TAKOTNA RIVER SALMON STUDIES AND UPPER KUSKOKWIM RIVER AERIAL SURVEYS, 2003

By

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and

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ABSTRACT

Operations in 2003 marked the fourth year that a weir was used to enumerate annual salmon escapement in the Takotna River . Enumeration began 2 July and ended 20 September. Counting began after the target operational date of 24 June because of high water levels. Escapement included 378 chinook salmon, 3,393 chum salmon, 7,171 coho salmon, 3 sockeye salmon, and 0 pink salmon. The chum, coho and sockeye salmon passage represent total annual escapements for those species. The Alaska Board of Fisheries classified Kuskokwim River chinook and chum salmon as "stocks of concern" in September 2000 (5AAC 39.222; Burkey et al. 2000a, 2000b), which led to management actions that likely benefited the chinook and chum salmon escapements to the Takotna River by allowing periods of passage in the lower Kuskokwim River early in the season. Estimated chinook escapement was the second highest since monitoring began in the Takotna River, though chum salmon escapement was the second lowest on record. Coho salmon have not been identified as a stock of concern, and the 2003 escapement was the largest on record.

Age, sex, and length samples were taken from 16.1% of the chinook escapement, 16.6% of the chum escapement, and 2.6% of the coho escapement. Though the number of chinook samples was insufficient to estimate the ASL composition of the total escapement, the chinook sample composition included 49% age-1.4 fish and 46% females. The chum composition included 84% age-0.3 fish and 11% age-0.4 fish, and 48% females. The coho salmon composition included 86% age-2.1 fish and 52% females.

Fish observed with numbered spaghetti tags from the Kalskag/Aniak mark-recapture project, included 6 chum salmon and 71 coho salmon, plus two radio-tagged chinook salmon passed upstream of the weir. The majority of fish bound for the Takotna River were tagged during the first half of the Kalskag/Aniak tagging effort, suggesting that Takotna River salmon pass through the lower Kuskokwim River during the early part of the run.

Juvenile fish were caught with minnow traps deployed in the Takotna River in June and July. Captures included 53 juvenile chinook and 26 juvenile coho salmon. As in past years, most of the juvenile fish were found in Fourth-of-July Creek and Big Creek (lower).

The weir project served as a platform for conducting two sets of aerial stream surveys. Spawning salmon were found throughout the upper Kuskokwim River drainage, but in relatively low densities. Chinook and coho salmon appeared more abundant in 2003 than in previous years.

KEY WORDS: Kuskokwim River, Takotna River, escapement, chinook salmon (*Oncorhynchus tshawytscha),* chum salmon (*O. keta*), coho salmon (*O. kisutch*), juvenile salmon, resistance board weir, aerial survey

INTRODUCTION

The Kuskokwim River is the second largest river in Alaska, draining an area approximately 130,000 km^2 (Figure 1; Brown 1983). Each year mature Pacific salmon *Oncorhynchus spp* return to the river and its tributaries to spawn, thereby supporting subsistence and commercial fisheries that harvest an annual average of 1,156,958 salmon from the waters of the Kuskokwim River Area (Ward et al. 2003). Subsistence harvests remain a fundamental component of local culture, and the subsistence salmon fishery in the Kuskokwim Area is one of the largest and most important in the state (Coffing 1991, 1997a, 1997b; Coffing et al. 2000; Ward et al. 2003). The commercial salmon fishery, though modest in value compared to other areas of Alaska, has been an important component of the market economy of lower Kuskokwim River communities (Buklis 1999, Burkey et al. 2002).

Managing for sustainable salmon fisheries in the Kuskokwim River is challenging due in part to the lack of abundance and run-timing information, both for the total run and constituent stocks. Historically, few salmon spawning streams within the Kuskokwim River basin have been the focus of rigorous salmon escapement monitoring, which in turn has limited the ability of managers to assess the adequacy of escapements and the effects of management decisions. The need for escapement monitoring became more evident in September 2000, when the Alaska Board of Fisheries (BOF) classified both Kuskokwim River chinook *O. tshawytscha* and chum *O. keta* salmon as "yield concerns" due to the chronic inability of managers to maintain expected harvest levels (5 AAC 39.222; Burkey et al. 2000a, 2000b; Ward et al. 2003). Adequate information about escapements was lacking for consideration of the more severe level of "management concern" (D. Molyneaux, ADF&G Anchorage, personal communication). The low salmon abundance that prompted the BOF finding also gave rise to several main river and regional projects that depend on the benefits of tributary escapement monitoring for such things as tag recovery (e.g., Kerkvliet et al. 2003), marked-to-unmarked ratios (e.g., Stuby 2003), and baseline samples for stock identification (e.g., Templin et al. 2004). The Takotna River weir is one of several initiatives started in the late 1990s to help address information gaps in the Kuskokwim River salmon management program (Figure 1).

The Takotna River supports runs of chinook (*O. tshawytscha*), chum (*O. keta*), and coho (*O. kisutch*) salmon that contribute to subsistence and commercial fisheries in the Kuskokwim River. The two rivers confluence at river kilometer (rkm) 816 of the main stem Kuskokwim River (Figure 1), which make the Takotna River weir the only ground based salmon escapement monitoring project in the upper Kuskokwim River basin (Ward et al. 2003, Clark and Molyneaux 2003). Salmon production from the Takotna River, though modest, contributes to overall harvest by adding to the production and diversity of salmon populations that support the subsistence and commercial fisheries (Hilborn et al. 2003).

Salmon production in the upper Kuskokwim River may support a disproportionately high fraction of the subsistence harvest, particularly for chinook salmon. Harvest in the lower Kuskokwim River accounts for 86% of the total Kuskokwim River chinook salmon subsistence harvest (Ward et al. 2003), and fishers tend to harvest fish from the early part of the chinook salmon run (Figure 2; Burkey et al. 2000a). Recent salmon tagging studies in the Kuskokwim River suggest that the proportion of upper river stocks diminishes as the run progresses (Kerkvliet et al. 2003, Stuby 2003). If so, upper Kuskokwim River chinook salmon stocks may be providing a disproportionately high fraction of the subsistence harvest taken in the lower Kuskokwim River.

Objectives

1. Determine daily and total annual escapements of chinook, chum, and coho salmon to the Takotna River upstream of the community of Takotna during the target operational period of 24 June to 20 September.

2. Estimate the age, sex, and length (ASL) composition of total annual chinook, chum and coho salmon escapements from a minimum of three pulse samples, one collected from each third of the run, such that 95 percent simultaneous confidence intervals for the age composition in each pulse (chinook and chum) or over the entire run (coho) are no wider than 0.20 ($\alpha = 0.05$ and $d = 0.10$).

3. Recover tag numbers and associated information from chum and coho salmon in support of the mark-recapture study conducted on the mainstem Kuskokwim River.

4. Serve as a monitoring site for chinook salmon equipped with radio transmitters deployed as part of a radiotelemetry study conducted on the mainstem Kuskokwim River.

5. Monitor habitat variables including daily water temperature and daily water level.

6. Determine the distribution of juvenile salmon upstream of the Takotna River weir.

7. Determine the distribution of spawning salmon upstream of the Takotna River weir.

8. Identify locations of spawning salmon aggregates in upper Kuskokwim River drainage tributaries.

Background

Takotna River salmon populations appear to be in a state of recovery following near extirpation in the early twentieth century (Stokes 1985, Molyneaux et al. 2000). Prior to the early 1900's, Native Athabaskans in the area harvested salmon from the Takotna River, including residents of Tagholjitdochak', a village located near the confluence of Fourth-of-July Creek and the main stem Takotna River (Figure 3; Hosley 1966, Stokes 1985, Anderson 1977, BLM 1984). Hosley (1966) and Stokes (1983) reported that people from the Vinasale and Tatlawiksuk Athabaskan bands also fished in the Takotna River. The numbers of salmon these groups harvested is unknown, but interviews with Nikolai elders recall the existence of fairly strong chinook and chum runs in the Takotna River until the early 1900's (Stokes 1985).

Historically, Native Athabaskans commonly harvested salmon using weirs fitted with fish traps. At least four historical weir sites have been documented on the Takotna River (Figure 3; Stokes 1983). The last of these was abandoned no later than the mid-1920s according to oral history and first hand knowledge of elders from Nikolai. One of these sites was located on the Nixon Fork of the Takotna River, near the confluence of the West Fork River. The other locations included a site on the main river a short distance above the community of Takotna, one near Big Creek (lower), and another near, or within, Fourth-of-July Creek. According to an elder who fished the Nixon Fork weir, these sites were abandoned because the local Athabaskan population coalesced around major village sites, and as a result of the booming mining industry. Several epidemics also ravaged the area's Native populations in the late nineteenth and early twentieth centuries. Between 1908 and 1910, a wave of epidemics, primarily diphtheria, forced the remnant population at Tagholjitdochak' to abandon the site (BLM 1984).

Gold was discovered in the Innoko mining district in 1906 and the Takotna River was transformed into a major access route to the gold fields (Brown 1983). The community of Takotna developed as a supply point and staging area for the miners. Dog teams were the primary means of winter transportation and the dried salmon they were fed were likely harvested from the Takotna River and other local streams. Steamboats loaded with tons of mining supplies navigated the Takotna River as far upstream as the current town of Takotna. In the early 1920s small temporary dams were built on the river to facilitate steamboat passage (Kusko Times 1921). At some point, salmon populations became depleted. The timing and cause of the decline are unclear (Stokes 1985), but was likely caused by a combination of overfishing and habitat alteration associated with mining development.

Area residents and local biologists described the Takotna River as being almost void of salmon during the 1960s and 1970s (Molyneaux et al. 2000). By the 1980s, Takotna residents began to notice adult salmon in the river again. During an aerial survey in 1994, an experienced ADF&G fishery biologist observed several thousand chum and some chinook salmon in Fourth-of-July Creek, a clear water tributary of the Takotna River, but few salmon were observed elsewhere in the Takotna drainage (Burkey and Salomone 1999). By about the 1990s, rod and reel fishers began to catch coho salmon while pike fishing (D. Newton, local resident, Takotna, personal communication).

The perceived increase in salmon abundance prompted the establishment of the escapement monitoring program on the Takotna River in 1995. A counting tower was used to enumerate fish from 1995 to 1999, but success was limited because of poor water clarity, periodic high water levels, and organizational difficulties (Molyneaux et al. 2000). The escapement monitoring program transitioned from a counting tower to a resistance board weir in 2000, and the change greatly enhanced the success of the program (Schwanke et al. 2001, Schwanke and Molyneaux 2002, Clark and Molyneaux 2003). The Commercial Fisheries Division of the Alaska

Department of Fish and Game (ADF&G) and the Takotna Tribal Council (TTC) jointly operate the weir. Staff from ADF&G helps oversee in-season operations and serve as the principal agent for data management, analysis, and report writing. The TTC provides most of the field crew and coordinates much of the preseason preparations and inseason operations.

METHODS

Study Area

The Takotna River originates in the central Kuskokwim Mountains of the upper Kuskokwim River basin (Figure 1). Formed by the confluence of Moore Creek and Little Waldren Fork, the river flows northeasterly, passing the community of Takotna at rkm 80, before turning southeasterly near the confluence of the Nixon Fork at rkm 24 (Figure 3; Brown 1983). The Tatalina River joins at rkm 5, and then the Takotna River confluences with the Kuskokwim River across from McGrath at rkm 816.

The Takotna River is about 160 km in length and drains an area of 5,646 sq km (Brown 1983). The river is shallow with many meanders from its headwaters to the village of Takotna, but gradually becomes deeper downstream of that point, especially after the confluence of the Nixon Fork. In the lower reaches, the current is sluggish and the channel width averages 122 to 152 m. The river's average slope is about 89 cm per km (Brown 1983).

At normal flow the Takotna River has a nominal load of suspended materials, but the water is stained due to organic leaching. The Nixon Fork and Tatalina Rivers drain extensive bog flats and swampy lowlands, but the remainder of the basin is primarily upland spruce-hardwood forest (Brown 1983, Selkregg *undated*). White spruce, birch, and aspen are common on moderate south-facing slopes, while black spruce is more characteristic of northern exposures and poorly drained flat areas. The understory consists of spongy moss and low brush on the cool moist slopes, grasses on dry slopes, and willow and alder in the higher open forest near timberline.

Weir Design and Operation

Installation Site

The weir was installed in 2003 at the same location used in previous years, which is approximately 185 m upstream of the Takotna River Bridge (Clark and Molyneaux 2003). The site was about 3 rkm upstream of the village of Takotna and 85 rkm from the confluence with the Kuskokwim River.

Weir Design

The basic design and materials used in the Takotna River weir in 2003 were the same as those used in 2000 (Schwanke et al. 2001), and included modifications incorporated into the design in 2001 (Schwanke and Molyneaux 2002). The weir spanned an 85-m channel and consisted of 87 resistance board panels that covered the central 80 m of the channel. Two 3-m sections of aluminum fixed panels were placed along the stream margins to accommodate the slope of the bank. Stewart (2002, 2003) describes generalized details of panel construction and installation.

Fish were passed upstream of the weir through one of three passing gates. One of the gates incorporated a fish trap (the primary means of passing fish) and the other two were constructed from modified resistance board weir panels as described by Schwanke et al. (2001). A fish resting area was constructed just upstream of the fish trap as described by Clark and Molyneaux (2003).

Downstream passage chutes were incorporated into the weir design and used as needed to accommodate passage of fish migrating downstream, especially longnose suckers *Catastomus catastomus*. The chutes were constructed by releasing resistance boards on one or two adjacent weir panels, which allowed the distal ends to dip slightly below the water surface. These downstream migration chutes were positioned in areas where higher concentrations of downstream migrating fish typically occur. The chutes were monitored to ensure fish were not passing upstream of the weir.

Boat Passage

A section of weir contained modified panels to form a "boat gate" that was used to accommodate boat traffic over the weir. The section was constructed as described by Stewart (2003). The resistance boards on these panels were adjusted so that the distal ends of the panels dipped close to the water surface. Jet-driven boats could pass both upstream and downstream over these panels. An additional boat gate was constructed to facilitate upstream passage by propeller-driven boats; operators had to pull themselves over the weir using a rope that was anchored immediately upstream of the weir. Propeller-driven boats passed downstream by putting the engine in neutral and tilting the motor up just before passing over the weir.

Weir Maintenance

Typical daily cleaning was done by partially submerging the weir panels to allow the current to wash debris downstream. Algal growth and debris that accumulated around stringers was periodically removed either with a rake or by hand.

The daily cleaning routine included a visual inspection of the weir and substrate rail for signs of substrate scouring, broken pickets, or other conditions that could compromise operations. Periodically, the crew conducted a more thorough inspection by snorkeling along the substrate rail. Any points along the substrate rail showing signs of substrate scouring were immediately addressed with sandbags. Damaged weir pickets were repaired using wooden dowels as described by Stewart (2002).

Fish Passage

Upstream Fish Passage

All fish passing upstream of the weir through the passage gates were counted and recorded by species, excluding fish that were small enough to pass freely between the weir pickets. Standard operations consisted of a daily counting schedule of four 2-hour periods. This schedule was adjusted as needed to accommodate the migratory behavior and abundance of the fish, or operational constraints such as reduced visibility in evening hours late in the season. The daily passage count was tallied by species and recorded in the logbook.

The target operational period for the weir was 24 June to 20 September, although the actual operational period may vary. In years when the operational period fell short of the target (such as 2003), estimates of the daily salmon passage were made for missed days in order to provide for consistent comparisons of escapements among years. Total annual escapement was determined from the total observed fish passage plus any fish passage estimates that were made. The term "total annual escapement" is used to describe escapements for the entire target operational period.

Passage estimates were made for periods of one or more days when the weir was not operational during the target operational period. The passage estimate for a single day was calculated as the average of the observed passage 2 days before and 2 days after the inoperable period, minus any observed passage from the inoperable day. Daily passage estimates for inoperable periods lasting 2 or more days were calculated by a linear extrapolation of the average observed passage 2 days before and after the inoperable period using the following formula:

$$\hat{n}_{d_i} = \alpha + \beta \cdot i \qquad (1)$$

$$\alpha = \frac{n_{d_1-1} + n_{d_1-2}}{2}$$

$$\beta = \frac{\left(n_{d_I+1} + n_{d_I+2}\right) - \left(n_{d_1-1} + n_{d_1-2}\right)}{2(I+1)}$$

for $(d_1, 2, \ldots, d_i, \ldots d_I)$

where

$\hat{n}_{d_i}$ = passage estimate for the i^{th} day of the period (d_1, 2, ..., d_i, ...d_I) when the weir was inoperative;

n_{d_I+1} = observed passage the first day after the weir was reinstalled;

n_{d_I+2} = observed passage the second day after the weir was reinstalled;

n_{d_1-1} = observed passage of the one day before the weir was washed out;

n_{d_1-2} = observed passage of the second day before the weir was washed out;

I = number of inoperative days.

Alternatively, because fish passage characteristics of Takotna River was similar to that of Kogrukluk River, the daily passage of Takotna River during the inoperative period can be estimated using daily passage proportion of Kogrukluk River during the same period:

$$\hat{n}_{d_i} = \left(\frac{(n_{Kd_i} \times N_T)}{N_K} \right) \qquad (2)$$

where

n_{Kd_i} = passage of the Kogrukluk River weir in the i^{th} day (d_1, 2, ..., d_i, ...d_I) when the Takotna River weir was inoperative;

N_T = total passage of the Takotna River weir during the period the weir was operational;

N_K = total passage of the Kogrukluk River weir during the period the Takotna River weir was operational.

Carcass Counts

Spent and dead salmon (hereafter referred to as carcasses) that accumulated on the weir were counted by species and sex before being passed downstream. The daily carcass count was tallied and recorded in the logbook.

Salmon Age-Sex-Length Composition

Age-sex-length (ASL) composition of the total annual chinook, chum, and coho salmon escapements past the weir were estimated by sampling a fraction of the fish passage and applying the ASL composition of those samples to the total escapement (DuBois and Molyneaux 2000).

ASL Sampling

The crew at the Takotna River weir employed standard sampling techniques as described by DuBois and Molyneaux (2000). A pulse sampling design was used, in which intensive sampling was conducted for 1 to 3 days followed by a few days without sampling. The goal of each pulse was to collect samples from 210 chinook, 200 chum, and 70 coho salmon. These sample sizes were selected so that the simultaneous 95% confidence interval estimates of age and sex composition proportions would be no wider than 0.20 (Bromaghin 1993) per pulse for chinook salmon assuming 10 age/sex categories and chum salmon assuming 8 age/sex categories, and for the entire season for coho salmon assuming 10 age/sex categories. Sample sizes were increased by 10% from that recommended by Bromaghin (1993) to account for scales that cannot be aged. The minimum acceptable number of pulse samples was three per species, one pulse sample from each third of the run, to account for temporal dynamics in the ASL composition. In 2003, this minimum was achieved for chum and coho salmon, but not for chinook salmon.

Salmon were sampled from a fish trap installed in the weir as described by Schwanke et al. (2001). The trap included an entrance gate, holding box, and exit gate. The entrance gate was opened while the exit gate remained closed, allowing fish to accumulate inside the 1.5 by 2.5 m holding box. The holding box was allowed to fill with fish and sampling was done during scheduled counting periods.

Crewmembers used a dip-net to remove fish from the holding pen. Fish were passed to another crewmember positioned just outside of the holding pen, upstream of the exit gate. Fish were removed from the dip-net and placed into a partially submerged fish cradle or into a plexiglass sampling box (Figure 4). Three scales were taken from the preferred area according to standard procedures (DuBois and Molyneaux 2000). These scales were later used to determine the age of the fish. Sex was determined through visual examination of the external morphology, keying on the development of the kype, roundness of the belly, and the presence or absence of an ovipositor. Length was measured to the nearest millimeter from mid eye to tail fork using a straight-edged meter stick. After sampling, each fish was released into a resting area upstream of the weir. Scales were placed on gum cards and sampling information was recorded. This information was later transferred to computer mark-sense forms. The procedure was repeated until the holding pen was emptied. Completed gum cards and data forms were sent to the Bethel or Anchorage ADF&G office for processing.

Additional samples were collected for chinook salmon through active sampling. Active sampling required a technician to be positioned at the downstream end of the trap to observe fish entering the holding pen. When a chinook entered the holding pen, the technician would immediately close both the entrance and exit gates, thereby actively trapping the chinook salmon inside the holding box for sampling.

Estimating ASL Composition of Escapement

ADF&G staff in Bethel and Anchorage aged scales collected at the Takotna River weir, processed the ASL data, and generated data summaries. DuBois and Molyneaux (2000) describe details of the processing and summarizing procedures. These procedures generated two types of summary tables for each species; one described the age and sex composition and the other described length statistics. These summaries account for changes in the ASL composition throughout the season by first partitioning the season into temporal strata based on pulse sample dates, then applying the ASL composition of individual pulse samples to the corresponding temporal strata, and finally summing the strata to generate the estimated ASL composition for the season. This procedure ensures that the ASL composition of the total annual escapement is weighted by the abundance of fish in the escapement rather than the abundance of fish in the samples. For example, if samples of chum salmon were collected in six pulses, then the season would be partitioned into six temporal strata with one pulse sample occurring in each stratum. A sample of 187 chum salmon collected from 14 to 16 July would be used to estimate the ASL composition of the 1,119 chum salmon that passed the weir during the temporal strata that extended from 11 to 19 July. This procedure would be repeated for each stratum, and the estimated age and sex composition for the total annual escapement would be calculated as the sum of chum salmon in each stratum. In similar fashion, the estimated mean length composition for the total annual escapement would be calculated by weighting the mean lengths in each stratum by the escapement of chum salmon that passed the weir during that stratum.

Ages are reported using European notation. European notation is composed of two numerals separated by a decimal, where the first numeral indicates the number of winters the juvenile has spent in fresh water and the second numeral indicates the number of winters spent in the ocean (Groot and Margolis 1991). Total age of a fish is equal to the sum of these two numerals, plus 1 year to account for the winter when the egg was incubating in gravel. For example, a chinook salmon described as an age-1.4 fish is actually 6 years of age.

Salmon Tag Recovery

Two tagging studies were conducted on the mainstem Kuskokwim River in 2003. The Takotna River weir and other weir projects in the Kuskokwim River drainage were integrated into both studies.

Chinook Radiotelemetry Tagging

The Takotna River weir was part of a radiotelemetry project intended to estimate the total abundance of chinook salmon in the Kuskokwim River (Stuby 2003, Stuby *in press*). Radio transmitters were inserted into chinook salmon caught near the Kalskag/Aniak tagging site, and one of several radio receiver stations was placed approximately 300 meters downstream from the Takotna River weir to monitor the movement of tagged chinook at the weir. The chinook were also given a spaghetti tag that allowed the weir crew to capture tagged fish in the fish trap and record the date of capture, tag number, tag color, and the general condition of the fish. The known chinook salmon passage at the weir, coupled with data collected from the receiver station, were used with similar data collected at other weir projects to develop estimates of the total chinook salmon abundance upstream from the tagging site.

Chum and Coho Mark-RecaptureTagging

Chum and coho salmon were spaghetti tagged near Kalskag/Aniak tagging site in an effort to estimate the total abundance of these species in the Kuskokwim River (Kerkvliet et al. *in press*). The Takotna River weir served as one of several tag recovery locations for collecting information on tagged fish.

The weir crew captured tagged fish in the fish trap and recorded the date of capture, species, and tag number (when recovered). The tagged fish were captured in the same manner as the active sampling technique described for the ASL sampling of chinook salmon. Visibility was enhanced through the use of clear-bottom viewing boxes that reduced glare and water turbulence. Tagged fish were re-released upstream of the weir. The crew summarized the number of tagged and untagged fish daily, so that uncaptured tagged fish were recorded by tag color and added to the daily tallies. The crew also examined actively-sampled and ASL-sampled salmon for a secondary mark (in this case, a hole-punched adipose fin) in order to determine the incidence of tag loss.

Climatological and Hydrological Monitoring

Water and air temperatures were measured at the Takotna River weir each day at approximately 09:00 and 18:00 hours. Temperatures were measured using a calibrated thermometer. Water temperature was determined by submerging the thermometer below the water surface until the temperature reading stabilized. Air temperature was obtained by placing the thermometer in a shaded location until the temperature reading stabilized. Temperature readings were recorded in the logbook, along with notations about wind direction, estimated wind speed, cloud cover, and precipitation. Daily precipitation was measured using a rain gauge.

Daily operations included monitoring river depth with a standardized staff gauge. The staff gauge consisted of a metal rod driven into the stream channel with a meter stick attached. The height of the water surface, as measured from the meter stick, represented the "stage" of the river above an established datum plane. The staff gauge was calibrated to the datum plane by a semi-permanent benchmark, which was installed in 2000 to provide for consistent stage measurements between years (Schwanke et al. 2001). The benchmark consisted of a steel rod driven several feet into the ground near the shoreline, such that only a few inches showed above the surface. The tip of the rods corresponded to stage measurements of 580 mm relative to the datum plane. Water stage was measured at approximately 09:00 and 18:00 hours.

Juvenile Salmon Investigations

Juvenile salmon were captured with minnow traps to determine their distribution in the middle and upper reaches of the Takotna River basin. In 2003, efforts focused on 4 of 13 geographic zones, referred to as Index Areas, in the mainstem of the Takotna River and major tributaries (Figure 5). Periodic trapping and seining took place from 19 June to 19 July on an opportunistic basis.

Minnow traps had 1/4-in mesh and were baited with salmon roe placed loosely in the trap. Traps were fished between 12 and 24 hours. Juvenile salmon caught were identified to species and measured to the nearest millimeter (fork length). Soak time, number of fish caught, global positioning system (GPS) coordinates, and a brief habitat description was recorded.

Aerial Stream Surveys

Aerial surveys were flown over the Takotna River drainage and other selected upper Kuskokwim River tributaries to determine relative abundance and spawning distribution information for chinook, early and late-spawning chum, and coho salmon. Surveys were flown on 20 July for chinook and early-spawning chum salmon, and from 27 September to 30 September for late-spawning chum and coho salmon. Surveys were flown using a contracted pilot flying a Piper PA 18 Super Cub.

Mouth and headwater coordinates for each stream to be surveyed were given to the pilot to enter into the plane's onboard navigational system prior to each survey (Appendix A.1). Both coordinates were given so that streams could be flown in different directions to compensate for wind, weather, and lighting conditions. The pilot would follow the stream to the best of his abilities while the observer used tally counters to record the number of fish. After a stream was surveyed, the observer recorded details about the survey in a logbook. These details included information about wind, weather, lighting conditions, water color, water clarity, bottom type, number of live fish and carcasses by species, fish distribution and movements, time and distance covered, and vegetation cover. Notes were later transferred to an "*Escapement Observations—Kuskokwim Area*" form, and submitted for entry into the "*Kuskokwim Area Salmon Escapement Observation Catalog*" database (e.g., Burkey and Salomone 1999).

RESULTS

Weir Operations

Installation of the Takotna River weir began on 29 June and was complete at 14:30 hours on 2 July, eight days after the target operational date of 24 June. High water rendered the weir inoperable from 07:00 on 3 July to 18:00 on 4 July, and again from 20:30 on 27 July to 17:00 on 1 August. During inoperable periods, passage gates remained open to pass fish freely upstream. No holes were found during weir inspections that adult salmon could pass through. The weir was disassembled on 21 September.

Fish Passage

Chinook Salmon

Total chinook salmon escapement in 2003 was 378 fish, and no passage estimate was made to account for the late project start date (Table 1, Appendix B.1). Chinook salmon were observed passing the weir from 2 July to 1 September. Peak daily passage of 37 chinook salmon occurred on 9 July. The central 50% of passage occurred between 10 and 24 July. Chinook salmon passage was likely missed when the weir was not operational between 24 June and 5 July. Passage during this time was not estimated due to a lack of information and correlating model data sets. However, an estimate of passage of 24 chinook (6.3% of the total run) was made for the inoperable period that occurred between 28 July and 1 August, excluding partial day counts. These estimates were made using linear extrapolation.

Chum Salmon

Total annual chum salmon escapement for the 2003 target operational period was 3,393 fish (Table 1, Appendix B.2), including an estimated 162 chum salmon (4.8% of the total run) that passed before the first full day of operations on 5 July and an estimated 210 chum salmon (6.2% of the total run) that passed when the weir was not operational between 28 July and 1 August. The pattern of daily chum salmon passage at Kogrukluk River weir appear to correlate well with Takotna River weir, so the Kogrukluk River data set was used as a model to generate proportional estimates for the 24 June to 5 July inoperable period at Takotna River weir. Linear estimates were made for the 28 July to 1 August inoperable period. Chum salmon were observed passing the weir from 2 July to 9 September. Peak passage of 231 chum salmon occurred on 20 July. The median passage date was 18 July and the central 50% of the passage occurred between 10 July and 22 July.

Coho Salmon

The total annual coho salmon escapement for the 2003 target operational period was 7,171 fish (Table 1, Appendix B.3), including an estimated 24 coho salmon (0.3% of the total run) that passed when the weir was inoperable between 28 July and 1 August. Estimates were made using linear extrapolation, and no coho salmon were thought to have passed before the first full day of operation on 5 July. Coho salmon were observed passing the weir from 26 July to 19 September. Peak passage of 429 coho salmon occurred on 27 August. The median passage point was 27 August and the central 50% of passage was between 20 August and 2 September.

Other Species

Sockeye *O. nerka* and pink *O. gorbuscha* salmon are uncommon in the Takotna River; however, four sockeye were observed passing upstream of the weir between 8 August and 9 September (Appendix B.3, B.4). No pink salmon were observed in 2003.

Five resident fish species were observed passing upstream of the weir in 2003. Longnose suckers were the most abundant, with 609 fish passing the weir (Table 1). Other species included one sheefish *Stendous leucichthys nelma (Pallas)*, two Arctic grayling *Thymallus arcticus*, 14 northern pike *Esox lucius*, and two whitefish *Coregonus spp.* No estimates of resident fish passage were made for inoperable periods.

Carcass Counts

A total of 15 chinook, 129 chum, 11 coho, and 2 sockeye salmon carcasses were recovered at the Takotna River weir in 2003. Chinook carcasses were recovered between 15 July and 23 August, with 50% cumulative recovery on 10 August. Females accounted for 7% of the recovered chinook salmon carcasses. Chum carcasses were recovered between 2 July and 2 September, with 50% cumulative recovery on 27 July. Females accounted for 35% of the recovered chum salmon carcasses. Coho carcasses were first recovered 15 August, and females accounted for 64% of the recovered carcasses. Other species recovered included 14 whitefish, 4 northern pike, and 1,116 longnose suckers. Many of the longnose suckers were still alive when they were passed downstream of the weir.

Age-Sex-Length Data

Chinook Salmon

Sampling goals for chinook salmon were not achieved in 2003. Age, sex, and length were determined for 61 chinook salmon, or 16.1% of the total chinook escapement in 2003 (Tables 2, 3). Because total annual escapement was not determined for chinook salmon in 2003, nor sufficient number of samples were collected, we did not estimate the ASL composition of the weir passage. Of the fish sampled, age-1.4 was the most abundant age class (49.2%), followed by age-1.3 (41.0%), age-1.2 (8.2%), and age-1.5 (1.6%), and females comprised 45.9% of the sample.

The average length of the sampled fish showed partitioning by age class. For males, ages-1.2, -1.3, and -1.4, average lengths were 514, 723, and 764 mm, respectively. For females, ages-1.3 and -1.4, average lengths were 817 and 867 mm. One age-2.2 female chinook salmon was found, with a length of 975 mm, and one age-1.5 female chinook salmon was found, with a length of 975 mm. Male chinook salmon lengths ranged from 430 to 893 mm, while female lengths ranged from 765 to 975 mm.

Chum Salmon

Age, sex, and length were determined for 564 chum salmon, or 16.6% of the total annual chum salmon escapement in 2003 (Tables 4, 5). The samples were collected in three pulses with sample sizes of 212, 187, and 165 fish. The chum run was partitioned into three temporal strata based on sampling dates. As applied to the total chum escapement, age 0.3 was the most abundant age class (83.6%), followed by age 0.4 (10.9%), age 0.2 (5.0%), and age 0.5 (0.5%). The percentages of older-aged fish (age-0.4 and -0.5) tended to decrease as the run progressed. Female chum salmon comprised 47.7% of the total annual escapement, or 1,618 fish. The percentage of females increased from 33.5% to 63.0% as the run progressed.

The length of female chum salmon ranged from 470 to 647 mm, and males ranged from 476 to 676 mm. Average lengths for female age-0.2, -0.3, and -0.4 fish were 510, 539, and 570 mm, respectively. Average lengths for male age-0.2, -0.3, -0.4, and -0.5 fish were 538, 569, 612, and 624 mm, respectively.

Coho Salmon

Age, sex, and length were determined for 183 coho salmon, or 2.6% of the total annual coho salmon escapement in 2003 (Tables 6, 7). The samples were collected in three pulses with sample sizes of 61, 62, and 60 fish to account for variability through time. Age-2.1 fish accounted for 86.4% of the total annual escapement, and age-3.1 and -1.1 fish accounted for 12.7% and 0.9% of the escapement. Female coho salmon comprised 52.1% of the total annual escapement, or 3,734 fish.

The lengths of female coho salmon ranged from 480 to 625 mm, and males ranged from 427 to 641 mm. Average length for female age-2.1 and -3.1 fish were 566 and 567 mm, respectively. Average length for male age-1.1, -2.1, and -3.1 fish were 488, 540, and 576 mm.

Salmon Tag Recovery

Chinook Radiotelemetry Tag Recovery

Two chinook with radio transmitters passed through the weir in 2003, one on 17 July and the second on 22 July (Appendix C). Two days before passing the weir, both fish were detected by a radio receiver located approximately 1.5 km downstream from the weir (Stuby *in press*).

Chum and Coho Mark-Recapture Tag Recovery

Six spaghetti tagged chum salmon (0.2% of the total annual escapement) were observed passing the Takotna River weir, and tag information was recovered for four of the fish (Appendix C). Of 564 fish examined for secondary marks (16.6% of the total annual escapement), no untagged chum salmon had a secondary mark that would have indicated spaghetti tag loss.

Seventy-one spaghetti tagged coho salmon (1.0% of the total annual escapement) were observed passing the weir and tag information was recovered for 67 of these fish (Appendix C). Of 183 fish examined for secondary marks (2.6% of the total annual escapement), no untagged coho salmon had a secondary mark.

Climatological and Hydrological Conditions

Water temperature in the Takotna River ranged from 0° to 17°C, with an average water temperature of 9.6°C (Appendix D). River stages ranged from 47 to 137 cm, with an average of 70 cm for the overall operational period. Air temperature at the weir ranged from -6° to 30°C, with an average air temperature of 11.9°C for the operational period.

Juvenile Salmon Investigations

In 2003, juvenile salmon were trapped in June and July on an opportunistic basis. There were 53 juvenile chinook salmon and 26 juvenile coho salmon captured using 59 baited minnow traps with an average soak time of 21.5 hours (Table 8, Appendix E). Sampling focused on Index Areas 2, 3, 4, and 11 (Figure 5). Juvenile chinook salmon were most abundant in Fourth-of-July Creek (94%, Index Area 4), plus small numbers were found in the main stem between Fourth-of-July Creek and the weir (6%, Index Area 2). Juvenile coho salmon were most abundant in Big Creek, lower (90%, Index Area 3), with smaller numbers found in the main stem below Fourth-of-July Creek (7%, Index Area 2) and in Fourth-of-July Creek (3%, Index Area 4). No salmon were found in Moore Creek (Index Area 11). Overall, highest catch-per-unit-effort (CPUE) occurred in Fourth-of-July Creek (Index Area 4). The lengths of juvenile chinook salmon ranged from 58 to 76 mm, and lengths of juvenile coho salmon ranged from 39 to 109 mm (Appendix E). Other captured species include 48 slimy sculpin *Cottus cagnatus*, two burbot *Lota lota*, and one Dolly Varden *Salvelinus marma*.

Aerial Stream Surveys

Aerial surveys were conducted in selected tributaries of the upper Kuskokwim River drainage basin on 20 July to assess the relative abundance and distribution of spawning chinook and early-spawning chum, and from 27 to 30 September to assess late-spawning chum and coho salmon (Figure 6). A detailed log of the surveys is provided in Appendix A.2.

Chinook and Early-spawning Chum Salmon

The upper Pitka Fork River and one of its tributaries, Bear Creek, were surveyed under excellent water conditions and good weather on 20 July (Figure 7, Appendix A). A total of 197 chinook salmon were counted in the mainstem Pitka Fork River above the confluence with Sheep Creek, and 176 chinook were seen in Bear Creek . No early-spawning chum salmon were observed.
Salmon River index areas were also surveyed on 20 July under similar conditions (Figure 8). The majority of the fish were found in Index Area 104, with a total of 935 chinook salmon. Index Areas 101, 102, and 103 had 129 chinook, 273 chinook, and 31 chinook, respectively. Three chinook carcasses were observed in Index Area 103. No early-spawning chum salmon were observed.

Coho and Late-spawning Chum Salmon

September aerial surveys concentrated on upper Kuskokwim River tributaries including Takotna River, South Fork, Big River, and Highpower Creek (Appendix A). Some of these tributaries were difficult to survey because of water color, meandering stream channels, and dense riparian vegetation. Inclement weather prevented surveying in the Pitka Fork tributaries.

Tributaries of the upper Takotna River drainage were surveyed on 27 September (Figure 9). Counts for Fourth-of-July Creek and Big Creek (lower) included 159 and 52 live coho salmon, respectively. One coho salmon carcass was observed in Fourth-of-July Creek. Little Waldren Fork and Moore Creek had four and five coho, respectively. No late-spawning chum salmon were observed in upper Takotna River tributaries.

The South Fork Kuskokwim River and select tributaries were surveyed on 29 September (Figure 10). Surveying in the mainstem was limited to clear side channels and shallow areas near gravel bars, where 759 coho and 1,280 chum salmon were observed. In an unnamed tributary of the Little Tonzona River, 1,194 coho salmon were observed, but no late-spawning chum salmon were observed. In Jones River, 136 coho and 20 late-spawning chum salmon were observed.

The Big River was surveyed on 29 September (Figure 11). Surveying in the mainstem was limited to clear side channels and shallow areas near gravel bars, where 72 live coho, 12 coho carcasses, and 23 live late-spawning chum salmon were observed. No fish were found in the one unnamed tributary surveyed.

Highpower Creek and its tributaries were surveyed on 30 September (Figure 12). Conditions in Highpower Creek and its tributaries, Deep Creek and Lonestar Creek, were all unsuitable for surveying, and no fish were observed. However, conditions in Fish River were suitable for surveying, and 1,433 coho salmon were observed. No late-spawning chum salmon were seen.

DISCUSSION

Weir Operations

Overall, operation of the Takotna River weir in 2003 was a success. High water levels delayed the first full day of operation by 11 days and caused a 5-day inoperable period in late July; however, with the exception of chinook salmon, the project leader was able to make acceptable estimates of salmon passage for the inoperable periods. Furthermore, no major damage was incurred to the weir during the season.

Fish Passage

Chinook Salmon

Abundance. Reported escapement of 378 chinook salmon past the Takotna River weir from 5 July through 20 September was likely less than the actual 2003 total annual escapement (Table 1). Although estimates for chinook passage could be made for the 5-day inoperable period in late July, there was insufficient information and no suitable model data set to estimate passage during the 11 inoperable days at the start of the season, so actual passage was likely higher than reported. Between 7% and 16% of the chinook run passed the Takotna River weir prior to July 5 in similar years (2000 and 2002).

Comparisons between years are incomplete; however, observed escapement in 2003 was higher than escapements in 2000 and 2002 (Figure 13, Appendix B.1), which is consistent with the trend of increasing chinook salmon escapement observed at most other monitored locations in the Kuskokwim River (e.g. Table 9, Figure 14; Linderman et al. 2004, Shelden et al. 2004, Roettiger et al. *in press,* Zabkar and Harper *in press*).

Chinook escapements to the Takotna River would likely have been lower had it not been for conservation measures taken in response to the BOF designating Kuskokwim River chinook salmon as a stock of concern (Burkey et al. 2000a). One of these measures was the closure of the Kuskokwim River commercial salmon fishery in June and July. Consequently, the total commercial harvest of chinook salmon was only 150 fish in 2003, while the 10-year average harvest was 9,632 fish per year (Bergstrom and Whitmore 2004).

Another conservation measure was the implementation of a subsistence fishing schedule throughout the Kuskokwim River drainage (Burkey et al. 2000a). This schedule was first invoked in 2001 and requires all Kuskokwim River subsistence fishers to cease fishing for 3 consecutive days each week in accordance with a prearranged schedule. In 2003, the schedule was discontinued after 6 July when most run assessment tools suggested the measure was no longer needed. Thereafter, subsistence fishing was allowed 7 days a week. Chinook salmon had just begun to arrive in the upper Kuskokwim by this time, so savings from local (upper river) impacts of the schedule were probably minimal. However, the Takotna River and upper Kuskokwim River tributaries likely benefited from the schedule because the June closures provided windows when fish could bypass the subsistence fishery of the lower Kuskokwim River. Evidence from Stuby (2003) suggests that upper river chinook salmon pass through the lower river during the earlier parts of the run.

Run Timing. The run timing for Takotna River chinook salmon in 2003 was likely later than in most previous years (Figure 15). The delayed start date limits the utility of the 2003 data set to support this conclusion; however, if the historic data sets are truncated to a 5 July start date, then 2003 has the second latest run timing of the six available years of information (Appendix B.5). At other Kuskokwim River escapement projects, the run timing of chinook salmon was variable in 2003; for example, at Kogrukluk and Kwethluk river weirs the chinook salmon run timings were among the latest on record (Shelden et al. *in press*, Roettiger et al. *in press*), whereas at Tuluksak River weir it was the earliest on record (Zabkar and Harper *in press*).

