155***	13,214	5,522	3,269
12-Aug	***5,578***	***13,658***	***11,284***		4,916	4,607	8,464	10,206	6,723	12,326	***20,596***	***14,165***	***13,223***	5,530	3,272
13-Aug	***5,579***	***13,662***	***11,290***		4,921	4,612	8,466	10,208	6,731	12,332	***20,602***	***14,170***	***13,227***	5,535	3,281
14-Aug	***5,579***	***13,665***	***11,296***		4,922	4,618	8,469	10,209	6,732		***20,606***	***14,173***	13,231	5,539	3,287
15-Aug		***13,666***	***11,298***		4,923	4,619	8,471	10,212	6,737		***20,608***	14,178	13,244	5,540	3,292
16-Aug		***13,666***	***11,298***		4,924	4,619	8,474	10,214	6,746		20,609	14,179	13,250	5,542	3,293
17-Aug		***13,667***	***11,304***		4,925	4,619	8,479	10,214	6,748		20,612	14,179	13,255	5,545	3,293
18-Aug		***13,667***	***11,307***		4,925	4,619	8,483	10,215	6,752		20,614	14,180	13,256	5,548	3,293
19-Aug			***11,316***		4,927	4,619	8,486	10,216	6,754		20,614	14,180	13,261	5,548	3,294
20-Aug			***11,323***		4,927	4,619	8,489	10,216	6,755		20,616	14,183	13,265	5,549	3,297
21-Aug			***11,327***		4,928	4,619	8,492	10,217	6,755		20,619	14,185	13,266	5,549	3,297
22-Aug			***11,332***			4,619	8,495	10,217			20,620	14,188	13,268	5,551	3,298
23-Aug			***11,335***			4,619	8,497	10,218			20,621	14,192	13,269	5,551	3,300
24-Aug			***11,337***			4,619	8,497	10,218			20,621	14,193	13,269	5,552	3,300
25-Aug			***11,338***			4,619	8,498	10,218			20,621	14,193	13,271	5,554	3,301
26-Aug			***11,338***			4,619	8,499	10,218			20,621	14,195	13,275	5,555	3,301
27-Aug						4,619	8,500	10,218			20,624	14,196	13,279	5,557	3,303
28-Aug						4,619	8,504	10,218			20,626	14,197	13,279	5,557	3,306
29-Aug						4,619	8,505	10,218			20,630	14,199	13,286	5,557	3,306

[a] Letters next to year indicate run-timing model used for estimating missing counts: L = late; N = normal; E = early.

Bold italics represent estimated counts. Boxed areas are middle 50% of run. Midpoint is bounded by double lines. **ESCAPEMENT GOAL = 10,000**

Appendix B2. Historical cummulative estimated escapement of sockeye salmon at the Kogrukluk Weir for years with adequate data.[a]

