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**PIKMIKTALIK RIVER SALMON ESCAPEMENT
ENUMERATION AND SAMPLING
PROJECT, 2003-2005**

Final Report for Study 04-105

Phase II

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ABSTRACT

Much of the salmon subsistence harvest for the communities of Stebbins and St. Michael occurs on the Pikmiktalik River. The Pikmiktalik River is part of the Yukon Delta National Wildlife Refuge, and is the site of one of few Federal subsistence fisheries in the Norton Sound area. Local residents strongly feel that availability of in- and post-season escapement information would improve management of these fishery resources. Kawerak, Inc., in cooperation with the Stebbins and St Michael IRAs, conducted a salmon escapement enumeration and sampling project on the Pikmiktalik River in 2003, 2004 and 2005. The information collected provided baseline data regarding salmon abundance, run-timing and biological (age, sex, and length) data to the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game. Total estimated escapements in 2003, 2004 and 2005 respectively were 345, 225 and 153 Chinook *Oncorhynchus tshawytscha*; 7,707, 8,051 and 8,821 chum *O. keta*; 13,165, 50,621 and 56,469 pink salmon *O. gorbuscha*. The estimated total return for coho salmon (*O. kisutch*) in 2004 and 2005 was 11,799 and 17,718, however, due to a flooding event in 2004, the estimated return of coho was probably higher. Additionally, a total of 527, 616 and 123 Dolly Varden (*Salvelinus malma*) were counted in 2003, 2004 and 2005 respectively. Finally, the net movement of 915, 514 and 1609 whitefish (*Coregonus* sp.) was recorded in 2003, 2004 2005 respectively. The ratio of chum females to males was a consistent 1:1 in 2003, 2004 and 2005. However, the age class ratios did change substantially during that same period. Age, sex and length data collected from chum salmon indicated that most abundant age class in 2003 was 4-year-olds, which made up 82.8% of chum captured. In 2004, the most abundant age class was 5-year-old chum salmon, which accounted for 47.9% of the total sample and in 2005, 92.8% of the chum run was made up of 4 year old fish. Males were generally longer than females, and older salmon were generally longer than younger ones for both chum and coho salmon. Of the coho sampled in 2004 and 2005, the ratio of females to males was very similar, and the age composition was consistent between years (83.6-83.8% of coho were age 2.1 and 14.3 and 14.8% were age 1.1).

KEY WORDS: Pikmiktalik River, Yukon Delta National Wildlife Refuge, Escapement and Enumeration, chum salmon, *Oncorhynchus keta*, Chinook salmon, *Oncorhynchus tshawytscha*, pink salmon, *Oncorhynchus gorbuscha*, salmon spawning, subsistence.

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INTRODUCTION

Much of Stebbins and St. Michael's subsistence harvest of salmon is on the Pikmiktalik River stocks. However, until 2003 there were no projects to provide estimates of the number of Chinook, chum (summer and fall), pink or coho salmon entering this river to spawn. In Norton Sound, many rivers have had salmon populations crash while under state management. Local residents strongly feel that availability of in and post-season escapement information would improve management of these fishery resources. Currently, the Pikmiktalik River salmon enumeration project is the only project estimating salmon run strength on any river for 115 kilometers, and the amount of time spent enumerating salmon has increased yearly, from 7 weeks in 2003 to over 11 weeks in 2005.

Stebbins Community Association received funding from the Native American Rights Fund to conduct surveys of local salmon systems during August 1995. Mr. Morris J. Coffey was the principal investigator for this work. Ground and aerial surveys to count salmon in the Pikmiktalik and Kogok Rivers were conducted with the use of boats and a helicopter. Test fishing was also done in the southern Norton Sound area for pink salmon. Information was sent to the Alaska Department of Fish and Game, Division of Commercial Fisheries, Area Office in Nome for use in the management of the salmon fisheries. The U.S. Fish and Wildlife Service, National Park Service and Stebbins Community Association conducted a preliminary study (FIS 02-020) in 2002 to assess the feasibility of visually counting salmon and to select possible project sites (Lean et al. 2003). The current salmon escapement enumeration and sampling project began in 2003 and was continued in 2004 and 2005. The goal of this salmon escapement enumeration and sampling project is to obtain daily and annual estimates of salmon entering this system to improve management of important fishery resources for local subsistence users.

OBJECTIVES

The 2003 - 2005 seasons represents all years that Kawerak, Inc. operated a salmon enumeration and sampling project on the Pikmiktalik River. The objectives for the three years were as follows:

- Install tower, weir and flash panel at the counting site.
- Provide daily and total annual estimates of salmon passing the counting site.
- Provide estimates of the age, sex, and length composition of chum and coho (2004 and 2005 only) salmon passing the counting site.
- Record weather and water conditions at the salmon counting site.

METHODS

Weir and tower installation occurred on June 16, 2003, June 18, 2004 and June 21, 2005. In 2003 and 2004, the crews consisted of a Lead Fisheries Technician, two regular Fisheries Technicians and an alternate Fisheries Technician to substitute when other Technicians took time off. In 2005, the crew switched to a 3-week on and 1-week off schedule, which enabled technicians to take scheduled breaks. Counting continued until August 6, 2003, August 31, 2004

and September 7, 2005. The utilized tower site was the preferred location identified by Lean et al. (2003; Figure 1).

Design and Construction

The counting tower apparatus consists of one 15-foot high scaffold tower. The tower had a counting platform at its uppermost level and was fastened to earth anchors for stability. Construction and installation of this prefabricated, commercially available tower conformed to OSHA standards.