Carcasses. Only 4% of the 2003 chinook salmon escapement was later found as carcasses at the weir. The remainder of the spawned-out fish were likely retained in or near the river upstream of the weir for a protracted period of time (Figure 16). The nutrient value of the spawned-out chinook salmon was likely retained within the Takotna River, thereby contributing to the productivity of the system through the injection of marine derived nutrients (Cederholm et al. 1999). Retention of spawned-out salmon carcasses within the Takotna River is particularly important given that this salmon run appears to be in recovery following decades of near absence of salmon in the river. The retention of nutrients will assist towards the continued rebuilding of the Takotna River salmon runs, as well as increase the overall productivity of the encompassing ecosystem.

Index Value. One of the arguments supporting operation of the Takotna River weir is that it provides a measure of escapement that can be applied as an index for the upper Kuskokwim River drainage. The only other escapement monitoring regularly done in the upper Kuskokwim River is aerial surveys of the Salmon River (Pitka Fork drainage), a formal escapement index stream (Burkey et al. 2002). The Salmon River surveys, however, focus only on chinook salmon and are not done every year. To date, there are four years with chinook escapement measures from both the Takotna River weir and the Salmon River aerial surveys, and the two data sets do not correlate well (Table 9, Figure 17). Both abundance measures showed an increase from 2000 to 2001, but in 2002 and 2003 more chinook salmon were seen in the Salmon River survey than would have been suggested based on the Takotna River weir escapement data. In 2003, this discrepancy may be due to the late operational date and lack of reliable estimates for the early inoperable period. The authors recommend that managers continue to expand this paired data set so that the relationship can be better assessed.

Chum Salmon

Abundance. The escapement estimate of 3,393 chum salmon past the Takotna River weir from 24 June through 20 September is believed a reliable estimate of the 2003 total annual escapement (Table 1). Though the weir was not operable for the first 11 days of the target operational period and inoperable for 4 days in late July, estimates of chum passage were made using linear and proportional estimates.

Chum salmon escapement in 2003 was the third highest escapement recorded for the Takotna River (Figure 13, Appendix B.2). Though not as high as 2001 or 2002, the 2003 escapement was more than twice that reported for 2000, which was one of the years that contributed to the "stock of concern" designation by the BOF (Burkey et al. 2000b). In 2003, other escapement projects in the Kuskokwim River drainage had chum salmon escapements that were much higher than occurred in 2000 (e.g. Figure 18; Linderman et al. 2004, Shelden et al. 2004, Roettiger et al. *in press*).

Kuskokwim River chum salmon were identified as a stock of concern by the BOF in 2001 (Burkey et al. 2000b), and escapements likely benefited from the consequent conservation measures. The closure of the commercial fishery in June and July resulted in a total harvest of chum salmon in the 2003 Kuskokwim River commercial fishery of 2,760 fish, compared to the 10-year average annual commercial harvest of 139,083 chum salmon (Bergstrom and Whitmore 2004). Another conservation measure was the implementation of a subsistence fishing schedule throughout the Kuskokwim River drainage (Burkey et al. 2000a). This schedule was first invoked in 2001 and requires all Kuskokwim River subsistence fishers to cease fishing for 3 consecutive days each week in accordance with a prearranged schedule. In 2003, the schedule was discontinued after 6 July when most run assessment tools suggested the measure was no longer needed. Thereafter, subsistence fishing was allowed 7 days a week. Chum salmon had just begun to arrive in the upper Kuskokwim by this time, so savings from local (upper river) impacts of the schedule were probably minimal. However, the Takotna River and upper Kuskokwim River tributaries likely benefited from the schedule because the June closures provided windows when fish could bypass the subsistence fishery of the lower Kuskokwim River. Evidence from Kerkvliet et al. (2003) suggests that upper river chum salmon pass through the lower river during the earlier parts of the run.

Run Timing. The run timing for Takotna River chum salmon in 2003 was one of the latest on record (Figure 15). The median passage date was 7 days later than in 2002, 1 day later than in 2001, and 4 days later than in 2000 (Appendix B.2). With the exception of Aniak River sonar

(ADF&G, unpublished data), all other Kuskokwim River escapement projects had late run timings for chum salmon in 2003 (e.g. Linderman et al. 2004, Shelden et al. 2004, Roettiger et al. *in press*, Zabkar and Harper *in press*).

Carcasses. Only 3.8% of the 2003 chum salmon escapement was later found as carcasses at the weir, the remainder of the spawned-out fish were likely retained in or near the river, upstream of the weir for a protracted period of time (Figure 16). The ramification is that the nutrient value of the spawned-out chum salmon was likely retained within the Takotna River, thereby contributing to the productivity of the system through the injection of marine derived nutrients (Cederholm et al. 1999). Retention of spawned-out salmon carcasses within the Takotna River is particularly important given that this salmon run appears to be in recovery following decades of near absence of salmon in the river. The retention of nutrients will assist the continued rebuilding of the Takotna River salmon runs, as well as increase the overall productivity of the encompassing ecosystem.

Females comprised 34.9% of the carcass count, compared to 48.0% of the upstream migrants. This reinforces that sex composition derived from weir carcass counts is biased low for females (DuBois and Molyneaux 2000).

Coho Salmon

Abundance. The escapement estimate of 7,171 coho salmon past the Takotna River weir from 24 June through 20 September is believed to be a reliable estimate of the 2003 total annual coho escapement (Table 1). Though the weir was inoperable for 4 days in late July, linear estimates of coho passage could be made and are considered reliable.

Coho salmon escapement in 2003 was much higher than any previous escapement recorded at the Takotna River (Figure 13, Appendix B.3). Record coho escapements were reported throughout the Kuskokwim River drainage in 2003 (e.g. Figure 19; Linderman et al. 2004, Shelden et al. 2004, Roettiger et al. *in press*, Zabkar and Harper *in press*).

Kuskokwim River coho salmon have not been identified as a stock of concern, even though harvests, and sometimes escapements, have generally been below average since 1996 (Ward et al 2003). In 2003, however, the coho run made a remarkable resurgence to an abundance that was most comparable in magnitude to the recorded run in 1996. There was a directed commercial fishery for Kuskokwim River coho salmon beginning 30 July and continuing through August. The below average harvest of 284,064 fish, compared to the 10-year average annual take of 356,164 coho salmon, was due to limited processing capacity (Whitmore and Bergstrom 2003).

Run Timing. Run timing of coho salmon in the Takotna River in 2003 was similar to that in previous years (Figure 15, Appendix B.3). The median passage date was similar over all years, although the central 50% passage occurred over a period of 14 days in 2003, compared to 10, 9, and 10 days in 2000, 2001, and 2002, respectively. The overall pattern of daily passage was markedly similar between the 4 years of enumeration data. At other Kuskokwim River escapement projects, the run timing of coho salmon was variable in 2003; for example, run timing was average at Kogrukluk and George river weirs (Linderman et al. 2004, Shelden et al.

2004), tied for earliest on record at Tuluksak River (Zabkar and Harper *in press*), and the latest on record at Kwethluk River (Roettiger et al. *in press*). A difference in water level fluctuations at the various weir projects appears to have an influence on run timing to the tributaries.

Carcasses. In addition to the upstream passage, records were kept regarding the occurrence of coho salmon carcasses washing downstream to the weir. However, no conclusions have been made because it is likely that the weir was removed before the majority of the fish had completed spawning.

Other Species

The number of longnose suckers that passed the weir in 2003 was similar to 2002, but was fewer than the 3,798 and 13,458 suckers seen in 2000 and 2001 (Appendix B.4). Fewer longnose suckers were also reported at the George River weir (Linderman et al. 2004), the only other monitored tributary where longnose suckers were a prominent species in 2003. A significant number of longnose suckers may have passed upstream during the high water levels before the first full day of operations, which may account for their low numbers. Information on longnose sucker passage is likely incomplete because upstream migration probably occurs before the beginning of weir operations (Morrow 1980).

Numbers of sockeye salmon passing the Takotna River weir remained low in 2003 (Appendix B.3). No pink salmon were seen passing upstream in 2003 (Appendix B.4).

Salmon Age-Sex-Length Composition

Chinook Salmon

Chinook ASL samples generally fell below the objective sample size, despite active sampling efforts. The need for achieving the target sample size for each ASL pulse sample was weighed against the need for collecting the samples over a brief period of time, the abundance of the species at the time the samples were collected, and the need to avoid undue delay to the salmon migration. As in 2001, the ASL data collected from chinook salmon were not adequate for describing the age composition for the total annual escapement in 2003 because the first and last third of the run were not represented; therefore, only general comparisons can be made from fish sampled during the same time frames in previous years (Clark and Molyneaux 2003).

Age-1.4 chinook salmon was the dominant age class in 2000 and 2002 total annual escapement, and in the incomplete samples from 2001 and 2003 (Appendix F.1). Though the ASL data were insufficient in 2003 for determining trends over the chinook run, information in 2000 and 2002 indicated that the percentage of age-1.4 fish increase as the season progresses (Figure 20). The percentage of age-1.3 chinook in the 2003 ASL samples was slightly higher than in 2000 or 2002, although the estimate for 2003 age-1.3 chinook may be conservative because trends in

2002 indicate that the percentage of age-1.3 fish decreases as the run progresses (Figure 20). This may indicate a stronger return of age-1.4 fish in 2004. However, the percentage of age-1.2 chinook in the ASL samples was lower than in either 2000 or 2002, which may indicate poorer returns in future years of the siblings from that same brood year. The age composition of chinook salmon sampled in 2003 had a higher percentage of older-aged fish than the samples from 2000 or 2002 (Appendix F.1).

The percentage of female chinook salmon in 2003 was higher than in previous years (Figure 21, Appendix F.1), though this percentage may be artificial due to the late operational date in 2003. A higher percentage of females would not be surprising given the higher percentage of older-aged fish, because older age classes were more prominent in 2003 and tend to have a higher incidence of females than younger age classes (DuBois and Molyneaux 2000). However, because the number of females tends to increase as the run progresses (Figure 21), the inoperable period early in the 2003 season may have accounted for the high percentage of female chinook seen in ASL samples. The percentage of female chinook during the 2003 operational period is similar to that of previous years during the same time period.

The mean length for male age-1.3 chinook salmon sampled in 2003 was greater than that observed in previous years, while length-at-age for other age classes appeared to be similar to past years (Appendix F.2). The mean length-at-age for female chinook salmon sampled in 2003 was similar to lengths observed in 2000, 2001, and 2002. For both male and female chinook salmon, length tends to increase as age increases. In addition, female chinook salmon had a larger average length-at-age than males.

Chum Salmon

The ASL data collected from chum salmon in 2003 were adequate for describing the age composition for the total annual escapement. Older chum salmon, age-0.4 and -0.5, were more prominent early in the run, and their percentages diminished as the season progressed and age-0.2 and -0.3 fish became more prominent (Figure 20, Appendix F.3). This trend was observed in 2000, 2001, and 2002, and has been observed at other escapement monitoring projects (DuBois and Molyneaux 2000, Clark and Molyneaux 2003). While age-0.3 chum salmon typically compose a large percentage of the annual run, the number of age-0.3 fish observed in 2003 was higher than in previous years (Appendix F.3; DuBois and Molyneaux 2000). This may produce a high number of returning age-0.4 fish for 2004, and is consistent with the relatively high number of age-0.2 fish observed in 2002 (Clark and Molyneaux 2003). This trend was similar to what was observed at other Kuskokwim escapement weirs for 2003 (e.g. Linderman et al. 2004, Shelden et al. 2004, Roettiger et al. *in press*, Zabkar and Harper *in press*). Missing from this assessment is the number of Takotna River chum salmon that may have been removed through harvest.

The percentages of female chum salmon were similar in 2000, 2001, 2002, and 2003 (Figure 21, Appendix F.3). These percentages are also similar to what is found at most other escapement projects (DuBois and Molyneaux 2000). DuBois and Molyneaux (2000) reported that within season percentage of females generally increases over the duration of the run. In 2003, the percentage of females increased from 33.5% to 63.0%. A similar pattern was observed in 2001; however, the 2000 and 2002 runs did not show this trend (Clark and Molyneaux 2003). The reason for inconsistency among years is unknown.

Mean lengths of chum salmon by sex and age class in 2003 were similar to those seen in past years. Some slight differences were observed, but may not be significant (Appendix F.4). The largest length variation was in age-0.5 male chum, but this age group is represented by the smallest sample size. For both male and female chum, length increased with older age classes. In addition, the average length-at-age for males was consistently larger than females.

Coho Salmon

The ASL data collected from coho salmon in 2003 were adequate for describing the age and length composition for the total annual escapement upstream. Similar to past years, the coho salmon run was dominated by age-2.1 fish (Table 7; Appendix F.5), which is typical of Kuskokwim Area coho runs (DuBois and Molyneaux 2000). Mean length for coho salmon has varied little in the 4 years that length data have been collected (Appendix F.6). In 2003, both male and female coho length was similar among age classes and among years.

The percentage of female coho salmon in 2003 was greater than in 2000, 2001, or 2002 (Appendix F.5). In past years, there have been questions regarding the crew misidentifying the sex of fish. DuBois and Molyneaux (2000) identified erroneous sex identification as being a persistent problem with coho salmon, and this necessitates continued diligence in sexing fish at the Takotna River weir project.

Salmon Tag Recovery

Chinook Radiotelemetry Tag Recovery

Two radio-tagged chinook salmon passed through the weir in 2003. The chinook were tagged at the Kalskag/Aniak tagging site on 27 June and 5 July. The total transit time to the Takotna River radio receiver station was 15 and 18 days, and the migration rate was 37.6 km per day and 31.3 km per day, respectively. Both chinook salmon were eventually detected in Fourth-of-July Creek during aerial tracking, where it is assumed they spawned (Stuby *in press*). The two radio-tagged fish were 0.5% of the chinook salmon escapement upstream of the weir, which was similar to the percentage at other weir projects in the Kuskokwim River drainage (Stuby *in press*).

A total of six radio-tagged chinook salmon were found in the Takotna River drainage during 2003. In addition to the two fish that passed the weir, two more were detected downstream near the community of Takotna, and two in the Nixon Fork River. In 2002, no radio-tagged chinook salmon passed the weir, and only one was found downstream of the weir (Stuby 2003).

Stuby (*in press*) will discuss details of the 2003 Kuskokwim River chinook radiotelemetry project. Overall, the run timing of discreet chinook salmon spawning aggregates past the Kalskag/Aniak tagging site was more compacted in 2003 than in 2002 (Figure 22). Furthermore, the pattern of upper river populations running past the tagging site earlier than lower river populations was less distinct in 2003 than in 2002.

Chum Mark-Recapture Tag Recovery

Six tagged chum salmon were observed passing the Takotna River weir in 2003; three tags were observed during the central 50% of the run (Figure 23). Of the four tag numbers that were recovered, three were tagged from the first 10% of the chum salmon run past the Kalskag/Aniak tagging sites (Figure 24). Similar to 2002, transit time in 2003 from Kalskag/Aniak ranged from 14 to 16 days, with a migration speed that ranged from 35 to 40 km per day (Appendix C; Kerkvliet et al. 2003). The sample size is small, but these findings suggest that chum salmon migrating to the Takotna River are predominately an early component of the Kuskokwim River chum run. This tendency may be typical of other upper Kuskokwim River tributaries. Tag recoveries from other Kuskokwim River escapement projects suggest a difference in run timing between spawning populations as they passed the Kalskag/Aniak mark-recapture sites (Figure 25; Kerkvliet et al. 2003, Kerkvliet et al. *in press*). According to these results, chum salmon bound for upper river tributaries tend to pass through the lower river during the earlier parts of the run, emphasizing the importance of run timing information for sustainable management of Kuskokwim River chum salmon. Populations of late-spawning chum salmon are not represented in the tagging results.

The percentage of tagged fish in the total annual chum salmon escapement past the Takotna River weir was relatively small compared to the percentage observed at the George River weir or the Aniak River sonar projects, while the percentage was similar to that observed at the Kogrukluk River weir (Kerkvliet et al. *in press*). The lower incidence of tagged chum salmon in the Takotna River indicates that this spawning aggregate had a lower probability of capture at the tagging site than did chum salmon from other tributaries. The reasons for this disparity are unknown. Kerkvliet et al. (*in press*) will discuss details about the 2003 mark-recapture tagging project.

Coho Mark-Recapture Tag Recovery

Seventy-one tagged coho salmon were observed passing the Takotna River weir in 2003, but the run timing of the tagged fish was about 3 days later than the run timing of the overall escapement (Figure 23). The lag in run timing for the tagged fish may be associated with the recovery time required following handling during the tagging event at the Kalskag/Aniak tagging sites, and decreased as the run progressed. Tag numbers were recovered from 67 of the 71 tagged coho salmon that passed the weir (Appendix C). Of these 71 fish, only 12 were tagged from a left bank wheel, suggesting some bank preference for coho salmon returning to the Takotna River. The transit time for tagged fish from the Kalskag/Aniak tagging sites to the weir ranged from 12 to 29 days, and the average travel time was 19 days. The migration speed from the tagging sites to the Takotna River weir ranged from 19 to 47 km per day, with an average migration speed of 31 km per day.

Information from recovered tags indicates that Takotna River coho salmon passed through the Kalskag/Aniak tagging site during the early part of the overall Kuskokwim River coho run (Figure 26). The midpoint of the coho salmon captures at the tagging sites was 19 August, but by that date 84% of the coho salmon bound for the Takotna River had been tagged. As in 2002, these findings indicate that coho salmon migrating to the Takotna River occur early in the overall Kuskokwim River coho run (Kerkvliet et al. 2003). This pattern may be typical of upper Kuskokwim River tributaries. Though not as pronounced as chum salmon, tag recoveries from coho salmon at other escapement projects in the Kuskokwim River basin suggest a difference in run timing between spawning populations as they passed the Kalskag/Aniak mark-recapture sites (Figure 27; Kerkvliet et al. 2003, Kerkvliet et al. *in press*). According to these results, coho salmon bound for upper river tributaries tend to pass through the lower river during the earlier parts of the run, emphasizing the importance of run timing information for sustainable management of Kuskokwim River salmon.

Climatological and Hydrological Monitoring

There were two high water events that rendered the weir inoperable during 2003 (Figure 28). The first occurred the day after the weir was installed in early July, and crested at 118 cm. The second occurred on 29 July, and crested at 137 cm. There did not appear to be a strong correlation in 2003 between increases in chinook and chum salmon passage and increases in water level (Figure 29). However, the weir was inoperable during the highest river stages, and more fish may have passed at these times than was estimated.

The reported range in water temperature of the Takotna River during the 2003 project operations was consistent with the 2000 and 2002 ranges and more variable than the 2001 range (Clark and Molyneaux 2003). The average water temperature was lower than in previous years. There did not appear to be a strong correlation between daily water temperatures and salmon passage (Figure 30).

Juvenile Salmon Investigations

This was the fourth consecutive year in which juvenile salmon investigations were conducted in the Takotna River basin, but efforts in 2003 were less extensive than past years. Low water levels during the summer months made access difficult upstream of Fourth-of-July Creek, so most sampling occurred downstream of Fourth-of-July Creek. The one exception was a sampling event to Moore Creek in the upper Takotna River basin on 19 June, but no juvenile salmon were captured. Overall, the juvenile salmon investigations conducted in 2003 provided no new distribution information.

Length-frequency distributions of captured juvenile salmon (Figure 31) indicate the presence of multiple age classes for both chinook and coho salmon, which is similar to findings in 2001 and 2002. Since little sampling was done in 2003, and individual sites were not sampled more than once during the season, it is difficult to draw conclusions regarding emergence timing or habitat usage. However, most of the juvenile chinook salmon were sampled from Fourth-of-July Creek in July, and most of the juvenile coho salmon were sampled from Big Creek (lower) in June.

Aerial Stream Surveys

Chinook and Early-spawning Chum Salmon

The Salmon River (Pitka Fork drainage) was the main spawning system for chinook salmon in 2003. The Salmon River index area has been surveyed 23 times since 1975, with a focus on enumerating chinook salmon (Burkey and Salomone 1999). Counts in previous years ranged from 272 to 2,555 salmon. In 2003, aerial survey counts found 1,391 chinook, exceeding the minimum escapement goal of 1,300 fish. No early-spawning chum salmon were observed.

There has been interest in developing a weir project on the Salmon River, though the project may be of limited utility compared to other weirs in the area. Aerial survey data indicate that the Salmon River is an important upper Kuskokwim River spawning area for chinook salmon, but use by other salmon species is negligible. A weir was operated on the southern fork of the Salmon River in 1981 and 1982, but the passage was mostly limited to chinook salmon (Schneiderhan 1982a, 1982b). A ground survey for a potential weir installation site was conducted in 2000 (L. DuBois, ADF&G Anchorage, personal communication), but the most promising locations may conflict with subsistence fishers that operate in the immediate area.

Elsewhere in the Pitka Fork drainage, the mainstem Pitka Fork upstream of Sheep Creek had the next highest concentration of chinook salmon. This is similar to observations in 2002 (Clark and Molyneaux 2003). A survey was not conducted in the mainstem downstream of Sheep Creek, but 176 chinook salmon were observed in Bear Creek. Bear Creek has been surveyed 10 times since 1975, with chinook salmon counts ranging from 3 to 242 fish (Burkey and Salomone 1999).

Historically, 48 aerial surveys have been conducted collectively on the mainstem Pitka Fork, Salmon River, Bear Creek, Sullivan Creek, and Sheep Creek to assess chinook and early-spawning chum salmon escapements (Burkey and Salomone 1999, Clark and Molyneaux 2003). Since the first survey in July 1975, early-spawning chum salmon have been observed in only five surveys in the mainstem Pitka Fork and in the Salmon River (Burkey and Salmone 1999). The abundance of early-spawning chum salmon has been 50 fish or fewer in the five surveys that chum salmon were observed. Results from the weir operated on the Salmon River in 1981 and

1982 documented counts of eight and 39 chum salmon respectively (Schneiderhan 1982a, 1982b). Aerial surveys conducted in those years reported no chum salmon, although the 1981 survey was rated as poor (Burkey and Salomone 1999). In the Salmon River there was a single report of 997 early-spawning chum salmon in 1997; however, speciation in this survey is suspect due to the poor surveying conditions and inexperience of the observer. Aerial survey data indicate that the Pitka Fork and its tributaries are not utilized by early-spawning chum salmon, although early-spawning chum salmon may remain undetected in the Pitka Fork downstream from its confluence with Sullivan Creek because the water clarity of the mainstem Pitka Fork is marginal for aerial surveys in most years.

Coho and Late-spawning Chum Salmon

Aerial surveys in the Takotna River drainage occurred after cumulative coho salmon passage at the weir had reached 100% (Table 1). However, the fish observed during the aerial surveys only accounted for 3.1% of the cumulative escapement through 20 September. Fourth-of-July Creek remained the dominant system for spawning coho salmon in the Takotna River drainage. Coho were also found in Big Creek (lower), and a few were found in Little Waldren Fork and Moore Creek. In surveys conducted in 2000 and 2001, no fish were found in either Little Waldren Fork or Moore Creek, although coho escapements were much lower in those years. Late-spawning chum salmon do not occur in the Takotna River.

Aerial surveys conducted in the South Fork Kuskokwim River basin concentrated on an unnamed tributary of the Little Tonzona River, the Jones River, and clearwater side channels where fish had been found in 1996, 2000, 2001, and 2002 surveys. In each year, many of the late-spawning chum salmon were found in one west bank side channel (62°54.37 N, 154°05.81 W). In 2003, there were 812 late-spawning chum in this channel; this same side channel had 4,150 late-spawning chum in 2002, and 375, 50, and 480 chum in 1996, 2000, and 2001, respectively (Burkey and Salomone 1999, Schwanke and Molyneaux 2002, Clark and Molyneaux 2003). Coho salmon were found in side channels throughout the 2003 survey, mostly in small groups of 5 to 15 fish. The largest number of coho salmon, 208 fish, were found in a side channel located at 62°30.62 N, 153°32.55 W. Portions of the South Fork Kuskokwim River have been surveyed in 1996, 2000, 2001, and 2002, and results have varied. In general, salmon were found in clear side channels, and in most years (1996, 2001, 2002, and 2003) there were many more late-spawning chum salmon than coho salmon. The Jones River, a braided stream with clarity slightly obscured by glacier flour, had 20 chum and 136 coho. A portion of the Jones River surveyed in 2001 had 165 coho (Schwanke and Molyneaux 2002). An unnamed tributary of the Little Tonzona was surveyed in 2000, 2001, and 2003 and observed 900, 208, and 1,194 coho salmon, respectively. A different unnamed tributary was surveyed in 2002, and only three coho salmon were observed.

Aerial surveys in the Big River basin during 2003 concentrated on clear side channels where fish had been found in 1996, 2000, and 2001 surveys. Though Big River appeared to have good spawning habitat, relatively few coho and late-spawning chum salmon were observed during the 2003 survey. Side channels that contained large numbers of salmon in past surveys had few or no fish in 2003.

The only tributary in the Highpower Creek basin that had adequate survey conditions in 2003 was Fish River. Part of this stream was surveyed in 1996, when 634 coho salmon were counted (Schwanke et al. 2001). In 2003, a total of 1,433 coho salmon were seen, some in large groups of 50 to 100 fish. This stream could serve as an excellent coho salmon index stream.

CONCLUSIONS

Weir Operations

- High water levels resulted in an 11-day delay in the start of operations, plus a 5-day inoperable period in late July.
- Total annual escapement was estimated for chum and coho salmon, but not for chinook salmon.

Fish Passage

- Although the 2003 chinook salmon escapement assessment was incomplete, the escapement showed improvement over 2000 and 2002. The improvement, however, appears proportionately lower than the increases seen at most other Kuskokwim River tributaries.
- Chum salmon escapement was above average; however, this was the third year that total annual escapement to the Takotna River has decreased, which is contrary to the pattern seen at most other tributaries in the Kuskokwim River drainage.
- Coho salmon escapement in 2003 was the largest escapement yet recorded for the Takotna River, which was consistent with trends seen elsewhere in the Kuskokwim River.

Salmon Age-Sex-Length Composition

- There were no noteworthy deviations from past years in the ASL composition for any salmon species, although a relatively high abundance of age-1.3 chinook salmon and age-0.3 chum salmon are good indications of continued improvement in run abundance for 2004.

Salmon Tag Recovery

- The run timing of discreet chinook salmon spawning aggregates past the Kalskag/Aniak tagging site was more compacted in 2003 than in 2002; furthermore, the pattern of upper river populations running past the tagging site earlier than lower river populations was less distinct in 2003 than in 2002, inclusive of the fish that past the Takotna River weir.
- Radio-tagged chinook salmon have been detected downstream of the Takotna River weir for the second consecutive year, suggesting the occurrence of spawning areas downstream of the weir.
- For the second consecutive year, the run timing of Takotna River chum salmon past the Kalskag/Aniak tagging site was earlier than any other monitored tributary. The emerging

pattern has particular ramifications for stock based management of fisheries in the lower Kuskokwim River.

- The proportion of tagged chum salmon at the Takotna River weir is low relative to the observed passage when compared to other weir projects, indicating that Takotna River chum salmon are less susceptible to capture at the Kalskag/Aniak tagging site than are other chum salmon spawning stocks.
- For the second consecutive year, the run timing of Takotna River coho salmon past the Kalskag/Aniak tagging site was earlier than any other monitored tributary. The emerging pattern has particular ramifications for stock based management of fisheries in the lower Kuskokwim River, although the difference in run timing between spawning populations appears less protracted than was observed in chum salmon.
- The proportion of tagged coho salmon at Takotna River weir is more comparable to that observed at other weir projects, indicating a more equal probability of capture between spawning populations as they pass through the Kalskag/Aniak tagging site.

Juvenile Salmon Investigations

- Limited juvenile salmon investigations were done in Takotna River tributaries upstream of Fourth-of-July Creek in 2003, and no new distribution information was added to the database.

Aerial Stream Surveys

- The largest concentration of spawning chinook salmon found in the upper Kuskokwim River was in the Salmon River (Pitka Fork drainage), which is consistent with findings in past years.
- The 2003 aerial survey of chinook salmon in the Salmon River (Pitka Fork drainage) was 59 fish short of the 1,300 fish escapement goal, which was similar to 2002 but an improvement over 2001 and 2000.
- Adult coho salmon were found in Moore Creek and Little Waldren Creek of the upper Takotna River drainage.
- Adult coho salmon were found in most of the tributaries surveyed in the upper Kuskokwim River, with the largest concentrations in Fish Creek (Highpower Creek drainage) and a clear water tributary of the Little Tonzona River.
- The largest concentrations of adult late-spawning chum salmon were found in clear water side sloughs of the South Fork Kuskokwim River.

Recommendations

Annual operation of the Takotna River weir should continue indefinitely. As the only ground based monitoring project in the upper Kuskokwim River basin, the project provides insights about upper river chinook, chum, and coho salmon that are critical for sustainable salmon management practices. Most notably the Takotna River weir provides an index of escapement for upper Kuskokwim River salmon populations, which are shown to have the earliest run timing through the subsistence and commercial fisheries of the lower Kuskokwim River (Kalskag and

Aniak). These early running populations are subject to intensive harvest at a point in the run when fisheries managers have the least information to assess run abundance; consequently, these early running populations are at greatest risk of management error.

Weir Operations

- The Takotna River weir should continue to be operated jointly by the TTC and the ADF&G. The TTC crew is fully capable at operating the weir, but TTC lacks capacity for conducting post-season data analysis and report writing. The mutually dependent partnership has created a level of dialogue and synergy that benefits both organizations, as well as the public. Formal and informal discussions that have arisen through the presence of ADF&G staff at Takotna and McGrath has created a level of public awareness about salmon management and stock status that did not previously exist. The interaction has also created a heightened level of trust between the public and ADF&G that should not be dismissed.
- As opportunity allows, crewmembers should consider installing the substrate railing late in the spring to take advantage of low water levels in the Takotna River, thereby hopefully avoiding the delay in operation experienced in 2003. The TTC crew are resident at Takotna, making the likelihood of effective timing of an early installation highly plausible.

Fish Passage

- Investigate the use of findings from the main river chinook salmon radio telemetry project to estimate the numbers of chinook salmon spawning downstream of the Takotna River weir by comparing the ratio of tagged to untagged chinook above the weir to the number of radio tagged chinook salmon found only downstream of the weir. If tag recovery numbers for a given year are too low, consider pooling results from multiple years.

Salmon Age-Sex-Length Composition

- Sample size objectives for chinook salmon ASL sampling should be re-evaluated for the Takotna River weir because the target sample size of three 210-fish samples typically exceeds the total annual escapement at the weir.

Salmon Tag Recovery

- Takotna River weir is the farthest upstream salmon escapement monitoring project in the Kuskokwim River drainage. As a representative of upper river spawning populations, the recovery of tags at this site provides insights into the run timing of these fish through the lower Kuskokwim River that is not available by any other means. Preliminary findings that these fish have a relatively early run timing are of particular interest to salmon managers because of the implications of harvest timing in lower Kuskokwim River fisheries. As such, the Takotna River weir should continue to be operated in conjunction with main river tagging projects.

Juvenile Salmon Investigations

- Future effort to document distribution of juvenile chinook and coho salmon in the Takotna River drainage should focus on the upper portion of the Takotna River basin, upstream of Fourth-of-July Creek. The exceptional coho salmon escapement in 2003, coupled with the observation of adult coho salmon in Moore Creek and Little Waldren Creek, should enhance the likelihood that juvenile coho salmon will be found in these tributaries in 2004.

- Another area of investigation to consider is to document the timing of juvenile chum salmon outmigration from the Takotna River.

Aerial Stream Surveys

- Future aerial surveys to assess late-spawning chum salmon abundance in the upper Kuskokwim River should focus on segments of the South Fork of the Kuskokwim River identified in this report.
- Future aerial surveys to assess relative abundance of coho salmon in the upper Kuskokwim River should focus on Little Tonzona River drainage and Fish Creek (High Power Creek drainage).
- Aerial surveys should continue in Fourth-of-July Creek to create a pair database with weir passage.

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TABLES

Table 1. Daily, cumulative, and percent passage for chinook, chum, and coho salmon and longnose suckers at the Takotna River weir, 2003.

Date	Chinook Salmon			Chum Salmon			Coho Salmon			Longnose Sucker		
	Daily	Cumulative	Percent Passage	Daily	Cumulative	Percent Passage	Daily	Cumulative	Percent Passage	Daily	Cumulative	Percent Passage
24-Jun	d			0 b	0	0	0 b	0	0	c		
25-Jun	d			0 b	0	0	0 b	0	0	c		
26-Jun	d			1 b	1	0	0 b	0	0	c		
27-Jun	d			5 b	6	0	0 b	0	0	c		
28-Jun	d			7 b	13	0	0 b	0	0	c		
29-Jun	d			4 b	17	1	0 b	0	0	c		
30-Jun	d			12 b	29	1	0 b	0	0	c		
1-Jul	d			10 b	39	1	0 b	0	0	c		
2-Jul	10 d	10	3	40 a	79	2	0 b	0	0	0 c	0	0
3-Jul	5 d	15	4	57 a	136	4	0 b	0	0	0 c	0	0
4-Jul	d	15	4	54 b	190	6	0 b	0	0	c	0	0
5-Jul	6	21	6	111	301	9	0	0	0	0	0	0
6-Jul	6	27	7	120	421	12	0	0	0	1	1	0
7-Jul	6	33	9	126	547	16	0	0	0	0	1	0
8-Jul	10	43	11	137	684	20	0	0	0	8	9	1
9-Jul	37	80	21	142	826	24	0	0	0	1	10	2
10-Jul	23	103	27	88	914	27	0	0	0	13	23	4
11-Jul	10	113	30	47	961	28	0	0	0	1	24	4
12-Jul	16	129	34	77	1,038	31	0	0	0	1	25	4
13-Jul	24	153	40	62	1,100	32	0	0	0	9	34	6
14-Jul	5	158	42	140	1,240	37	0	0	0	29	63	10
15-Jul	2	160	42	129	1,369	40	0	0	0	23	86	14
16-Jul	5	165	44	155	1,524	45	0	0	0	9	95	16
17-Jul	9	174	46	150	1,674	49	0	0	0	27	122	20
18-Jul	22	196	52	172	1,846	54	0	0	0	0	122	20
19-Jul	26	222	59	187	2,033	60	0	0	0	38	160	26
20-Jul	26	248	66	231	2,264	67	0	0	0	144	304	50
21-Jul	8	256	68	155	2,419	71	0	0	0	6	310	51
22-Jul	15	271	72	168	2,587	76	0	0	0	43	353	58
23-Jul	6	277	73	87	2,674	79	0	0	0	38	391	64
24-Jul	11	288	76	69	2,743	81	0	0	0	2	393	65
25-Jul	7	295	78	63	2,806	83	0	0	0	0	393	65
26-Jul	4	299	79	53	2,859	84	4	4	0	22	415	68
27-Jul	9	308	81	53	2,912	86	3	7	0	2	417	68
28-Jul	6 a	314	83	50 a	2,962	87	4 a	11	0	0 c	417	68
29-Jul	6 b	320	85	46 b	3,008	89	4 b	15	0	c	417	68
30-Jul	6 b	326	86	43 b	3,051	90	5 b	20	0	c	417	68
31-Jul	5 b	331	88	39 b	3,090	91	5 b	25	0	c	417	68
1-Aug	5 a	336	89	36 a	3,126	92	6 a	31	0	0 c	417	68
2-Aug	4	340	90	29	3,155	93	4	35	0	0	417	68
3-Aug	5	345	91	35	3,190	94	8	43	1	1	418	69
4-Aug	5	350	93	32	3,222	95	13	56	1	1	419	69
5-Aug	4	354	94	44	3,266	96	15	71	1	0	419	69
6-Aug	1	355	94	28	3,294	97	27	98	1	4	423	69
7-Aug	2	357	94	18	3,312	98	25	123	2	9	432	71
8-Aug	5	362	96	11	3,323	98	48	171	2	3	435	71
9-Aug	2	364	96	6	3,329	98	40	211	3	4	439	72
10-Aug	0	364	96	6	3,335	98	50	261	4	7	446	73
11-Aug	0	364	96	6	3,341	98	85	346	5	8	454	75
12-Aug	0	364	96	4	3,345	99	139	485	7	0	454	75
13-Aug	0	364	96	10	3,355	99	150	635	9	2	456	75
14-Aug	2	366	97	7	3,362	99	212	847	12	106	562	92
15-Aug	0	366	97	6	3,368	99	140	987	14	19	581	95
16-Aug	0	366	97	5	3,373	99	131	1,118	16	4	585	96
17-Aug	1	367	97	0	3,373	99	121	1,239	17	1	586	96
18-Aug	2	369	98	2	3,375	99	160	1,399	20	0	586	96

-Continued-

Table 1. (Page 2 of 2)

Date	Chinook Salmon			Chum Salmon			Coho Salmon			Longnose Sucker		
	Daily	Cumulative	Percent Passage	Daily	Cumulative	Percent Passage	Daily	Cumulative	Percent Passage	Daily	Cumulative	Percent Passage
19-Aug	1	370	98	0	3,375	99	348	1,747	24	1	587	96
20-Aug	1	371	98	4	3,379	100	197	1,944	27	0	587	96
21-Aug	1	372	98	2	3,381	100	356	2,300	32	0	587	96
22-Aug	0	372	98	0	3,381	100	254	2,554	36	11	598	98
23-Aug	2	374	99	5	3,386	100	176	2,730	38	0	598	98
24-Aug	0	374	99	0	3,386	100	189	2,919	41	0	598	98
25-Aug	1	375	99	1	3,387	100	217	3,136	44	0	598	98
26-Aug	1	376	99	0	3,387	100	299	3,435	48	3	601	99
27-Aug	1	377	100	0	3,387	100	429	3,864	54	0	601	99
28-Aug	0	377	100	1	3,388	100	335	4,199	59	0	601	99
29-Aug	0	377	100	0	3,388	100	288	4,487	63	0	601	99
30-Aug	0	377	100	0	3,388	100	219	4,706	66	0	601	99
31-Aug	0	377	100	1	3,389	100	267	4,973	69	0	601	99
1-Sep	1	378	100	0	3,389	100	285	5,258	73	0	601	99
2-Sep	0	378	100	0	3,389	100	277	5,535	77	0	601	99
3-Sep	0	378	100	0	3,389	100	192	5,727	80	0	601	99
4-Sep	0	378	100	0	3,389	100	91	5,818	81	0	601	99
5-Sep	0	378	100	0	3,389	100	262	6,080	85	0	601	99
6-Sep	0	378	100	1	3,390	100	209	6,289	88	0	601	99
7-Sep	0	378	100	1	3,391	100	188	6,477	90	0	601	99
8-Sep	0	378	100	1	3,392	100	200	6,677	93	0	601	99
9-Sep	0	378	100	1	3,393	100	131	6,808	95	0	601	99
10-Sep	0	378	100	0	3,393	100	70	6,878	96	0	601	99
11-Sep	0	378	100	0	3,393	100	78	6,956	97	0	601	99
12-Sep	0	378	100	0	3,393	100	83	7,039	98	0	601	99
13-Sep	0	378	100	0	3,393	100	79	7,118	99	2	603	99
14-Sep	0	378	100	0	3,393	100	28	7,146	100	0	603	99
15-Sep	0	378	100	0	3,393	100	10	7,156	100	0	603	99
16-Sep	0	378	100	0	3,393	100	9	7,165	100	0	603	99
17-Sep	0	378	100	0	3,393	100	4	7,169	100	0	603	99
18-Sep	0	378	100	0	3,393	100	1	7,170	100	3	606	100
19-Sep	0	378	100	0	3,393	100	1	7,171	100	0	606	100
20-Sep	0	378	100	0	3,393	100	0	7,171	100	3	609	100

a = estimated salmon passage (partial day)
b = estimated salmon passage (whole day)
c = no estimation for missed longnose sucker counts
d = no estimates for inoperable period

Table 2. Age and sex composition of chinook salmon sampled at the Takotna River weir in 2003, using escapement samples collected with a live trap.

Year	Sample Dates	Sample Size	Sex	Age Class 1.1 Esc.	1.1 %	1.2 Esc.	1.2 %	1.3 Esc.	1.3 %	2.2 Esc.	2.2 %	1.4 Esc.	1.4 %	1.5 Esc.	1.5 %	Total Esc.	Total %
2003 [a]	7/5-25	61	M		0.0		8.2		31.2		0.0		14.8		0.0		54.1
			F		0.0		0.0		9.8		0.0		34.4		1.6		45.9
			Subtotal		0.0		8.2		41.0		0.0		49.2		1.6	96	100.0

[a] Sampling dates do not meet criteria for estimating escapement percentages for all of the strata.

Table 3. Mean length (mm) of chinook salmon sampled at the Takotna River weir in 2003 using escapement samples collected with a live trap.

Year	Sample Dates	Sex		Age Class 1.1	1.2	1.3	2.2	1.4	1.5
2003 [a]	7/5-25	M	Mean Length		514	723		764	
			Range		430- 607	635- 785		675- 893	
			Sample Size	0	5	19	0	9	0
		F	Mean Length			817	975	867	975
			Range			765- 850	975- 975	770- 980	975- 975
			Sample Size	0	0	6	1	21	1

[a] Sampling dates do not meet criteria for estimating escapement percentages for all of the strata.

Table 4. Age and sex composition of chum salmon at the Takotna River weir in 2003 based on escapement samples collected with a live trap.