Date	1976(N)	1978(N)	1979(N)	1981(E)	1984(N)	1985(L)	1988(E)	1990(N)	1991(N)	1992(L)	1993(N)	1995(N)	1996(N)	1997(N)	1999(L)	2000 (L)
20-Jun				*1*	1						*1*	*0*		0		
21-Jun				*10*	1			*1*	*1*		*3*	*1*	*1*	0		
22-Jun				*29*	1			*2*	*3*	*1*	*6*	*2*	*3*	0		
23-Jun				*79*	4			*5*	*10*	*4*	*17*	*6*	*9*	0		
24-Jun				*155*	6		*2*	*10*	*19*	*8*	*34*	*13*	*17*	0		
25-Jun				*246*	7		*3*	*15*	*29*	*13*	*52*	*20*	*27*	0		
26-Jun				*375*	9		*11*	*24*	*47*	*21*	*85*	*32*	*44*	0		
27-Jun		0		*597*	12		*15*	*24*	*75*	*34*	*134*	*49*	*68*	0		
28-Jun	1	0		1,137	22		*25*	24	*145*	*66*	*260*	*92*	*129*	0		
29-Jun	1	1		1,842	34		*57*	29	*245*	*112*	*437*	*155*	*139*	8		
30-Jun	2	12	0	2,816	41		*74*	35	*381*	*145*	*679*	*236*	214	91		
01-Jul	6	48	1	4,068	126	*2*	*86*	112	*610*	*233*	*1,089*	*383*	471	121		
02-Jul	13	103	9	5,008	250	*3*	*104*	267	*868*	414	*1,209*	*414*	856	225		
03-Jul	15	175	28	5,632	307	*11*	*150*	374	*1,148*	545	1,707	650	1,099	316		
04-Jul	32	233	42	6,430	358	*15*	*225*	645	*1,202*	650	*2,231*	1,033	1,551	635		
05-Jul	59	299	51	7,271	639	*24*	375	1,105	*1,282*	727	*2,879*	1,570	2,087	926		10
06-Jul	125	330	126	7,866	817	43	658	1,406	*1,388*	860	4,005	2,028	2,893	1,463	1	24
07-Jul	258	431	250	8,502	1,031	93	1,134	2,040	*1,520*	921	5,376	2,458	3,539	2,037	8	36
08-Jul	462	536	311	9,204	1,190	169	1,639	2,244	2,277	1,066	7,533	2,959	4,644	2,614	14	53
09-Jul	669	679	376	9,639	1,214	260	2,058	3,071	3,036	1,191	10,050	3,667	5,589	3,163	28	94
10-Jul	789	795	460	10,286	1,276	389	2,565	3,508	3,408	1,546	11,949	4,473	6,543	3,424	69	185
11-Jul	927	850	644	10,778	1,571	610	2,930	4,125	3,997	1,812	13,745	4,810	7,451	3,754	114	354
12-Jul	1,157	922	959	11,199	1,744	844	3,169	4,241	5,033	2,037	15,563	5,205	8,990	4,131	206	571
13-Jul	1,269	1,048	1,228	11,583	2,083	989	3,442	4,763	6,020	2,431	17,065	5,417	10,112	4,559	349	606
14-Jul	1,370	1,115	1,448	12,052	2,521	1,167	3,718	5,500	6,762	2,847	18,887	5,779	10,933	4,980	493	628
15-Jul	1,513	1,178	1,687	12,647	2,740	1,375	3,897	5,963	7,540	3,253	20,915	6,400	11,391	5,648	721	731
16-Jul	1,615	1,252	1,861	13,068	2,932	1,560	4,006	6,372	*8,354*	3,492	22,955	7,094	11,759	6,474	1,121	1,016
17-Jul	1,762	1,300	2,007	13,498	3,016	1,733	4,089	6,801	9,282	3,958	24,666	7,463	12,058	6,917	1,439	1,166
18-Jul	1,841	1,345	2,089	13,884	3,079	1,992	4,135	6,891	10,230	4,376	25,498	7,957	12,443	7,872	1,675	1,335
19-Jul	1,893	1,396	2,179	14,270	3,200	2,168	4,172	7,048	11,159	4,648	26,443	8,220	12,652	8,723	2,023	1,425
20-Jul	2,059	1,420	2,262	14,865	3,369	2,375	4,212	7,231	11,913	4,893	27,222	8,713	13,022	9,599	2,375	1,519
21-Jul	2,154	1,469	2,310	15,391	3,557	2,502	4,241	7,424	12,672	5,031	27,442	9,185	13,290	10,210	2,713	1,742
22-Jul	2,197	1,509	2,357	15,756	3,646	2,617	4,274	7,561	13,289	5,349	27,728	9,443	13,523	10,776	3,058	1,960
23-Jul	2,230	1,550	2,432	16,101	3,729	2,844	4,302	7,634	13,891	5,610	27,930	9,659	13,774	11,050	3,306	2,107
24-Jul	2,264	1,582	2,464	16,398	3,767	3,086	4,311	7,691	*14,477*	5,852	28,121	9,891	14,082	11,561	3,746	2,220