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	0.2 Esc.	0.2 %	0.3 Esc.	0.3 %	0.4 Esc.	0.4 %	0.5 Esc.	0.5 %	Total Esc.	Total %
2003	7/5 - 7	212	M	0	0.0	496	54.3	104	11.3	9	0.9	608	66.5
	(6/24 - 7/10)		F	26	2.8	224	24.5	56	6.2	0	0.0	306	33.5
			Subtotal	26	2.8	720	78.8	160	17.5	9	0.9	914	100.0
	7/14 - 16	187	M	6	0.5	556	49.7	102	9.1	0	0.0	664	59.4
	(7/11 - 7/19)		F	24	2.2	413	36.9	18	1.6	0	0.0	455	40.6
			Subtotal	30	2.7	969	86.6	120	10.7	0	0.0	1,119	100.0
	7/23 - 25, 8/10 - 11	165	M	8	0.6	445	32.7	41	3.0	8	0.6	503	37.0
	(7/20 - 9/20)		F	107	7.9	701	51.5	50	3.7	0	0.0	857	63.0
			Subtotal	115	8.5	1,146	84.2	91	6.7	8	0.6	1,360	100.0
	Season	564	M	14	0.4	1,497	44.2	246	7.3	17	0.5	1,775	52.3
			F	157	4.6	1,338	39.4	124	3.6	0	0.0	1,618	47.7
			Total	171	5.0	2,835	83.6	370	10.9	17	0.5	3,393	100.0

Table 5. Mean length (mm) of chum salmon at the Takotna River weir in 2003 based on escapement samples collected with a live trap.

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
2003	7/5 - 7	M	Mean Length		585	624	618
	(6/24 - 7/10)		Std. Error		3	5	18
			Range		500- 645	570- 676	600- 635
			Sample Size	0	115	24	2
		F	Mean Length	540	568	585	
			Std. Error	10	4	7	
			Range	505- 563	520- 647	555- 625	
			Sample Size	6	51	13	0
	7/14 - 16	M	Mean Length	550	567	604	
	(7/11 - 7/19)		Std. Error	-	3	9	
			Range	550- 550	505- 635	500- 655	
			Sample Size	1	93	17	0
		F	Mean Length	521	544	590	
			Std. Error	5	4	30	
			Range	510- 532	475- 620	535- 640	
			Sample Size	4	69	3	0
	7/23 - 25, 8/10 - 11	M	Mean Length	530	554	603	630
	(7/20 - 9/20)		Std. Error	-	4	14	-
			Range	530- 530	476- 620	570- 650	630- 630
			Sample Size	1	54	5	1
		F	Mean Length	502	527	547	
			Std. Error	6	3	12	
			Range	470- 537	485- 605	495- 580	
			Sample Size	13	85	6	0
	Season	M	Mean Length	538	569	612	624
			Range	530- 550	476- 645	500- 676	600- 635
			Sample Size	2	262	46	3
		F	Mean Length	510	539	570	
			Range	470- 563	475- 647	495- 640	
			Sample Size	23	205	22	0

Table 6. Age and sex composition of coho salmon at the Takotna River weir in 2003 based on escapement samples collected with a live trap.

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 1.1 Esc.	1.1 %	2.1 Esc.	2.1 %	3.1 Esc.	3.1 %	Total Esc.	Total %
2003	8/10 - 11	61	M	0	0.0	623	55.7	19	1.7	641	57.4
	(7/26 - 8/16)		F	0	0.0	458	41.0	18	1.6	477	42.6
			Subtotal	0	0.0	1,081	96.7	37	3.3	1,118	100.0
	8/22 - 23	62	M	62	1.6	1,617	41.9	311	8.1	1,990	51.6
	(8/17 - 8/31)		F	0	0.0	1,741	45.2	124	3.2	1,865	48.4
			Subtotal	62	1.6	3,358	87.1	435	11.3	3,855	100.0
	9/10 - 11	60	M	0	0.0	696	31.7	110	5.0	806	36.7
	(9/1 - 20)		F	0	0.0	1,062	48.3	330	15.0	1,392	63.3
			Subtotal	0	0.0	1,758	80.0	440	20.0	2,198	100.0
	Season	183	M	62	0.9	2,936	40.9	439	6.1	3,437	47.9
			F	0	0.0	3,261	45.5	472	6.6	3,734	52.1
			Total	62	0.9	6,197	86.4	911	12.7	7,171	100.0

Table 7. Mean length (mm) of coho salmon at the Takotna River weir in 2003 based on escapement samples collected with a live trap.

Year	Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
2003	8/10 - 11	M	Mean Length		544	628
	(7/26 - 8/16)		Std. Error		7	-
			Range		462- 641	628- 628
			Sample Size	0	34	1
		F	Mean Length		562	547
			Std. Error		4	-
			Range		537- 604	547- 547
			Sample Size	0	25	1
	8/22 - 23	M	Mean Length	488	533	578
	(8/17 - 8/31)		Std. Error	-	7	21
			Range	488- 488	427- 598	510- 624
			Sample Size	1	26	5
		F	Mean Length		567	548
			Std. Error		5	36
			Range		492- 612	512- 583
			Sample Size	0	28	2
	9/10 - 11	M	Mean Length		551	564
	(9/1 - 20)		Std. Error		12	24
			Range		450- 640	523- 606
			Sample Size	0	19	3
		F	Mean Length		568	576
			Std. Error		7	8
			Range		480- 625	542- 605
			Sample Size	0	29	9
	Season	M	Mean Length	488	540	576
			Range	488- 488	427- 641	510- 628
			Sample Size	1	79	9
		F	Mean Length		566	567
			Range		480- 625	512- 605
			Sample Size	0	82	12

Table 8. Juvenile chinook and coho salmon data collected in the Takotna River drainage, 2003.

Index	Chinook								Coho							
Area[c]	Seine			Trap				Percent by Index Area	Seine			Trap				Percent by Index Area
	No. of Sets	No. of Fish	CPUE[a]	No. of Sets	Soak (hrs)	No. of Fish	CPUE[b]		No. of Sets	No. of Fish	CPUE[a]	No. of Sets	Soak (hrs)	No. of Fish	CPUE[b]	
1	0	na	na	0	na	na	na	na	0	na	na	0	na	na	na	na
2	0	na	na	16	36	3	0.28	6	0	na	na	16	36	2	0.19	7
3	0	na	na	13	12	0	0.00	0	0	na	na	13	12	26	1.00	90
4	0	na	na	10	24	50	5.00	94	0	na	na	10	24	1	0.10	3
5	0	na	na	0	na	na	na	na	0	na	na	0	na	na	na	na
6	0	na	na	0	na	na	na	na	0	na	na	0	na	na	na	na
7	0	na	na	0	na	na	na	na	0	na	na	0	na	na	na	na
8	0	na	na	0	na	na	na	na	0	na	na	0	na	na	na	na
9	0	na	na	0	na	na	na	na	0	na	na	0	na	na	na	na
10	0	na	na	0	na	na	na	na	0	na	na	0	na	na	na	na
11	0	na	na	20	14	0	0	0	0	na	na	20	14	0	0	0
12	0	na	na	0	na	na	na	na	0	na	na	0	na	na	na	na
13	0	na	na	0	na	na	na	na	0	na	na	0	na	na	na	na
Totals	0	0	0	59		53	0.90	100	0	0	0.00	59		29	0.49	100

[a] CPUE is defined as the number of salmon captured per seine attempt

[b] CPUE is defined as the number of salmon captured per trap per 24-h period

[c] Area

1	below weir
2	above weir to 4th of July Creek
3	Big Creek (lower)
4	4th of July Creek
5	Fourth of July Creek to Big Waldren Fork
6	Bonnie Creek
7	Minnie Creek
8	Big Waldren Fork
9	Big Waldren Fork to Moore Creek/Little Waldren Confluence
10	Little Waldren Fork
11	Moore Creek
12	Big Creek (upper)
13	Tatalina Creek

Table 9. Historic chinook salmon escapements for selected tributaries of the Kuskokwim River.

Escapement Project	Year					
Weir	1996	1997	2000	2001	2002	2003
Takotna River	401	1,176	345	723	316	378[a]
Tatlawiksuk River			817	2,010	2,237	1,683[b]
Kogrukluk River	14,199	13,286	3,310	9,298	10,099	11,771
George River	7,716	7,834	2,960	3,309	2,444	4,693[c]
Kwethluk River		10,395	3,547		8,397	14,474
Aerial Survey						
Salmon River (Pitka Fork)			374	1,029	1,276	1,371
Cheeneetnuk River		345			730	810
Holitna River		2,093	501	1,760	1,741	1,477
Oskawalik River		1,470	62	181	235	844
Holokuk River	85	165	42	52	513	1,096
Salmon River (Aniak River)	983	980	152	703	1,236	1,292
Kipchuk River (Aniak River)		855	182		1,615	1,493
Aniak River	3,496	2,187	714		1,856	3,514
Kisaralik River	439				2,285	688

[a] Estimates not made for inoperable period; numbers may not reflect true escapement.

[b] Estimates made for inoperable period represent 64% of annual escapement.

[c] Estimates made for inoperable period represent 79% of annual escapement.

FIGURES

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

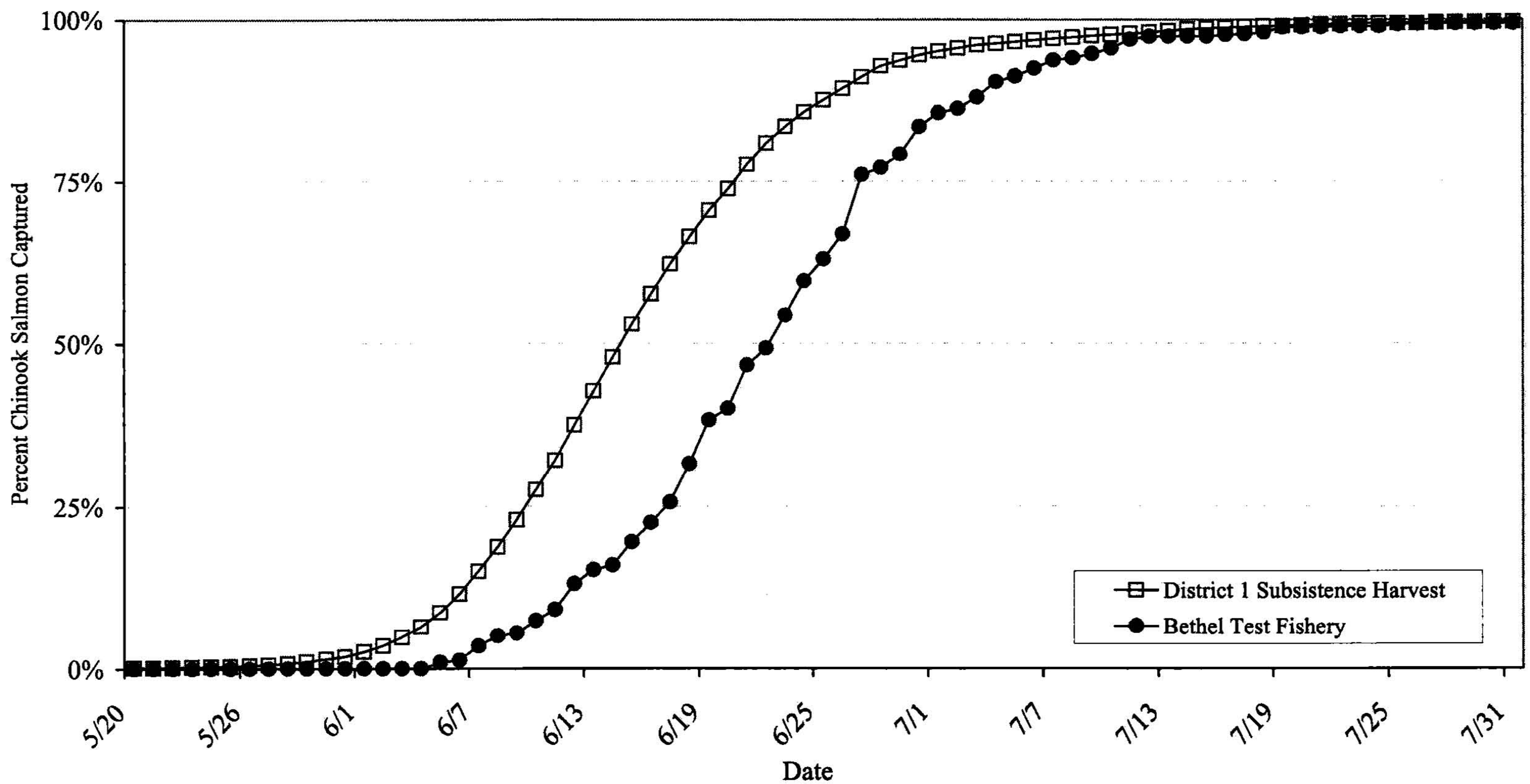


Figure 2. Average timing of the subsistence chinook salmon harvest in District 1 compared with the average run timing observed in the Bethel Test fishery, 1984 through 1999.

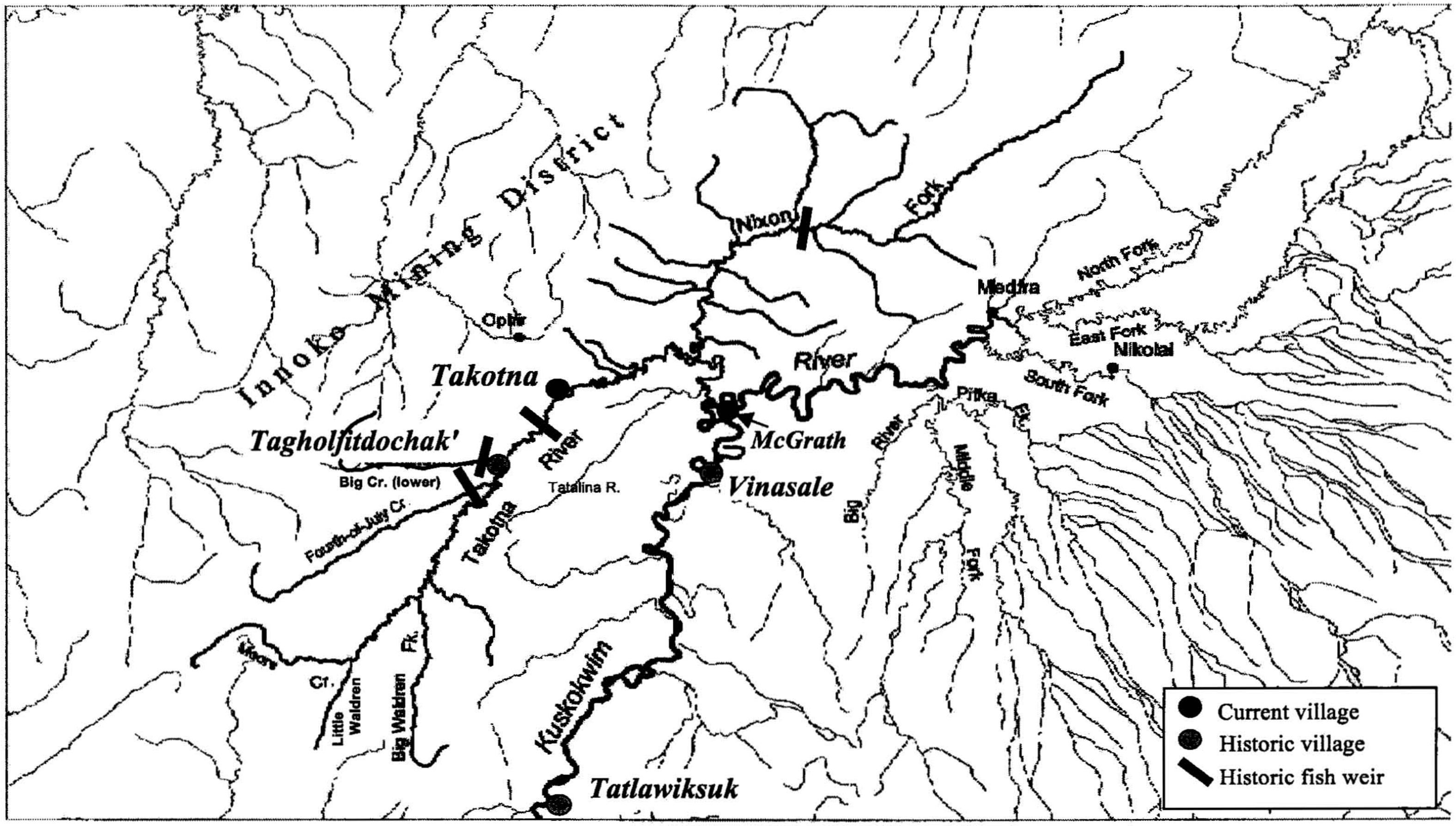


Figure 3. Takotna River drainage and location of historic native villages and fish weirs.

Figure 4. A plexiglass sampling box used to collect age-sex-length data at the Takotna River weir, 2003

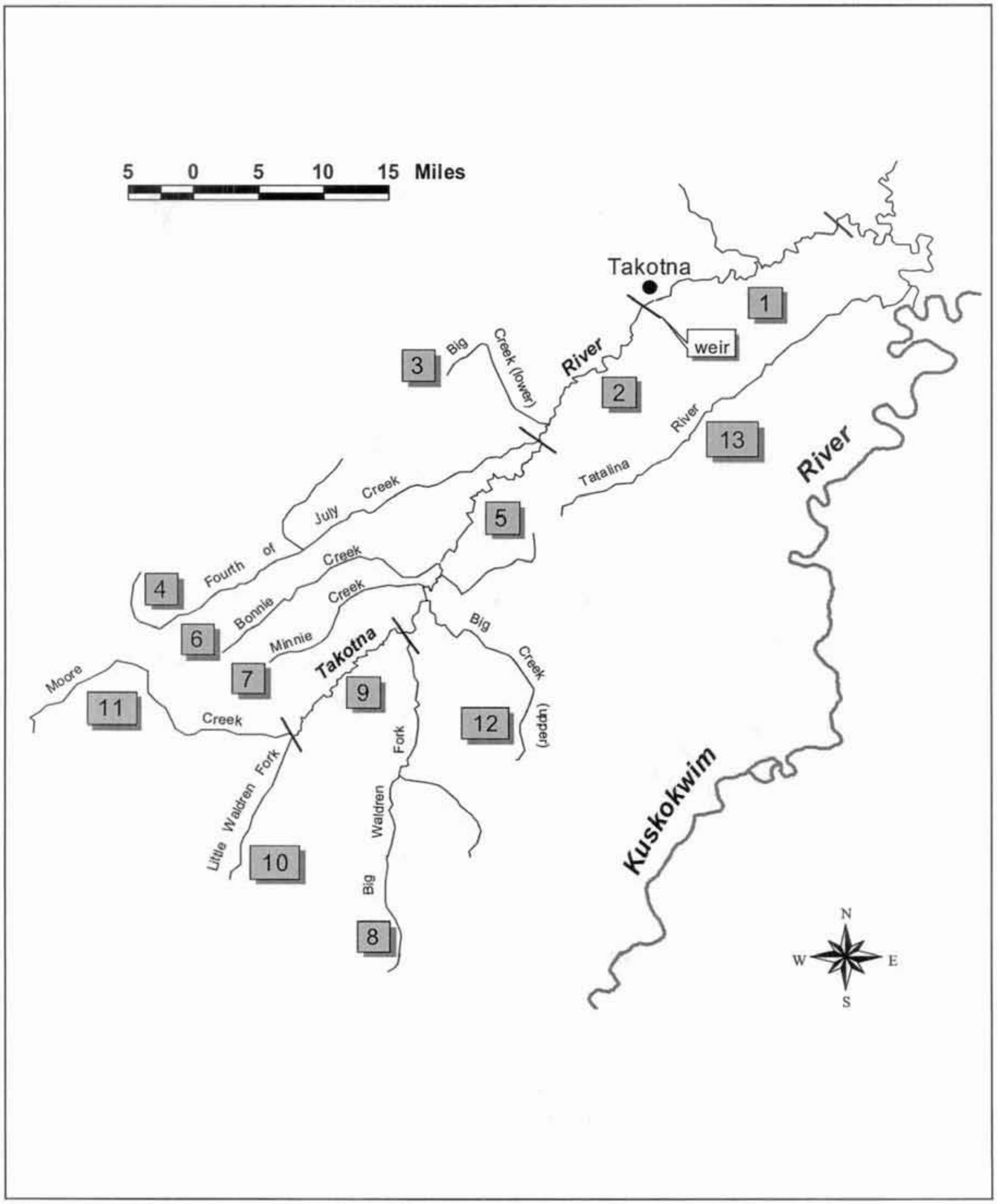


Figure 5. Index areas used for juvenile salmon investigation in the Takotna River drainage.

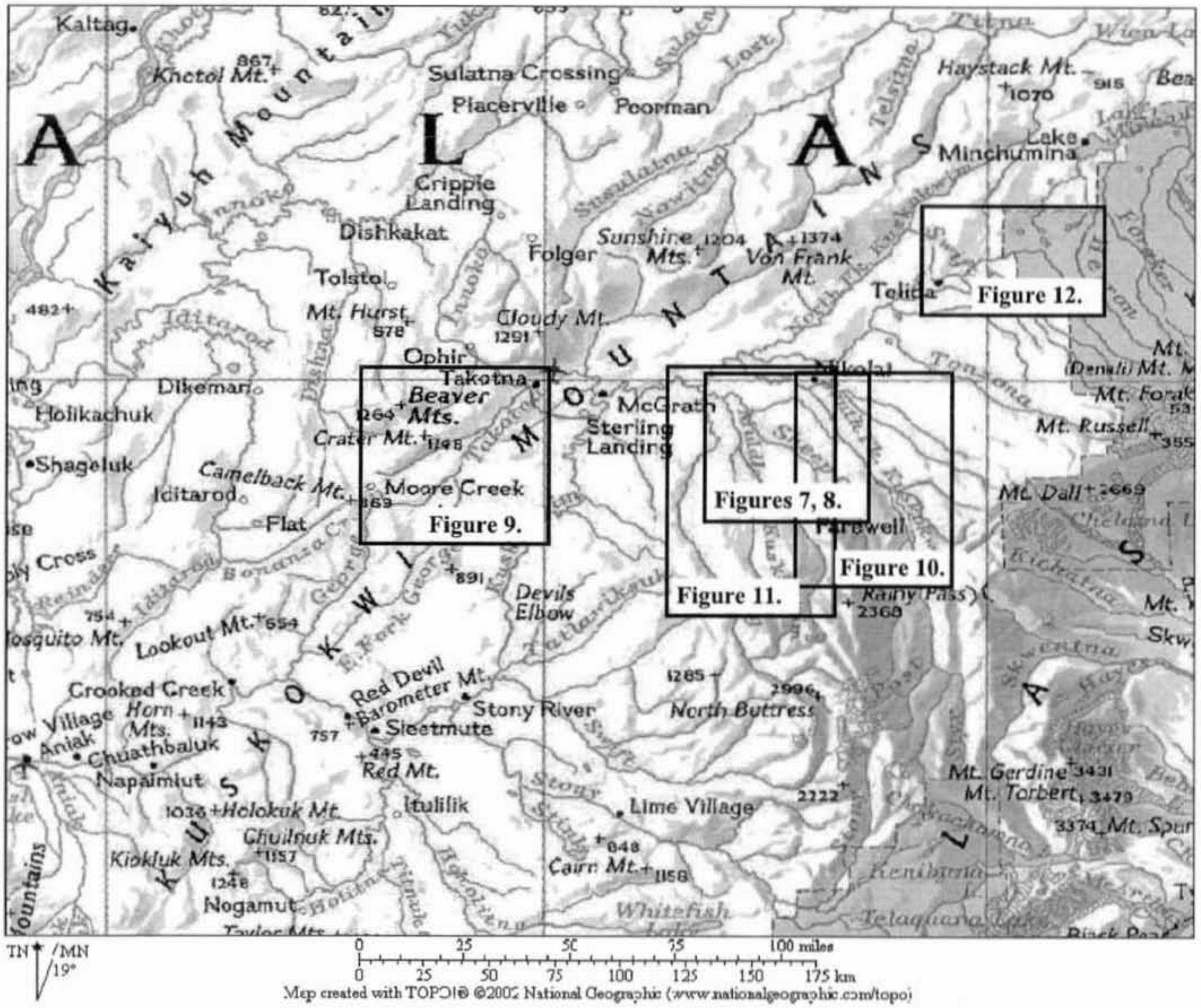


Figure 6. Reference map of the upper Kuskokwim River for Figures 7 to 12.

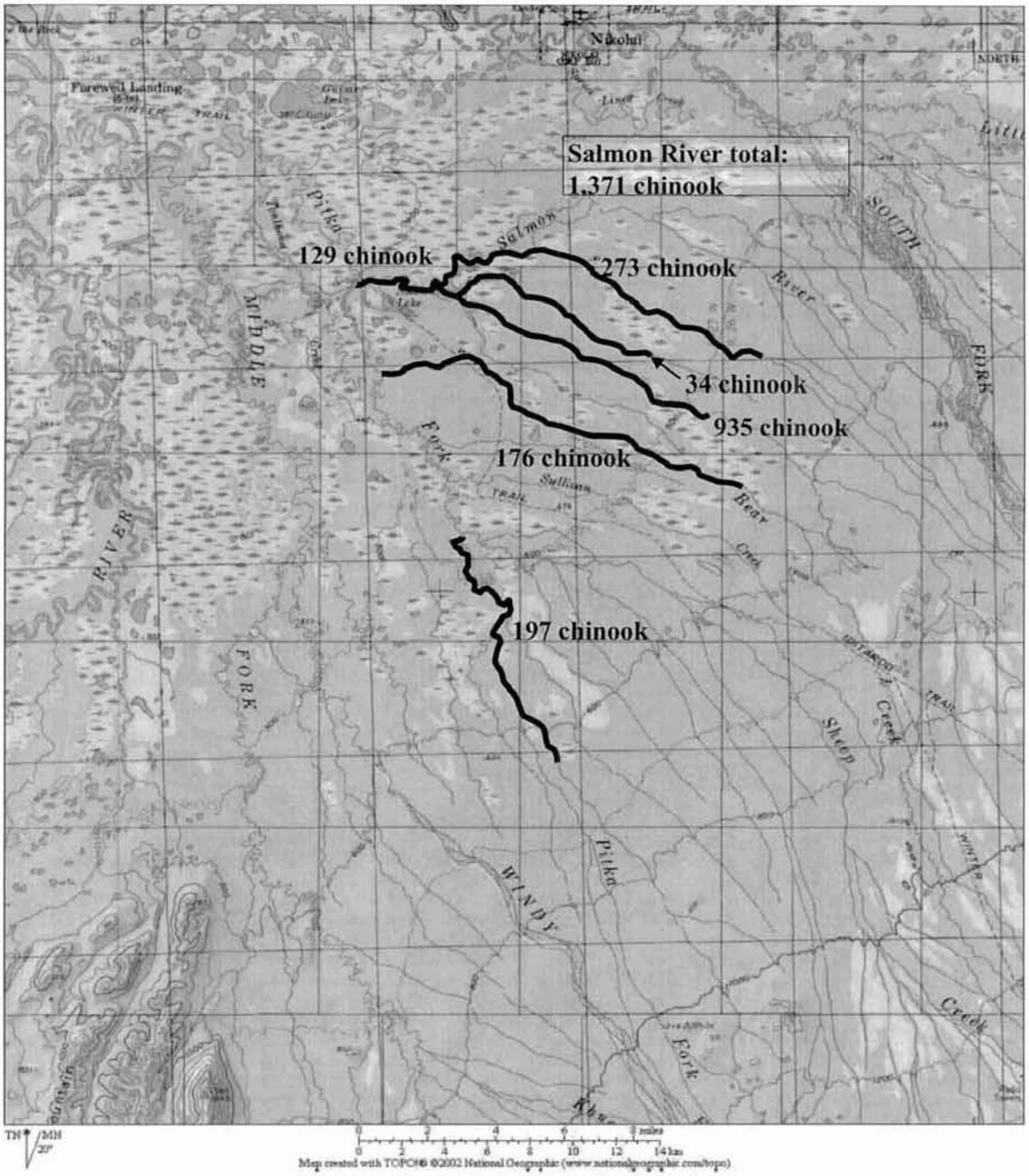


Figure 7. Aerial stream surveys conducted in the Pitka Fork drainage, July 2003.

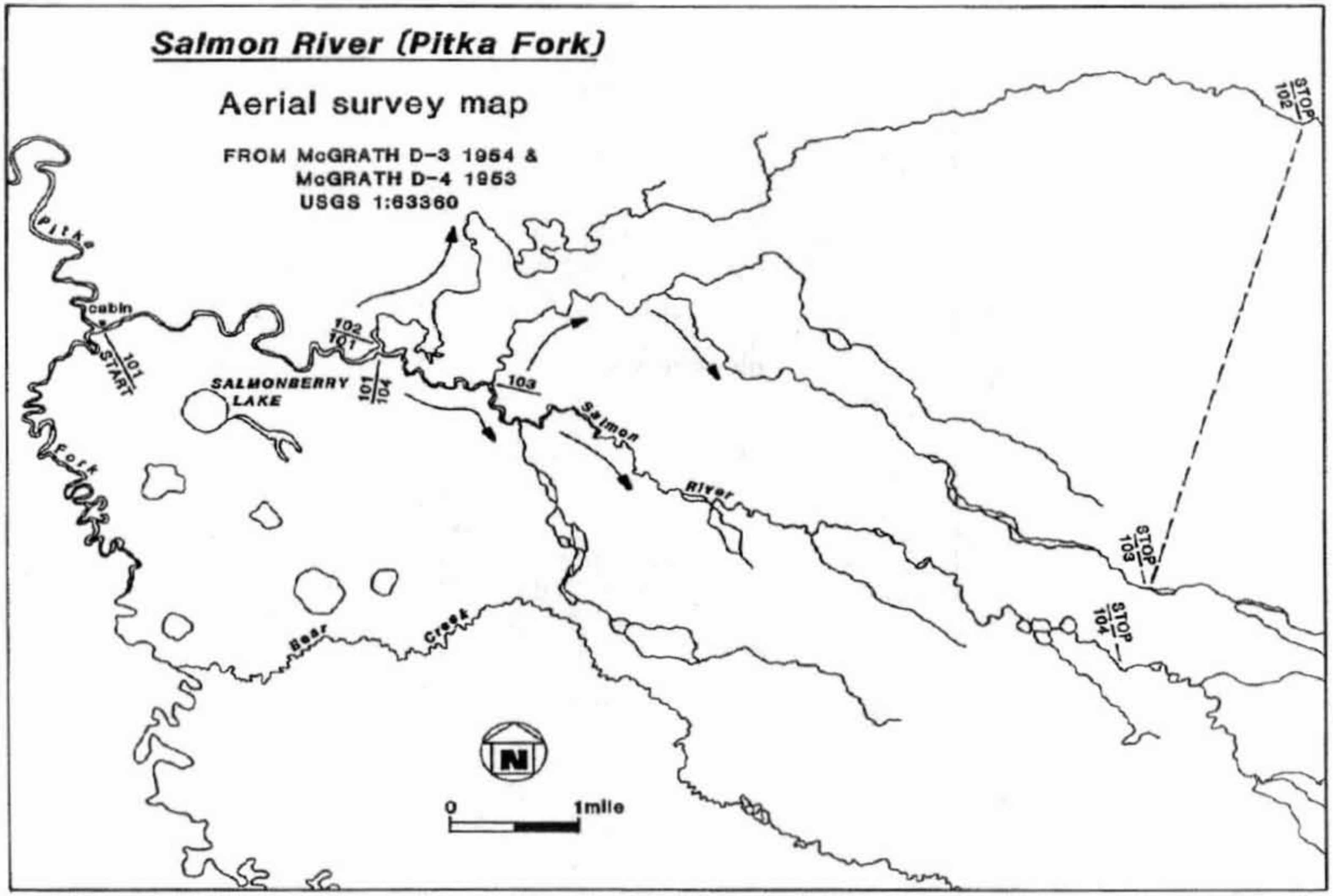


Figure 8. Salmon River Index Areas used for aerial stream surveys.

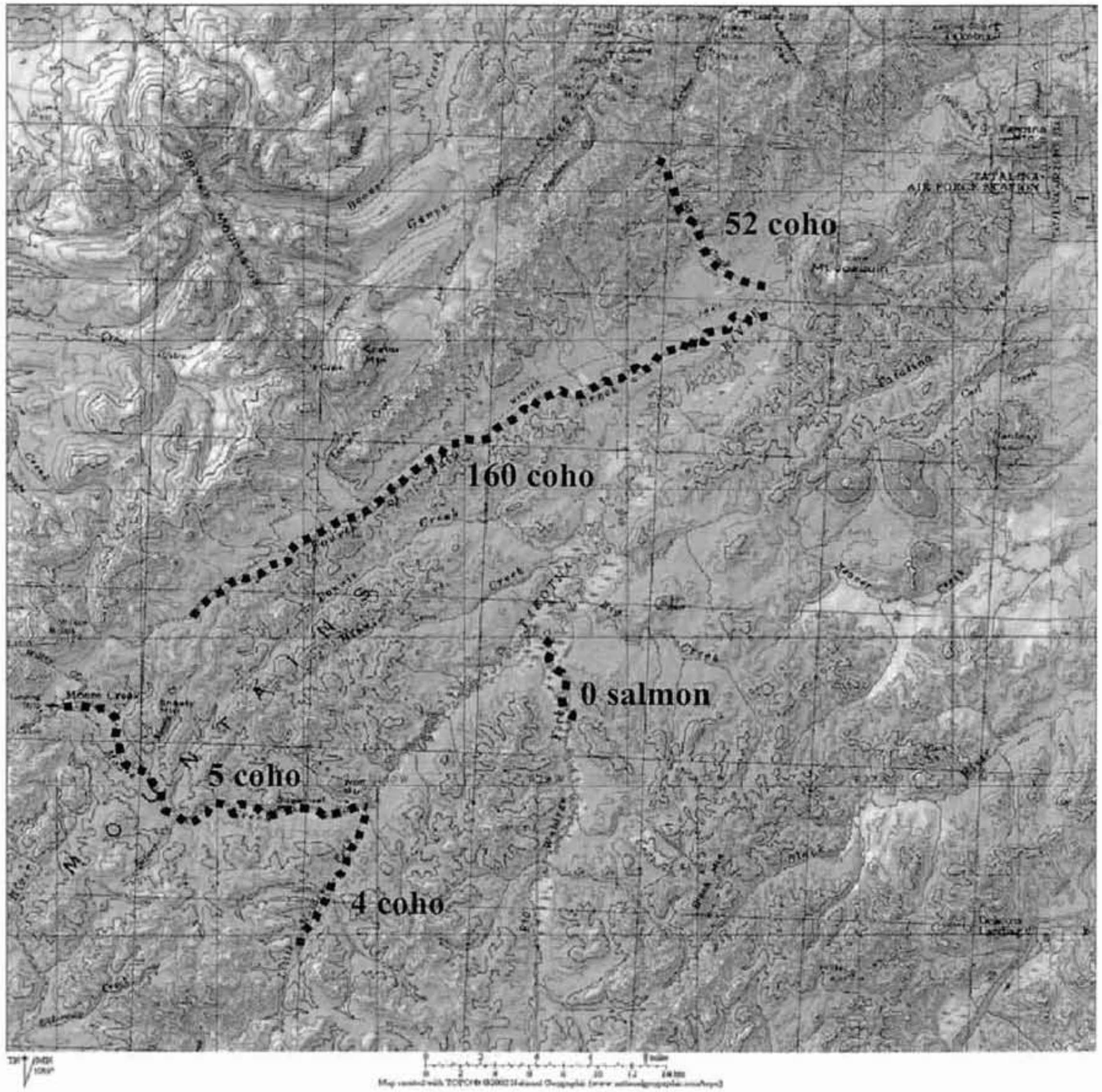


Figure 9. Aerial stream surveys conducted in the Takotna River drainage, September 2003.

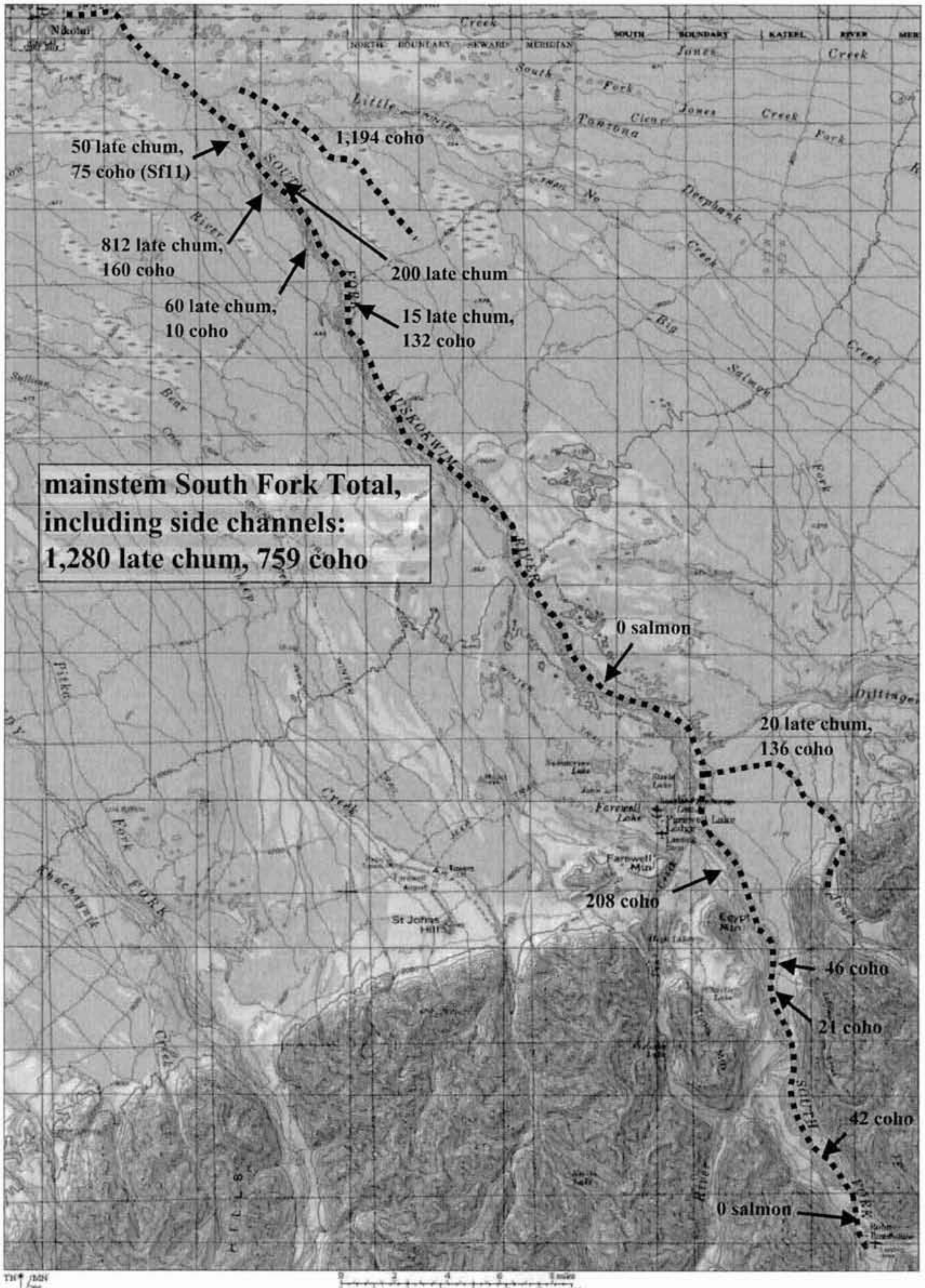


Figure 10. Aerial stream surveys conducted in the South Fork Kuskokwim River drainage including side channels, September 2003. Mainstem totals include salmon spotted in both side channels and in the main channel.

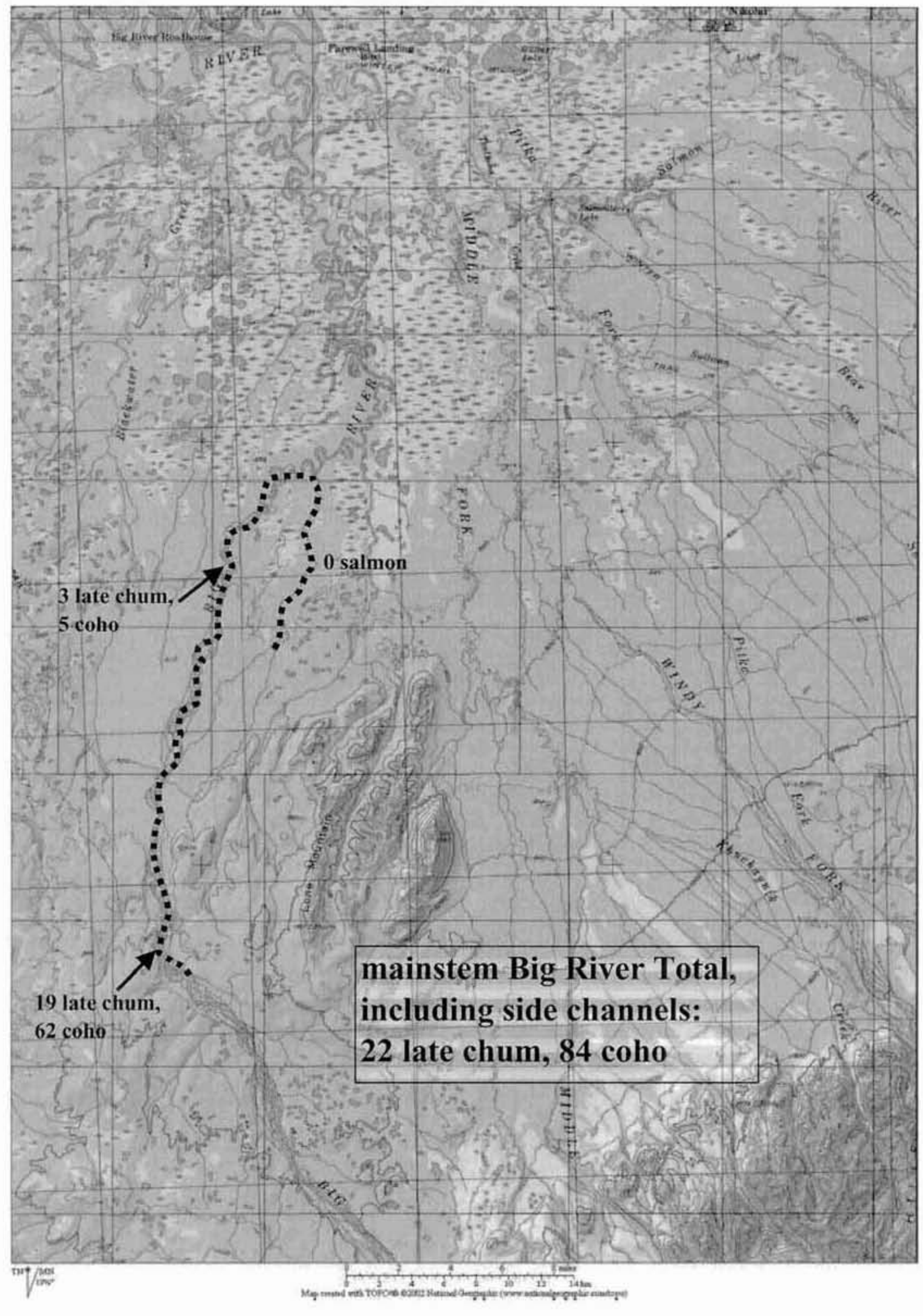


Figure 11. Aerial stream surveys conducted in the Big River drainage, including side channels, September 2003. Mainstem totals include fish spotted in both side channels and in the main channel.

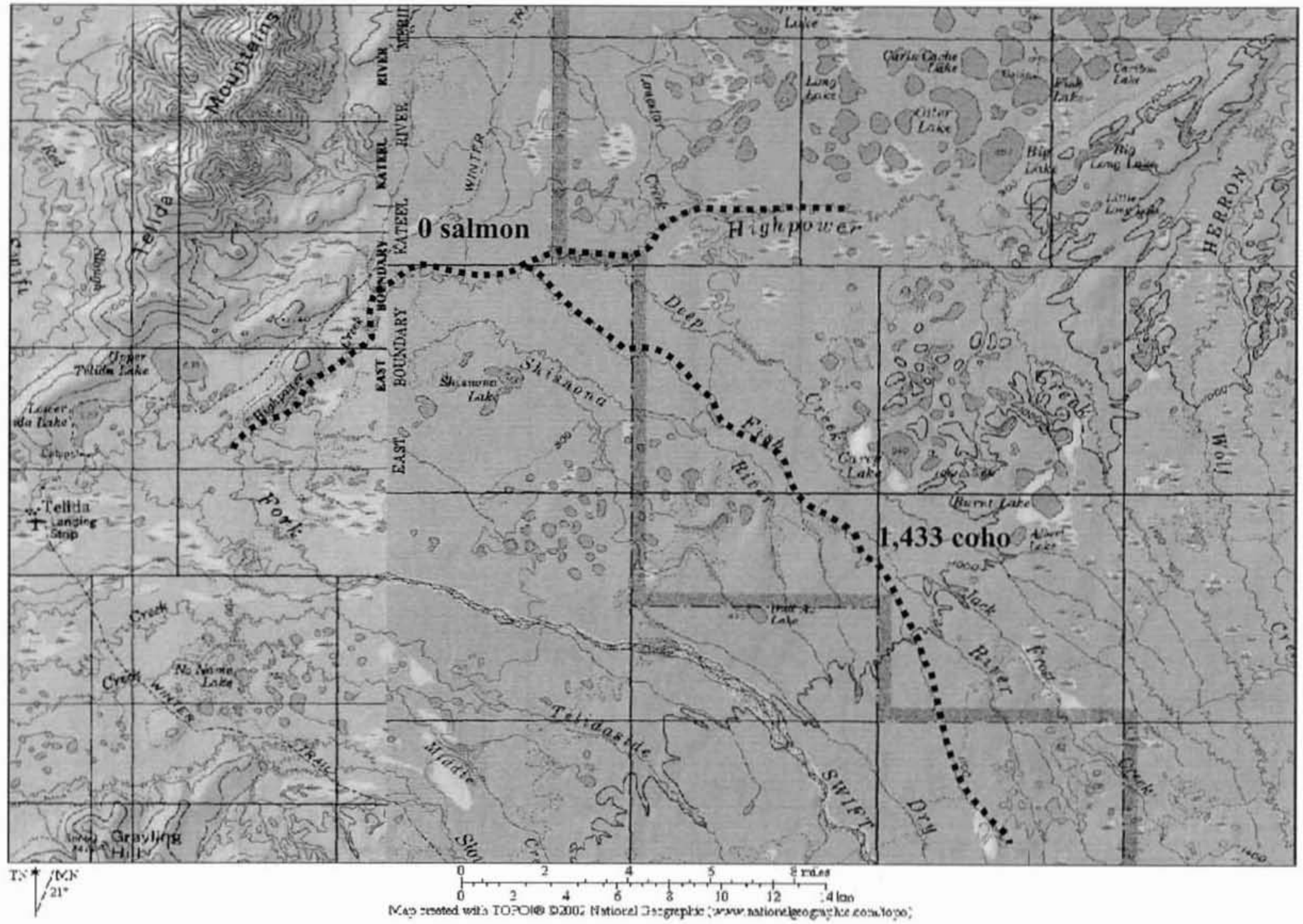


Figure 12. Aerial stream surveys conducted in the Highpower Creek drainage, September 2003.

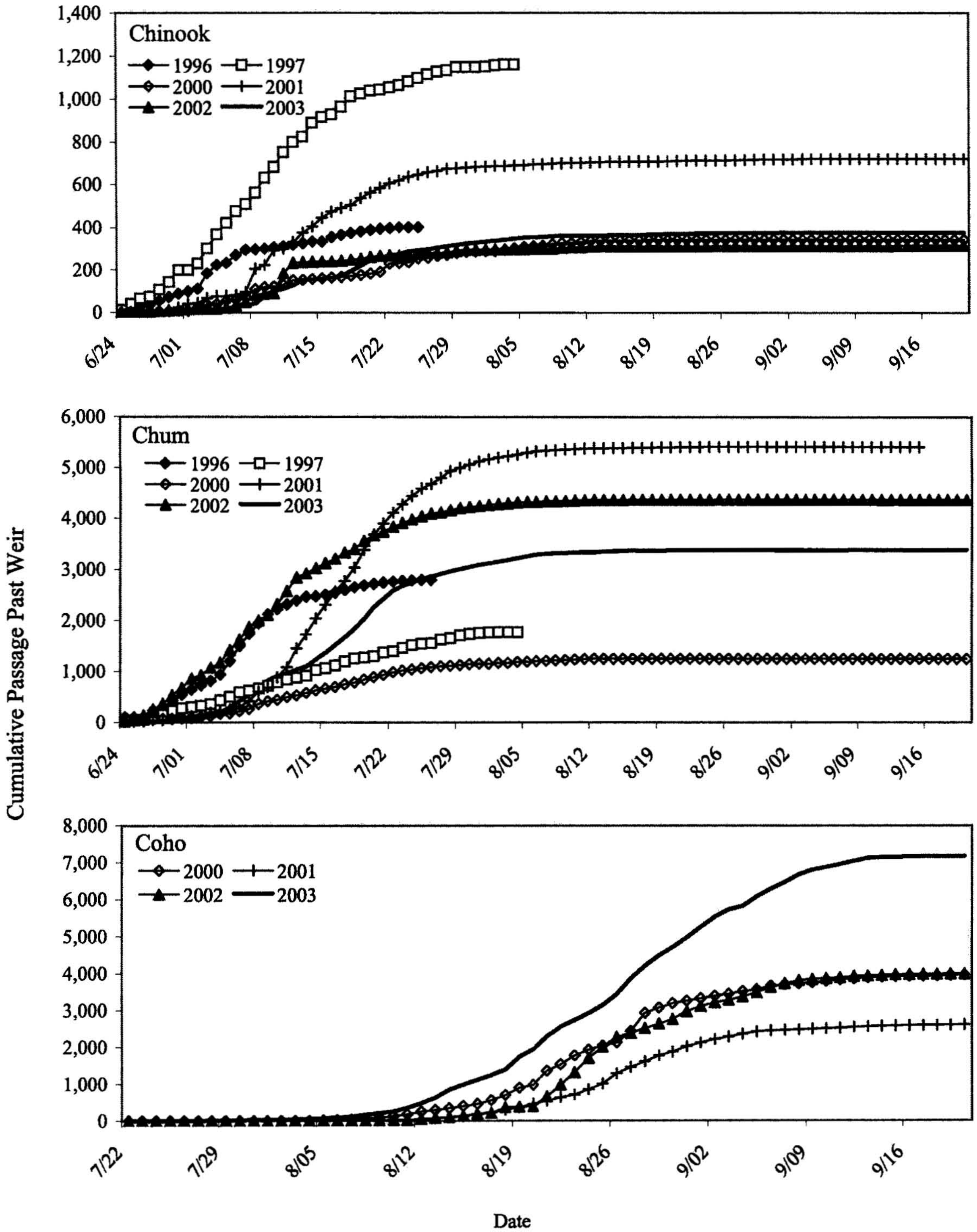


Figure 13. Historic cumulative passage of chinook, chum, and coho salmon past the Takotna River tower (1996 and 1997) and weir (2000 to 2003).

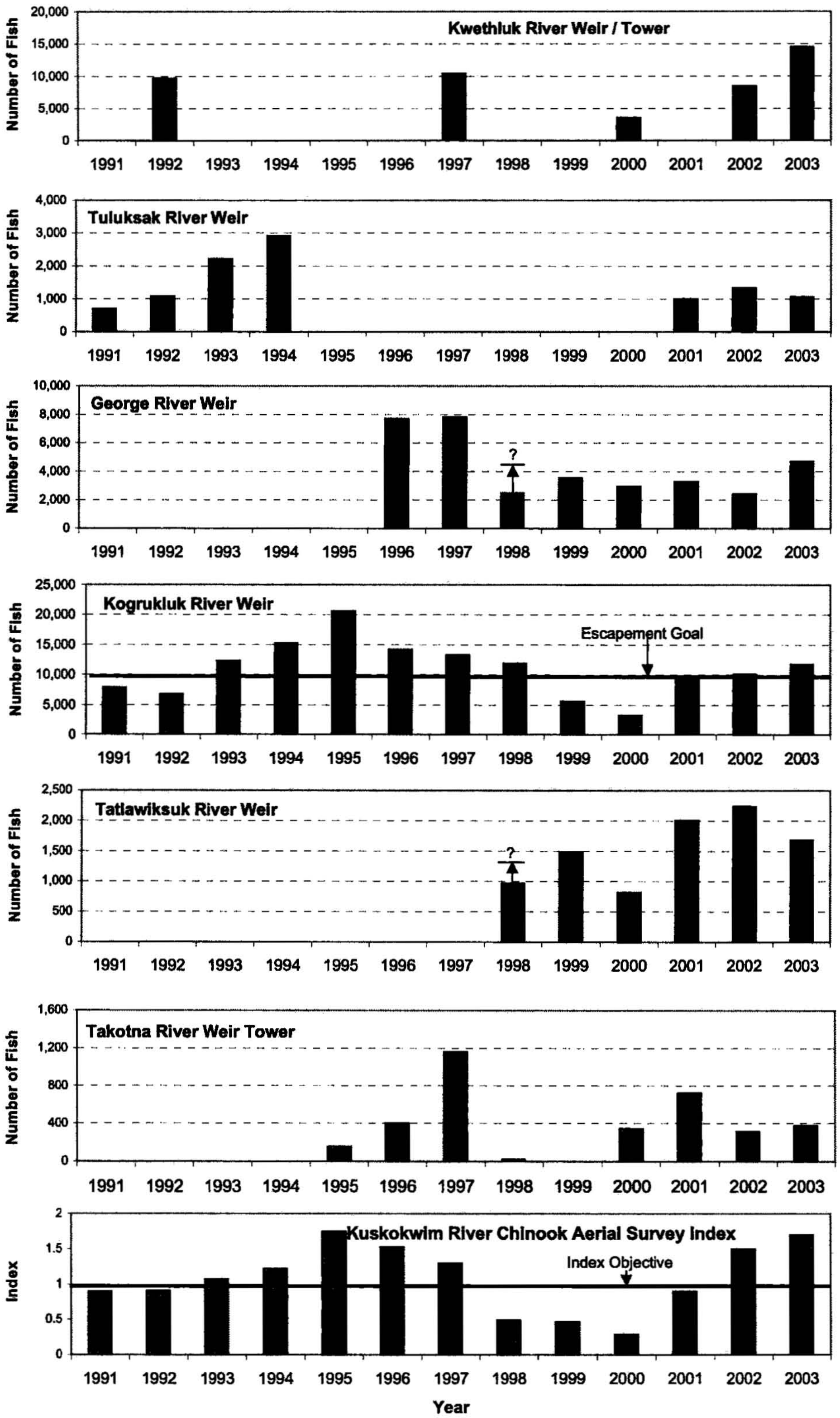


Figure 14. Chinook salmon escapement into six Kuskokwim River tributaries, and Kuskokwim River chinook salmon aerial survey indices, 1991 to 2003.

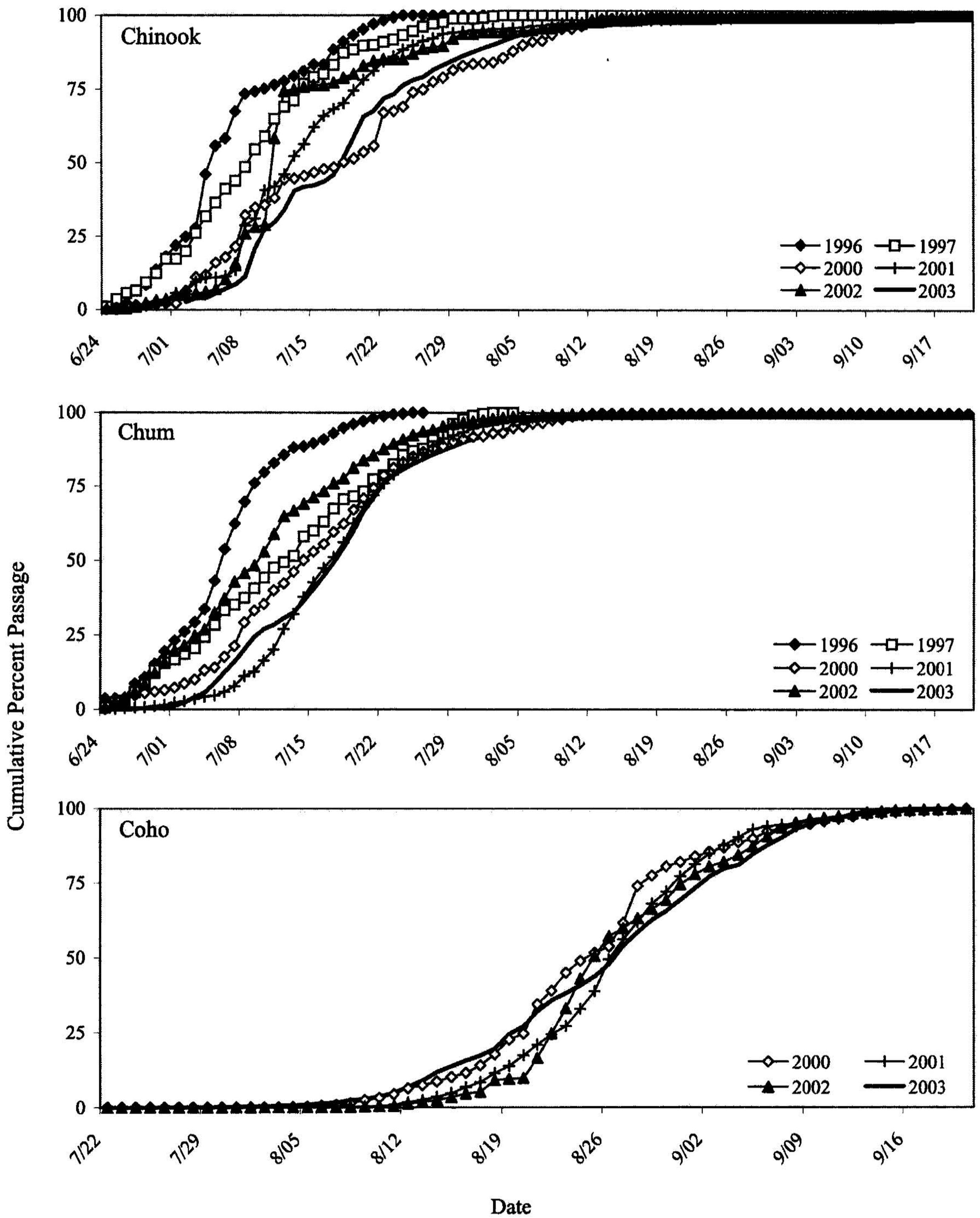


Figure 15. Historic cumulative percent passage of chinook, chum, and coho salmon past the Takotna River tower (1996 and 1997) and weir (2000 to 2003).

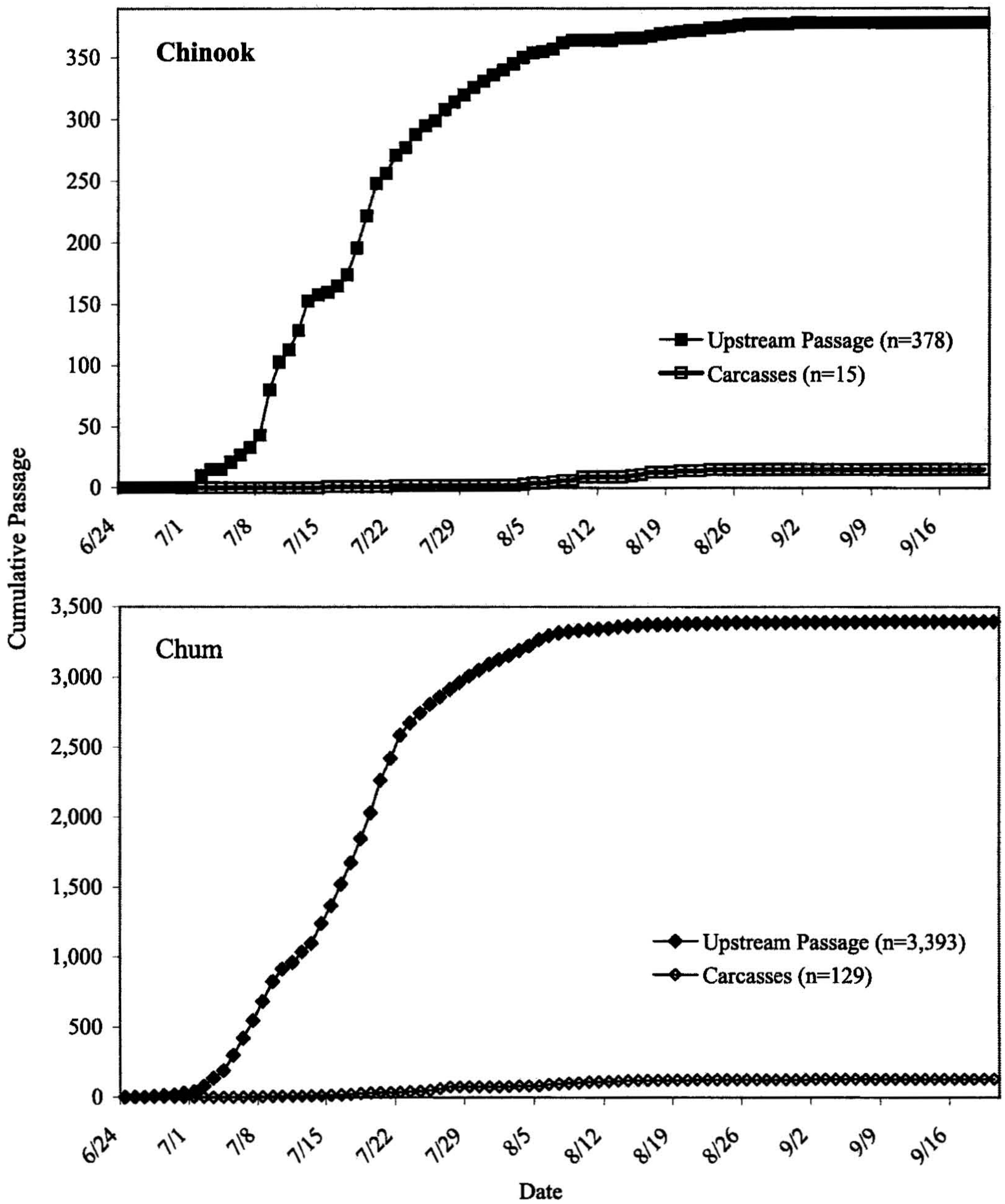


Figure 16. Comparison of cumulative upstream salmon passage and downstream carcass passage by species at the Takotna River weir, 2003.

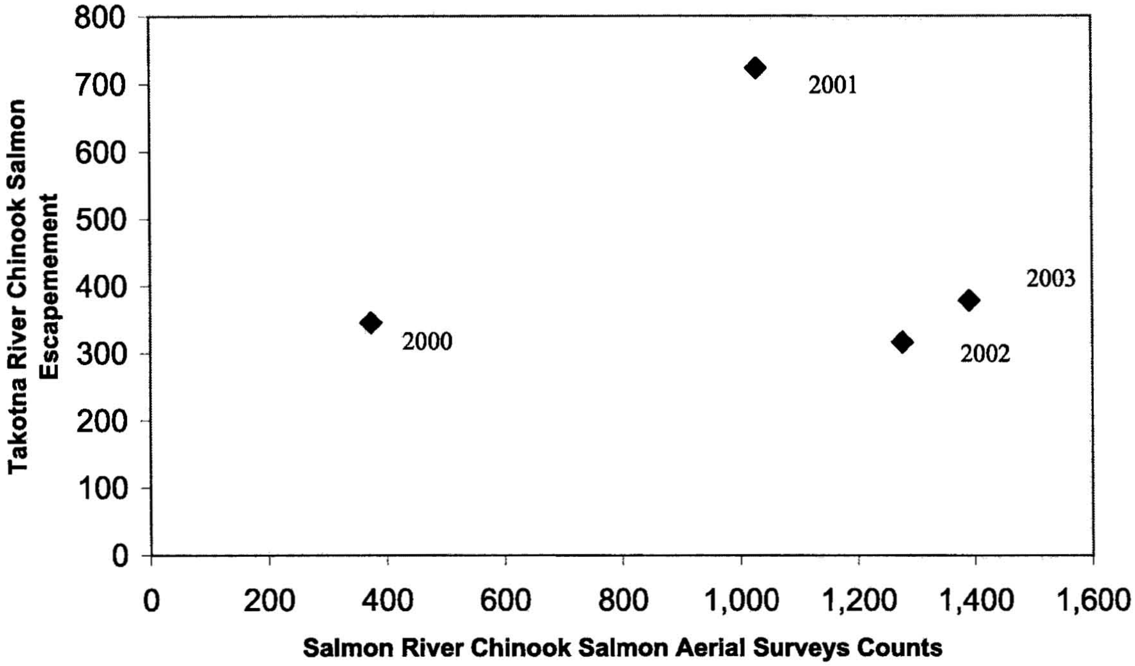


Figure 17. Comparison of Salmon River aerial survey counts and Takotna River escapement counts for chinook salmon, 2000 through 2003.

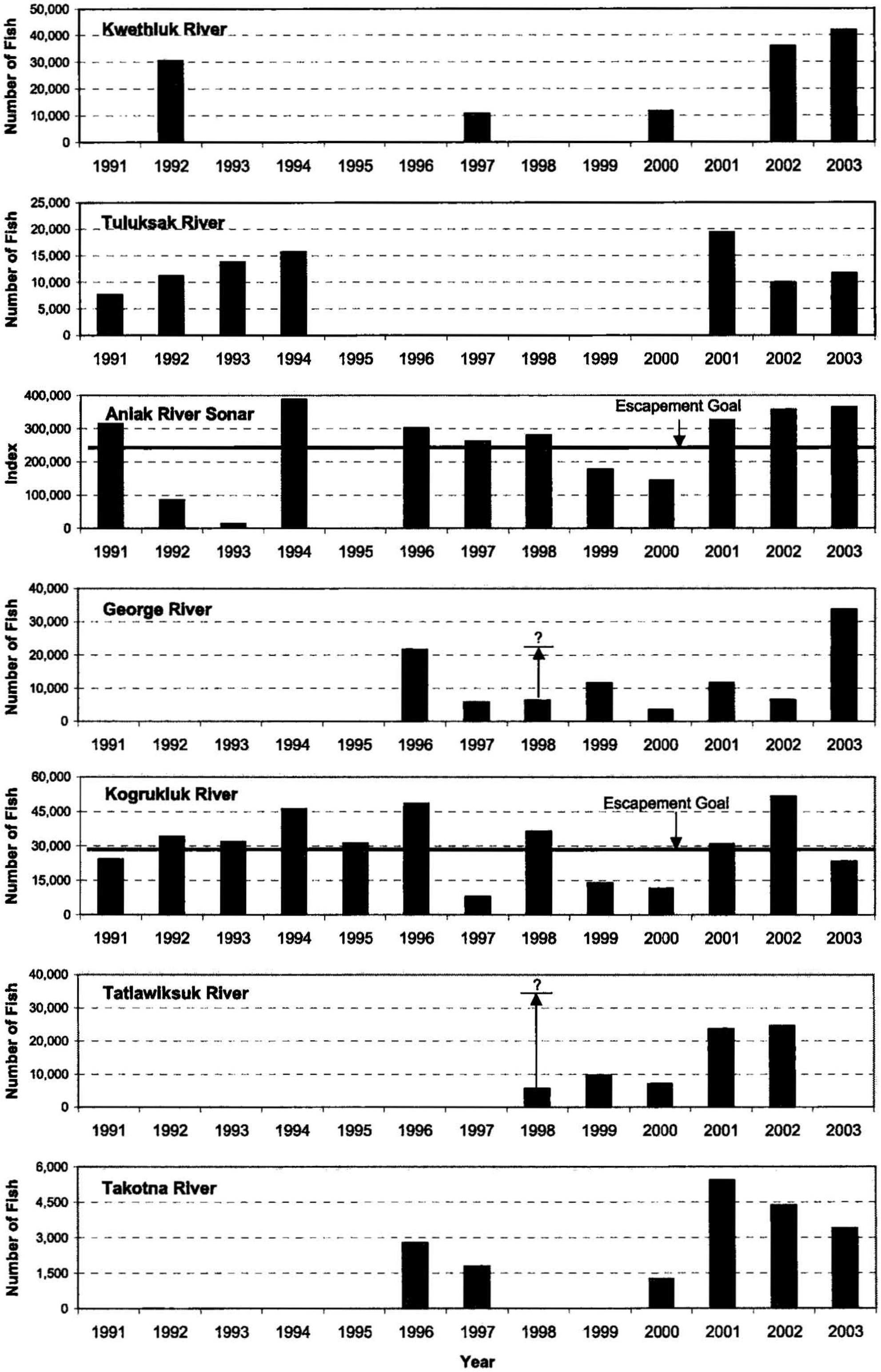


Figure 18. Chum salmon escapement into seven Kuskokwim River tributaries, 1991 through 2003.

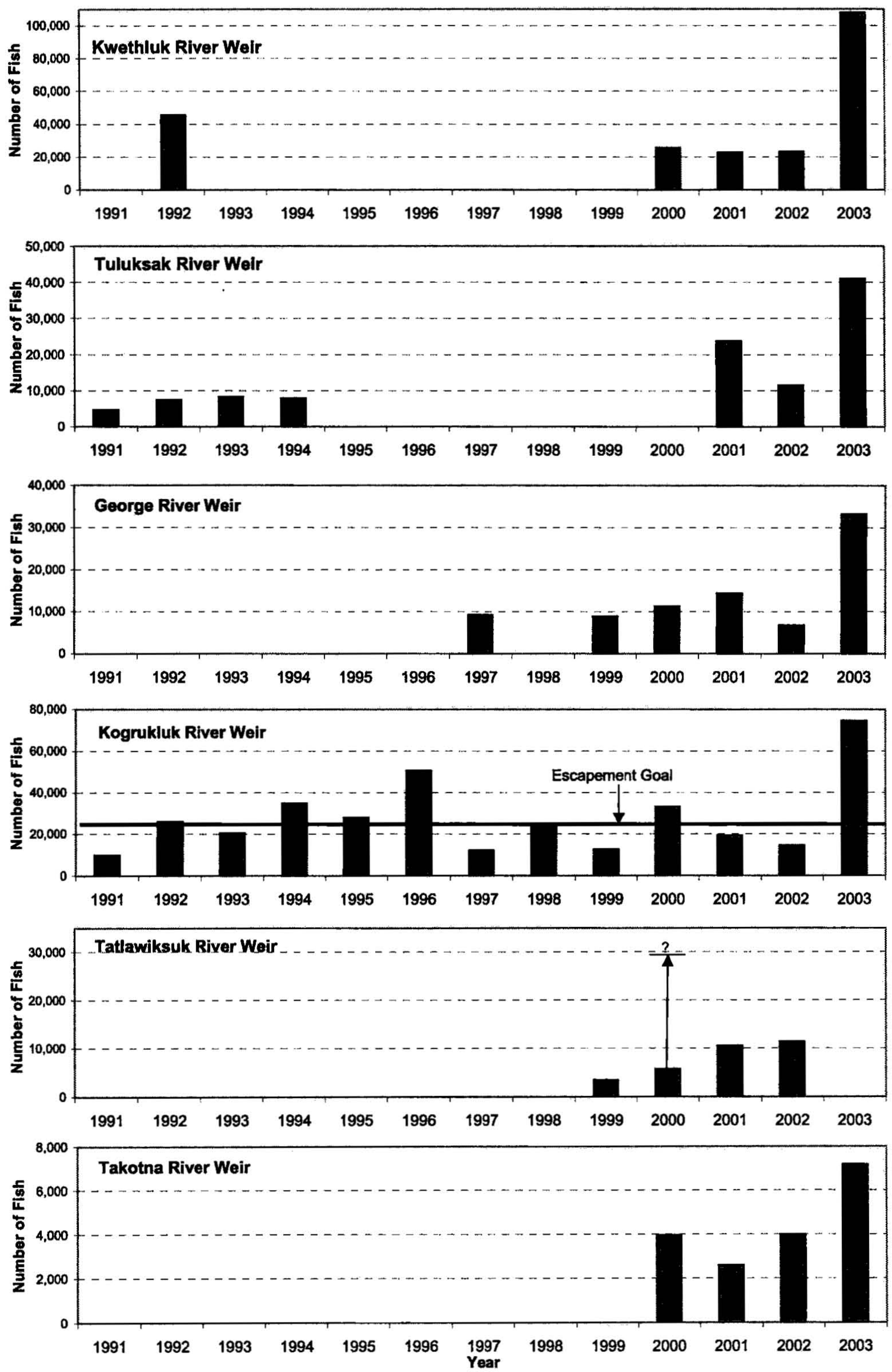


Figure 19. Coho salmon escapement into six Kuskokwim River tributaries, 1991 through 2003.

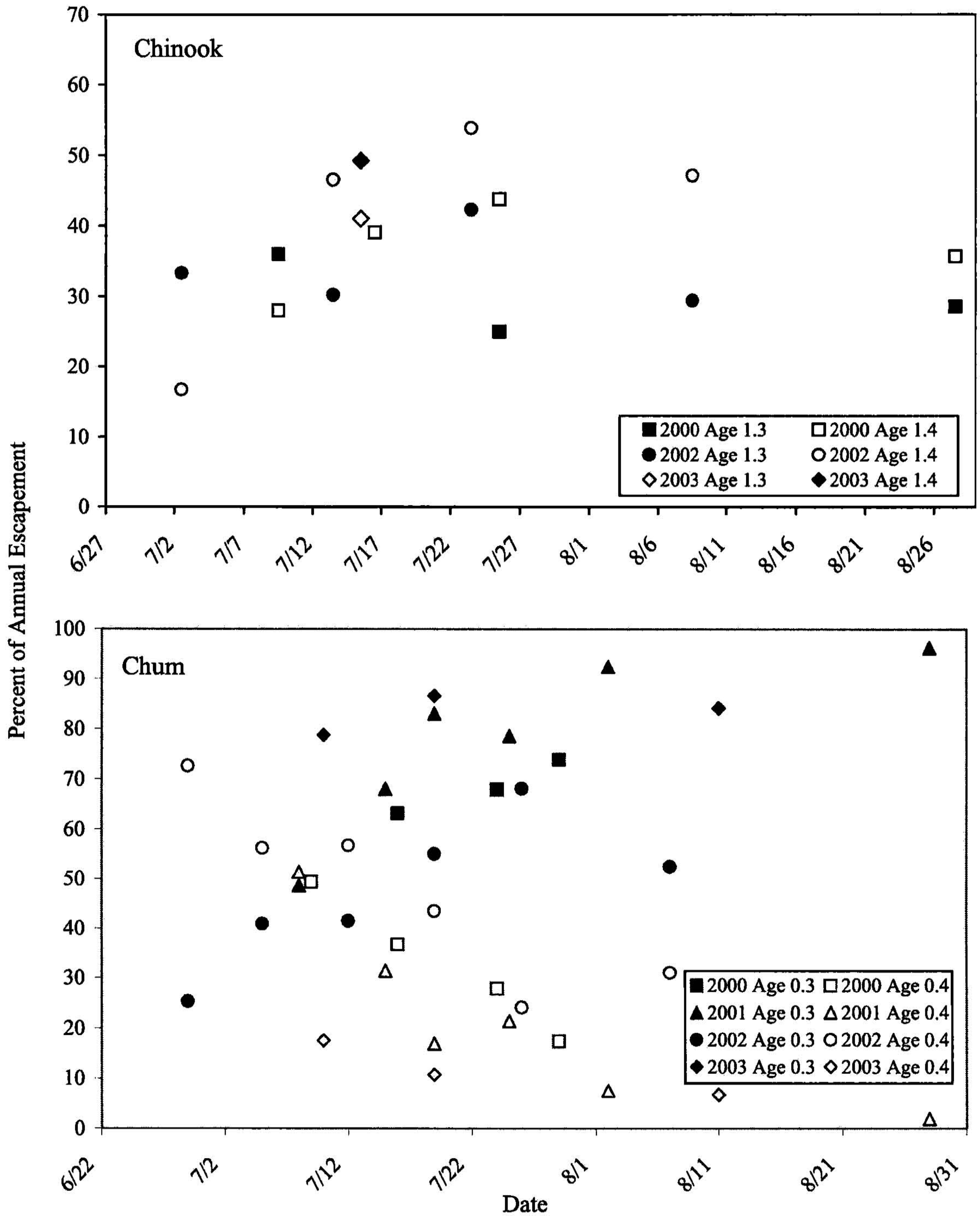


Figure 20. Historic age composition by sample date for chinook and chum salmon at the Takotna River weir.

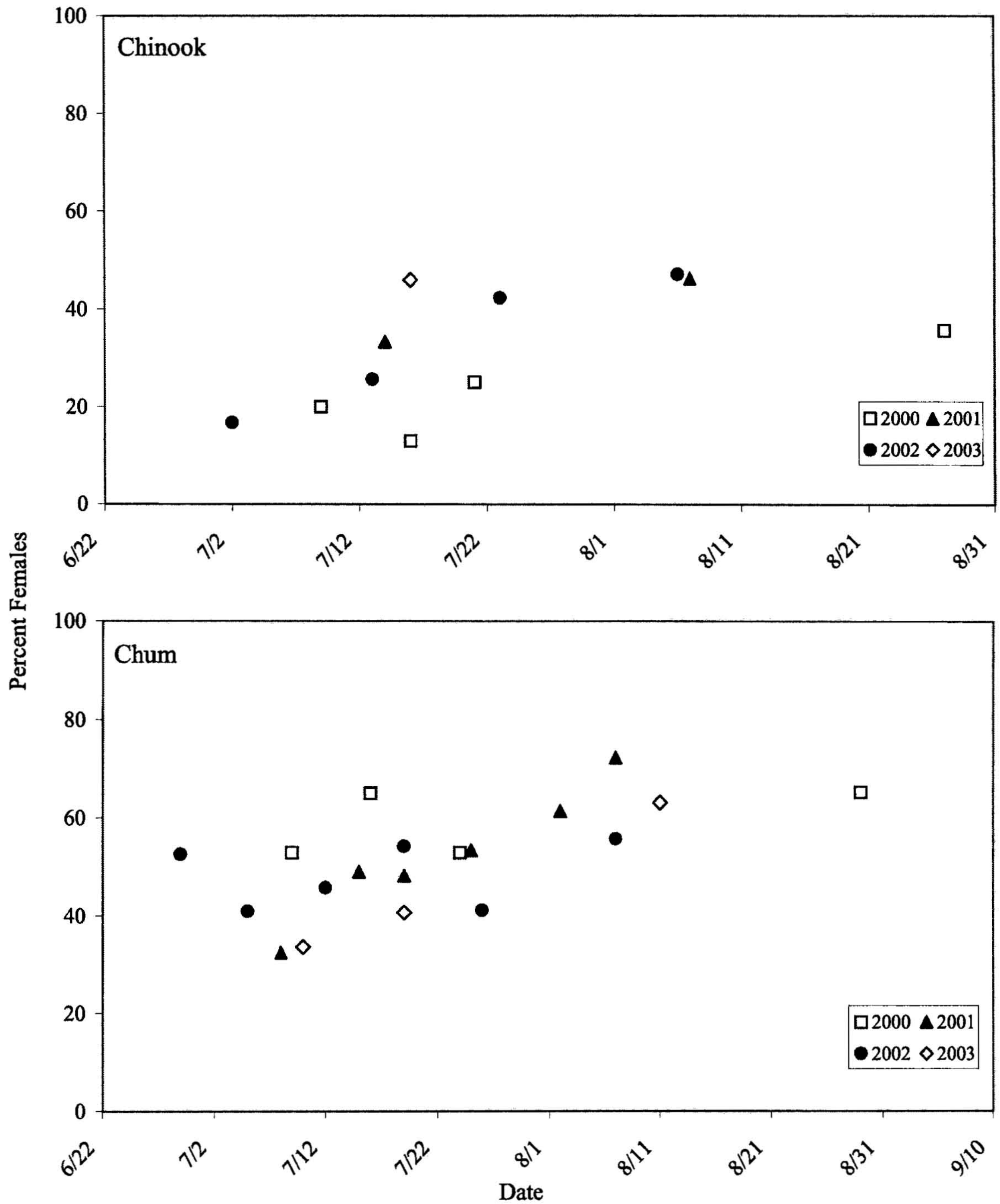


Figure 21. Historic percentage of female chinook and chum salmon by sample date at the Takotna River weir.

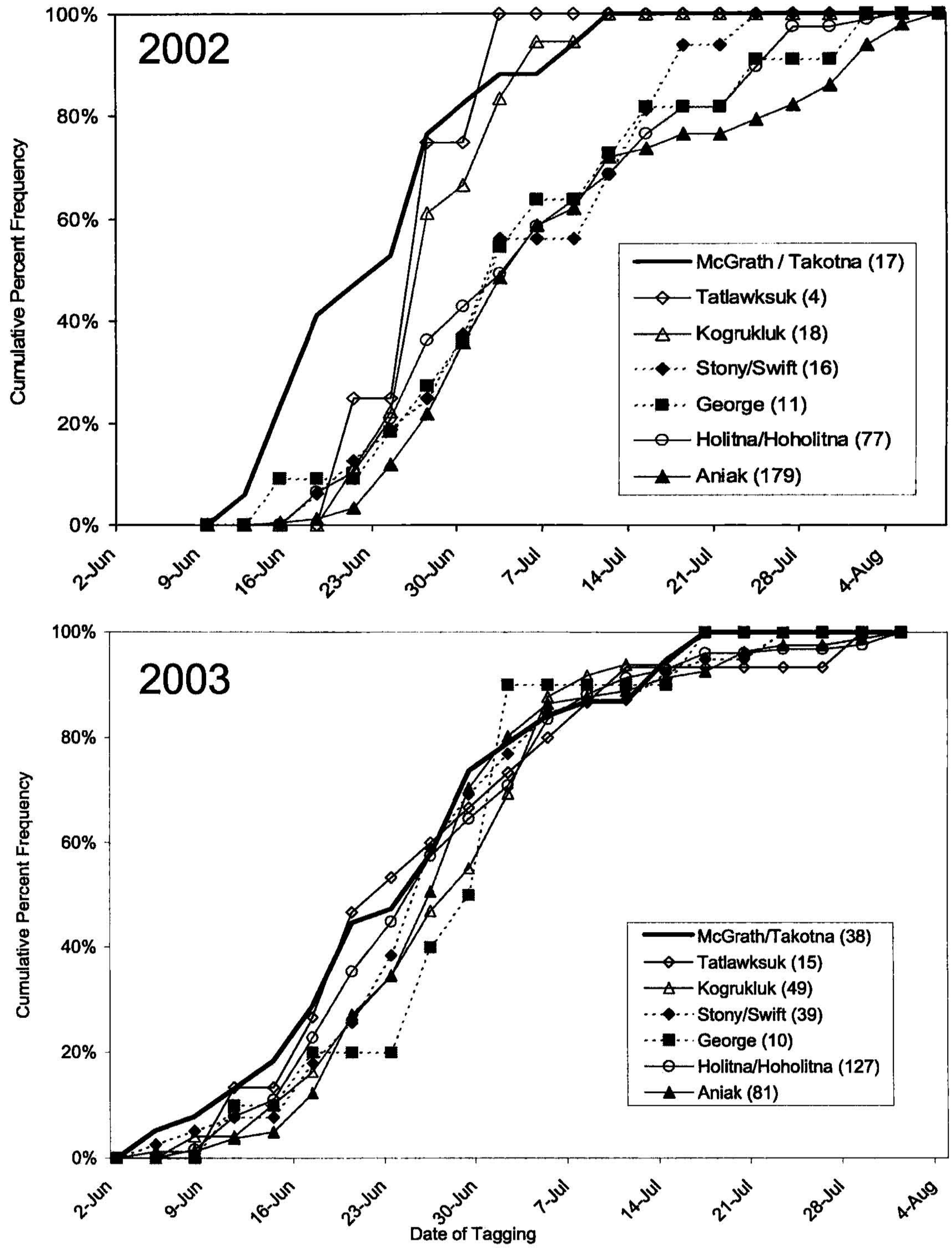


Figure 22. Preliminary cumulative percent frequency of chinook salmon of known final destination with respective dates of initial tagging in 2002 and 2003 (Stuby 2003, Stuby *in press*). Sample size is in parentheses.