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Date	1976(N)	1978(N)	1979(N)	1981(E)	1984(N)	1985(L)	1988(E)	1990(N)	1991(N)	1992(L)	1993(N)	1995(N)	1996(N)	1997(N)	1999(L)	2000 (L)
25-Jul	2,269	1,597	***2,482***	16,655	3,827	3,246	4,320	7,774	14,972	6,004	28,335	10,028	14,149	11,713	4,100	2,242
26-Jul	2,276	1,605	***2,496***	16,942	3,877	3,410	4,324	7,795	15,394	6,249	28,565	10,286	14,266	11,842	4,257	2,320
27-Jul	2,285	1,620	***2,528***	17,184	3,934	3,604	4,334	7,868	15,650	6,485	28,747	10,378	14,365	12,035	4,565	2,423
28-Jul	2,288	1,631	***2,553***	17,373	3,966	3,761	4,340	7,985	15,831	6,767	28,909	10,481	14,601	12,378	4,713	2,486
29-Jul	2,296	1,639	***2,576***	17,514	3,984	3,892	4,349	8,066	15,959	6,979	***29,051***	10,632	14,845	12,505	4,861	2,531
30-Jul	2,302	1,646	***2,596***	17,624	3,998	3,985	4,361	8,126	16,095	7,128	***29,138***	10,688	14,926	12,594	5,093	2,565
31-Jul	2,304	1,648	***2,604***	17,704	4,030	4,093	4,369	8,185	16,199	7,228	29,189	10,730	14,997	12,683	5,255	2,645
01-Aug	***2,307***	***1,651***	***2,606***	17,771	4,055	4,150	***4,373***	8,249	16,282	7,380	29,218	10,800	15,058	12,745	5,420	2,672
02-Aug	***2,310***	***1,654***	***2,609***	17,836	4,078	4,193	***4,374***	8,294	16,330	7,442	29,237	10,854	15,109	12,799	5,515	2,704
03-Aug	***2,313***	***1,657***	***2,612***	17,877	4,098	4,234	4,377	8,311	16,366	7,461	29,253	10,892	15,141	12,836	5,592	***2,729***
04-Aug	***2,314***	***1,658***	***2,615***	17,895	4,106	4,261	4,380	8,339	16,390	***7,472***	29,269	10,911	15,179	12,874	5,667	***2,750***
05-Aug	***2,320***	***1,664***	***2,616***	17,922	4,108	4,288	4,382	8,351	16,404	***7,485***	29,289	10,920	15,226	12,915	5,735	***2,768***
06-Aug	***2,323***	***1,667***	***2,622***	17,935	4,111	4,299	4,383	8,365	16,414	***7,499***	29,313	10,928	15,257	12,931	5,754	***2,782***
07-Aug	***2,323***	***1,667***	***2,625***	17,950	4,114	4,326	4,383	8,378	16,417	***7,502***	29,330	10,945	15,280	12,957	5,782	***2,793***
08-Aug	***2,324***	***1,668***	***2,625***	17,973	4,117	4,334	4,384	8,383	16,420	***7,508***	29,344	10,955	15,289	12,972	5,804	2,794
09-Aug	***2,325***	***1,669***	***2,626***	17,993	4,118	4,341	4,387	8,384	16,424	***7,514***	29,346	10,962	15,320	12,986	5,818	2,804
10-Aug	***2,325***	***1,669***	***2,627***	18,001	4,124	4,342	4,388	8,388	16,430	7,518	29,348	***10,966***	15,326	13,006	5,831	2,813
11-Aug	***2,325***	***1,669***	***2,627***	18,013	4,127	4,355	4,389	8,394	16,439	7,525	29,354	***10,972***	***15,335***	13,038	5,838	2,823
12-Aug	***2,325***	***1,669***	***2,627***	18,023	4,127	4,357	4,390	8,398	16,443	7,531	29,358	***10,975***	***15,339***	13,052	5,843	2,830
13-Aug	***2,326***	***1,670***	***2,627***	18,033	4,128	4,358	4,391	8,401	16,443	7,535		***10,987***	***15,355***	***13,057***	5,846	2,836
14-Aug	***2,326***	***1,670***	***2,628***	18,038	4,129	4,359	4,391	8,403	16,444	7,535		***10,987***	***15,362***	***13,061***	5,852	2,843
15-Aug			***2,628***	18,044	4,129	4,359	4,391	8,403	16,445	7,535		***10,987***	15,363	13,066	5,855	2,849
16-Aug				18,051	4,129	4,359	4,391	8,406	16,446	7,539		10,988	15,365	13,068	5,858	2,852
17-Aug				18,052	4,129	4,359	4,393	8,406	16,450	7,539		10,989	15,370	13,072	5,861	2,854
18-Aug				18,054	4,130	4,359	4,394	8,406	16,450	7,539		10,991	15,370	13,073	5,861	2,855
19-Aug				18,056	4,130	4,359	4,394	8,406	16,451	7,539		10,992	15,371	13,074	5,863	2,856
20-Aug				18,056	4,131	4,359	4,395	8,406	16,451	7,540		10,993	15,371	13,074	5,864	2,857
21-Aug				18,058	4,131	4,359	4,396	8,406	16,451			10,993	15,373	13,074	5,864	2,858
22-Aug				18,058	4,131	4,359	4,396	8,406	16,451			10,993	15,377	13,075	5,864	2,859
23-Aug				18,061	4,131	4,359	4,396	8,406	16,452			10,993	15,378	13,075	5,864	2,860
24-Aug				18,061	4,132	4,359	4,396	8,406	16,452			10,993	15,379	13,075	5,864	2,861
25-Aug				18,062	4,133	4,359	4,396	8,406	16,454			10,993	15,381	13,075	5,864	2,862
26-Aug				18,063	4,133	4,359	4,397	8,406	16,454			10,993	15,381	13,076	5,864	2,862
27-Aug				18,064	4,133	4,359	4,397	8,406	16,454			10,993	15,381	13,077	5,864	2,862
28-Aug				18,066	4,133	4,359	4,397	8,406	16,455			10,996	15,385	13,078	5,864	2,862
29-Aug															5,864	2,867