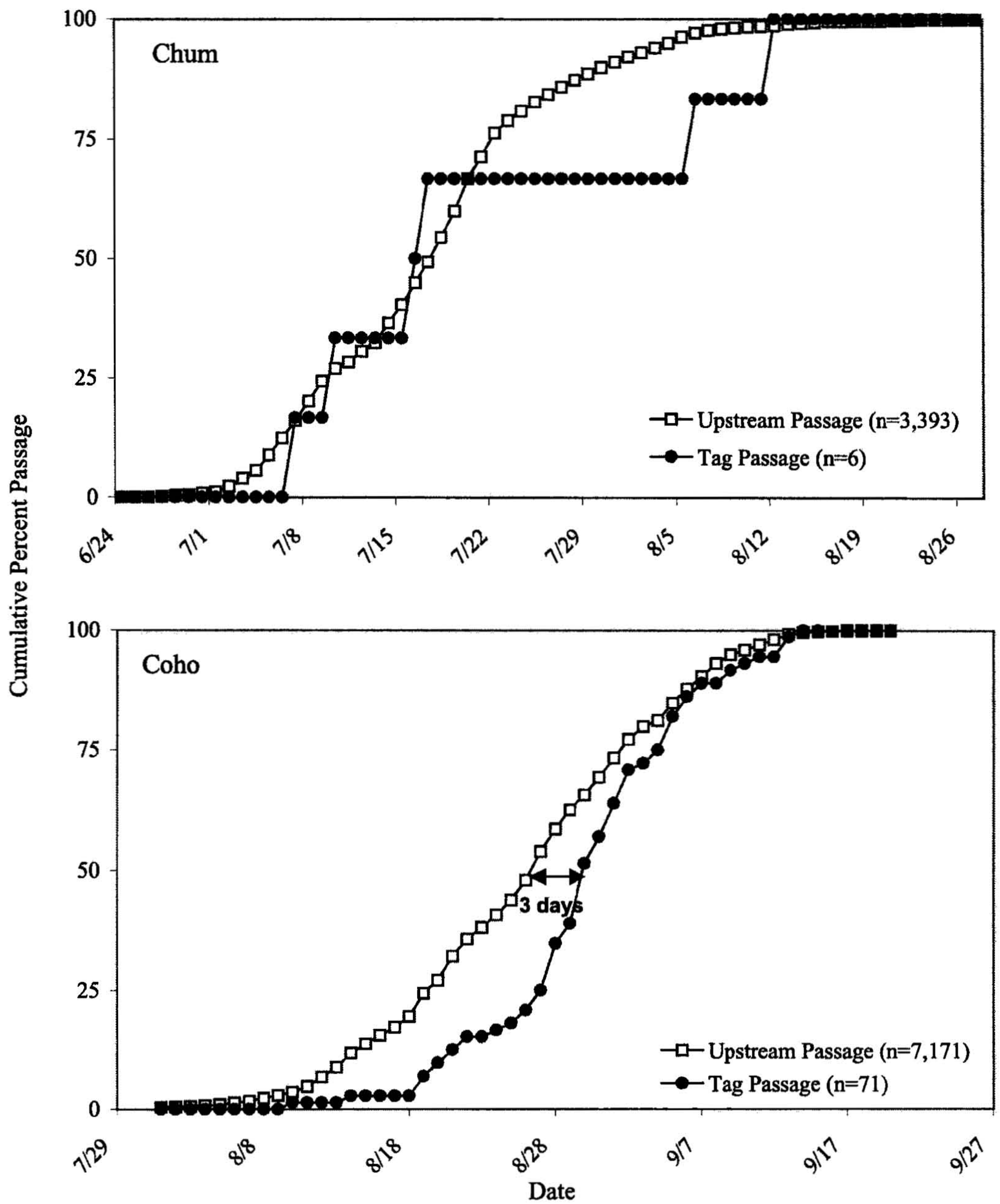


Figure 23. Comparison of cumulative upstream salmon passage and observed tag passage for chum and coho salmon at the Takotna River weir, 2003.

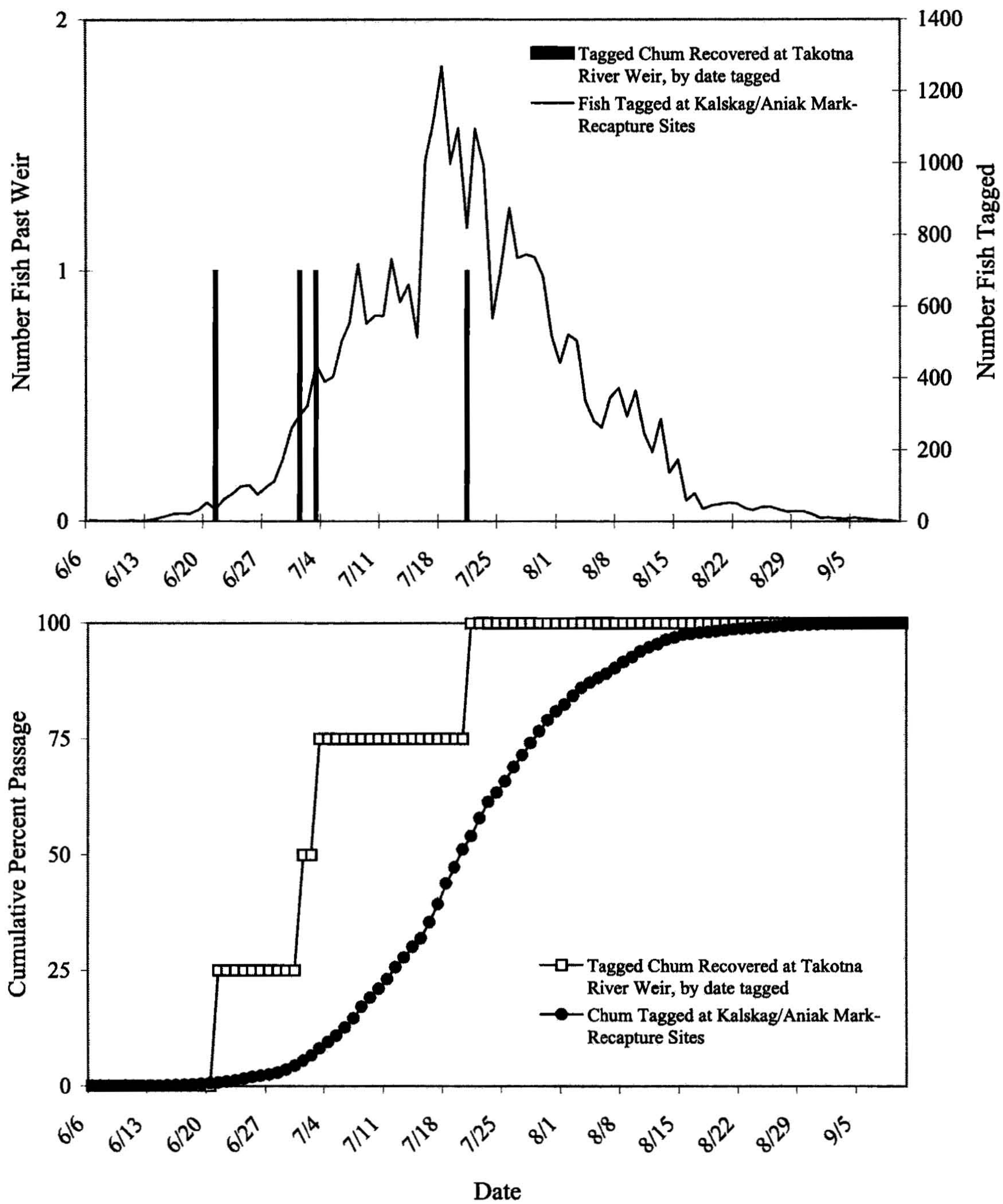
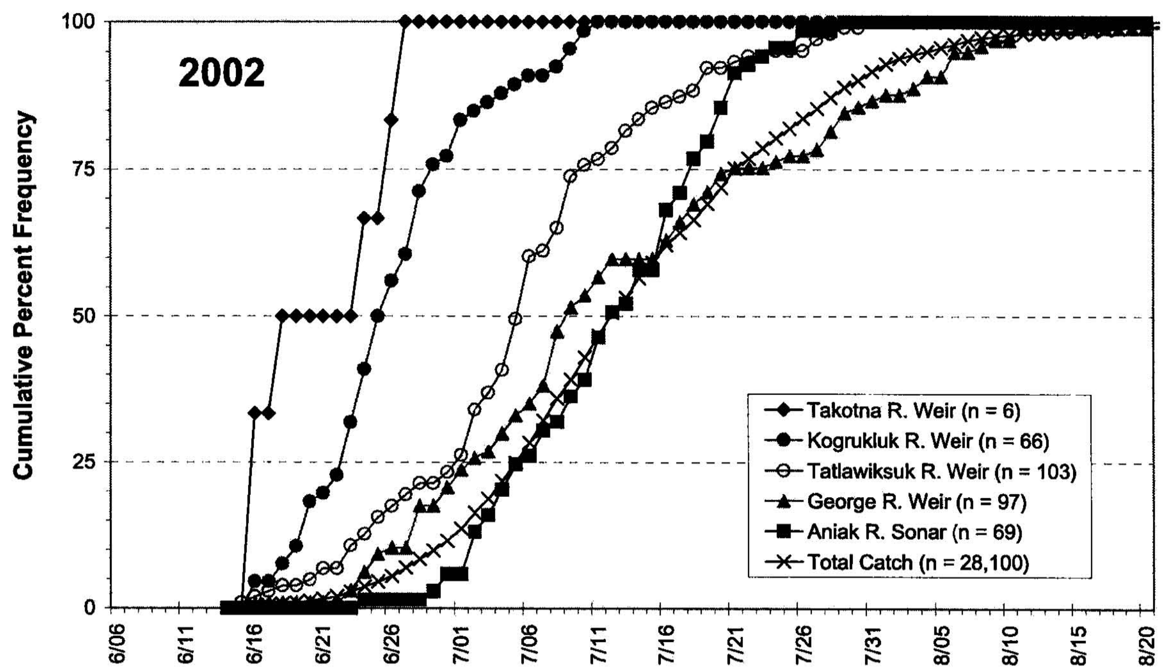


Figure 24. Chum salmon captured at the Kalskag/Birch Tree Crossing mark-recapture sites, by date, compared to chum salmon recovered at the Takotna River weir, by date tagged, 2003.



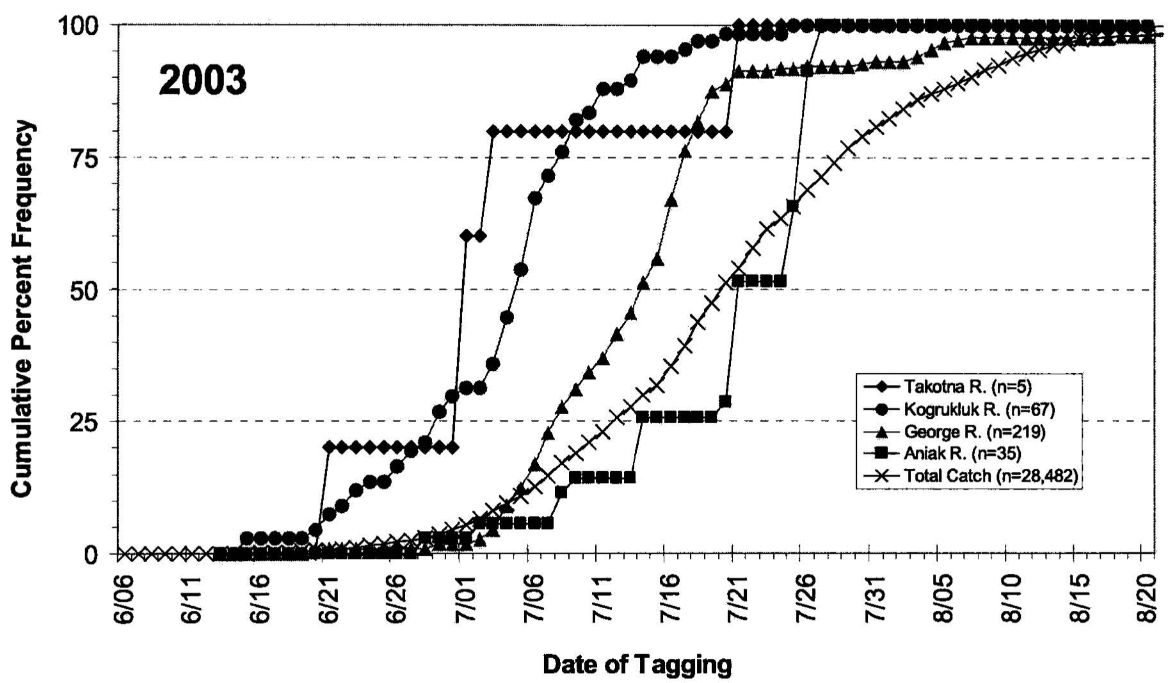


Figure 25. Cumulative percentage by date tagged of chum salmon tags recovered at the Takotna, Kogrukluk, George, and Aniak Rivers, including cumulative passage of the total chum salmon catch at the Kalskag/Aniak mark-recapture tagging site in 2002 and 2003 (Kerkvliet et al. 2003, Kerkvliet et al. *in press*). Sample sizes are in parentheses.

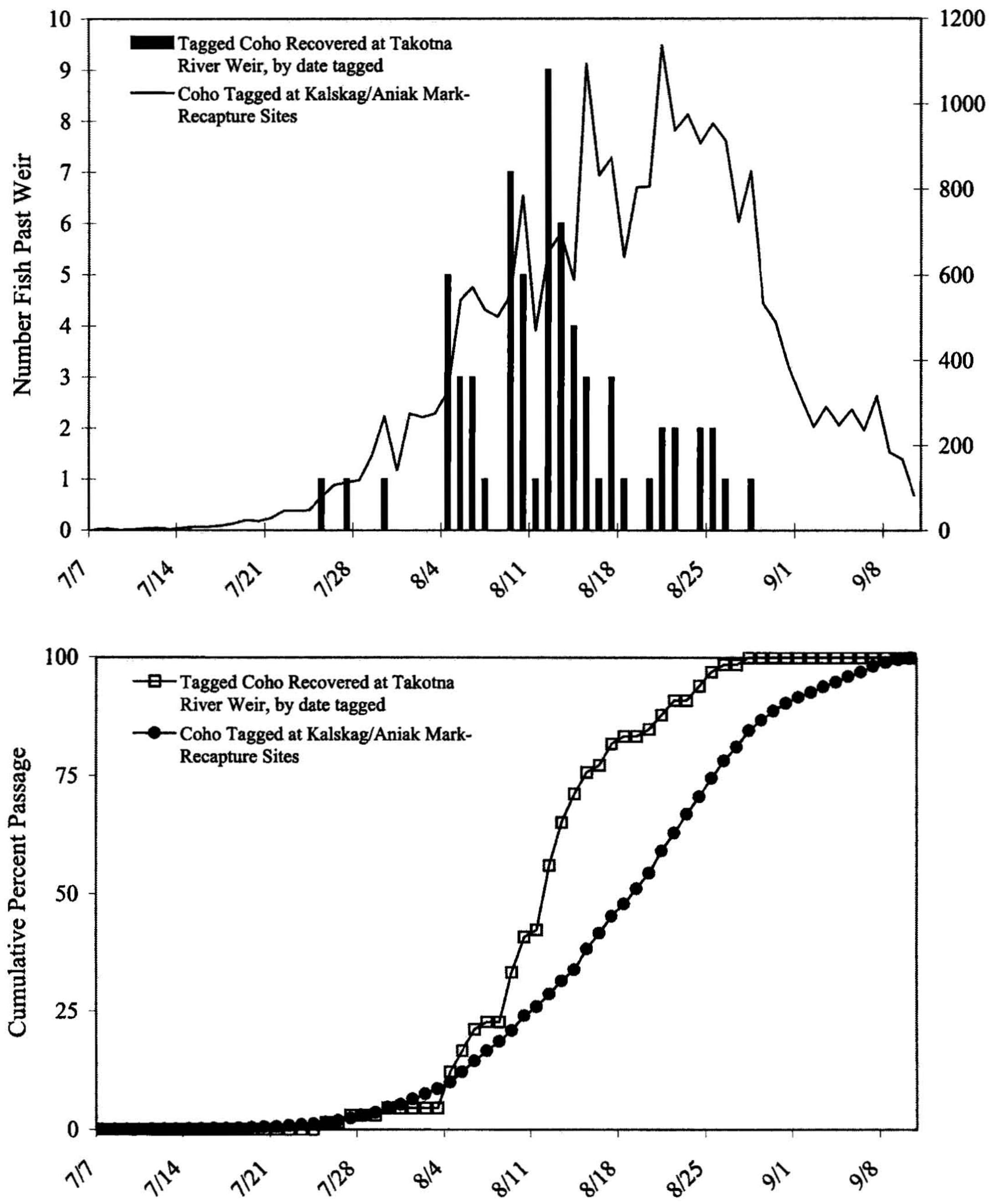


Figure 26. Coho salmon captured at the Kalskag/Aniak mark-recapture sites, by date, compared to coho salmon recovered at the Takotna River weir, by date tagged, 2003.

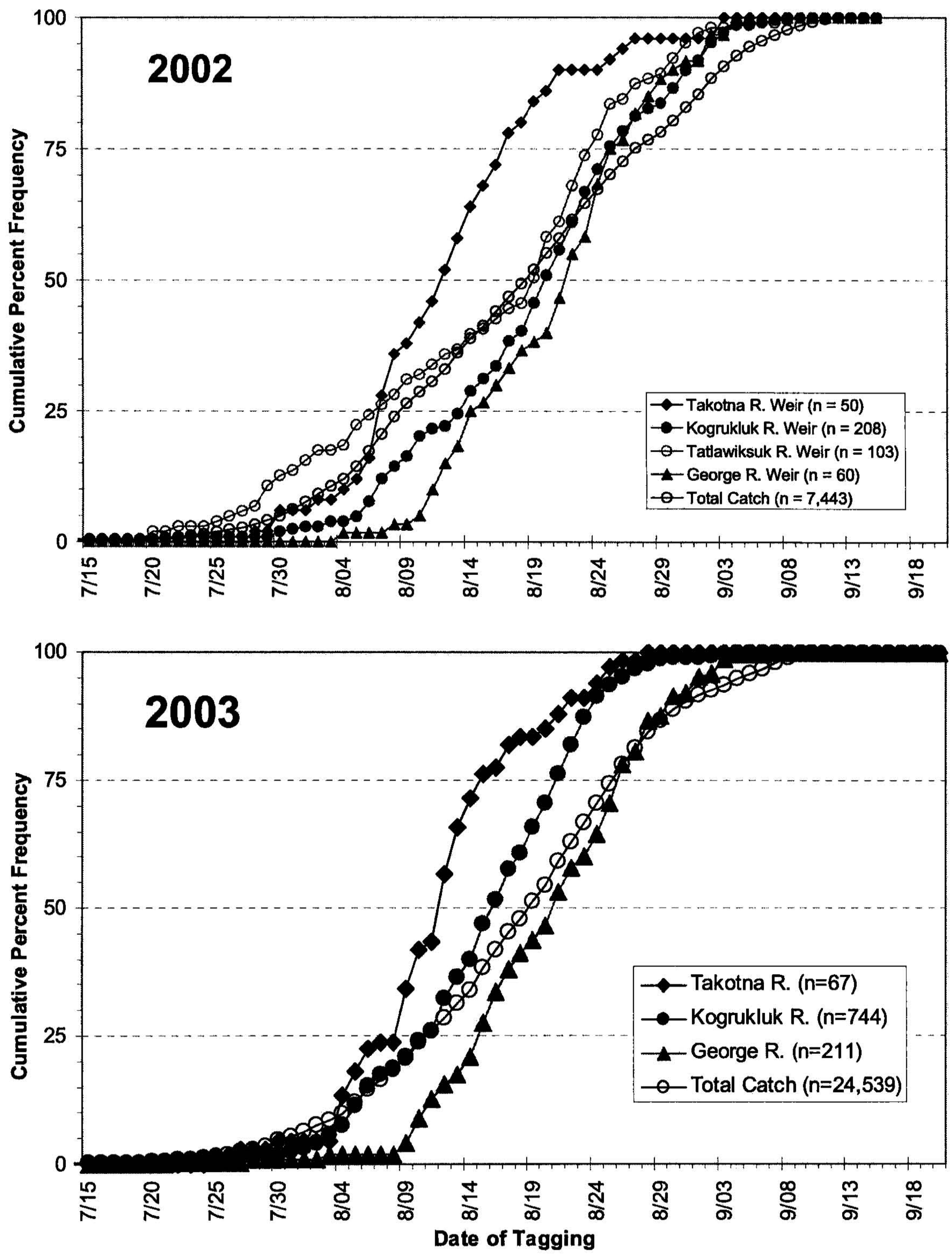


Figure 27. Cumulative percentage by date tagged of chum salmon tags recovered at the Takotna, Kogrukluk, George, and Aniak Rivers, including cumulative passage of the total coho salmon catch at the Kalskag/Aniak mark-recapture tagging site in 2002 and 2003 (Kerkvliet et al. 2003, Kerkvliet et al. *in press*). Sample sizes are in parentheses.

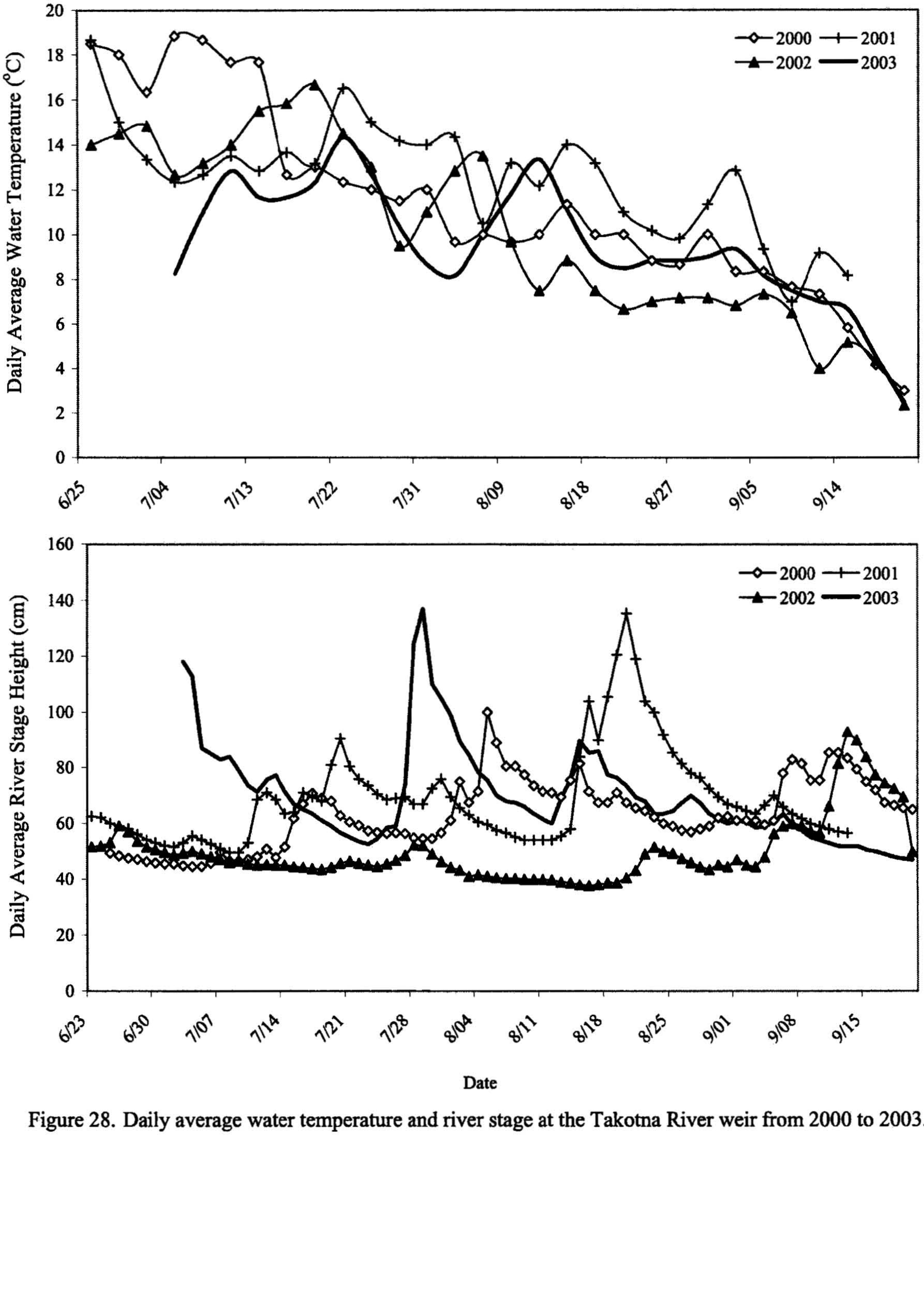


Figure 28. Daily average water temperature and river stage at the Takotna River weir from 2000 to 2003.

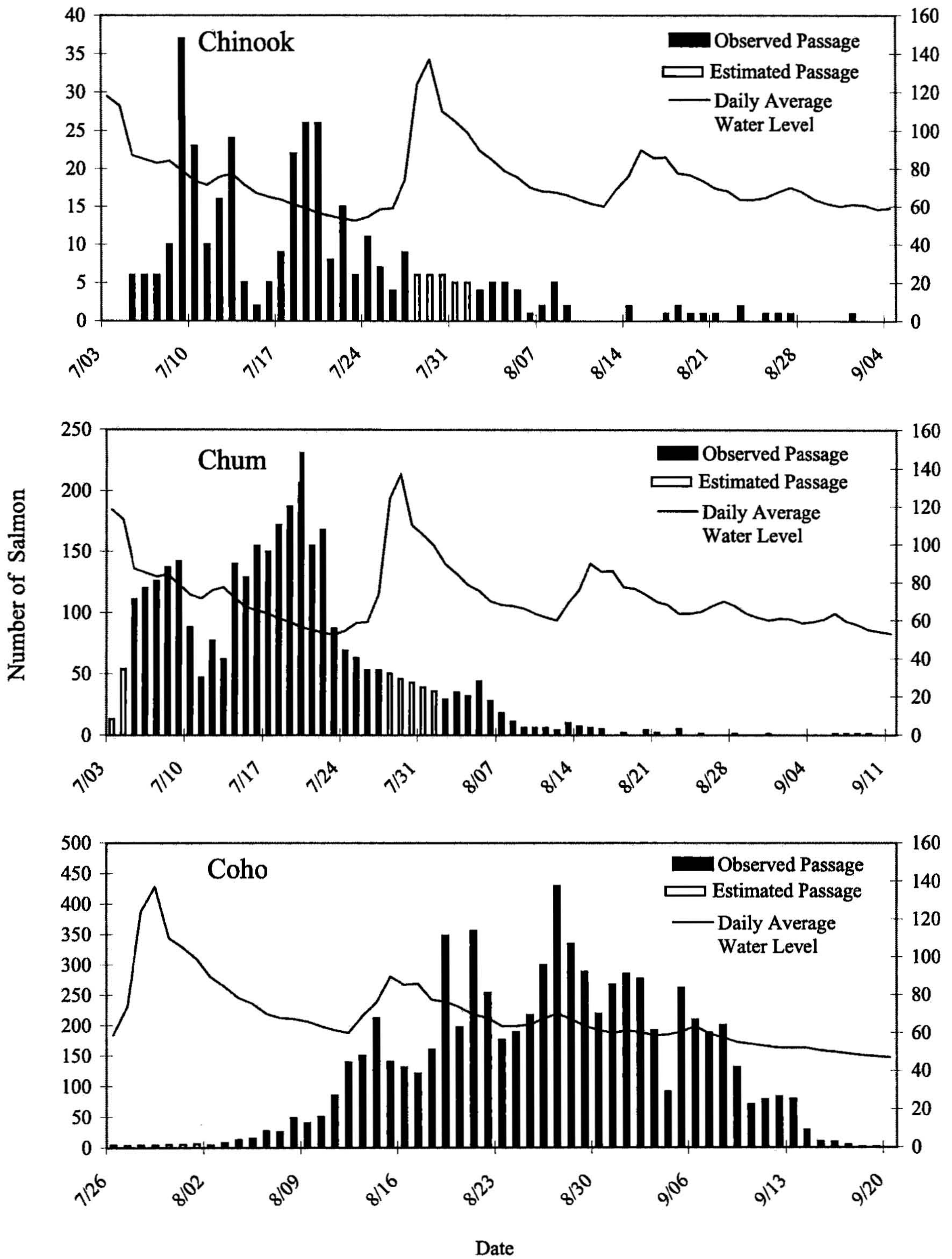


Figure 29. Daily chinook, chum, and coho salmon passage at the Takotna River weir relative to average river stage height, 2003.

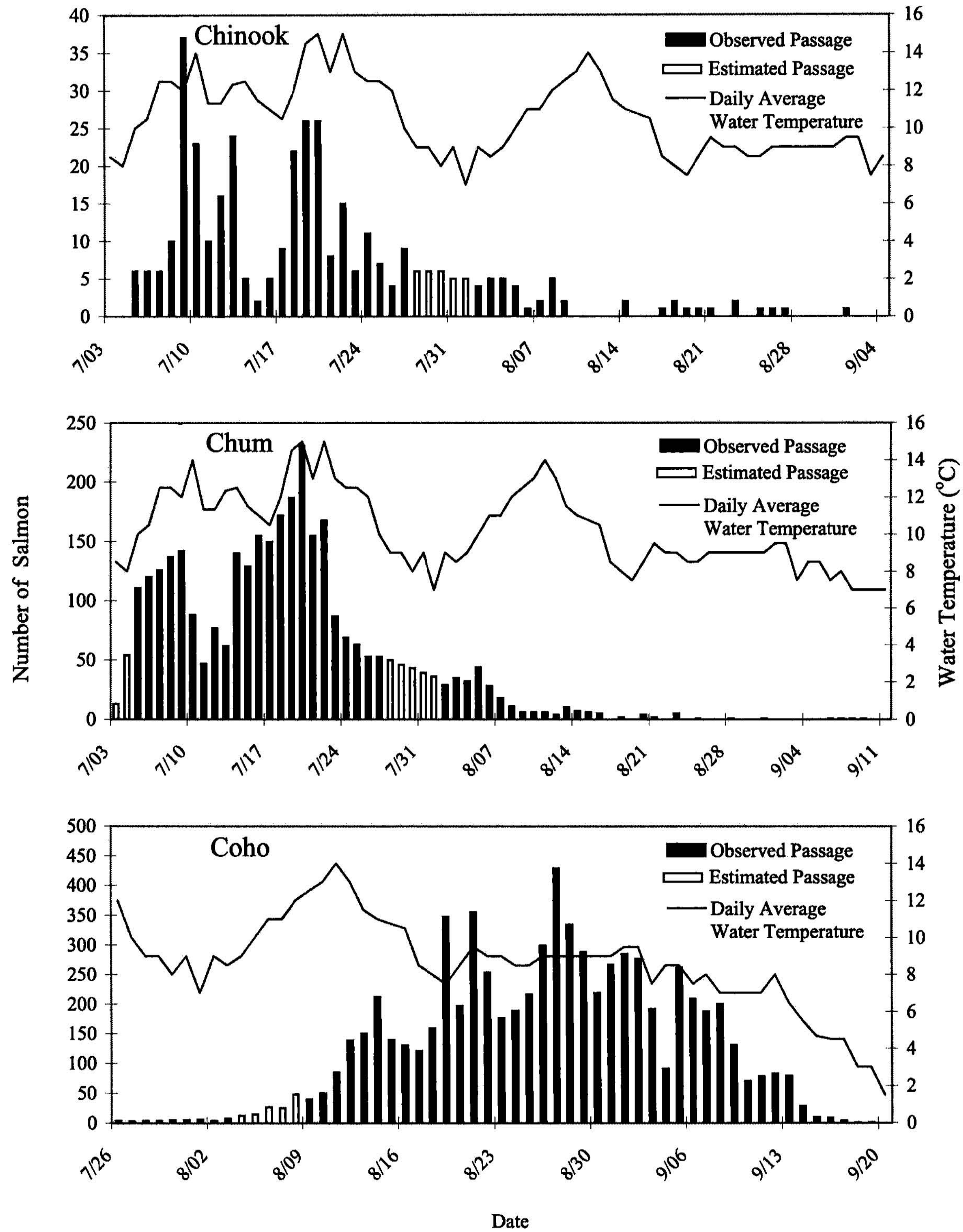


Figure 30. Daily chinook, chum, and coho salmon passage at the Takotna River weir relative to average water temperature, 2003.

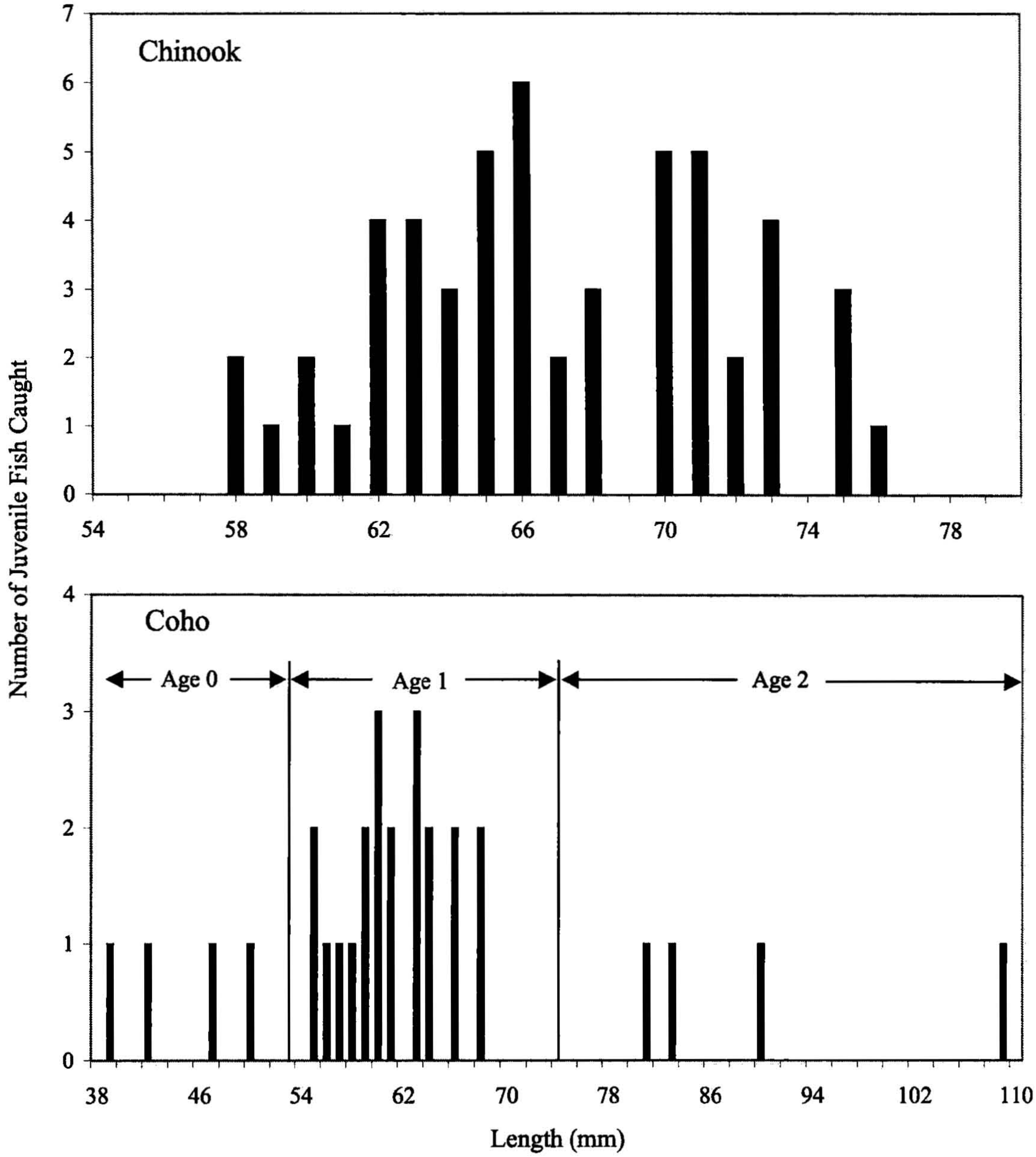


Figure 31. Trap-caught juvenile salmon lengths in the Takotna River drainage, summer 2003, with speculation of represented age classes.

APPENDICES

APPENDIX A:
AERIAL SURVEY INFORMATION FOR THE UPPER KUSKOKWIM DRAINAGE, 2003

Appendix A.1. Aerial survey coordinates for selected upper Kuskokwim River tributaries.

Lat.	Long.	Code	River and System
62 48 24	154 13 66	Brc 1	Bear Creek headwaters (Pitka)
62 51 08	154 32 94	Brc 2	Bear Creek mouth (Pitka)
62 40 35	154 23 28	Pit 1	Upper Pitka Fork headwaters (Pitka)
62 46 28	154 28 66	Pit 2	Upper Pitka Fork mouth (Pitka)
62 52 91	154 28 99	Sr 1a	Salmon River Index Area 101 End
62 53 66	154 34 50	Sr 1b	Salmon River Index Area 101 Start
62 51 88	154 12 36	Sr 2a	Salmon River Index Area 102 End
62 52 91	154 28 99	Sr 2b	Salmon River Index Area 102 Start
62 51 62	154 19 82	Sr 3a	Salmon River Index Area 103 End
62 53 11	154 28 93	Sr 3b	Salmon River Index Area 103 Start
62 50 00	154 14 78	Sr 4a	Salmon River Index Area 104 End
62 52 91	154 28 99	Sr 4b	Salmon River Index Area 104 Start
62 39 00	157 00 00	Jul 1	Fourth of July Creek headwaters (Takotna)
62 50 11	156 20 64	Jul 2	Fourth of July Creek mouth (Takotna)
62 55 00	156 27 00	Big 1	Big Creek headwaters (Takotna)
62 50 72	156 19 74	Big 2	Big Creek mouth (Takotna)
62 34 49	156 33 78	Bw 1	Big Waldren Creek headwaters (Takotna)
62 38 16	156 34 29	Bw 2	Big Waldren Creek mouth (Takotna)
62 28 01	156 51 82	Lw 1	Little Waldren Creek headwaters (Takotna)
62 32 30	156 47 50	Lw 2	Little Waldren Creek mouth (Takotna)
62 36 21	157 08 85	Mo 1	Moore Creek headwaters (Takotna)
62 32 30	156 47 50	Mo 2	Moore Creek mouth (Takotna)
62 53 17	153 55 55	Ltt 1-2	Unnamed trib. of the Little Tonzona Creek headwaters
62 58 01	154 07 70	Ltt 2-2	Unnamed trib. of the Little Tonzona Creek mouth
62 30 71	153 24 78	Jon 1	Jones River headwaters
62 34 15	153 33 30	Jon 2	Jones River mouth

-Continued-

Appendix A.1. (Page 2 of 2).

Lat.	Long.	Code	River and System
62 51 28	153 59 93	Sf 1	East bank side channel of South Fork Kuskokwim R.
62 37 32	153 41 17	Sf 2	East bank side channel of South Fork Kuskokwim R.
62 27 55	153 28 44	Sf 3	East bank side channel of South Fork Kuskokwim R.
62 26 70	153 29 08	Sf 4	East bank side channel of South Fork Kuskokwim R.
62 20 58	153 25 69	Sf 5	East bank side channel of South Fork Kuskokwim R.
62 18 70	153 22 58	Sf 6	East bank side channel of South Fork Kuskokwim R.
62 54 37	154 05 81	Sf 7	West bank side channel of South Fork Kuskokwim R.
62 53 03	154 03 14	Sf 8	West bank side channel of South Fork Kuskokwim R.
62 30 62	153 32 55	Sf 9	West bank side channel of South Fork Kuskokwim R.
62 56 40	154 08 61	Sf10	West bank side channel of South Fork Kuskokwim R.
62 40 71	154 57 69	Bgr 1	West bank side channel of Big River
62 37 85	154 54 65	Bgr 2a	Unnamed tributary of Big River headwaters
62 43 78	154 51 68	Bgr 2b	Unnamed tributary of Big River mouth
62 26 06	155 01 29	Bgr 3	Big River headwaters
63 24 55	153 07 41	Hp 2	Highpower Creek mouth
63 29 50	152 47 25	Lst 2	Lonestar Creek mouth (Highpower Creek)
63 28 62	152 49 23	Dc 2	Deep Creek mouth (Highpower Creek)
63 18 27	152 36 48	Fr 1	Fish River headwaters (Highpower Creek)
63 28 53	152 53 20	Fr 2	Fish River mouth (Highpower Creek)

Appendix A.2. Chinook, Chum, and Coho Salmon Aerial Surveys, 2003

Aerial surveys were conducted in the upper Kuskokwim River drainage to assess the relative abundance and spawning distribution of chinook, coho, and early and late spawning chum. The summer surveys were conducted on 20 July, and the fall surveys were conducted from 27 September to 30 September.

Each stream survey was assigned a rating number to represent the overall effectiveness of the survey. Conditions determining this rating included wind, weather, water turbidity, water visibility, bottom type, time of day, and spawning stage. The rating was on a scale of 1 to 3, with 1 representing "good", 2 representing "fair", and 3 representing "poor".

Chum and Chinook Aerial Surveys

Sara Gilk (Alaska Department of Fish and Game)—observer
Larry Nicholson (Gull Cape Air)—pilot
Piper PA-18 Super Cub

20 July. We departed Takotna at 08:15 under clear skies and winds from the north at less than five knots. We filed a flight plan at 08:20 and departed for Bear Creek to begin surveying.

We arrived at the headwaters of Bear Creek (62°48.24 N, 154°13.66 W) at 09:04 and began surveying. The first group of fish, an aggregate of 16 chinook, were spotted at 09:07. The upper section of Bear Creek was clear, with good visibility and bottom type. The last three miles of the creek had an increasingly silty bottom with some overgrowth and cut banks, making surveying more difficult. There were two to three small aggregates (about 10 fish) of chinook, mostly in the upper section of the creek; otherwise, the fish were primarily found in spawning pairs. We arrived at the mouth of Bear Creek (62°51.08 N, 154°32.94 W) at 09:20. A total of 176 chinook were spotted, and the counts were confirmed by the pilot. The survey was given an overall rating of 1.

We then flew to the upper Pitka Fork headwaters (62°40.35 N, 154°23.28 W), and began surveying at 09:31. The first mile of the survey had some overgrowth, making surveying more difficult. Most of the river was clear with good visibility and bottom type, but the lower section was slightly silty. Most of the chinook were in pairs, but there were two to three small aggregates (about 10 fish). There was a large beaver dam located about halfway through the survey, but chinook were seen upriver of it. The survey ended at the confluence of the upper Pitka Fork and Sheep Creek (62°46.28 N, 154°28.66 W) at 09:50. A total of 197 chinook were counted, and the counts were confirmed by the pilot. The survey was given an overall rating of 1.

We departed for Nikolai for a short break. We arrived at Nikolai at 10:03, and departed at 10:25.

We then headed to the Salmon River Index Area 101 mouth (62°53.66 N, 154°34.50 W) to continue surveying. (There appeared to be a mistake in the previous year's coordinates for this Index Area, so the end and start coordinates were corrected.) Index Area 101 had good visibility and bottom type. The survey started at one cabin, and ended at another. We arrived at the end point (the first major fork in the river, 62°52.91 N, 154°28.99 W) at 10:43. A total of 129 chinook were counted, and the survey was given a rating of 1.

We arrived at the headwaters of the Salmon River Index Area 104 (62°50.00 N, 154°14.78 W) and began surveying at 10:55. (There appeared to be a mistake in the previous year's coordinates for this Index Area, so the end and start coordinates were corrected.) Most of Index Area 104 had good visibility and bottom type. There were several large aggregates (about 20 to 100 fish) of chinook salmon, with the largest (about 100 fish) occurring early into the survey. We surveyed about 7 mi of stream, and arrived at the end of the Index Area (62°52.91 N, 154°28.99 W) at 11:05. We counted 935 chinook, and the survey was given a rating of 1.

We then headed to McGrath to refuel and for lunch. We arrived at 11:30. We departed McGrath at 13:10 heading for the Salmon River Index Area 102 under clear skies and high haze, winds from the north at about 15 mph, and an air temperature of 73°F. The winds were causing a small amount of turbulence.

We arrived at the headwaters of Salmon River Index Area 102 (62°51.88 N, 154°12.36 W) at 13:40. We took the southern tributary of this section as it appeared to be the main tributary. (There appeared to be a mistake in the previous year's coordinates for this Index Area, so the end and start coordinates were corrected.) Most of the chinook were in smaller groups (mostly spawning pairs), though there were a few larger aggregates (about 10 to 40 fish). Most of the Index Area had good visibility and bottom type. We arrived at the end of the Index Area (62°52.91 N, 154°28.99 W) at 13:55, having counted 273 chinook. The survey was given an overall rating of 1.

We then flew to the mouth of Salmon River Index Area 103 (62°53.11 N, 154°28.93 W) and began surveying at 13:57. The lower part of this Index Area was more difficult to survey due to overgrowth, but the views were only moderately obstructed. The stream gets braided and shallow near the stop point, and few fish were seen in this upper area. Most of the chinook were in spawning pairs. Three chinook carcasses were spotted on a bar in the braids of the upper section of the stream. We arrived at the headwaters of the Index Area (62°51.62 N, 154°19.82 W) at 14:05. A total of 31 chinook were counted in addition to the three chinook carcasses, and the survey was given an overall rating of 1.

We concluded surveying and returned to Takotna. We arrived at 15:00 with a total of five hours of flight time for the day.

[Note: After examining maps and past survey logs, it was later determined that we may have surveyed the incorrect portions of some of the Salmon River Index Areas. The end of Index Area 101 and the start (or mouth) of Index Areas 102 and 104 should probably be: 62°53.37 N, 154°30.40 W. The portion of Index Area 102 that has probably been surveyed historically (a northern tributary) ends at: 62°55.01 N, 154°16.94 W.]

Coho and Late Spawning Chum Aerial Surveys

Sara Gilk (Alaska Department of Fish and Game)—observer
Larry Nicholson (Gull Cape Air)—pilot
Piper PA-18 Super Cub

27 September. We departed Takotna for Fourth of July Creek at 13:45 under clear skies and southeast winds at 10 to 15 mph.

Due to the winds, we decided to begin the survey at the headwaters of Fourth-of-July Creek (62°39.00 N, 157°00.00 W) in the Takotna River drainage. We arrived and began surveying at 14:10. The water was clear throughout most of the survey, but the stream was difficult to survey due to high timber and overgrowth, shadows from trees and cliffs, and extreme meanders. It is estimated that approximately 25% to 30% of the stream was not surveyed. The coho were scattered throughout the stream, mostly in small groups (10 to 20 fish) and in spawning pairs. Coho were seen in larger pools near the headwaters of the creek. Some of the fish had white tails and backs (presumably from spawning activity). We took a five-minute break partway through the survey, but returned to the same spot to resume surveying. We arrived at the mouth of Fourth of July Creek (62°50.11 N, 156°20.64 W) at 14:50, having counted 159 coho and 1 coho carcass. The survey was given an overall rating of 2.

We then flew to the headwaters of lower Big Creek (62°55.00 N, 156°27.00 W). We arrived at 15:04 and began the survey. The water was clear, but surveying was difficult due to high timber overgrowth and many meanders. We were not able to survey the lower section of the creek near the mouth due to poor visibility. It is estimated that approximately 30% to 40% of the stream was not surveyed. There were a few big beaver dams near the headwaters, as well as some iced-over ponds. There were a few fish near the headwaters of Big Creek, and a few others scattered throughout the survey (no large aggregates of fish). We arrived at the mouth of the creek (62°50.72 N, 156°19.74 W) at 15:11. We counted 52 coho. The survey was given a rating of 2 for the upper sections, and a 3 for the lowest section near the mouth.

We then flew to the mouth of Big Waldren Fork (62°38.16 N, 156°34.29 W), arriving at 15:20. We flew over looking for clear water for surveying, but the water remained dark and slightly turbid. No fish were seen, so we ended the survey at 15:25. The survey was given a rating of 3.

Next we flew to the mouth of Little Waldren Fork (62°32.30 N, 156°47.50 W). We arrived and began surveying at 15:42. The water was mostly clear, but surveying was difficult due to many meanders, shadows, and some cut banks. It is estimated that we could not survey approximately 25% of the stream. The few fish seen were individuals, scattered throughout the survey. We arrived at the headwaters (62°28.01 N, 156°51.82 W) at 15:50, having counted a total of four coho. A rating of 2-3 was given to this survey.

We decided to fly to the headwaters of Moore Creek (62°36.21 N, 157°08.85 W) next and fly downstream due to the wind direction. The survey began at 16:00. There are many old mine tailings and three large beaver dams near the start of the survey, and ice was on some of the ponds. No fish were seen in this section. Moore Creek has many meanders, some shadows, and timber and overgrowth that made surveying more difficult; it is estimated that we could not survey approximately 15% of the stream. The coho were first seen about halfway through the survey (upstream of Sugarloaf Mountain, possibly near Banner Creek). There was one pair of coho with the rest scattered to the mouth. We arrived at the mouth (62°32.30 N, 156°47.50 W) of the creek and ended the survey at 16:20. There was a total of five coho, and the survey was given an overall rating of 2.

We then flew back to Takotna, arriving at 16:45. Total flight time for the day was 3 hours.

28 September. We departed Takotna at 11:35 under 100% overcast skies, light rain, and easterly winds at 5 to 10 mph. We filed a flight plan at 11:41 and headed to Highpower Creek to survey. Ten miles outside of McGrath, the FAA called and warned us that the forecast was calling for sheer winds from the east at 35 mph. We had begun to encounter headwinds of 30 mph, so we decided to cancel surveying for the day. We turned around and arrived at Takotna at 12:13. Total flight time for the day was 45 minutes.

29 September. We departed Takotna at 10:07 under mostly cloudy skies and calm winds. We filed a flight plan at 10:15 and headed to an unnamed tributary of the Little Tonzona River to continue surveying.

We arrived at the mouth of the unnamed tributary of the Little Tonzona River (62°58.01 N, 154°07.70 W) at 10:50. We observed a two moose at the confluence. This was an excellent stream to survey, with good visibility and bottom type. Coho were observed throughout the stream, mostly in large schools (10 to 40 fish). Some of the largest schools consisted of about 100 coho, mostly in deeper pools in bends of the creek. The survey ended at the headwaters (62°53.17 N, 153°55.55 W) at 11:04, with a total of 1,194 coho salmon. The survey was given a rating of 1. [Note: It appears that this tributary was surveyed in 2000 and 2001, but a different unnamed tributary was flown in 2002. We returned to this tributary due to reports of higher numbers of fish.]

We decided to survey the South Fork Kuskokwim River next, and flew over the river headed for the first side channel in which fish had been spotted in previous surveys. The South Fork is a glacial river, with turbid water that allows surveying only in clear side channels and sloughs or in shallow areas near gravel bars. We spotted 12 coho enroute, and noticed many eagles and ravens throughout the survey. In the clear, short east bank side channel located at 62°51.28 N, 153°59.93 W, we counted 132 coho and 15 chum at 11:07. In shallow areas of the main channel, we counted 27 coho and 1 chum enroute to the next side channel. The short side channel located at 62°37.32 N, 153°41.17 W was very shallow, and appeared to be impassable to fish in some spots. No fish were seen despite excellent visibility. We spotted 26 coho enroute to the next side channel, located at 62°30.62 N, 153°32.55 W. We arrived at the west bank side channel at 11:38, and counted 208 coho, some in large aggregates of 20 – 30 fish. We counted two chum enroute to the next side channel, located on the east bank at 62°27.55 N, 153°28.44 W. In this channel, we counted 46 coho, mostly in pairs or small groups. We arrived at a clear side channel located at 62°26.70 N, 153°29.08 W and spotted 21 coho. A herd of 7 – 10 bison were located in this area. At the clear side channel located at 62°20.58 N, 153°25.69 W, we counted 42 coho, mostly in a large group located at the mouth of the channel. We started to pick up more turbulence near the mountains, but surveying was still possible. We arrived at the clear east bank side channel located at 62°18.70 N, 153°22.58 W at 11:55. This channel was very shallow, and looked impassable to fish in some spots. There was also a sizeable beaver dam that looked impassable to fish. No fish were seen.

We then headed to the mouth of the Jones River (62°34.15 N, 153°33.30 W), and arrived to begin surveying at 12:10. The Jones River is a braided stream that empties in to the South Fork on the east side opposite of Farewell Lake. The river appeared low, so the water was only slightly turbid except in deeper pools. The coho we saw were in small groups (5 to 10 fish), and some had white tails that indicated spawning activity. The chum were scattered throughout the survey. The stream began to dissipate, so we ended the survey at 12:26 at 62°30.71 N, 153°24.78 W. We counted a total of 20 chum and 136 coho, and the survey was given a rating of 2 due to poor visibility in deeper pools and poor lighting.

From here we continued to search side channels and sloughs of the South Fork Kuskokwim River. At 12:53, we arrived at a west bank side channel located at 62°54.37 N, 154°05.81 W. There were many large groups of chum (aggregates up to 150 fish), and some coho scattered throughout. It was more difficult to see into the deeper pools, so the sizes of the chum schools may be underestimated. A total of 812 chum and 160 coho were counted. We then arrived at a west bank side channel located at 62°53.03 N, 154°03.14, and observed 60 chum and 10 coho. The fish were found mostly in smaller groups or as individuals, with one larger school of chum. We ended this portion of the South Fork survey at 13:00.

We then headed back to McGrath for lunch and to refuel. We arrived at McGrath at 13:30, and departed McGrath at 14:50 heading for Big River.

We intersected Big River at 62°00.00 N, 154°37.50 W. These coordinates appeared to be too far upriver to find fish in clear side channels, so we flew low over the river until we found an area more suitable for surveying. We arrived at 62°26.06 N, 155°01.29 W at 15:15 and began surveying. About 1.5 mi downstream, we searched a west bank clear side channel and found 50 coho, 19 chum, and 12 coho carcasses.

We decided to take a quick break and land on a sandbar to stretch our legs. We landed at 15:45 and departed at 15:50 to continue surveying.

We flew to a previously surveyed side channel, searching for fish in side channels on the way. We spotted 17 coho and 1 chum enroute, and noticed fewer eagles than on the South Fork. We arrived at the west bank side channel located at 62°40.71 N, 154°57.69 W at 16:34. The channel looked like good spawning habitat, but we saw very few fish. We counted a total of five coho and three chum. We continued to search in the side channels of Big River enroute to the next previously surveyed tributary, but did not see any fish.

At 16:50, we arrived the headwaters of an unnamed tributary (62°37.85 N, 154°54.65 W) that flows into the Big River on the west bank. The upper part of the creek had good visibility and bottom type, but the lower section of the creek was difficult to survey due to turbid and dark water and high timber obscuring the view. We arrived at the mouth of the tributary (62°43.78 N, 154°51.68 W) at 17:00. No fish were seen. The upper part of the tributary was given a rating of 1, while the lower portion was given a rating of 3.

Due to the very few fish seen (despite seemingly good habitat), we decided to end the Big River survey here. A total of 72 live coho, 12 coho carcasses, and 23 live chum were observed in the river.

We then flew back to the South Fork Kuskokwim River side channel located at 62°54.37 N, 154°05.81 W to look for possible places to land in order to conduct genetics sampling. We arrived in the area at 17:20, surprising a couple of camps of hunters. We were not able to find a good place to land due to large numbers of logs on the sand bars, but we observed about 200 chum in a side channel opposite the previously surveyed side channel. On the way to Nikolai, we counted 50 to 60 chum about a mile upriver of this. We looked at a side channel on the west bank located at 62°56.40 N, 154°08.61 W, and spotted 75 coho and 50 chum. Enroute to Nikolai from this side channel, we counted 90 more chum in shallower areas of the river, mostly in large groups of more than 20 fish. A total of 759 coho and 1,280 chum were observed in the South Fork Kuskokwim River for the day. The clear side channels were given a rating of 1, but the river was given an overall rating of 2 due to glacial silt that restricted surveying to shallower areas.

We landed in Nikolai for a short break at 17:40. We departed for Takotna at 17:45 and arrived about 18:30. Total flight time for the day was about 7 hours.

30 September. We departed Takotna at 10:13 under cloudy skies and calm winds. After filing a flight plan at 10:15, we headed for Highpower Creek. Enroute, we stopped in Medfra for a five-minute break and to take off the fuselage cover due to warm air temperatures (about 50°F).

We arrived at the mouth of Highpower Creek (63°24.55 N, 153°07.41 W) at 11:28. The lower part of the creek is poor for surveying due to turbid and dark water. We decided to fly higher over the creek looking for a surveyable area. The entire area was burned in a wildfire 1 to 2 years ago, which has resulted in many fallen trees. A large log jam was located about 2 mi upstream of the mouth of the creek, but still looked passable to fish. Deep Creek and Lonestar Creek both look poor for surveying, due to high timber and muddy water. Highpower Creek began to clear up at about 63°30.04 N, 152°39.77 W. However, even in ideal conditions, the creek is difficult to survey due to many meanders, timber obscuring the views, and turbid water in deeper holes (even in relatively low water). We flew about 7 miles of the creek without conditions improving much. No fish were seen, and we abandoned the survey at 11:46. It was just beginning to rain.

We then flew to Fish River, a tributary of Highpower Creek that looked more promising for surveying than either Deep Creek or Lonestar Creek. A section of Fish River was surveyed in 1996, yielding high counts of coho. We arrived at the mouth of Fish River (63°28.53 N, 152°53.20 W) and began surveying at 11:52. Both the upper and lower parts of the stream were good for surveying, with clear water and good spawning gravel, but most of the fish were in the upper section (after 63°18.59 N, 152°38.54 W). The coho were seen in large groups of 50 to 100 in deeper pools, with some pairs and smaller aggregates scattered throughout. We arrived at the headwaters (63°18.27 N, 152°36.48 W) and ended the survey at 12:15. A total of 1,433 coho were seen. The survey was given an overall rating of 1.

We headed to Telida for a break, arriving at 12:32. We departed at 12:51, heading to McGrath for lunch, to refuel, and to clean the spark plugs. We arrived in McGrath at 13:39. We departed McGrath at about 15:00, under cloudy skies, scattered showers, and light surface winds. A few miles outside of McGrath, we began to encounter northeast winds about 20 mph, with gusts up to 45 mph. (The FAA reported wind sheers at higher altitudes, about 1500 feet.) Due to the winds and turbulence above 1000 feet, we abandoned our plans to head to the Pitka Fork and Salmon River. We attempted to head back to Takotna, but were not able to land due to high winds. We arrived in McGrath at 14:10, for a total flight time of 3.5 hours for the day.

Wind sheers persisted for the next few days, preventing further surveying.

APPENDIX B:
FISH PASSAGE AT THE TAKOTNA RIVER WEIR, 2003

Appendix B.1. Historic chinook salmon passage for the Takotna River.

Date	Daily Passage								Cumulative Passage								Percent Passage					
	1995	1996	1997	1998	2000	2001	2002	2003	1995	1996	1997	1998	2000	2001	2002	2003	1996	1997	2000	2001	2002	2003
6/15																						
6/16																						
6/17																						
6/18																						
6/19																						
6/20																						
6/21[d]			0																			
6/22			6																			
6/23[d]			0			0	0															
6/24			12		0	1	1	e			12		0	1	1		0	1	0	0	0	
6/25		0	30		2	3	0	e		0	42		2	4	1		0	4	1	1	0	
6/26		9	24		2	1	0	e		9	66		4	5	1		2	6	1	1	0	
6/27		17	9		1	4	2	e		26	75		5	9	3		6	6	1	1	1	
6/28		8	33	0	0	1	4	e		34	108	0	5	10	7		8	9	1	1	2	
6/29		21	36	0	1	1	3	e		55	144	0	6	11	10		14	12	2	2	3	
6/30		18	57	0	1	13	1	e		73	201	0	7	24	11		18	17	2	3	3	
7/01		15	0	0	0	17	5	e		88	201	0	7	41	16		22	17	2	6	5	
7/02		12	30	3	15	4	0	10 e		100	231	3	22	45	16	10	25	20	6	6	5	3
7/03		12	72	3	16	23	1	5 e		112	303	6	38	68	17	15	28	26	11	9	5	4
7/04		73	66	3	3	10	2	e		185	369	9	41	78	19	15	46	32	12	11	6	4
7/05		39	54	12	14	1	3	6		224	423	21	55	79	22	21	56	36	16	11	7	6
7/06		10	54		7	3	11	6		234	477		62	82	33	27	58	41	18	11	10	7
7/07		37	33		12	15	17	6		271	510		74	97	50	33	67	44	21	13	16	9
7/08		24	54		37	110	32	10		295	564		111	207	82	43	73	49	32	29	26	11
7/09		3	69		9	17	7	37		298	633		120	224	89	80	74	55	35	31	28	21
7/10		4	51		3	69	2	23		302	684		123	293	91	103	75	59	36	41	29	27
7/11		5	69		8	9	93	10		307	753		131	302	184	113	76	65	38	42	58	30
7/12		5	48		22	30	51	16		312	801		153	332	235	129	78	69	44	46	74	34
7/13		7	24		1	45	2	24		319	825		154	377	237	153	79	71	45	52	75	40
7/14		7	66		3	29	2	5		326	891		157	406	239	158	81	77	46	56	76	42
7/15		9	27		4	41	2 e	2		335	918		161	447	241	160	83	79	47	62	76	42
7/16		0	12		4	28	0	5		335	930		165	475	241	165	83	80	48	66	76	44
7/17		20	36		2	17	3	9		355	966		167	492	244	174	88	83	48	68	77	46
7/18		11	48		6	14	5	22		366	1,014		173	506	249	196	91	87	50	70	79	52
7/19		9	12		4	31	4	26		375	1,026		177	537	253	222	93	88	51	74	80	59
7/20		8	15		8	26	9	26		383	1,041		185	563	262	248	95	90	54	78	83	66
7/21		7	3		7	23	5	8		390	1,044		192	586	267	256	97	90	56	81	84	68
7/22		5	12		39	21	2	15		395	1,056		231	607	269	271	98	91	67	84	85	72
7/23		4	9		2	13	0	6		399	1,065		233	620	269	277	99	92	68	86	85	73
7/24		3	18		5	17	0	11		402	1,083		238	637	269	288	100	93	69	88	85	76
7/25		0	15		17	10	6	7		402	1,098		255	647	275	295	100	95	74	90	87	78
7/26			18		3	11	5	4		402	1,116		258	658	280	299	100	96	75	91	89	79
7/27			12		9	6	2	9			1,128		267	664	282	308	100	97	77	92	89	81
7/28			6		5	11	1	6 a			1,134		272	675	283	314	100	98	79	94	90	83
7/29			15		9	3	8	6 b			1,149		281	678	291	320	100	99	81	94	92	85
7/30			0		5	2	5	6 b			1,149		286	680	296	326	100	99	83	94	94	86
7/31			0		2	4	0	5 b			1,149		288	684	296	331	100	99	83	95	94	88
8/01			3		1	1	2	5 a			1,152		289	685	298	336	100	99	84	95	94	89
8/02			6		1	3	0	4			1,158		290	688	298	340	100	100	84	95	94	90
8/03			3		5	0	0	5			1,161		295	688	298	345	100	100	86	95	94	91
8/04			0		8	2	1	5			1,161		303	690	299	350	100	100	88	96	95	93
8/05					7	1	0	4					310	691	299	354	100	100	90	96	95	94
8/06					4	4	1	1					314	695	300	355	100	100	91	96	95	94
8/07					1	1	2	2					315	696	302	357	100	100	91	97	96	94
8/08					7	3	0	5					322	699	302	362	100	100	93	97	96	96
8/09					7	1	3	2					329	700	305	364	100	100	95	97	97	96
8/10					0	2	2	0					329	702	307	364	100	100	95	97	97	96
8/11					3	1	0	0					332	703	307	364	100	100	96	98	97	96
8/12					6	2	4	0					338	705	311	364	100	100	98	98	98	96
8/13					2	1	1	0					340	706	312	364	100	100	99	98	99	96
8/14					1	1	0	2					341	707	312	366	100	100	99	98	99	97
8/15					0	0	1	0					341	707	313	366	100	100	99	98	99	97
8/16					0	1	0	0					341	708	313	366	100	100	99	98	99	97
8/17					0	0	0	1					341	708	313	367	100	100	99	98	99	97
8/18					2	1	0	2					343	709	313	369	100	100	99	98	99	98
8/19					0	0	0	1					343	709	313	370	100	100	99	98	99	98
8/20					0	1 a	0	1					343	710	313	371	100	100	99	98	99	98
8/21					0	1 b	0	1					343	711	313	372	100	100	99	99	99	98
8/22					0	1 b	0	0					343	712	313	372	100	100	99	99	99	98
8/23					0	1	0	2					343	713	313	374	100	100	99	99	99	99
8/24					0	0	0	0					343	713	313	374	100	100	99	99	99	99
8/25					0	0	1	1					343	713	314	375	100	100	99	99	99	99
8/26					0	1	0	1					343	714	314	376	100	100	99	99	99	99

-Continued-

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

Date	Daily Passage								Cumulative Passage								Percent Passage					
	1995	1996	1997	1998	2000	2001	2002	2003	1995	1996	1997	1998	2000	2001	2002	2003	1996	1997	2000	2001	2002	2003
8/27					1	1	0	1					344	715	314	377	100	100	100	99	99	100
8/28					0	1	0	0					344	716	314	377	100	100	100	99	99	100
8/29					0	1	0	0					344	717	314	377	100	100	100	99	99	100
8/30					0	1	0	0					344	718	314	377	100	100	100	100	99	100
8/31					0	1	0	0					344	719	314	377	100	100	100	100	99	100
9/01					0	0	0	1					344	719	314	378	100	100	100	100	99	100
9/02					0	0	0	0					344	719	314	378	100	100	100	100	99	100
9/03					0	1	0	0					344	720	314	378	100	100	100	100	99	100
9/04					0	1	0	0					344	721	314	378	100	100	100	100	99	100
9/05					0	0	0	0					344	721	314	378	100	100	100	100	99	100
9/06					0	0	0	0					344	721	314	378	100	100	100	100	99	100
9/07					0	0	0 e	0					344	721	314	378	100	100	100	100	99	100
9/08					0	0	0	0					344	721	314	378	100	100	100	100	99	100
9/09					1	0	0	0					345	721	314	378	100	100	100	100	99	100
9/10					0	0	0	0					345	721	314	378	100	100	100	100	99	100
9/11					0	0	0	0					345	721	314	378	100	100	100	100	99	100
9/12					0	0	0	0					345	721	314	378	100	100	100	100	99	100
9/13					0	0	1	0					345	721	315	378	100	100	100	100	100	100
9/14					0	0	0	0					345	721	315	378	100	100	100	100	100	100
9/15					0	0 e	1	0					345	721	316	378	100	100	100	100	100	100
9/16					0	0 e	0	0					345	721	316	378	100	100	100	100	100	100
9/17					0	0 e	0	0					345	721	316	378	100	100	100	100	100	100
9/18					0	0 e	0	0					345	721	316	378	100	100	100	100	100	100
9/19					0	0 e	0	0					345	721	316	378	100	100	100	100	100	100
9/20					0	0 e	0	0					345	721	316	378	100	100	100	100	100	100

a= estimated salmon passage (partial day)

b= estimated salmon passage (whole day)

c= no estimation for missed longnose sucker counts

d= date outside of target operational period (not included in accumulative totals)

e= no estimates for inoperable period

Appendix B.2. Historic chum salmon passage for the Takotna River.

Date	Daily Passage								Cumulative Passage								Percent Passage					
	1995	1996	1997	1998	2000	2001	2002	2003	1995	1996	1997	1998	2000	2001	2002	2003	1996	1997	2000	2001	2002	2003
6/15		0																				
6/16		0																				
6/17		0	0																			
6/18		0	0																			
6/19		0	0																			
6/20		0	0																			
6/21[d]		14	6																			
6/22		0	0																			
6/23[d]		0	0			6	9															
6/24		102	12		1	3	29	0 b		102	12		1	3	29	0	4	1	0	0	1	0
6/25		0	27		24	9	55	0 b		102	39		25	12	84	0	4	2	2	0	2	0
6/26		0	12		23	10	55	1 b		102	51		48	22	139	1	4	3	4	0	3	0
6/27		137	51		11	12	111	5 b		239	102		59	34	250	6	9	6	5	1	6	0
6/28		58	45	0	9	4	116	7 b		297	147	0	68	38	366	13	11	8	5	1	8	0
6/29		127	84	0	6	19	168	4 b		424	231	0	74	57	534	17	15	13	6	1	12	1
6/30		117	48	9	6	20	147	12 b		541	279	9	80	77	681	29	19	16	6	1	16	1
7/01		101	18	0	10	42	180	10 b		642	297	9	90	119	861	39	23	17	7	2	20	1
7/02		85	33	15	18	24	72	40 a		727	330	24	108	143	933	79	26	19	9	3	21	2
7/03		89	33	6	17	47	145	57 a		816	363	30	125	190	1,078	136	29	20	10	4	25	4
7/04		123	69	3	39	40	94	54 b		939	432	33	164	230	1,172	190	34	24	13	4	27	6
7/05		264	72	12	12	21	250	111		1,203	504	45	176	251	1,422	301	43	28	14	5	32	9
7/06		295	87		45	60	204	120		1,498	591		221	311	1,626	421	54	33	18	6	37	12
7/07	0	242	33		44	106	251	126	0	1,740	624		265	417	1,877	547	62	35	21	8	43	16
7/08	53	209	42		101	188	124	137	53	1,949	666		366	605	2,001	684	70	37	29	11	46	20
7/09	18	172	57		49	78	110	142	71	2,121	723		415	683	2,111	826	76	41	33	13	48	24
7/10	222	105	63		27	204	205	88	293	2,226	786		442	887	2,316	914	80	44	35	16	53	27
7/11	63	88	60		58	198	259	47	356	2,314	846		500	1,085	2,575	961	83	48	40	20	59	28
7/12	42	78	33		29	372	266	77	398	2,392	879		529	1,457	2,841	1,038	86	49	42	27	65	31
7/13	98	70	36		49	275	80	62	496	2,462	915		578	1,732	2,921	1,100	88	51	46	32	67	32
7/14	117	11	117		50	309	103	140	613	2,473	1,032		628	2,041	3,024	1,240	89	58	50	38	69	37
7/15	82	28	36		35	265	97 a	129	695	2,501	1,068		663	2,306	3,121	1,369	90	60	53	43	71	40
7/16	126	37	54		33	257	88	155	821	2,538	1,122		696	2,563	3,209	1,524	91	63	56	47	73	45
7/17	11	58	78		51	206	117	150	832	2,596	1,200		747	2,769	3,326	1,674	93	67	60	51	76	49
7/18	150	53	57		34	264	73	172	982	2,649	1,257		781	3,033	3,399	1,846	95	71	62	56	78	54
7/19	189	35	18		59	352	161	187	1,171	2,684	1,275		840	3,385	3,560	2,033	96	72	67	63	81	60
7/20	42	29	30		50	301	109	231	1,213	2,713	1,305		890	3,686	3,669	2,264	97	73	71	68	84	67
7/21	129	26	72		43	212	72	155	1,342	2,739	1,377		933	3,898	3,741	2,419	98	77	74	72	85	71
7/22	72	21	24		53	215	95	168	1,414	2,760	1,401		986	4,113	3,836	2,587	99	79	79	76	88	76
7/23	79	15	66		33	165	79	87	1,493	2,775	1,467		1,019	4,278	3,915	2,674	99	82	81	79	89	79
7/24	8	6	57		23	168	67	69	1,501	2,781	1,524		1,042	4,446	3,982	2,743	100	86	83	82	91	81
7/25	18	11	24		25	145	62	63	1,519	2,792	1,548		1,067	4,591	4,044	2,806	100	87	85	85	92	83
7/26	11	0	15		20	93	53	53	1,530	2,792	1,563		1,087	4,684	4,097	2,859	100	88	87	87	94	84
7/27	33		72		14	117	23	53	1,563		1,635		1,101	4,801	4,120	2,912		92	88	89	94	86
7/28	21		21		11	135	49	50 a	1,584		1,656		1,112	4,936	4,169	2,962		93	89	91	95	87
7/29	29		57		18	58	39	46 b	1,613		1,713		1,130	4,994	4,208	3,008		96	90	92	96	89
7/30	66		27		12	64	21	43 b	1,679		1,740		1,142	5,058	4,229	3,051		98	91	93	97	90
7/31	6		21		10	68	15	39 b	1,685		1,761		1,152	5,126	4,244	3,090		99	92	95	97	91
8/01			12		3	38	21	36 a			1,773		1,155	5,164	4,265	3,126		100	92	95	97	92
8/02			6		12	30	22	29			1,779		1,167	5,194	4,287	3,155		100	93	96	98	93
8/03			0		2	34	15	35			1,779		1,169	5,228	4,302	3,190		100	93	97	98	94
8/04			0		22	30	17	32			1,779		1,191	5,258	4,319	3,222		100	95	97	99	95
8/05					5	38	5	44					1,196	5,296	4,324	3,266			95	98	99	96
8/06					11	25	4	28					1,207	5,321	4,328	3,294			96	98	99	97
8/07					5	16	13	18					1,212	5,337	4,341	3,312			97	99	99	98
8/08					11	11	3	11					1,223	5,348	4,344	3,323			98	99	99	98
8/09					5	13	5	6					1,228	5,361	4,349	3,329			98	99	99	98
8/10					10	8	6	6					1,238	5,369	4,355	3,335			99	99	99	98
8/11					6	8	6	6					1,244	5,377	4,361	3,341			99	99	100	98
8/12					6	5	4	4					1,250	5,382	4,365	3,345			100	99	100	99
8/13					2	2	2	10					1,252	5,384	4,367	3,355			100	99	100	99
8/14					0	3	0	7					1,252	5,387	4,367	3,362			100	100	100	99
8/15					0	2	0	6					1,252	5,389	4,367	3,368			100	100	100	99
8/16					0	1	3	5					1,252	5,390	4,370	3,373			100	100	100	99
8/17					0	0	1	0					1,252	5,390	4,371	3,373			100	100	100	99
8/18					0	7	0	2					1,252	5,397	4,371	3,375			100	100	100	99
8/19					0	4	0	0					1,252	5,401	4,371	3,375			100	100	100	99
8/20					1	3 a	1	4					1,253	5,404 b	4,372	3,379			100	100	100	100
8/21					0	3 b	0	2					1,253	5,407 b	4,372	3,381			100	100	100	100
8/22					0	3 b	0	0					1,253	5,410 b	4,372	3,381			100	100	100	100
8/23					0	0	1	5					1,253	5,410	4,373	3,386			100	100	100	100
8/24					0	1	1	0					1,253	5,411	4,374	3,386			100	100	100	100
8/25					0	2	2	1					1,253	5,413	4,376	3,387			100	100	100	100
8/26					0	0	0	0					1,253	5,413	4,376	3,387			100	100	100	100

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Appendix B.2. (Page 2 of 2)

Date	Daily Passage								Cumulative Passage								Percent Passage					
	1995	1996	1997	1998	2000	2001	2002	2003	1995	1996	1997	1998	2000	2001	2002	2003	1996	1997	2000	2001	2002	2003
8/27					0	0	0	0					1,253	5,413	4,376	3,387			100	100	100	100
8/28					0	1	0	1					1,253	5,414	4,376	3,388			100	100	100	100
8/29					1	0	0	0					1,254	5,414	4,376	3,388			100	100	100	100
8/30					0	0	0	0					1,254	5,414	4,376	3,388			100	100	100	100
8/31					0	0	1	1					1,254	5,414	4,377	3,389			100	100	100	100
9/01					0	0	0	0					1,254	5,414	4,377	3,389			100	100	100	100
9/02					0	0	0	0					1,254	5,414	4,377	3,389			100	100	100	100
9/03					0	0	0	0					1,254	5,414	4,377	3,389			100	100	100	100
9/04					0	0	0	0					1,254	5,414	4,377	3,389			100	100	100	100
9/05					0	0	0	0					1,254	5,414	4,377	3,389			100	100	100	100
9/06					0	0	0	1					1,254	5,414	4,377	3,390			100	100	100	100
9/07					0	0	0	1 e					1,254	5,414	4,377	3,391			100	100	100	100
9/08					0	0	0	1					1,254	5,414	4,377	3,392			100	100	100	100
9/09					0	0	0	1					1,254	5,414	4,377	3,393			100	100	100	100
9/10					0	0	0	0					1,254	5,414	4,377	3,393			100	100	100	100
9/11					0	0	0	0					1,254	5,414	4,377	3,393			100	100	100	100
9/12					0	0	0	0					1,254	5,414	4,377	3,393			100	100	100	100
9/13					0	0	0	0					1,254	5,414	4,377	3,393			100	100	100	100
9/14					0	0	0	0					1,254	5,414	4,377	3,393			100	100	100	100
9/15					0	0 e	0	0					1,254	5,414	4,377	3,393			100	100	100	100
9/16					0	0 e	0	0					1,254		4,377	3,393			100	100	100	100
9/17					0	0 e	0	0					1,254		4,377	3,393			100	100	100	100
9/18					0	0 e	0	0					1,254		4,377	3,393			100	100	100	100
9/19					0	0 e	0	0					1,254		4,377	3,393			100	100	100	100
9/20					0	0 e	0	0					1,254		4,377	3,393			100	100	100	100

a= estimated salmon passage (partial day)
b= estimated salmon passage (whole day)
c= no estimation for missed longnose sucker counts
d= date outside of target operational period (not included in accumulative totals)
e= no estimates for inoperable period

Appendix B.3. Historic coho and sockeye salmon passage at theTakotna River weir.