[a] Letters next to year indicate run-timing model used for estimating missing counts: L = late; N = normal; E = early.

Bold italics represent estimated counts. Boxed areas are middle 50% of run. Midpoint is bounded by double lines. NO ESCAPEMENT GOAL

Appendix B3. Historical cummulative estimated escapement of chum salmon at the Kogrukluk Weir for years with adequate data.[a]

Date	1976(N)	1978(N)	1981(E)	1984(N)	1985(L)	1986(L)	1990(N)	1991(L)	1992(N)	1993(N)	1995(N)	1996(E)	1997(L)	1999(L)	2000 (L)
15-Jun			2												
16-Jun		2	2										0		
17-Jun		2	2						1	1			0		
18-Jun		2	11				1		2	1			0		
19-Jun		11	14	2			2		3	3	3	5	0		
20-Jun		14	27	2			5		8	7	3	5	0		
21-Jun		27	66	2			9		13	11	6	15	0		
22-Jun		66	108	11			18		24	22	15	39	1		
23-Jun	2	108	151	14	2	2	35	3	46	42	24	73	2		
24-Jun	2	151	189	27	2	2	53	3	68	63	40	107	4		
25-Jun	2	189	411	66	2	2	82	3	104	97	71	156	10		
26-Jun	11	411	686	108	11	11	131	18	165	155	115	278	18		
27-Jun	14	686	1,103	151	14	14	210	23	265	249	178	439	25		
28-Jun	27	994	2,306	189	27	27	228	44	440	414	203	668	69		
29-Jun	53	1,612	4,570	411	66	57	297	94	769	722	328	1,096	285		
30-Jun	102	2,241	6,825	686	108	126	428	174	1,225	1,149	509	1,301	442		
01-Jul	220	2,889	9,475	1,103	151	310	607	243	2,279	1,824	837	2,435	598	3	
02-Jul	301	3,921	12,991	2,042	189	462	1,353	304	4,695	2,652	1,362	5,490	763	18	27
03-Jul	431	5,616	16,598	3,196	411	753	2,390	662	7,310	3,496	2,275	8,324	1,014	25	88
04-Jul	620	7,295	18,705	4,567	686	1,225	3,829	1,105	9,225	4,562	3,858	10,536	1,259	46	209
05-Jul	802	9,249	20,641	5,408	1,103	1,531	5,612	1,462	10,920	5,562	5,908	14,073	1,758	97	399
06-Jul	1,141	11,400	23,514	7,024	1,364	1,874	7,204	1,782	11,931	6,876	7,042	16,941	2,104	269	689
07-Jul	1,664	12,803	25,760	8,920	2,049	2,240	8,005	2,064	13,138	8,294	9,191	19,627	2,493	581	1,159
08-Jul	2,277	14,959	27,660	10,870	2,430	2,749	9,746	2,309	14,052	9,538	10,590	23,326	2,855	960	1,596
09-Jul	2,956	17,255	30,552	12,834	3,048	3,674	10,835	3,089	15,221	10,955	11,356	24,603	3,012	1,381	2,123
10-Jul	3,466	20,057	34,065	13,926	3,590	5,073	12,822	3,638	15,940	12,391	12,552	27,073	3,204	1,971	2,748
11-Jul	3,831	23,026	36,953	15,227	3,972	6,694	14,236	4,155	17,201	13,642	13,698	28,584	3,414	2,737	3,446