Date	Coho Salmon												Sockeye Salmon							
	Daily				Cumulative				% Passage				Daily				Cumulative			
	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003
6/15																				
6/16																				
6/17																				
6/18																				
6/19																				
6/20																				
6/21																				
6/22																				
6/23		0	0											0	0					
6/24	0	0	0		e 0	0	0		0	0	0		0	0	0		e 0	0	0	
6/25	0	0	0		e 0	0	0		0	0	0		0	0	0		e 0	0	0	
6/26	0	0	0		e 0	0	0		0	0	0		0	0	0		e 0	0	0	
6/27	0	0	0		e 0	0	0		0	0	0		0	0	0		e 0	0	0	
6/28	0	0	0		e 0	0	0		0	0	0		0	0	0		e 0	0	0	
6/29	0	0	0		e 0	0	0		0	0	0		0	0	0		e 0	0	0	
6/30	0	0	0		e 0	0	0		0	0	0		0	0	0		e 0	0	0	
7/01	0	0	0		e 0	0	0		0	0	0		0	0	0		e 0	0	0	
7/02	0	0	0		e 0	0	0		0	0	0		0	0	0		e 0	0	0	
7/03	0	0	0		e 0	0	0		0	0	0		0	0	0		e 0	0	0	
7/04	0	0	0		e 0	0	0		0	0	0		0	0	0		e 0	0	0	
7/05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/15	0	0	0	e 0	0	0	0	0	0	0	0	0	0	0	0	e 0	0	0	0	0
7/16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7/26	0	0	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
7/27	0	0	0	3	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
7/28	0	0	0	4	a 0	0	0	11	a 0	0	0	0	0	0	0	0	e 0	0	0	0
7/29	0	0	0	4	b 0	0	0	15	b 0	0	0	0	0	0	0		e 0	0	0	0
7/30	0	1	1	5	b 0	1	1	20	b 0	0	0	0	0	0	0		e 0	0	0	0
7/31	0	0	1	5	b 0	1	2	25	b 0	0	0	0	0	0	0		e 0	0	0	0
8/01		0	0	6	a 0	1	2	31	a 0	0	0	0	0	0	0	0	e 0	0	0	0
8/02		0	0	4	0	1	2	35	0	0	0	0	0	0	0	0	0	0	0	0
8/03		1	0	8	0	2	2	43	0	0	0	1	0	0	0	0	0	0	0	0
8/04	3	0	0	13	3	2	2	56	0	0	0	1	0	0	0	0	0	0	0	0
8/05	11	0	0	15	14	2	2	71	0	0	0	1	1	0	0	0	1	0	0	0
8/06	8	3	2	27	22	5	4	98	1	0	0	1	0	0	0	0	1	0	0	0
8/07	14	1	0	25	36	6	4	123	1	0	0	2	0	0	0	0	1	0	0	0
8/08	19	1	2	48	55	7	6	171	1	0	0	2	0	0	0	1	1	0	0	1
8/09	40	2	6	40	95	9	12	211	2	0	0	3	0	0	0	1	1	0	0	2
8/10	31	3	6	50	126	12	18	261	3	0	0	4	0	1	0	0	1	1	0	2
8/11	44	12	4	85	170	24	22	346	4	1	1	5	0	0	0	0	1	1	0	2
8/12	80	19	26	139	250	43	48	485	6	2	1	7	0	0	0	0	1	1	0	2
8/13	42	20	27	150	292	63	75	635	7	2	2	9	0	0	0	0	1	1	0	2
8/14	51	29	23	212	343	92	98	847	9	4	2	12	0	0	0	0	1	1	0	2
8/15	58	31	36	140	401	123	134	987	10	5	3	14	0	0	0	0	1	1	0	2
8/16	54	51	49	131	455	174	183	1,118	11	7	5	16	0	0	0	0	1	1	0	2
8/17	98	44	20	121	553	218	203	1,239	14	8	5	17	0	0	0	0	1	1	0	2
8/18	146	77	159	160	699	295	362	1,399	18	11	9	20	0	0	0	0	1	1	0	2
8/19	192	66	17	348	891	361	379	1,747	23	14	10	24	0	0	0	0	1	1	0	2
8/20	80	91	a 11	197	971	452	390	1,944	25	17	10	27	0	0	e 0	0	1	1	0	2
8/21	387	91	b 266	356	1,358	543	656	2,300	34	21	16	32	0	0	e 1	0	1	1	1	2
8/22	178	91	b 326	254	1,536	634	982	2,554	39	24	25	36	0	0	e 0	0	1	1	1	2
8/23	241	74	328	176	1,777	708	1310	2,730	45	27	33	38	0	0	0	0	1	1	1	2
8/24	152	145	397	189	1,929	853	1707	2,919	49	33	43	41	0	0	0	0	1	1	1	2
8/25	107	156	301	217	2,036	1,009	2008	3,136	51	39	50	44	0	0	0	0	1	1	1	2
8/26	86	275	267	299	2,122	1,284	2275	3,435	54	49	57	48	0	0	0	0	1	1	1	2

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Appendix B.3. (Page 2 of 2)

Date	Coho Salmon												Sockeye Salmon							
	Daily				Cumulative				% Passage				Daily				Cumulative			
	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003
8/27	314	175	107	429	2,436	1,459	2382	3,864	62	56	60	54	0	0	0	0	1	1	1	2
8/28	490	151	134	335	2,926	1,610	2516	4,199	74	62	63	59	0	0	0	1	1	1	1	3
8/29	140	164	121	288	3,066	1,774	2637	4,487	77	68	66	63	0	0	0	0	1	1	1	3
8/30	120	104	127	219	3,186	1,878	2764	4,706	81	72	69	66	0	0	0	0	1	1	1	3
8/31	62	137	205	267	3,248	2,015	2969	4,973	82	77	75	69	0	0	0	0	1	1	1	3
9/01	70	105	133	285	3,318	2,120	3102	5,258	84	81	78	73	0	0	0	0	1	1	1	3
9/02	66	92	107	277	3,384	2,212	3209	5,535	86	85	81	77	0	0	0	0	1	1	1	3
9/03	54	71	63	192	3,438	2,283	3272	5,727	87	88	82	80	0	0	0	0	1	1	1	3
9/04	70	73	90	91	3,508	2,356	3362	5,818	89	90	84	81	0	0	0	0	1	1	1	3
9/05	46	68	118	262	3,554	2,424	3480	6,080	90	93	87	85	0	0	0	0	1	1	1	3
9/06	100	26	134	209	3,654	2,450	3614	6,289	92	94	91	88	0	0	0	0	1	1	1	3
9/07	42	13	109	e 188	3,696	2,463	3723	6,477	93	95	93	90	0	0	0	e 0	1	1	1	3
9/08	25	14	79	200	3,721	2,477	3802	6,677	94	95	95	93	0	0	0	0	1	1	1	3
9/09	30	14	39	131	3,751	2,491	3841	6,808	95	96	96	95	0	0	0	1	1	1	1	4
9/10	36	15	19	70	3,787	2,506	3860	6,878	96	96	97	96	0	0	0	0	1	1	1	4
9/11	40	11	21	78	3,827	2,517	3881	6,956	97	97	97	97	0	0	0	0	1	1	1	4
9/12	27	24	37	83	3,854	2,541	3918	7,039	97	98	98	98	0	0	0	0	1	1	1	4
9/13	29	12	13	79	3,883	2,553	3931	7,118	98	98	99	99	0	0	0	0	1	1	1	4
9/14	16	15	14	28	3,899	2,568	3945	7,146	99	99	99	100	0	0	0	0	1	1	1	4
9/15	9	6	b 16	10	3,908	2,574	3961	7,156	99	99	99	100	0		e 0	0	1	1	1	4
9/16	15	11	b 7	9	3,923	2,585	3968	7,165	99	99	100	100	0		e 0	0	1	1	1	4
9/17	5	3	b 7	4	3,928	2,588	3975	7,169	99	99	100	100	0		e 0	0	1	1	1	4
9/18	8	5	b 2	1	3,936	2,593	3977	7,170	99	100	100	100	0		e 0	0	1	1	1	4
9/19	10	6	b 2	1	3,946	2,599	3979	7,171	100	100	100	100	0		e 0	0	1	1	1	4
9/20	11	7	b 5	0	3,957	2,606	3984	7,171	100	100	100	100	0		e 0	0	1	1	1	4

a= estimated salmon passage (partial day)

b= estimated salmon passage (whole day)

c= no estimation for missed longnose sucker counts

d= date outside of target operational period (not included in accumulative totals)

e= no estimates for inoperable period

Appendix B.4. Historic pink salmon and longnose sucker passage at the Takotna River weir.

Date	Pink Salmon								Longnose Sucker											
	Daily				Cumulative				Daily				Cumulative				Cumulative Percent			
	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003
6/15																				
6/16																				
6/17																				
6/18																				
6/19																				
6/20																				
6/21																				
6/22		0	0																	
6/23	0	0	0		0	0	0			2,186	0			2,186	0			16	0	
6/24	0	0	0		e 0	0	0		2	571	3		c 2	2,757	3		0	20	0	
6/25	0	0	0		e 0	0	0		67	2,746	1		c 69	5,503	4		2	41	1	
6/26	0	0	0		e 0	0	0		82	2,076	7		c 151	7,579	11		4	56	2	
6/27	0	0	0		e 0	0	0		63	1,748	2		c 214	9,327	13		6	69	2	
6/28	0	0	0		e 0	0	0		101	113	21		c 315	9,440	34		8	70	6	
6/29	0	0	0		e 0	0	0		100	1,095	3		c 415	10,535	37		11	78	6	
6/30	0	0	0		e 0	0	0		220	641	19		c 635	11,176	56		17	83	9	
7/01	0	0	0		e 0	0	0		406	633	11		c 1,041	11,809	67		27	88	11	
7/02	0	0	0		e 0	0	0		641	207	0		c 1,682	12,016	67		44	89	11	
7/03	0	0	0		e 0	0	0		489	94	0		c 2,171	12,110	67		57	90	11	
7/04	0	0	0		e 0	0	0		264	30	0		c 2,435	12,140	67		64	90	11	
7/05	0	0	0	0	0	0	0	0	134	23	8	0	2,569	12,163	75	0	68	90	12	0
7/06	0	0	0	0	0	0	0	0	107	5	1	1	2,676	12,168	76	1	70	90	13	0
7/07	0	0	0	0	0	0	0	0	158	0	4	0	2,834	12,168	80	1	75	90	13	0
7/08	0	0	0	0	0	0	0	0	229	93	5	8	3,063	12,261	85	9	81	91	14	1
7/09	0	0	0	0	0	0	0	0	118	38	2	1	3,181	12,299	87	10	84	91	14	2
7/10	0	0	0	0	0	0	0	0	112	117	0	13	3,293	12,416	87	23	87	92	14	4
7/11	0	0	0	0	0	0	0	0	94	1	96	1	3,387	12,417	183	24	89	92	30	4
7/12	0	0	0	0	0	0	0	0	56	20	75	1	3,443	12,437	258	25	91	92	43	4
7/13	0	0	0	0	0	0	0	0	112	110	15	9	3,555	12,547	273	34	94	93	45	6
7/14	0	0	0	0	0	0	0	0	60	140	1	29	3,615	12,687	274	63	95	94	45	10
7/15	0	0	0	e 0	0	0	0	0	63	107	7	23	c 3,678	12,794	281	86	97	95	47	14
7/16	0	0	0	0	0	0	0	0	22	58	0	9	3,700	12,852	281	95	97	95	47	16
7/17	0	0	0	0	0	0	0	0	9	9	0	27	3,709	12,861	281	122	98	96	47	20
7/18	0	0	0	0	0	0	0	0	7	95	2	0	3,716	12,956	283	122	98	96	47	20
7/19	0	0	0	0	0	0	0	0	0	203	4	38	3,716	13,159	287	160	98	98	48	26
7/20	0	0	0	0	0	0	0	0	3	39	3	144	3,719	13,198	290	304	98	98	48	50
7/21	0	0	0	0	0	0	0	0	9	38	1	6	3,728	13,236	291	310	98	98	48	51
7/22	0	0	0	0	0	0	0	0	4	9	0	43	3,732	13,245	291	353	98	98	48	58
7/23	0	0	0	0	0	0	0	0	0	19	13	38	3,732	13,264	304	391	98	99	50	64
7/24	0	0	0	0	0	0	0	0	0	39	0	2	3,732	13,303	304	393	98	99	50	65
7/25	0	0	0	0	0	0	0	0	1	19	1	0	3,733	13,322	305	393	98	99	50	65
7/26	0	0	0	0	0	0	0	0	4	1	19	22	3,737	13,323	324	415	98	99	54	68
7/27	0	0	0	0	0	0	0	0	4	6	0	2	3,741	13,329	324	417	98	99	54	68
7/28	0	0	0	0	e 0	0	0	0	1	1	4	0	c 3,742	13,330	328	417	99	99	54	68
7/29	0	0	0		e 0	0	0	0	7	34	5		c 3,749	13,364	333	417	99	99	55	68
7/30	0	0	1		e 0	0	1	0	0	0	98		c 3,749	13,364	431	417	99	99	71	68
7/31	0	0	0		e 0	0	1	0	2	7	52		c 3,751	13,371	483	417	99	99	80	68
8/01	0	0	0	0	e 0	0	1	0	2	9	4	0	c 3,753	13,380	487	417	99	99	81	68
8/02	0	0	0	0	0	0	1	0	7	22	5	0	3,760	13,402	492	417	99	100	81	68
8/03	0	0	0	0	0	0	1	0	3	0	2	1	3,763	13,402	494	418	99	100	82	69
8/04	0	0	0	0	0	0	1	0	1	0	0	1	3,764	13,402	494	419	99	100	82	69
8/05	0	0	0	0	0	0	1	0	8	0	0	0	3,772	13,402	494	419	99	100	82	69
8/06	0	0	0	0	0	0	1	0	4	0	20	4	3,776	13,402	514	423	99	100	85	69
8/07	0	0	0	0	0	0	1	0	3	0	14	9	3,779	13,402	528	432	99	100	87	71
8/08	0	0	0	0	0	0	1	0	3	0	0	3	3,782	13,402	528	435	100	100	87	71
8/09	0	0	0	0	0	0	1	0	0	0	0	4	3,782	13,402	528	439	100	100	87	72
8/10	0	0	0	0	0	0	1	0	1	0	0	7	3,783	13,402	528	446	100	100	87	73
8/11	0	0	0	0	0	0	1	0	0	0	0	8	3,783	13,402	528	454	100	100	87	75
8/12	0	0	0	0	0	0	1	0	7	0	5	0	3,790	13,402	533	454	100	100	88	75
8/13	0	0	0	0	0	0	1	0	0	0	6	2	3,790	13,402	539	456	100	100	89	75
8/14	0	0	0	0	0	0	1	0	0	0	5	106	3,790	13,402	544	562	100	100	90	92
8/15	0	0	0	0	0	0	1	0	0	0	2	19	3,790	13,402	546	581	100	100	90	95
8/16	0	0	0	0	0	0	1	0	0	0	2	4	3,790	13,402	548	585	100	100	91	96
8/17	0	0	0	0	0	0	1	0	0	0	6	1	3,790	13,402	554	586	100	100	92	96
8/18	0	0	0	0	0	0	1	0	0	0	1	0	3,790	13,402	555	586	100	100	92	96
8/19	0	0	0	0	0	0	1	0	0	0	0	1	3,790	13,402	555	587	100	100	92	96
8/20	0	0	0	0	0	0	1	0	0	0	c 0	0	3,790	13,402	555	b 587	100	100	92	96
8/21	0	0	0	0	0	0	1	0	0	0	c 0	0	3,790	13,402	555	b 587	100	100	92	96
8/22	0	0	0	0	0	0	1	0	2	0	c 1	11	3,792	13,402	556	b 598	100	100	92	98
8/23	0	0	0	0	0	0	1	0	4	0	2	0	3,796	13,402	558	598	100	100	92	98
8/24	0	0	0	0	0	0	1	0	1	0	12	0	3,797	13,402	570	598	100	100	94	98
8/25	0	0	0	0	0	0	1	0	0	0	9	0	3,797	13,402	579	598	100	100	96	98
8/26	0	0	0	0	0	0	1	0	1	0	3	3	3,798	13,402	582	601	100	100	96	99

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Appendix B.4. (Page 2 of 2)

Date	Pink Salmon								Longnose Sucker											
	Daily				Cumulative				Daily				Cumulative				Cumulative Percent			
	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003
8/27	0	0	0	0	0	0	1	0	0	0	7	0	3,798	13,402	589	601	100	100	98	99
8/28	0	0	0	0	0	0	1	0	0	0	1	0	3,798	13,402	590	601	100	100	98	99
8/29	0	0	0	0	0	0	1	0	0	0	1	0	3,798	13,402	591	601	100	100	98	99
8/30	0	0	0	0	0	0	1	0	0	0	1	0	3,798	13,402	592	601	100	100	98	99
8/31	0	0	0	0	0	0	1	0	0	0	1	0	3,798	13,402	593	601	100	100	98	99
9/01	0	0	0	0	0	0	1	0	0	4	2	0	3,798	13,406	595	601	100	100	99	99
9/02	0	0	0	0	0	0	1	0	0	23	0	0	3,798	13,429	595	601	100	100	99	99
9/03	0	0	0	0	0	0	1	0	0	16	2	0	3,798	13,445	597	601	100	100	99	99
9/04	0	0	0	0	0	0	1	0	0	5	1	0	3,798	13,450	598	601	100	100	99	99
9/05	0	0	0	0	0	0	1	0	0	1	1	0	3,798	13,451	599	601	100	100	99	99
9/06	0	0	0	0	0	0	1	0	0	1	4	0	3,798	13,452	603	601	100	100	100	99
9/07	0	0	0 e	0	0	0	1	0	0	1	1	0 c	3,798	13,453	604	601	100	100	100	99
9/08	0	0	0	0	0	0	1	0	0	0	0	0	3,798	13,453	604	601	100	100	100	99
9/09	0	0	0	0	0	0	1	0	0	1	0	0	3,798	13,454	604	601	100	100	100	99
9/10	0	0	0	0	0	0	1	0	0	1	0	0	3,798	13,455	604	601	100	100	100	99
9/11	0	0	0	0	0	0	1	0	0	0	0	0	3,798	13,455	604	601	100	100	100	99
9/12	0	0	0	0	0	0	1	0	0	1	0	0	3,798	13,456	604	601	100	100	100	99
9/13	0	0	0	0	0	0	1	0	0	0	0	2	3,798	13,456	604	603	100	100	100	99
9/14	0	0	0	0	0	0	1	0	0	2	0	0	3,798	13,458	604	603	100	100	100	99
9/15	0	e	0	0	0	0	1	0	0	0 c	0	0	3,798	13,458	604	603	100	100	100	99
9/16	0	e	0	0	0	0	1	0	0	0 c	0	0	3,798	13,458	604	603	100	100	100	99
9/17	0	e	0	0	0	0	1	0	0	0 c	0	0	3,798	13,458	604	603	100	100	100	99
9/18	0	e	0	0	0	0	1	0	0	0 c	0	3	3,798	13,458	604	606	100	100	100	100
9/19	0	e	0	0	0	0	1	0	0	0 c	0	0	3,798	13,458	604	606	100	100	100	100
9/20	0	e	0	0	0	0	1	0	0	0 c	0	3	3,798	13,458	604	609	100	100	100	100

a= estimated salmon passage (partial day)

b= estimated salmon passage (whole day)

c= no estimation for missed longnose sucker counts

d= date outside of target operational period (not included in accumulative totals)

e= no estimates for inoperable period

Appendix B.5. Historic chinook salmon passage for the Takotna River, truncated to a start date of 5 July.

Date	Daily Passage								Cumulative Passage								Percent Passage					
	1995	1996	1997	1998	2000	2001	2002	2003	1995	1996	1997	1998	2000	2001	2002	2003	1996	1997	2000	2001	2002	2003
6/15																						
6/16																						
6/17																						
6/18																						
6/19																						
6/20																						
6/21d																						
6/22																						
6/23d																						
6/24																						
6/25																						
6/26																						
6/27																						
6/28																						
6/29																						
6/30																						
7/01																						
7/02																						
7/03																						
7/04																						
7/05		39	54	12	14	1	3	6		39	54	12	14	1	3	6	18	7	5	0	1	2
7/06		10	54		7	3	11	6		49	108		21	4	14	12	23	14	7	1	4	3
7/07		37	33		12	15	17	6		86	141		33	19	31	18	40	18	11	3	10	5
7/08		24	54		37	110	32	10		110	195		70	129	63	28	51	25	23	20	20	7
7/09		3	69		9	17	7	37		113	264		79	146	70	65	52	33	26	23	22	17
7/10		4	51		3	69	2	23		117	315		82	215	72	88	54	40	27	33	23	23
7/11		5	69		8	9	93	10		122	384		90	224	165	98	56	48	30	35	52	26
7/12		5	48		22	30	51	16		127	432		112	254	216	114	59	55	37	40	68	30
7/13		7	24		1	45	2	24		134	456		113	299	218	138	62	58	37	47	69	37
7/14		7	66		3	29	2	5		141	522		116	328	220	143	65	66	38	51	70	38
7/15		9	27		4	41	2 e	2		150	549		120	369	222	145	69	69	39	57	70	38
7/16		0	12		4	28	0	5		150	561		124	397	222	150	69	71	41	62	70	40
7/17		20	36		2	17	3	9		170	597		126	414	225	159	78	75	41	64	71	42
7/18		11	48		6	14	5	22		181	645		132	428	230	181	83	81	43	67	73	48
7/19		9	12		4	31	4	26		190	657		136	459	234	207	88	83	45	71	74	55
7/20		8	15		8	26	9	26		198	672		144	485	243	233	91	85	47	75	77	62
7/21		7	3		7	23	5	8		205	675		151	508	248	241	94	85	50	79	78	64
7/22		5	12		39	21	2	15		210	687		190	529	250	256	97	87	63	82	79	68
7/23		4	9		2	13	0	6		214	696		192	542	250	262	99	88	63	84	79	69
7/24		3	18		5	17	0	11		217	714		197	559	250	273	100	90	65	87	79	72
7/25		0	15		17	10	6	7		217	729		214	569	256	280	100	92	70	88	81	74
7/26			18		3	11	5	4		217	747		217	580	261	284	100	94	71	90	83	75
7/27			12		9	6	2	9			759		226	586	263	293	100	96	74	91	83	78
7/28			6		5	11	1	6 a			765		231	597	264	299	100	97	76	93	84	79
7/29			15		9	3	8	6 b			780		240	600	272	305	100	98	79	93	86	81
7/30			0		5	2	5	6 b			780		245	602	277	311	100	98	81	94	88	82
7/31			0		2	4	0	5 b			780		247	606	277	316	100	98	81	94	88	84
8/01			3		1	1	2	5 a			783		248	607	279	321	100	99	82	94	88	85
8/02			6		1	3	0	4			789		249	610	279	325	100	100	82	95	88	86
8/03			3		5	0	0	5			792		254	610	279	330	100	100	84	95	88	87
8/04			0		8	2	1	5			792		262	612	280	335	100	100	86	95	89	89
8/05					7	1	0	4					269	613	280	339	100	100	88	95	89	90
8/06					4	4	1	1					273	617	281	340	100	100	90	96	89	90
8/07					1	1	2	2					274	618	283	342	100	100	90	96	90	90
8/08					7	3	0	5					281	621	283	347	100	100	92	97	90	92
8/09					7	1	3	2					288	622	286	349	100	100	95	97	91	92
8/10					0	2	2	0					288	624	288	349	100	100	95	97	91	92
8/11					3	1	0	0					291	625	288	349	100	100	96	97	91	92
8/12					6	2	4	0					297	627	292	349	100	100	98	98	92	92
8/13					2	1	1	0					299	628	293	349	100	100	98	98	93	92
8/14					1	1	0	2					300	629	293	351	100	100	99	98	93	93
8/15					0	0	1	0					300	629	294	351	100	100	99	98	93	93
8/16					0	1	0	0					300	630	294	351	100	100	99	98	93	93
8/17					0	0	0	1					300	630	294	352	100	100	99	98	93	93
8/18					2	1	0	2					302	631	294	354	100	100	99	98	93	94
8/19					0	0	0	1					302	631	294	355	100	100	99	98	93	94
8/20					0	1 a	0	1					302	632	294	356	100	100	99	98	93	94
8/21					0	1 b	0	1					302	633	294	357	100	100	99	98	93	94
8/22					0	1 b	0	0					302	634	294	357	100	100	99	99	93	94
8/23					0	1	0	2					302	635	294	359	100	100	99	99	93	95
8/24					0	0	0	0					302	635	294	359	100	100	99	99	93	95
8/25					0	0	1	1					302	635	295	360	100	100	99	99	93	95
8/26					0	1	0	1					302	636	295	361	100	100	99	99	93	96

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Appendix B.5. (Page 2 of 2).

Date	Daily Passage								Cumulative Passage								Percent Passage					
	1995	1996	1997	1998	2000	2001	2002	2003	1995	1996	1997	1998	2000	2001	2002	2003	1996	1997	2000	2001	2002	2003
8/27					1	1	0	1					303	637	295	362	100	100	100	99	93	96
8/28					0	1	0	0					303	638	295	362	100	100	100	99	93	96
8/29					0	1	0	0					303	639	295	362	100	100	100	99	93	96
8/30					0	1	0	0					303	640	295	362	100	100	100	100	93	96
8/31					0	1	0	0					303	641	295	362	100	100	100	100	93	96
9/01					0	0	0	1					303	641	295	363	100	100	100	100	93	96
9/02					0	0	0	0					303	641	295	363	100	100	100	100	93	96
9/03					0	1	0	0					303	642	295	363	100	100	100	100	93	96
9/04					0	1	0	0					303	643	295	363	100	100	100	100	93	96
9/05					0	0	0	0					303	643	295	363	100	100	100	100	93	96
9/06					0	0	0	0					303	643	295	363	100	100	100	100	93	96
9/07					0	0	0 e	0					303	643	295	363	100	100	100	100	93	96
9/08					0	0	0	0					303	643	295	363	100	100	100	100	93	96
9/09					1	0	0	0					304	643	295	363	100	100	100	100	93	96
9/10					0	0	0	0					304	643	295	363	100	100	100	100	93	96
9/11					0	0	0	0					304	643	295	363	100	100	100	100	93	96
9/12					0	0	0	0					304	643	295	363	100	100	100	100	93	96
9/13					0	0	1	0					304	643	296	363	100	100	100	100	94	96
9/14					0	0	0	0					304	643	296	363	100	100	100	100	94	96
9/15					0	0 e	1	0					304	643	297	363	100	100	100	100	94	96
9/16					0	0 e	0	0					304	643	297	363	100	100	100	100	94	96
9/17					0	0 e	0	0					304	643	297	363	100	100	100	100	94	96
9/18					0	0 e	0	0					304	643	297	363	100	100	100	100	94	96
9/19					0	0 e	0	0					304	643	297	363	100	100	100	100	94	96
9/20					0	0 e	0	0					304	643	297	363	100	100	100	100	94	96

a= estimated salmon passage (partial day)
b= estimated salmon passage (whole day)
c= no estimation for missed longnose sucker counts
d= date outside of target operational period (not included in accumulative totals)
e= no estimates for inoperable period

APPENDIX C:
TAGGED SALMON OBSERVED AT THE TAKOTNA RIVER WEIR, 2003

Appendix C. Information summary for tagged chum and coho salmon observed at the Takotna River weir, 2003.

Date		Species	Tag Information		Sample	Tagging	Tagging	Gear	Travel Time	Travel Speed
Tagged	Recovered		Tag No.	Tag Color	Type	Location	Gear	Position	(days)	(km/d)
6/21	7/7	chum	67077	White	ASL	Birch Tree	Drift	In River	16	35
	7/10	chum	NR	White						
7/1	7/16	chum	32302	Pink	A	Kalskag	Fishwheel	Right Bank	15	38
7/3	7/17	chum	52760	Green	A	Birch Tree	Fishwheel	Right Bank	14	40
6/27	7/17	chinook	K08674	Green	A	Kalskag	Fishwheel	Right Bank	20	28
7/1	7/18	chum	32302	Pink	C	Kalskag	Fishwheel	Right Bank		
7/5	7/22	chinook	K08318	Green	A	Kalskag	Fishwheel	Right Bank	17	33
	8/6	chum	NR	Green						
7/25	8/10	coho	59998	Green	ASL	Birch Tree	Fishwheel	Right Bank	16	35
7/21	8/12	chum	58306	Green	C	Birch Tree	Fishwheel	Right Bank		
7/27	8/14	coho	46003	Pink	A	Kalskag	Fishwheel	Right Bank	18	31
	8/19	coho	NR	Green						
	8/19	coho	NR	Green						
	8/19	coho	NR	Pink						
7/30	8/20	coho	47151	Pink	A	Kalskag	Fishwheel	Right Bank	21	27
8/6	8/20	coho	64970	Green	A	Birch Tree	Fishwheel	Right Bank	14	40
8/4	8/21	coho	63991	Green	A	Birch Tree	Fishwheel	Left Bank	17	33
8/4	8/21	coho	63994	Green	A	Birch Tree	Fishwheel	Left Bank	17	33
8/4	8/22	coho	63991	Green	A	Birch Tree	Fishwheel	Left Bank	18	31
8/6	8/22	coho	64646	Green	ASL	Birch Tree	Fishwheel	Right Bank		
8/6	8/24	coho	64996	Green	A	Birch Tree	Fishwheel	Right Bank	18	31
8/5	8/25	coho	64328	Green	A	Birch Tree	Fishwheel	Right Bank	20	28
8/4	8/26	coho	47606	Pink	A	Kalskag	Fishwheel	Right Bank	22	26
8/9	8/26	coho	65902	Green	A	Birch Tree	Fishwheel	Right Bank	17	33
8/4	8/27	coho	47576	Pink	A	Kalskag	Fishwheel	Right Bank	23	25
8/5	8/27	coho	47714	Pink	A	Kalskag	Fishwheel	Right Bank	22	26
8/5	8/27	coho	64362	Green	A	Birch Tree	Fishwheel	Right Bank	22	26
8/7	8/28	coho	47951	Pink	A	Kalskag	Fishwheel	Right Bank	21	27
8/10	8/28	coho	48363	Pink	A	Kalskag	Fishwheel	Right Bank	18	31
8/11	8/28	coho	48739	Pink	A	Kalskag	Fishwheel	Left Bank	17	33
8/9	8/28	coho	65916	Green	A	Birch Tree	Fishwheel	Right Bank	19	30
8/9	8/28	coho	65931	Green	A	Birch Tree	Fishwheel	Right Bank	19	30
8/9	8/28	coho	65935	Green	A	Birch Tree	Fishwheel	Right Bank	19	30
8/10	8/28	coho	66519	Green	A	Birch Tree	Fishwheel	Right Bank	18	31
8/10	8/29	coho	48611	Pink	A	Kalskag	Fishwheel	Left Bank	19	30
8/12	8/29	coho	49174	Pink	A	Kalskag	Fishwheel	Right Bank	17	33
8/13	8/29	coho	75084	Green	A	Birch Tree	Fishwheel	Right Bank	16	35
8/12	8/30	coho	48910	Pink	A	Kalskag	Fishwheel	Left Bank	18	31
8/12	8/30	coho	49061	Pink	A	Kalskag	Fishwheel	Right Bank	18	31
8/12	8/30	coho	49067	Pink	A	Kalskag	Fishwheel	Right Bank	18	31
8/13	8/30	coho	49263	Pink	A	Kalskag	Fishwheel	Left Bank	17	33
8/13	8/30	coho	49464	Pink	A	Kalskag	Fishwheel	Right Bank	17	33
8/13	8/30	coho	49562	Pink	A	Kalskag	Fishwheel	Right Bank	17	33
8/12	8/30	coho	66947	Green	A	Birch Tree	Fishwheel	Right Bank	18	31
8/13	8/30	coho	75253	Green	A	Birch Tree	Fishwheel	Right Bank	17	33
8/14	8/30	coho	75546	Green	A	Birch Tree	Fishwheel	Right Bank	16	35
8/10	8/31	coho	48513	Pink	A	Kalskag	Fishwheel	Right Bank	21	27
8/10	8/31	coho	48593	Pink	A	Kalskag	Fishwheel	Right Bank	21	27
8/12	8/31	coho	49182	Pink	A	Kalskag	Fishwheel	Right Bank	19	30
8/9	8/31	coho	66195	Green	A	Birch Tree	Fishwheel	Right Bank	22	26
8/12	9/1	coho	48940	Pink	A	Kalskag	Fishwheel	Right Bank	20	28
8/12	9/1	coho	49201	Pink	A	Kalskag	Fishwheel	Right Bank	20	28

-Continued-

Appendix C. (Page 2 of 2)

Date		Species	Tag Information		Sample	Tagging	Tagging	Gear	Travel Time	Travel Speed
Tagged	Recovered		Tag No.	Tag Color	Type	Location	Gear	Position	(days)	(km/d)
8/15	9/1	coho	69219	Pink	A	Kalskag	Fishwheel	Right Bank	17	33
8/15	9/1	coho	75808	Green	A	Birch Tree	Fishwheel	Right Bank	17	33
8/18	9/1	coho	77999	Green	A	Birch Tree	Fishwheel	Right Bank	14	40
8/4	9/2	coho	64085	Green	A	Birch Tree	Fishwheel	Right Bank	29	19
8/12	9/2	coho	66994	Green	A	Birch Tree	Fishwheel	Right Bank	21	27
8/15	9/2	coho	69156	Pink	A	Kalskag	Fishwheel	Right Bank	18	31
8/21	9/2	coho	70695	Pink	A	Kalskag	Fishwheel	Right Bank	12	47
8/14	9/2	coho	75569	Green	A	Birch Tree	Fishwheel	Left Bank	19	30
8/17	9/3	coho	69529	Pink	A	Kalskag	Fishwheel	Left Bank	17	33
NA	9/4	coho	40032	Pink	A					
8/9	9/4	coho	66177	Green	A	Birch Tree	Fishwheel	Right Bank	26	22
8/9	9/5	coho	48232	Pink	A	Kalskag	Fishwheel	Right Bank	27	21
8/13	9/5	coho	49259	Pink	A	Kalskag	Fishwheel	Left Bank	23	25
8/17	9/5	coho	69626	Pink	A	Kalskag	Fishwheel	Right Bank	19	30
8/17	9/5	coho	69728	Pink	A	Kalskag	Fishwheel	Right Bank	19	30
8/14	9/5	coho	75476	Green	A	Birch Tree	Fishwheel	Right Bank	22	26
8/14	9/6	coho	49695	Pink	A	Kalskag	Fishwheel	Right Bank	23	25
8/20	9/6	coho	70544	Pink	A	Kalskag	Fishwheel	Right Bank	17	33
8/22	9/6	coho	79491	Green	A	Birch Tree	Fishwheel	Right Bank	15	38
8/22	9/7	coho	79515	Green	A	Birch Tree	Fishwheel	Right Bank	16	35
8/24	9/7	coho	80972	Green	A	Birch Tree	Fishwheel	Right Bank	14	40
8/16	9/9	coho	69349	Pink	A	Kalskag	Fishwheel	Left Bank	24	24
8/25	9/9	coho	81334	Green	A	Birch Tree	Fishwheel	Right Bank	15	38
	9/10	coho	NR	Pink						
8/28	9/11	coho	82574	Green	A	Birch Tree	Fishwheel	Right Bank	14	40
8/21	9/13	coho	70609	Pink	A	Kalskag	Fishwheel	Right Bank	23	25
8/26	9/13	coho	71764	Pink	A	Kalskag	Fishwheel	Left Bank	18	31
8/25	9/13	coho	81350	Green	A	Birch Tree	Fishwheel	Right Bank	19	30
8/24	9/14	coho	80563	Green	A	Birch Tree	Fishwheel	Right Bank	21	27

ASL = Age, sex, and length sample
A = Actively captured
C = Carcass
NR = Not recovered
Drift = Drift gillnet

APPENDIX D:
CLIMATE INFORMATION FOR THE TAKOTNA RIVER WEIR, 2003

Appendix D. Daily climate and water level data collected at the Takotna River weir site, 2003.

Date	Time	Sky Codes	Precipitation (mm)	Wind	Temperature (°C) Air	Temperature (°C) Water	Water Stage (cm)	
7/2	10:00	3	33	NA	NA	NA	72.0	
7/3	9:00	3	0.3	SW 5	17.0	9.0	125.0	
7/4	9:30	2	0	calm	12.0	8.0	113.0	a
7/5	9:00	4	trace	SW 5	16.0	10.0	89.0	a
7/6	9:00	4	0	SW 5	14.0	10.0	85.0	a
7/7	9:00	1	0	SW 5	17.0	12.0	84.0	a
7/8	8:00	1	0	calm	15.0	11.0	85.0	a
7/9	9:30	3	0	SW 5	14.0	12.0	79.0	a
7/10	9:30	3	0	SW 5	13.0	14.0	75.0	a
7/11	9:00	4	0	calm	13.0	12.0	72.0	a
7/12	7:00	3	0	calm	10.0	10.0	73.0	
7/13	7:00	3	0	SW 5	13.0	10.0	79.0	
7/14	9:00	3	0	SW 15-20	16.0	12.0	73.0	
7/15	9:00	4	trace	SW 5	13.0	12.0	67.0	
7/16	9:00	3	0.25	SW 5	7.0	10.0	65.0	
7/17	8:00	1	0	calm	7.0	9.0	64.0	
7/18	8:00	3	0	calm	11.0	10.0	62.0	
7/19	8:00	1	0	calm	14.0	12.0	60.0	
7/20	8:00	1	0	calm	15.0	13.0	58.0	
7/21	8:30	2	0	S 5	14.0	13.0	55.0	
7/22	8:00	4	0	SW 3	8.0	13.0	54.0	
7/23	8:00	4	0	S 7	17.0	13.0	52.0	
7/24	10:00	4	3.302	W 3	12.0	12.0	54.0	
7/25	9:30	2	0	S 5	12.0	11.0	58.0	
7/26	10:00	4	3.81	W 10	11.0	13.0	59.0	
7/27	9:30	4	10.922	SW 10-15	11.0	10.0	63.0	
7/28	8:30	4	trace	calm	8.0	9.0	124.0	
7/29	11:00	2	0	SW 5-10	15.0	9.0	137.0	
7/30	14:00	4	13.208	SW 5	11.0	8.0	110.0	
7/31	14:00	2	0	SW 5	12.0	9.0	105.0	
8/1	14:00	3	0.254	W 3	15.0	7.0	99.0	
8/2	8:00	3	0	calm	12.0	8.0	91.0	
8/3	9:00	4	0	SW 3	11.0	8.0	85.0	
8/4	8:00	5	0	SW 5	14.0	7.0	80.0	
8/5	8:00	1	0	SW 5	8.0	9.0	77.0	
8/6	8:00	3	0	calm	7.0	10.0	70.0	
8/7	8:00	4	0	SW 3	12.0	10.0	68.0	
8/8	8:00	5	3.81	calm	14.0	10.0	68.0	
8/9	8:00	1	trace	S 3	10.0	11.0	67.0	
8/10	8:00	1	0	calm	10.0	11.0	64.0	
8/11	8:00	4	7.62	S 5	16.0	13.0	61.0	
8/12	8:00	4	4.572	S 8	13.0	12.0	60.0	
8/13	8:00	5	0.508	calm	11.0	11.0	66.0	
8/14	8:00	4	3.81	calm	13.0	10.0	72.0	
8/15	8:00	4	trace	calm	12.0	11.0	92.0	
8/16	8:00	4	0.508	S 3	6.0	10.0	86.0	
8/17	8:00	5	0	calm	0.0	8.0	86.0	
8/18	8:00	5	0	calm	6.0	7.0	78.0	
8/19	8:00	5	0.254	calm	4.0	7.0	77.0	
8/20	8:00	2	0	calm	3.0	7.0	75.0	
8/21	8:00	2	0	calm	9.0	9.0	70.0	
8/22	8:00	2	0	calm	2.0	8.0	68.0	
8/23	8:00	4	0	S 10	11.0	8.0	64.0	
8/24	9:00	4	0.254	S 8	11.0	8.0	64.0	
8/25	8:00	4	2.794	S 3	9.0	8.0	63.0	

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Appendix D. (Page 2 of 2)

Date	Time	Sky Codes	Precipitation (mm)	Wind	Temperature (°C)		Water Stage (cm)
					Air	Water	
8/26	8:00	5	1.778	calm	10.0	9.0	66.0
8/27	8:00	5	0	calm	5.0	8.0	71.0
8/28	8:00	3	0	calm	5.0	8.0	68.0
8/29	8:00	3	0	calm	3.0	8.0	64.0
8/30	8:00	4	0	calm	9.0	8.0	62.0
8/31	8:00	4	0	calm	9.0	8.0	60.0
9/1	8:00	5	4.1	calm	10.0	9.0	61.0
9/2	8:00	4	0	SW 3	8.0	9.0	61.0
9/3	8:00	5	0	calm	1.0	7.0	59.0
9/4	8:00	4	0	SW 3	5.0	7.0	59.0
9/5	8:00	5	0	calm	5.0	8.0	60.0
9/6	8:00	2	0	calm	-2.0	7.0	64.0
9/7	8:00	5	0	calm	0.0	7.0	60.0
9/8	8:00	5	0	calm	0.0	5.0	58.0
9/9	8:15	2	0	SW 5	0.0	5.0	55.0
9/10	8:15	5	0	SW 5-10	2.0	5.0	54.0
9/11	8:30	4	0	SW 5-10	9.0	6.0	53.0
9/12	8:00	4	0.8	calm	8.0	7.0	52.0
9/13	8:00	1	0	calm	-2.0	5.0	52.0
9/14	9:00	1	0	calm	-3.0	4.0	52.0
9/15	8:15	1	0	calm	-6.0	3.0	51.0
9/16	9:00	1	0	calm	-3.0	3.0	50.0
9/17	9:00	1	0	calm	0.0	3.0	49.0
9/18	9:00	3	0	calm	-6.0	2.0	48.0
9/19	9:00	2	0	calm	-5.0	2.0	48.0
9/20	9:30	1	0	calm	-2.0	0.0	47.0
				Averages	8.3	8.7	70.2

a= estimated water stage

Sky Codes
0 = no observation
1 = clear or mostly clear (<10% cloud cover)
2 = cloud cover less than 50% of the sky
3 = cloud cover more than 50% of the sky
4 = complete overcast

APPENDIX E:
LENGTH DATA FOR JUVENILE SALMON SAMPLED IN THE TAKOTNA RIVER DRAINAGE, 2003

Appendix E.1. Trap caught juvenile chinook salmon lengths by month, location, and number caught, 2003.

Lengths (mm)	June		July		Total
	Moore Creek	Big Creek (lower)	Takotna River	Fourth-of-July Creek	
	Number Caught	Number Caught	Number Caught	Number Caught	Total
48	0	0	0	0	0
49	0	0	0	0	0
50	0	0	0	0	0
51	0	0	0	0	0
52	0	0	0	0	0
53	0	0	0	0	0
54	0	0	0	0	0
55	0	0	0	0	0
56	0	0	0	0	0
57	0	0	0	0	0
58	0	0	0	2	2
59	0	0	0	1	1
60	0	0	0	2	2
61	0	0	0	1	1
62	0	0	0	4	4
63	0	0	0	4	4
64	0	0	0	3	3
65	0	0	0	5	5
66	0	0	1	5	6
67	0	0	0	2	2
68	0	0	1	2	3
69	0	0	0	0	0
70	0	0	0	5	5
71	0	0	0	5	5
72	0	0	0	2	2
73	0	0	0	4	4
74	0	0	0	0	0
75	0	0	1	2	3
76	0	0	0	1	1
77	0	0	0	0	0
78	0	0	0	0	0
79	0	0	0	0	0
80	0	0	0	0	0
Totals	0	0	3	50	53

Appendix E.2. Trap caught juvenile coho salmon lengths by month, location, and number caught, 2003.