12-Jul	4,252	25,376	38,984	17,993	4,471	7,861	15,229	5,314	18,451	14,724	15,037	30,338	3,686	3,700	4,095
13-Jul	4,588	27,548	40,853	20,070	5,010	8,800	15,957	6,750	19,395	16,114	16,568	33,402	4,020	4,580	4,524
14-Jul	4,910	30,899	43,140	22,393	5,717	9,654	16,829	7,768	20,738	17,120	17,719	35,456	4,349	5,231	4,926
15-Jul	5,233	33,401	45,596	24,905	6,274	10,545	18,382	8,769	22,204	18,525	18,586	36,822	4,740	5,770	5,456
16-Jul	5,574	35,981	47,526	27,176	7,110	11,021	19,605	9,749	23,458	20,036	19,593	38,213	5,044	6,360	6,242
17-Jul	5,839	37,862	48,706	29,083	7,834	11,621	20,269	10,708	24,365	22,066	21,363	39,814	5,291	6,833	6,733
18-Jul	6,172	39,384	50,006	30,419	8,480	11,983	21,386	11,748	25,627	23,851	22,386	40,847	5,604	7,274	7,271
19-Jul	6,454	40,765	50,934	31,388	9,108	12,327	21,589	12,490	26,698	24,375	23,574	41,711	5,924	7,865	7,775
20-Jul	6,694	42,076	51,363	32,808	9,619	12,557	21,992	12,957	27,510	25,392	24,127	42,339	6,098	8,421	8,113
21-Jul	7,285	42,721	52,087	34,496	10,091	12,750	22,599	13,419	27,994	26,634	25,150	43,478	6,361	8,998	8,496
22-Jul	7,538	43,696	52,773	36,148	10,564	12,978	23,040	14,207	28,512	27,134	26,083	44,047	6,489	9,420	8,836
23-Jul	7,704	44,462	53,304	37,353	11,013	13,073	23,356	15,020	29,422	27,621	27,098	44,861	6,652	9,901	9,142
24-Jul	7,877	45,341	53,805	38,065	11,538	13,197	23,432	15,878	29,975	27,957	27,825	45,344	6,723	10,359	9,393
25-Jul	7,951	46,156	54,070	38,455	12,113	13,300	23,531	16,781	30,655	28,447	28,367	45,609	6,778	10,724	9,563
26-Jul	7,983	46,719	54,418	38,872	12,572	13,419	23,626	17,721	31,053	28,713	28,701	45,791	6,901	11,044	9,784
27-Jul	8,016	47,109	54,796	39,329	12,888	13,516	23,721	18,488	31,520	29,090	29,007	45,908	7,001	11,397	9,987
28-Jul	8,028	47,348	55,288	39,654	13,229	13,663	23,883	19,136	31,894	29,579	29,256	46,263	7,193	11,666	10,191
29-Jul	8,052	47,563	55,671	39,974	13,471	13,797	24,245	19,632	32,193	30,030	29,541	46,860	7,316	11,954	10,330
30-Jul	8,066	47,673	56,033	40,242	13,688	13,910	24,569	20,244	32,470	30,444	29,870	47,275	7,393	12,278	10,491
31-Jul	8,073	47,785	56,317	40,560	13,947	14,002	24,850	21,096	32,724	30,751	30,086	47,465	7,429	12,530	10,696