	June		July		
Lengths (mm)	Moore Creek Number Caught	Big Creek (lower) Number Caught	Takotna River Number Caught	Fourth-of-July Creek Number Caught	Total
39	0	1	0	0	1
40	0	0	0	0	0
41	0	0	0	0	0
42	0	1	0	0	1
43	0	0	0	0	0
44	0	0	0	0	0
45	0	0	0	0	0
46	0	0	0	0	0
47	0	1	0	0	1
48	0	0	0	0	0
49	0	0	0	0	0
50	0	1	0	0	1
51	0	0	0	0	0
52	0	0	0	0	0
53	0	0	0	0	0
54	0	0	0	0	0
55	0	2	0	0	2
56	0	1	0	0	1
57	0	1	0	0	1
58	0	1	0	0	1
59	0	2	0	0	2
60	0	3	0	0	3
61	0	2	0	0	2
62	0	0	0	0	0
63	0	3	0	0	3
64	0	2	0	0	2
65	0	0	0	0	0
66	0	2	0	0	2
67	0	0	0	0	0
68	0	2	0	0	2
69	0	0	0	0	0
70	0	0	0	0	0
71	0	0	0	0	0
72	0	0	0	0	0
73	0	0	0	0	0
74	0	0	0	0	0
75	0	0	0	0	0
76	0	0	0	0	0
77	0	0	0	0	0
78	0	0	0	0	0
79	0	0	0	0	0
80	0	0	0	0	0
81	0	1	0	0	1
82	0	0	0	0	0
83	0	1	0	0	1
84	0	0	0	0	0
85	0	0	0	0	0
86	0	0	0	0	0
87	0	0	0	0	0
88	0	0	0	0	0
89	0	0	0	0	0
90	0	1	0	0	1
91	0	0	0	0	0

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Appendix E.2. (Page 2 of 2)

92	0	0	0	0	0
93	0	0	0	0	0
94	0	0	0	0	0
95	0	0	0	0	0
96	0	0	0	0	0
97	0	0	0	0	0
98	0	0	0	0	0
99	0	0	0	0	0
100	0	0	0	0	0
101	0	0	0	0	0
102	0	0	0	0	0
103	0	0	0	0	0
104	0	0	0	0	0
105	0	0	0	0	0
106	0	0	0	0	0
107	0	0	0	0	0
108	0	0	0	0	0
109	0	0	0	1	1
Totals	0	25	0	1	26

APPENDIX F:
HISTORIC AGE, SEX, AND LENGTH DATA FOR FISH SAMPLED AT THE TAKOTNA RIVER WEIR

Appendix F.1. Historic sex and age data for trap-caught chinook salmon at the Takotna River weir. [ab]

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	0.2 Esc.	0.2 %	1.1 Esc.	1.1 %	1.2 Esc.	1.2 %	2.1 Esc.	2.1 %	1.3 Esc.	1.3 %	2.2 Esc.	2.2 %	1.4 Esc.	1.4 %	2.3 Esc.	2.3 %	1.5 Esc.	1.5 %	2.4 Esc.	2.4 %	1.6 Esc.	1.6 %	2.5 Esc.	2.5 %	Total Esc.	Total %
2000	7/5-7	25	M	0	0.0	5	4.0	38	32.0	0	0.0	38	66.7	0	0.0	15	6.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	96	80.0
	(6/25 - 7/9)		F	0	0.0	0	0.0	0	0.0	0	0.0	5	20.0	0	0.0	19	6.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	24	20.0
			Subtotal	0	0.0	5	4.0	38	32.0	0	0.0	43	86.7	0	0.0	34	13.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	120	100.0
	7/12-14	23	M	0	0.0	0	0.0	8	17.4	0	0.0	18	14.3	0	0.0	12	42.9	0	0.0	2	4.3	0	0.0	0	0.0	0	0.0	39	87.0
	(7/10-16)		F	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	6	42.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	6	13.0
			Subtotal	0	0.0	0	0.0	8	17.4	0	0.0	18	14.3	0	0.0	18	85.7	0	0.0	2	4.3	0	0.0	0	0.0	0	0.0	45	100.0
	7/19-21	16	M	0	0.0	0	0.0	28	31.3	0	0.0	23	14.3	0	0.0	17	57.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	68	75.0
	(7/17-25)		F	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	22	14.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	22	25.0
			Subtotal	0	0.0	0	0.0	28	31.3	0	0.0	23	14.3	0	0.0	39	71.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	90	100.0
	7/28-30, 8/14,27	14	M	0	0.0	0	0.0	32	35.7	0	0.0	19	14.3	0	0.0	6	57.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	58	64.3
	(7/26-9/9)		F	0	0.0	0	0.0	0	0.0	0	0.0	7	0.0	0	0.0	26	14.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	32	35.7
			Subtotal	0	0.0	0	0.0	32	35.7	0	0.0	26	14.3	0	0.0	32	71.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	90	100.0
	Season	78	M	0	0.0	5	1.4	106	30.9	0	0.0	98	36.5	0	0.0	50	12.2	0	0.0	2	0.6	0	0.0	0	0.0	0	0.0	260	75.5
			F	0	0.0	0	0.0	0	0.0	0	0.0	11	2.7	0	0.0	73	32.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	85	24.5
			Total	0	0.0	5	1.4	106	30.9	0	0.0	109	39.2	0	0.0	123	44.6	0	0.0	2	0.6	0	0.0	0	0.0	0	0.0	345	100.0
2001	7/5-14	34	M		0.0		0.0		6.7		0.0		26.7		0.0		33.3		0.0		0.0		0.0		0.0		0.0		66.7
			F		0.0		0.0		0.0		0.0		4.4		0.0		28.9		0.0		0.0		0.0		0.0		0.0		33.3
			Subtotal		0.0		0.0		6.7		0.0		31.1		0.0		62.2		0.0		0.0		0.0		0.0		0.0		100.0
	7/17-8/7	40	M		0.0		0.0		14.6		0.0		14.6		0.0		19.5		0.0		4.9		0.0		0.0		0.0		53.7
			F		0.0		0.0		0.0		0.0		4.9		0.0		41.5		0.0		0.0		0.0		0.0		0.0		46.3
			Subtotal		0.0		0.0		14.6		0.0		19.5		0.0		61.0		0.0		4.9		0.0		0.0		0.0		100.0
	Season	74	M																										60.5
			F																										39.5
			Total																									721	100.0
2002	6/27 - 7/1	12	M	0	0.0	0	0.0	7	41.7	0	0.0	5	33.3	0	0.0	2	8.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	13	83.3
	(6/23 - 7/2)		F	0	0.0	0	0.0	1	8.3	0	0.0	0	0.0	0	0.0	1	8.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	16.7
			Subtotal	0	0.0	0	0.0	8	50.0	0	0.0	5	33.3	0	0.0	3	16.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	16	100.0
	7/4 - 9, 11	43	M	0	0.0	0	0.0	51	23.3	0	0.0	62	27.9	0	0.0	46	20.9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	164	74.4
	(7/3 - 13)		F	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	57	25.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	57	25.6
			Subtotal	0	0.0	0	0.0	51	23.3	0	0.0	62	27.9	0	0.0	103	46.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	221	100.0
	7/15, 17 - 22	26	M	0	0.0	0	0.0	0	0.0	0	0.0	11	34.6	0	0.0	7	23.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	18	57.7
	(7/14 - 23)		F	0	0.0	0	0.0	1	3.8	0	0.0	3	7.7	0	0.0	10	30.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	14	42.3
			Subtotal	0	0.0	0	0.0	1	3.8	0	0.0	14	42.3	0	0.0	17	53.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	32	100.0

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Appendix F.1. (Page 2 of 2)

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 0.2		1.1		1.2		2.1		1.3		2.2		1.4		2.3		1.5		2.4		1.6		2.5		Total	
				Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%	Esc.	%
2002	7/25-26, 29-30, 8/6	17	M	0	0.0	0	0.0	8	17.6	0	0.0	11	23.5	0	0.0	5	11.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	25	52.9
(Cont.)	(7/24 - 9/19)		F	0	0.0	0	0.0	0	0.0	0	0.0	3	5.9	0	0.0	17	35.3	0	0.0	3	5.9	0	0.0	0	0.0	0	0.0	22	47.1
			Subtotal	0	0.0	0	0.0	8	17.6	0	0.0	14	29.4	0	0.0	22	47.1	0	0.0	3	5.9	0	0.0	0	0.0	0	0.0	47	100.0
	Season	98	M	0	0.0	0	0.0	66	21.0	0	0.0	89	28.2	0	0.0	61	19.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	221	70.0
			F	0	0.0	0	0.0	3	0.8	0	0.0	5	1.7	0	0.0	84	26.7	0	0.0	3	0.9	0	0.0	0	0.0	0	0.0	95	30.0
			Total	0	0.0	0	0.0	69	21.8	0	0.0	94	29.9	0	0.0	145	45.8	0	0.0	3	0.9	0	0.0	0	0.0	0	0.0	316	100.0
2003 [d]	7/5-25	61	M		0.0		0.0		8.2		0.0		31.2		0.0		14.8		0.0		0.0		0.0		0.0		0.0		54.1
			F		0.0		0.0		0.0		0.0		9.8		0.0		34.4		0.0		1.6		0.0		0.0		0.0		45.9
			Subtotal		0.0		0.0		8.2		0.0		41.0		0.0		49.2		0.0		1.6		0.0		0.0		0.0	96	100.0
	Grand Total [c]	176	M	0	0.0	5	0.8	172	26.0	0	0.0	187	28.3	0	0.0	111	16.8	0	0.0	2	0.3	0	0.0	0	0.0	0	0.0	481	72.8
			F	0	0.0	0	0.0	3	0.5	0	0.0	16	2.4	0	0.0	157	23.8	0	0.0	3	0.5	0	0.0	0	0.0	0	0.0	180	27.2
			Total	0	0.0	5	0.8	175	26.5	0	0.0	203	30.7	0	0.0	268	40.5	0	0.0	5	0.8	0	0.0	0	0.0	0	0.0	661	100.0

[a] The number of fish in each stratum age and sex category are derived from the sample percentages; discrepancies in sums are attributed to rounding errors.
[b] The number of fish in "Season" summaries are the strata sums; "Season" percentages are derived from the sums.
[c] The number of fish in the "Grand total" are the sum of the "Season" totals; percentages are derived from those sums.
[d] Sampling dates do not meet criteria for estimating escapement percentages for some or all of the strata; "Season" is not included in the "Grand Total".

Appendix F.2. Historic age and length data for trap-caught chinook salmon at the Takotna River weir.

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	2.4	1.6	2.5
2000	7/5-7	M	Mean Length		451	515		674		743					
	(6/25-7/9)		Std. Error		-	23		19		8					
			Range		451-451	418		582-754		728-752					
			Sample Size	0	1	8	0	8	0	3	0	0	0	0	0
		F	Mean Length					722		844					
			Std. Error					-		16					
			Range					722-722		805-883					
			Sample Size	0	0	0	0	1	0	4	0	0	0	0	0
	7/12-14	M	Mean Length			519		646		802		895			
	(7/10-16)		Std. Error			22		16		28		-			
			Range			476-575		557-706		728-911		895-895			
			Sample Size	0	0	4	0	9	0	6	0	1	0	0	0
		F	Mean Length							873					
			Std. Error							50					
			Range							780-950					
			Sample Size	0	0	0	0	0	0	3	0	0	0	0	0
	7/19-21	M	Mean Length			482		650		760					
	(7/17-25)		Std. Error			14		28		62					
			Range			453-529		595-719		673-880					
			Sample Size	0	0	5	0	4	0	3	0	0	0	0	0
		F	Mean Length							781					
			Std. Error							37					
			Range							697-860					
			Sample Size	0	0		0	0	0	4	0	0	0	0	0
	7/28-30,8/14,27	M	Mean Length			498		710		798					
	(7/26-9/9)		Std. Error			27		23		-					
			Range			430-585		685-755		798-798					
			Sample Size	0	0	5	0	3	0	1	0	0	0	0	0
		F	Mean Length					812		821					
			Std. Error					-		39					
			Range					812-812		714-898					
			Sample Size	0	0		0	1	0	4	0	0	0	0	0
	Season [a]	M	Mean Length		451	501		671		770		895			
			Range		451-451	418-623		557-755		673-911		895-895			
			Sample Size	0	1	22	0	24	0	13	0	1	0	0	0
		F	Mean Length					744		818					
			Range					722-812		697-950					
			Sample Size	0	0	0	0	2	0	15	0	0	0	0	0

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Appendix F.2. (Page 2 of 3)

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	2.4	1.6	2.5
2001	7/5-14	M	Mean Length			552		663		810					
			Std. Error			6		14		15					
			Range			540-560		595-735		710-895					
			Sample Size	0	0	3	0	12	0	15	0	0	0	0	0
		F	Mean Length					783		867					
			Std. Error					78		8					
			Range					705-860		810-910					
			Sample Size	0	0	0	0	2	0	13	0	0	0	0	0
	7/17-8/7	M	Mean Length			498		688		828		855			
			Std. Error			25		33		29		5			
			Range			400-555		590-825		640-895		850-860			
			Sample Size	0	0	6	0	6	0	8	0	2	0	0	0
		F	Mean Length					770		861					
			Std. Error					30		15					
			Range					740-800		780-985					
			Sample Size	0	0	0	0	2	0	17	0	0	0	0	0
	Season [a]	M	Mean Length			516		671		816		855			
			Range			400-560		590-825		640-895		850-860			
			Sample Size	0	0	9	0	18	0	23	0	2	0	0	0
		F	Mean Length					776		864					
			Range					705-860		780-985					
			Sample Size	0	0	0	0	4	0	30	0	0	0	0	0
2002	6/27 - 7/1 (6/23 - 7/2)	M	Mean Length			544		679		765					
			Std Error			12		12		-					
			Range			500-565		645-695		765-765					
			Sample Size	0	0	5	0	4	0	1	0	0	0	0	0
		F	Mean Length			575				865					
			Std Error							-					
			Range			575-575				865-865					
			Sample Size	0	0	1	0	0	0	1	0	0	0	0	0
	7/4 - 9, 11 (7/3 - 13)	M	Mean Length			553		679	560	756					
			Std Error			6		12	-	25					
			Range			520-580		595-742	560-560	645-850					
			Sample Size	0	0	10	0	12	1	9	0	0	0	0	0
		F	Mean Length							876					
			Std Error							13					
			Range							800-960					
			Sample Size	0	0	0	0	0	0	11	0	0	0	0	0

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Appendix F.2. (Page 3 of 3)

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	2.4	1.6	2.5
2002 (Cont.)	7/15, 17 - 22 (7/14 - 23)	M	Mean Length					686		763					
			Std Error					14		38					
			Range					620-745		612-875					
			Sample Size	0	0	0	0	9	0	6	0	0	0	0	0
		F	Mean Length			627		814		835					
			Std Error			-		20		20					
			Range			627-627		794-833		740-922					
			Sample Size	0	0	1	0	2	0	8	0	0	0	0	0
	7/25-26, 29-30, 8/6 (7/24 - 9/19)	M	Mean Length			568		678		839					
			Std Error			22		14		19					
			Range			543-612		648-710		820-858					
			Sample Size	0	0	3	0	4	0	2	0	0	0	0	0
		F	Mean Length					825		855		827			
			Std Error					-		36		-			
			Range					825-825		755-976		827-827			
			Sample Size	0	0	0	0	1	0	6	0	1	0	0	0
	Season [a]	M	Mean Length			554		679	560	765					
			Range			500-612		595-745	560-560	612-875					
			Sample Size	0	0	18	0	29	1	18	0	0	0	0	0
		F	Mean Length			600		820		867		827			
			Range			575-627		794-833		740-976		827-827			
			Sample Size	0	0	2	0	3	0	26	0	1	0	0	0
2003 [c]	7/5-25	M	Mean Length			514		723		764					
			Range			430- 607		635- 785		675- 893					
			Sample Size	0	0	5	0	19	0	9	0	0	0	0	0
		F	Mean Length					817	975	867		975			
			Range					765- 850	975- 975	770- 980		975- 975			
			Sample Size	0	0	0	0	6	1	21	0	1	0	0	0
	Grand Total [b]	M	Mean Length		451	528		675	560	768		895			
			Range		451-451	418-623		557-755	560 - 560	673-911		895-895			
			Sample Size	0	1	40	0	53	1	31	0	1	0	0	0
		F	Mean Length			600		782		843		827			
			Range			575 - 627		722-812		697-950		827-827			
			Sample Size	0	0	2	0	5	0	41	0	1	0	0	0

[a] "Season" mean lengths are weighted by the escapement passage in each stratum.

[b] "Grand Total" mean lengths are simple averages of the "Season" mean lengths.

[c] Sampling dates do not meet criteria for estimating escapement percentages for some or all of the strata; "Season" is not included in "Grand Total".

Appendix F.3. Historic sex and age data for trap-caught chum salmon at the Takotna River weir.

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	7/5 - 7	85	M	0	0.0	73	17.6	117	28.2	5	1.2	195	47.1
	(6/24 - 7/9)		F	0	0.0	132	31.8	88	21.2	0	0.0	220	52.9
			Subtotal	0	0.0	205	49.4	205	49.4	5	1.2	415	100.0
	7/12 - 14	117	M	0	0.0	58	20.5	41	14.6	0	0.0	98	35.0
	(7/10 - 16)		F	0	0.0	120	42.7	62	22.2	0	0.0	183	65.0
			Subtotal	0	0.0	178	63.2	103	36.8	0	0.0	281	100.0
	7/19 - 21	140	M	8	2.2	104	30.0	52	15.0	0	0.0	163	47.1
	(7/17 - 24)		F	7	2.1	131	37.9	44	12.9	0	0.0	183	52.9
			Subtotal	15	4.3	235	67.9	96	27.9	0	0.0	346	100.0
	7/28 - 29	23	M	0	0.0	55	26.1	19	8.7	0	0.0	74	34.8
	(7/25 - 8/29)		F	18	8.7	102	47.8	18	8.7	0	0.0	138	65.2
			Subtotal	18	8.7	157	73.9	37	17.4	0	0.0	212	100.0
	Season	365	M	7	0.6	290	23.1	229	18.2	5	0.4	531	42.3
			F	26	2.1	484	38.6	213	17.0	0	0.0	723	57.7
			Total	33	2.7	774	61.7	442	35.2	5	0.4	1,254	100.0
2001	7/5, 6	74	M	0	0.0	223	36.5	190	31.1	0	0.0	413	67.6
	(6/20, 7/8)		F	0	0.0	74	12.1	124	20.3	0	0.0	198	32.4
			Subtotal	0	0.0	297	48.6	314	51.4	0	0.0	611	100.0
	7/10, 11, 13, 14	153	M	0	0.0	567	33.3	289	17.0	11	0.7	867	51.0
	(7/9, 15)		F	0	0.0	589	34.7	245	14.4	0	0.0	834	49.0
			Subtotal	0	0.0	1,156	68.0	534	31.4	11	0.7	1,701	100.0
	7/17, 18	83	M	0	0.0	429	39.7	130	12.1	0	0.0	559	51.8
	(7/16, 19)		F	0	0.0	468	43.4	52	4.8	0	0.0	520	48.2
			Subtotal	0	0.0	897	83.1	182	16.9	0	0.0	1,079	100.0
	7/21, 22, 23	103	M	0	0.0	421	34.9	141	11.7	0	0.0	562	46.6
	(7/20 , 25)		F	0	0.0	527	43.7	117	9.7	0	0.0	644	53.4
			Subtotal	0	0.0	948	78.6	258	21.4	0	0.0	1,206	100.0
	7/28, 29, 30	106	M	0	0.0	222	36.8	12	1.9	0	0.0	233	38.7
	(7/26 , 8/2)		F	0	0.0	335	55.7	34	5.6	0	0.0	370	61.3
			Subtotal	0	0.0	557	92.5	46	7.5	0	0.0	603	100.0
	8/5, 6, 7	54	M	0	0.0	57	25.9	4	1.9	0	0.0	61	27.8
	(8/3, 28)		F	4	0.9	155	70.4	0	0.0	0	0.0	159	72.2
			Subtotal	4	0.9	212	96.3	4	1.9	0	0.0	220	100.0
	Season	573	M	0	0.0	1,919	35.4	765	14.1	11	0.2	2,695	49.7
			F	4	0.1	2,149	39.7	572	10.6	0	0.0	2,725	50.3
			Total	4	0.1	4,068	75.1	1,337	24.7	11	0.2	5,420	100
2002	6/27 - 28	190	M	0	0.0	59	11.1	188	35.2	6	1.1	253	47.4
	(6/23 - 29)		F	0	0.0	76	14.2	200	37.4	5	1.0	281	52.6
			Subtotal	0	0.0	135	25.3	388	72.6	11	2.1	534	100.0
	7/1 - 3	137	M	0	0.0	207	23.4	311	35.0	7	0.7	525	59.1
	(6/30 - 7/5)		F	0	0.0	156	17.5	188	21.2	19	2.2	363	40.9
			Subtotal	0	0.0	363	40.9	499	56.2	26	2.9	888	100.0

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Appendix F.3. (Page 2 of 2)

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 %
2002 (cont.)	7/8 - 10 (7/6 - 12)	164	M	9	0.6	277	19.5	476	33.5	9	0.6	770	54.3
			F	8	0.6	311	22.0	329	23.2	0	0.0	649	45.7
			Subtotal	17	1.2	588	41.5	805	56.7	9	0.6	1,419	100.0
	7/15 - 17 (7/13 - 19)	131	M	6	0.8	203	29.0	112	16.0	0	0.0	320	45.8
			F	5	0.7	181	26.0	192	27.5	0	0.0	379	54.2
			Subtotal	11	1.5	384	55.0	304	43.5	0	0.0	699	100.0
	7/22 - 24 (7/20 - 26)	141	M	15	2.8	213	39.7	84	15.6	4	0.7	316	58.9
			F	23	4.3	153	28.4	45	8.5	0	0.0	221	41.1
			Subtotal	38	7.1	366	68.1	129	24.1	4	0.7	537	100.0
	7/29 - 31, 8/5 - 7 (7/27-9/20)	61	M	27	9.9	74	26.3	23	8.2	0	0.0	124	44.3
			F	14	4.9	73	26.2	64	22.9	5	1.6	156	55.7
			Subtotal	41	14.8	147	52.5	87	31.1	5	1.6	280	100.0
	Season	824	M	57	1.3	1,039	23.8	1,197	27.3	24	0.5	2,317	53.0
			F	50	1.2	955	21.8	1,024	23.4	30	0.7	2,060	47.0
			Total	107	2.5	1,994	45.6	2,221	50.7	54	1.2	4,377	100.0
2003	7/5 - 7 (6/24 - 7/10)	212	M	0	0.0	496	54.3	104	11.3	9	0.9	608	66.5
			F	26	2.8	224	24.5	56	6.2	0	0.0	306	33.5
			Subtotal	26	2.8	720	78.8	160	17.5	9	0.9	914	100.0
	7/14 - 16 (7/11 - 7/19)	187	M	6	0.5	556	49.7	102	9.1	0	0.0	664	59.4
			F	24	2.2	413	36.9	18	1.6	0	0.0	455	40.6
			Subtotal	30	2.7	969	86.6	120	10.7	0	0.0	1,119	100.0
	7/23 - 25, 8/10 - 11 (7/20 - 9/20)	165	M	8	0.6	445	32.7	41	3.0	8	0.6	503	37.0
			F	107	7.9	701	51.5	50	3.7	0	0.0	857	63.0
			Subtotal	115	8.5	1,145	84.2	91	6.7	8	0.6	1,360	100.0
	Season	564	M	14	0.4	1,497	44.2	246	7.3	17	0.5	1,775	52.3
			F	157	4.6	1,338	39.4	124	3.6	0	0.0	1,618	47.7
			Total	171	5.0	2,835	83.6	370	10.9	17	0.5	3,393	100.0
	Grand Total [c]	2,326	M	78	0.5	4,745	32.9	2,437	16.9	57	0.4	7,318	50.7
			F	237	1.6	4,926	34.1	1,933	13.4	30	0.2	7,126	49.3
			Total	315	2.2	9,671	67.0	4,370	30.3	87	0.6	14,444	100.0

[a] The number of fish in each stratum age and sex category are derived from the sample percentages; discrepancies in sums are attributed to rounding errors.

[b] The number of fish in "Season" summaries are the strata sums; "Season" percentages are derived from the sums.

[c] The number of fish in the "Grand Total" are the sum of the "Season" totals; percentages are derived from those sums.

Appendix F.4. Historic age and length data for trap-caught chum salmon at the Takotna River weir.

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
2000	7/5 - 7 (6/24 - 7/9)	M	Mean Length		554	606	648
			Std. Error		6	7	-
			Range		507- 580	540- 658	648- 648
			Sample Size	0	15	24	1
		F	Mean Length		542	576	
			Std. Error		4	9	
			Range		490- 583	514- 667	
			Sample Size	0	27	18	0
	7/12 - 14 (7/10 - 16)	M	Mean Length		561	577	
			Std. Error		3	4	
			Range		537- 587	548- 602	
			Sample Size	0	24	17	0
		F	Mean Length		540	558	
			Std. Error		3	6	
			Range		500- 583	485- 614	
			Sample Size	0	50	26	0
	7/19 - 21 (7/17 - 24)	M	Mean Length	547	562	590	
			Std. Error	29	4	8	
			Range	496- 596	502- 610	530- 698	
			Sample Size	3	42	21	0
		F	Mean Length	546	542	551	
			Std. Error	23	3	7	
			Range	516- 591	477- 591	515- 618	
			Sample Size	3	53	18	0
	7/28, 29 (7/25 - 8/29)	M	Mean Length		564	620	
			Std. Error		6		
			Range		548- 588	620- 620	
			Sample Size	0	6	2	0
		F	Mean Length	525	542	519	
			Std. Error	15	10	5	
			Range	510- 540	485- 587	514- 523	
			Sample Size	2	11	2	0
	Season	M	Mean Length	547	560	598	648
			Range	496- 596	502- 610	530- 698	648- 648
			Sample Size	3	87	64	1
		F	Mean Length	531	542	560	
			Range	510- 591	477- 591	485- 667	
			Sample Size	5	141	64	0

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Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
2001	7/5, 6	M	Mean Length		603	587	
	(6/23 - 7/8)		Std. Error		6	7	
			Range		540- 645	505- 640	
			Sample Size	0	27	23	0
		F	Mean Length		572	563	
			Std. Error		4	7	
			Range		545- 585	500- 600	
			Sample Size	0	9	15	0
	7/10 - 14	M	Mean Length		585	591	540
	(7/9 - 15)		Std. Error		4	7	-
			Range		535- 650	500- 645	540- 540
			Sample Size	0	51	26	1
		F	Mean Length		551	565	
			Std. Error		3	5	
			Range		495- 600	530- 615	
			Sample Size	0	53	22	0
	7/17 - 18	M	Mean Length		578	600	
	(7/16 - 19)		Std. Error		4	5	
			Range		540- 620	570- 620	
			Sample Size	0	33	10	0
		F	Mean Length		549	569	
			Std. Error		4	12	
			Range		515- 590	540- 590	
			Sample Size	0	36	4	0
	7/21 - 23	M	Mean Length		574	584	
	(7/20 - 25)		Std. Error		5	7	
			Range		520- 665	540- 625	
			Sample Size	0	36	12	0
		F	Mean Length		546	576	
			Std. Error		4	7	
			Range		475- 600	540- 615	
			Sample Size	0	45	10	0
	7/28 - 30	M	Mean Length		578	585	
	(7/26 - 8/2)		Std. Error		5	10	
			Range		510- 630	575- 595	
			Sample Size	0	39	2	0
		F	Mean Length		552	543	
			Std. Error		3	8	
			Range		500- 600	510- 565	
			Sample Size	0	59	6	0

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Appendix F.4. (Page 3 of 5)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
2001 (cont.)	8/5 - 7 (8/3 - 28)	M	Mean Length		559	620	
			Std. Error		10	-	
			Range		490- 610	620- 620	
			Sample Size	0	14	1	0
		F	Mean Length	500	519		
			Std. Error	-	4		
			Range	500- 500	465- 610		
			Sample Size	1	38	0	0
	Season	M	Mean Length		581	590	540
			Range		490- 665	500- 645	540- 540
			Sample Size	0	200	74	1
		F	Mean Length	500	548	566	
			Range	500- 500	465- 610	500- 615	
			Sample Size	1	240	57	0
2002	6/27 - 28 (6/23 - 29)	M	Mean Length		590	609	613
			Std. Error		5	3	8
			Range		544- 624	550- 660	605- 620
			Sample Size	0	21	67	2
		F	Mean Length		574	582	583
			Std. Error		4	3	28
			Range		537- 625	526- 630	555- 610
			Sample Size	0	27	71	2
	7/1 - 3 (6/30 - 7/5)	M	Mean Length		590	610	572
			Std. Error		7	4	-
			Range		520- 696	543- 680	572- 572
			Sample Size	0	32	48	1
		F	Mean Length		555	576	555
			Std. Error		5	4	3
			Range		500- 583	530- 611	551- 562
			Sample Size	0	24	29	3
	7/8 - 10 (7/6 - 12)	M	Mean Length	556	579	605	612
			Std. Error	-	5	4	-
			Range	556- 556	525- 633	525- 690	612- 612
			Sample Size	1	32	55	1
		F	Mean Length	496	556	571	
			Std. Error	-	4	4	
			Range	496- 496	498- 615	519- 625	
			Sample Size	1	36	38	0

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Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
2002	7/15 - 17	M	Mean Length	515	589	605	
(Cont.)	(7/13 - 19)		Std. Error	-	5	7	
			Range	515- 515	538- 648	550- 655	
			Sample Size	1	38	21	0
		F	Mean Length	532	542	573	
			Std. Error	-	4	5	
			Range	532- 532	508- 586	515- 643	
			Sample Size	1	34	36	0
	7/22 - 24	M	Mean Length	563	578	591	610
	(7/20 - 26)		Std. Error	22	4	7	-
			Range	506- 605	493- 660	550- 672	610- 610
			Sample Size	4	56	22	1
		F	Mean Length	528	551	561	
			Std. Error	8	4	7	
			Range	498- 552	476- 611	528- 600	
			Sample Size	6	40	12	0
	7/29 - 31, 8/5 - 7	M	Mean Length	538	578	605	
	(7/27-9/20)		Std. Error	11	6	20	
			Range	510- 586	515- 611	550- 650	
			Sample Size	6	16	5	0
		F	Mean Length	503	536	552	587
			Std. Error	12	7	5	-
			Range	482- 522	485- 574	518- 603	587- 587
			Sample Size	3	16	14	1
	Season	M	Mean Length	545	583	606	601
			Range	506- 605	493- 696	525- 690	572- 620
			Sample Size	12	195	218	5
		F	Mean Length	516	552	573	565
			Range	482- 552	476- 625	515- 643	551- 610
			Sample Size	11	177	200	6
2003	7/5 - 7	M	Mean Length		585	624	618
	(6/24 - 7/10)		Std. Error		3	5	18
			Range		500- 645	570- 676	600- 635
			Sample Size	0	115	24	2
		F	Mean Length	540	568	585	
			Std. Error	10	4	7	
			Range	505- 563	520- 647	555- 625	
			Sample Size	6	51	13	0

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Appendix F.4. (Page 5 of 5)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 0.2	0.3	0.4	0.5
2003 (Cont.)	7/14 - 16 (7/11 - 7/19)	M	Mean Length	550	567	604	
			Std. Error	-	3	9	
			Range	550- 550	505- 635	500- 655	
			Sample Size	1	93	17	0
		F	Mean Length	521	544	590	
			Std. Error	5	4	30	
			Range	510- 532	475- 620	535- 640	
			Sample Size	4	69	3	0
	7/23 - 25, 8/10 - 11 (7/20 - 9/20)	M	Mean Length	530	554	603	630
			Std. Error	-	4	14	-
			Range	530- 530	476- 620	570- 650	630- 630
			Sample Size	1	54	5	1
		F	Mean Length	502	527	547	
			Std. Error	6	3	12	
			Range	470- 537	485- 605	495- 580	
			Sample Size	13	85	6	0
	Season	M	Mean Length	538	569	612	624
			Range	530- 550	476- 645	500- 676	600- 635
			Sample Size	2	262	46	3
		F	Mean Length	510	539	570	
			Range	470- 563	475- 647	495- 640	
			Sample Size	23	205	22	0
	Grand Total b	M	Mean Length	543	573	602	603
			Range	496- 596	490- 665	500- 698	540- 648
			Sample size	17	744	402	10
		F	Mean Length	514	545	567	565
			Range	500- 591	465- 610	485- 667	551- 610
			Sample size	40	763	343	6

[a] "Season" mean lengths are weighted by the escapement passage in each stratum.
[b] "Grand Total" mean lengths are simple averages of the "Season" mean lengths.

Appendix F.5. Historic age and sex data for trap-caught coho salmon at the Takotna River weir.

Year	Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 1.1 Esc.	1.1 %	2.1 Esc.	2.1 %	3.1 Esc.	3.1 %	Total Esc.	Total %
2000	8/14	36	M	0	0.0	421	47.2	25	2.8	446	50.0
	(8/4-19)		F	0	0.0	445	50.0	0	0.0	445	50.0
			Subtotal	0	0.0	866	97.2	25	2.8	891	100.0
	8/25-27	152	M	0	0.0	1,059	48.7	15	0.7	1,073	49.3
	(8/20-29)		F	0	0.0	1,087	50.0	14	0.6	1,102	50.7
			Subtotal	0	0.0	2,146	98.7	29	1.3	2,175	100.0
	9/1- 3	136	M	0	0.0	273	43.4	0	0.0	273	43.4
	(8/30-9/7)		F	0	0.0	334	52.9	23	3.7	357	56.6
			Subtotal	0	0.0	607	96.3	23	3.7	630	100.0
	9/11-13	71	M	4	1.4	106	40.9	0	0.0	110	42.3
	(9/8-20)		F	7	2.8	140	53.5	4	1.4	151	57.7
			Subtotal	11	4.2	246	94.4	4	1.4	261	100.0
	Season	395	M	4	0.1	1,860	47.0	39	1.0	1,902	48.1
			F	7	0.2	2,006	50.7	41	1.0	2,055	51.9
			Total	11	0.3	3,866	97.7	80	2.0	3,957	100.0
2001	8/19-20, 24	142	M	7	0.7	589	58.4	107	10.6	703	69.7
	(7/30, 31, 8/1, 25)		F	0	0.0	277	27.5	28	2.8	305	30.3
			Subtotal	7	0.7	866	85.9	135	13.4	1,008	100.0
	8/28-29	119	M	0	0.0	522	47.0	38	3.4	560	50.4
	(8/26, 31, 9/1)		F	0	0.0	494	44.5	57	5.1	551	49.6
			Subtotal	0	0.0	1,016	91.5	95	8.5	1,111	100.0
	9/5-6	44	M	0	0.0	199	40.9	66	13.6	265	54.5
	(9/2, 20)		F	0	0.0	210	43.2	11	2.3	221	45.5
			Subtotal	0	0.0	409	84.1	77	15.9	486	100.0
	Season	305	M	7	0.3	1,310	50.3	211	8.1	1,528	58.7
			F	0	0.0	981	37.6	96	3.7	1,077	41.3
			Total	7	0.3	2,291	87.9	307	11.8	2,605	100.0
2002	8/19 - 20, 22 - 23	123	M	0	0.0	1,388	69.1	33	1.6	1,420	70.7
	(8/23 - 8/25)		F	0	0.0	506	25.2	81	4.1	588	29.3
			Subtotal	0	0.0	1,894	94.3	114	5.7	2,008	100.0
	8/27 - 28	114	M	0	0.0	523	54.4	34	3.5	556	57.9
	(8/26 - 31)		F	0	0.0	379	39.5	25	2.6	405	42.1
			Subtotal	0	0.0	902	93.9	59	6.1	961	100.0
	9/4 - 5	112	M	0	0.0	417	41.1	18	1.8	435	42.9
	(9/1 - 20)		F	9	0.9	544	53.5	27	2.7	580	57.1
			Subtotal	9	0.9	961	94.6	45	4.5	1,015	100.0
	Season	349	M	0	0.0	2,327	58.4	85	2.1	2,412	60.5
			F	9	0.2	1,429	35.9	134	3.4	1,572	39.5
			Total	9	0.2	3,756	94.3	219	5.5	3,984	100.0

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Year	Sample Dates (Stratum Dates)	Sample Size	Sex	Age Class 1.1 Esc.	1.1 %	2.1 Esc.	2.1 %	3.1 Esc.	3.1 %	Total Esc.	Total %
2003	8/10 - 11	61	M	0	0.0	623	55.7	19	1.7	641	57.4
	(7/26 - 8/16)		F	0	0.0	458	41.0	18	1.6	477	42.6
			Subtotal	0	0.0	1,081	96.7	37	3.3	1,118	100.0
	8/22 - 23	62	M	62	1.6	1,617	41.9	311	8.1	1,990	51.6
	(8/17 - 8/31)		F	0	0.0	1,741	45.2	124	3.2	1,865	48.4
			Subtotal	62	1.6	3,358	87.1	435	11.3	3,855	100.0
	9/10 - 11	60	M	0	0.0	696	31.7	110	5.0	806	36.7
	(9/1 - 20)		F	0	0.0	1,062	48.3	330	15.0	1,392	63.3
			Subtotal	0	0.0	1,758	80	440	20.0	2,198	100.0
	Season	183	M	62	0.9	2,936	40.9	439	6.1	3,437	47.9
			F	0	0.0	3,261	45.5	472	6.6	3,734	52.1
			Total	62	0.9	6,197	86.4	911	12.7	7,171	100.0
	Grand Total [c]	1,232	M	73	0.4	8,433	47.6	774	4.4	9,279	52.4
			F	16	0.1	7,677	43.3	743	4.2	8,438	47.6
			Total	89	0.5	16,110	90.9	1,517	8.6	17,717	100.0

[a] The number of fish in each stratum age and sex category are derived from the sample percentages; discrepancies in sums are attributed to rounding errors.

[b] The number of fish in "Season" summaries are the strata sums; "Season" percentages are derived from the sums.

[c] The number of fish in the "Grand Total" are the sum of the "Season" totals; percentages are derived from those sums.

Appendix F.6. Historic age and length data for trap-caught coho salmon at the Takotna River weir.

Year	Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
2000	8/14	M	Mean Length		541	650
	(8/4-19)		Std. Error		9	-
			Range		476- 614	650- 650
			Sample Size	0	17	1
		F	Mean Length		535	
			Std. Error		11	
			Range		425- 610	
			Sample Size	0	18	0
	8/25-27	M	Mean Length		537	506
	(8/20-29)		Std. Error		5	-
			Range		412- 611	506- 506
			Sample Size	0	74	1
		F	Mean Length		552	543
			Std. Error			-
			Range		488- 600	543- 543
			Sample Size	0	76	1
	9/1- 3	M	Mean Length		547	
	(8/30-9/7)		Std. Error		6	
			Range		420- 640	
			Sample Size	0	59	0
		F	Mean Length		544	563
			Std. Error		4	13
			Range		435- 594	523- 597
			Sample Size	0	72	5
	9/11-13	M	Mean Length	573	551	
	(9/8-20)		Std. Error	-	8	
			Range	573- 573	444- 611	
			Sample Size	1	29	0
		F	Mean Length	571	558	575
			Std. Error	21	5	-
			Range	550- 591	477- 614	575- 575
			Sample Size	2	38	1
	Season	M	Mean Length	573	540	597
			Range	573- 573	412- 640	506- 650
			Sample Size	1	179	2
		F	Mean Length	571	547	557
			Range	550- 591	425- 614	523- 597
			Sample Size	2	204	7

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Year	Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
2001	8/19-20, 24	M	Mean Length	550	567	559
	7/30,31,8/1,25		Std. Error	-	5	12
			Range	550- 550	475- 635	430- 620
			Sample Size	1	79	19
		F	Mean Length		568	558
			Std. Error		4	9
			Range		505- 620	535- 585
			Sample Size	0	38	5
	8/28-29	M	Mean Length		561	581
	8/26,31,9/1		Std. Error		8	14
			Range		395- 640	520- 630
			Sample Size	0	53	7
		F	Mean Length		577	578
			Std. Error		4	12
			Range		500- 635	530- 620
			Sample Size	0	51	8
	9/5-6	M	Mean Length		559	580
	9/2,20		Std. Error		14	13
			Range		440- 640	515- 615
			Sample Size	0	17	7
		F	Mean Length		568	563
			Std. Error		6	33
			Range		515- 605	530- 595
			Sample Size	0	18	2
	Season	M	Mean Length	550	563	570
			Range	550- 550	395- 640	430- 630
			Sample Size	1	149	33
		F	Mean Length		573	570
			Range		500- 635	530- 620
			Sample Size	0	107	15
2002	8/19 - 20, 22 - 23	M	Mean Length		530	480
	(6/23 - 8/25)		Std. Error		5	45
			Range		440- 615	435- 525
			Sample Size	0	85	2
		F	Mean Length		564	628
			Std. Error		4	47
			Range		525- 620	536- 810
			Sample Size	0	31	5

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Appendix F.6. (Page 3 of 4)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
2002	8/27 - 28	M	Mean Length		563	607
(Cont.)	(8/26 - 31)		Std. Error		6	12
			Range		405- 630	580- 635
			Sample Size	0	62	4
		F	Mean Length		570	591
			Std. Error		4	14
			Range		516- 648	567- 615
			Sample Size	0	45	3
	9/4 - 5	M	Mean Length		568	550
	(9/1 - 20)		Std. Error		8	40
			Range		405- 660	510- 590
			Sample Size	0	46	2
		F	Mean Length	535	579	591
			Std. Error	-	4	11
			Range	535- 535	500- 650	578- 612
			Sample Size	1	60	3
	Season	M	Mean Length		545	546
			Range		405- 660	435- 635
			Sample Size	0	193	8
		F	Mean Length	535	571	613
			Range	535- 535	500- 650	536- 810
			Sample Size	1	136	11
2003	8/10 - 11	M	Mean Length		544	628
	(7/26 - 8/16)		Std. Error		7	-
			Range		462- 641	628- 628
			Sample Size	0	34	1
		F	Mean Length		562	547
			Std. Error		4	-
			Range		537- 604	547- 547
			Sample Size	0	25	1
	8/22 - 23	M	Mean Length	488	533	578
	(8/17 - 8/31)		Std. Error	-	7	21
			Range	488- 488	427- 598	510- 624
			Sample Size	1	26	5
		F	Mean Length		567	548
			Std. Error		5	36
			Range		492- 612	512- 583
			Sample Size	0	28	2

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Appendix F.6. (Page 4 of 4)

Year	Sample Dates (Stratum Dates)	Sex		Age Class 1.1	2.1	3.1
2003	9/10 - 11	M	Mean Length		551	564
(Cont.)	(9/1 - 20)		Std. Error		12	24
			Range		450- 640	523- 606
			Sample Size	0	19	3
		F	Mean Length		568	576
			Std. Error		7	8
			Range		480- 625	542- 605
			Sample Size	0	29	9
	Season	M	Mean Length	488	540	576
			Range	488- 488	427- 641	510- 628
			Sample Size	1	79	9
		F	Mean Length		566	567
			Range		480- 625	512- 605
			Sample Size	0	82	12
	Grand Total [b]	M	Mean Length	537	547	572
			Range	488 - 573	395-660	430 - 650
			Sample Size	3	600	52
		F	Mean Length	553	564	577
			Range	535 - 591	425-650	512 - 810
			Sample size	3	529	45

[a] "Season" mean lengths are weighted by the escapement passage in each stratum.

[b] "Grand Total" mean lengths are simple averages of the "Season" mean lengths.