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Appendix B3. (page 2of 2)

Date	1976(N)	1978(N)	1981(E)	1984(N)	1985(L)	1986(L)	1990(N)	1991(L)	1992(N)	1993(N)	1995(N)	1996(E)	1997(L)	1999(L)	2000 (L)
01-Aug	***8,085***	***47,885***	56,526	40,840	14,096	14,073	25,198	21,850	32,888	30,956	30,257	***47,635***	7,477	12,775	10,796
02-Aug	***8,097***	***47,959***	56,709	41,057	14,245	14,145	25,621	22,444	33,128	31,083	30,463	***47,786***	7,527	12,948	10,881
03-Aug	***8,102***	***47,991***	56,855	41,216	14,336	14,206	25,919	22,931	33,311	31,192	30,672	47,917	7,583	13,077	***10,988***
04-Aug	***8,111***	***48,024***	56,933	41,349	14,423	14,268	26,154	23,250	33,415	31,319	30,776	48,016	7,621	13,264	***11,079***
05-Aug	***8,112***	***48,036***	56,968	41,399	14,481	14,323	26,311	23,533	33,480	31,423	30,835	48,069	7,654	***13,387***	***11,162***
06-Aug	***8,112***	***48,060***	57,023	41,419	14,533	14,376	26,389	23,746	33,529	31,573	30,877	48,151	7,696	***13,490***	***11,233***
07-Aug	***8,112***	***48,074***	57,066	41,432	14,585	14,421	26,464	23,838	33,625	31,687	30,924	48,202	7,728	13,524	***11,295***
08-Aug	***8,113***	***48,081***	57,109	41,440	14,662	14,468	26,505	23,896	33,684	31,766	30,968	48,252	7,749	13,581	11,304
09-Aug	***8,113***	***48,093***	57,150	41,449	14,707	14,503	26,554	23,932	33,714	31,809	31,005	48,276	7,777	13,616	11,330
10-Aug	***8,114***	***48,105***	57,197	41,460	14,789	14,540	26,600	23,981	33,774	31,824	31,037	48,336	7,804	13,646	11,359
11-Aug	***8,116***	***48,110***	57,226	41,471	14,843	14,558	26,642	23,996	33,843	31,834	***31,078***	***48,351***	7,872	13,673	11,374
12-Aug	***8,117***	***48,119***	57,251	41,480	14,873	14,574	26,681	24,033	33,913	31,849	***31,131***	***48,370***	***7,887***	13,707	11,391
13-Aug		***48,120***	57,278	41,480	14,911	14,581	26,699	24,061	33,995	31,875	***31,178***	***48,399***	***7,903***	13,730	11,425
14-Aug		***48,120***	57,302	41,481	14,930	14,594	26,722	24,081	34,020	***31,879***	***31,206***	***48,404***	7,910	13,742	11,436
15-Aug		***48,120***	57,325	41,482	14,946	14,614	26,734	24,089	34,045	***31,879***	***31,222***	48,420	7,921	13,753	11,440
16-Aug		***48,121***	57,331	41,482	***14,961***	14,634	26,740	24,096	34,062	***31,883***	31,227	48,425	7,936	13,758	11,446
17-Aug		***48,121***	57,336	41,483	***14,973***	14,649	26,751	24,130	34,078	***31,887***	31,229	48,427	7,941	13,768	11,452
18-Aug		***48,122***	57,340	41,484	***14,985***	14,661	26,752	24,165	34,087	***31,891***	31,232	48,432	7,943	13,771	11,474
19-Aug		***48,124***	57,342	41,484	***14,990***	***14,673***	26,756	24,177	34,088	***31,895***	31,239	48,438	7,945	13,771	11,480
20-Aug		***48,125***	57,351	41,484	***14,999***	***14,678***	26,759	24,177	34,092	***31,899***	31,242	48,442	7,949	13,775	11,481
21-Aug			57,356		***15,000***	***14,687***	26,761	24,182	34,105		31,243	48,450	7,950	13,780	11,482
22-Aug			57,356		***15,000***	***14,688***	26,761	24,182			31,246	48,455	7,950	13,786	11,482
23-Aug			57,357		***15,000***	***14,688***	26,761	24,182			31,246	48,461	7,950	13,788	11,482
24-Aug			57,360		***15,001***	***14,688***	26,762	24,183			31,252	48,462	7,950	13,789	11,483
25-Aug			57,362		***15,001***	***14,689***	26,763	24,186			31,252	48,469	7,951	13,793	11,483
26-Aug			57,363		***15,002***	***14,689***	26,763	24,187			31,254	48,472	7,951	13,794	11,489
27-Aug			57,365		***15,004***	***14,690***	26,764	24,187			31,255	48,474	7,951	13,796	11,489
28-Aug			57,365		***15,005***	***14,692***	26,764	24,187			31,256	48,475	7,953	13,796	11,489
29-Aug			57,365			***14,693***	26,765	24,188			31,265	48,495	7,958	13,819	11,489

[a] Letters next to year indicate run-timing model used for estimating missing counts: L = late; N = normal; E = early.
Bold italics represent estimated counts. Boxed areas are middle 50% of run. Midpoint is bounded by double lines. **ESCAPEMENT GOAL=30,000**

Appendix B4. Historical cummulative estimated escapement of coho salmon at the Kogrukluk weir for years with adequate data.[a]

te	1981(N)	1982(N)	1983(L)	1984(E)	1985(E)	1987(N)	1988(N)	1996(E)	1997 (L)	1998(L)	1999(L)	2000 (E)
20-Jul	0	0		0	0		1	1	0	0		
21-Jul	0	0		0	0		1	3	0	0	0	
22-Jul	0	0		0	0		1	6	0	0	0	
23-Jul	0	0		0	0		1	6	0	0	0	
24-Jul	0	0		1	0		2	8	0	0	1	
25-Jul	0	0		5	0		2	14	0	0	1	3
26-Jul	0	0		7	0		2	17	0	2	1	5
27-Jul	0	0		8	0		2	20	0	4	1	8
28-Jul	0	0		9	0		2	35	0	4	1	9
29-Jul	0	0		13	0		2	60	2	4	1	10
30-Jul	0	0		15	0		2	143	2	5	2	14
31-Jul	0	0		18	0		2	169	3	7	2	24
01-Aug	0	0		29	6		2	***223***	7	9	2	25
02-Aug	0	5		43	10		2	***305***	12	12	2	34
03-Aug	0	11		62	17	***1***	2	415	15	22	2	***67***
04-Aug	2	26		94	24	***1***	2	456	19	29	2	***99***
05-Aug	7	43		112	38	***2***	2	492	42	43	2	***150***
06-Aug	12	59		165	46	***2***	6	707	64	49	2	***215***
07-Aug	14	101	***2***	264	64	***4***	12	858	111	56	2	***294***
08-Aug	24	137	***7***	308	113	***9***	23	998	122	61	4	388
09-Aug	50	192	***12***	427	126	12	38	1,243	148	78	5	580
10-Aug	70	234	***18***	479	220	20	63	1,849	213	84	11	905
11-Aug	92	340	***33***	701	279	38	101	***2,462***	302	111	15	1,138
12-Aug	154	431	***50***	816	397	67	181	***3,363***	***359***	128	19	1,788
13-Aug	216	489	68	1,040	465	102	267	***4,232***	***432***	163	30	2,660
14-Aug	349	567	103	1,187	547	141	313	***5,257***	***453***	290	35	3,627
15-Aug	503	762	159	1,366	631	202	338	6,380	517	381	59	4,430
16-Aug	644	818	177	1,510	***855***	288	443	7,764	640	625	121	4,775
17-Aug	753	1,329	203	1,596	***1,002***	428	600	9,237	724	850	170	4,874
18-Aug	863	1,794	249	2,854	***1,181***	671	858	10,344	817	904	185	5,433
19-Aug	1,159	2,165	273	3,849	***1,325***	870	1,060	11,379	934	928	191	6,584
20-Aug	1,473	2,448	284	4,386	***1,411***	1,168	1,350	13,521	1,172	1,056	429	7,683
21-Aug	1,660	2,857	287	4,707	***1,911***	1,580	1,702	16,031	1,621	1,803	498	8,926
22-Aug	1,845	2,999	354	6,119	***2,361***	1,866	2,085	18,578	2,049	2,101	686	10,069
23-Aug	2,042	3,227	506	7,849	***2,661***	2,184	2,408	21,243	2,528	2,361	877	11,120
24-Aug	2,297	3,874	606	9,039	2,982	2,711	2,797	23,661	2,953	3,301	1,052	12,185
25-Aug	2,713	4,742	641	11,070	3,213	3,369	3,055	26,388	3,564	3,771	1,223	12,777
26-Aug	3,031	5,546	647	13,106	3,413	4,145	3,953	28,734	4,149	5,102	1,300	13,185
27-Aug	3,400	6,492	674	13,837	3,886	4,907	4,331	30,687	4,550	5,540	1,561	15,066
3-Aug	3,667	7,312	944	14,421	4,776	5,721	4,949	33,117	4,900	6,021	1,664	17,739
29-Aug	3,811	7,944	993	14,791	5,593	6,872	5,502	34,492	5,200	6,611	1,870	20,805
30-Aug	4,113	9,432	1,021	15,479	6,087	8,013	6,272	36,548	5,907	7,514	2,135	23,369
31-Aug	4,435	11,112	1,182	16,386	6,946	9,837	6,766	38,646	6,815	8,955	2,343	24,785
01-Sep	4,731	12,649	1,762	16,999	8,326	10,845	7,096	40,650	7,379	10,360	2,692	25,890
02-Sep	5,059	14,554	1,789	17,820	9,597	12,618	7,465	42,598	7,630	11,934	3,174	26,754
03-Sep	5,355	16,534	2,258	18,533	10,163	13,778	7,703	44,090	8,061	13,329	3,675	27,481
04-Sep	5,967	17,819	2,621	19,386	10,720	16,728	7,940	45,080	8,130	15,311	4,551	27,907
05-Sep	6,502	19,600	2,721	20,173	11,351	17,781	8,111	45,970	8,670	16,500	5,552	28,459
06-Sep	7,157	24,613	3,277	20,915	11,881	18,743	8,281	46,877	8,904	17,142	5,976	29,755
07-Sep	7,663	27,832	3,482	21,258	12,734	***19,299***	8,434	47,912	9,626	17,384	6,506	30,551
08-Sep	8,184	29,997	3,593	22,365	13,552	***19,504***	8,879	48,687	10,223	17,867	7,035	31,153
09-Sep	8,751	31,457	3,744	23,446	14,141	***19,615***	9,058	49,204	10,638	18,291	7,441	31,598
10-Sep	9,086	32,683	4,602	23,493	14,480	***19,766***	9,492	49,664	10,980	19,058	7,854	31,878
11-Sep	9,369	33,604	4,962	24,323	14,635	***20,624***	10,458	50,009	11,175	19,780	8,112	32,336
12-Sep	9,615	34,326	4,977	24,686	14,943	***20,984***	10,894	50,239	11,277	20,333	8,458	32,606
13-Sep	9,854	35,074	5,152	24,910	15,176	***20,999***	11,151	50,367	11,357	20,760	8,683	32,796
14-Sep	10,048	35,582	6,039	25,267	15,435	***21,174***	11,303	50,483	11,419	21,030	9,292	32,898
15-Sep	10,205	***36,006***	6,173	25,304	15,676	21,195	11,415	50,555	11,471	21,386	9,734	32,968
16-Sep	10,373	***36,411***	6,324	***25,479***	15,816	21,256	11,536		11,560	21,749	9,862	33,001
17-Sep	10,505	***36,680***	6,748	***26,366***	15,929	21,379	11,722		11,649	22,184	10,094	33,040
18-Sep	10,654	***36,869***	7,153	***26,500***	16,013	21,454	***12,127***		11,713	22,413	***10,665***	33,083
19-Sep	10,772	***36,994***	7,422	***26,651***	16,151	21,605	***12,396***		11,751	22,614	***11,045***	33,107
20-Sep	10,910	***37,251***	7,611	***27,075***	16,241	21,858	***12,585***		11,779	***22,944***	***11,312***	33,135
21-Sep	11,013	***37,365***	7,736	***27,213***	16,301	21,968	***12,710***		11,805	***23,167***	***11,488***	
22-Sep	11,127	***37,500***	7,993	***27,303***	16,339	22,021	***12,967***		***11,945***	***23,440***	***11,850***	
23-Sep	11,205	***37,547***	8,107	***27,363***	16,348	22,196	***13,081***		***12,007***	***23,636***	***12,011***	
24-Sep	11,249	***37,592***	8,242	***27,401***	***16,362***	***22,309***	***13,216***		***12,080***	***23,818***	***12,202***	
25-Sep	11,279	***37,635***	8,289	***27,410***	***16,382***	***22,393***	***13,263***		***12,106***	***23,905***	***12,268***	
26-Sep	11,308	***37,664***	8,334	***27,424***	***16,401***	***22,531***	***13,308***		***12,130***	***24,019***	***12,332***	
27-Sep	11,334	***37,690***	8,377	***27,444***	***16,419***	***22,621***	***13,351***		***12,144***	***24,078***	***12,392***	
28-Sep	11,347	***37,703***	***8,406***	***27,463***	***16,434***	***22,681***	***13,380***		***12,168***	***24,124***	***12,433***	
29-Sep	11,361	***37,717***	***8,432***	***27,481***	***16,441***	***22,719***	***13,406***		***12,185***	***24,161***	***12,470***	
30-Sep	11,381	***37,737***	***8,445***	***27,496***		***22,728***	***13,419***		***12,191***	***24,193***	***12,488***	
01-Oct	11,400	***37,756***	***8,459***	***27,503***		***22,742***	***13,433***		***12,199***	***24,218***	***12,508***	
02-Oct	11,418	***37,774***	***8,479***	***27,529***		***22,762***	***13,453***		***12,210***	***24,254***	***12,536***	
03-Oct	11,433	***37,789***	***8,498***	***27,542***		***22,781***	***13,472***		***12,220***	***24,288***	***12,563***	
04-Oct	11,440	***37,796***	***8,516***	***27,556***		***22,799***	***13,490***		***12,229***	***24,326***	***12,588***	
05-Oct	11,450		***8,531***	***27,576***		***22,814***	***13,505***		***12,237***	***24,348***	***12,609***	
06-Oct	11,455		***8,538***	***27,595***		***22,821***	***13,512***					

[a]Letters next to year indicate run-timing model used for estimating missing counts: L=late; N=normal; E= early
Bold Italics represent estimated counts. Boxed areas are middle 50% of the run. Midpoint is bounded by double lines. **ESCAPEMENT GOAL 25,000**