A partial diversion weir was constructed according to the standard portable weir design currently used in Norton Sound (Robb 1995) and consisted of steel tripod supports, aluminum stringers and schedule 40 aluminum structural pipe for pickets. To avoid possible toxic effects on fish and aquatic life, galvanized pipe was not used. Picket spacing was approximately 2 5/8" and the weir was held up with a panel of steel fence posts connected with cable and sandbags placed on the river bottom. The panel slightly overlapped the toe of the picket weir and continued in a straight line to the bank on which the tower was placed. Cable clamps were periodically placed along the cable so that the fence posts remained spread out and the panel remained straight.

Installation and Operation

An observer counted salmon from the top of the tower for 20 minutes every hour, twenty four hours a day seven days a week. Numbers of salmon and other fish, by species, were recorded on a hand-tally counter. Salmon and other fishes passing downstream were subtracted from the count. Dead or dying fish drifting downstream past the counting site were not subtracted from 20-minute upstream counts, as they were not likely to swim upstream past the site again. Numbers from the hand tally counter were recorded in a logbook, and, at the end of the counting day, were expanded by 3 to estimate total passage for each hour. The 20-minute counting schedule occurred 24 hours a day, 7 days per week. The expanded daily count was transferred to a daily enumeration sheet and relayed to the Stebbins IRA office via radio the following day. Daily total salmon counts were submitted by radio and satellite phone to the Stebbins IRA office during weekdays and to the Kawerak, Inc. Fisheries Department on weekends. Kawerak, Inc. provided data to Alaska Department of Fish and Game and federal managers for their use and public distribution.

Care was taken to inspect, maintain, and clean debris, including salmon carcasses, from the partial weir on a regular basis. This ensured that fish could not pass through the weir undetected, and that debris load did not cause the weir to fail.

River stage height (cm), meteorological observations, and water temperatures (degrees C) were recorded at 0800 and 2000 hours each day. These data were entered on data sheets kept in a binder in the camp cabin.

Biological Sampling

Biological information was collected for chum and coho salmon. A pulse sampling design was used to collect this information for chum (Molyneaux and DuBois 1999). The sample size goal for each pulse was 200 chum. This sample size was selected so that simultaneous 95% confidence interval estimates of age composition proportions would be no wider than 0.20 (Bromaghin 1993). Recommended sample size was increased 9% to account for unreadable scales. Each pulse sample was used to estimate the age, sex, and length composition of the run for a given temporal stratum. A weighted mean, using the amount of chum salmon passage

during each defined stratum as the weight, was used to estimate age composition of the total season passage. Biological information was also collected from a target sample size of 160 coho salmon. Chum and coho salmon were collected using beach seines. For each salmon sampled, sex was determined from external characteristics, length was measured to the nearest 0.5 cm from the middle of the eye to the fork of the tail, and a scale was collected from left side. To avoid sampling the same salmon again, the adipose fin was removed prior to release.

Length summary statistics (mean, standard error, range) for each salmon species were reported by sampling stratum and age-sex category. The overall season mean was estimated by weighting stratum mean lengths by total passage of each species during that stratum.

Scales were collected from the left side of salmon, approximately two rows above the lateral line in the area crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (INPFC 1963). All scales removed were visually checked for damage and regeneration, and to make sure it was not taken from the lateral line, where scales would have pores or holes. If scales from the preferred area on left side of the salmon were missing, damaged, or regenerated, scales from the preferred area on the right side were collected. If scales could not be collected from the preferred area on either side of the fish, scales as close to the preferred area as possible were collected, and this was noted as “non-preferred scale” on the data sheet. Scales were mounted on gum cards with the insertion pointing down and to the right and the sculptured side facing out. All were initially recorded in a rite-in-the-rain field notebook and then transcribed onto data sheets in a binder kept in the camp cabin.

Scales were sent to Alaska Department of Fish and Game for age determination. Prior to examination, impressions of scales mounted on gum cards were made on cellulose acetate cards using a heated hydraulic press (Clutter and Whitesel 1956). Scale impressions on acetate cards were examined with microfiche readers. Ages were determined by examining scale characteristics (Mosher 1968). European notation was used to record ages (Koo 1962). In this system, a number preceding a decimal point refers to number of freshwater annuli and a number following the decimal refers to number of marine annuli. Total age, from time of egg deposition (often referred to as brood year) to time of capture, was the sum of these numbers plus one.

RESULTS

Chinook Salmon

Chinook salmon migrated past the tower from June 20 to July 27 in 2003, June 22 to July 13, in 2004 and June 21 to August 5 in 2005 (Table 1a, 1b and 1c; Figures 2 and 4). Approximately 50% of the total migration occurred by July 5 in 2003 and 2005 and by June 29 in 2004. The greatest daily passage occurred on July 4 in 2003 (60), June 29 in 2004 (42) and July 6 in 2005 (39). No age, sex or length data was taken from Chinook in 2003, 2004 or 2005.

Chum Salmon

In 2003, 2004 and 2005, salmon enumeration encompassed the entire chum run and counted 7,707, 8,051 and 8,821 chum respectively. The beginning of the chum run varied slightly between 2003 and 2005 with migration starting on June 24 in 2003, June 19 in 2004 and June 21 in 2005. In 2003, chum were counted until the salmon enumeration project ended on August 6, in 2004 the chum run was completed by August 22 and in 2005 it ended on August 14 (Table 1a,

1b, and 1c, Figure 2). Fifty percent of the chum run was complete by July 14 in 2003 and 2005 and by July 11 in 2004.

Totals of 339 (2003), 284 (2004) and 209 (2005) chum salmon had usable scales to sample for age, sex, and length data (Table 2a, 2b and 2c). The ratio of males to females in all years was 1:1. Samples were apportioned between two strata in 2003 and three strata in 2004 and 2005. Sex composition was similar between stratum, with the exception of late run chum in 2004 and 2005. In 2004, 65.2% of the chum sampled between July 19 and August 3 were male and in 2005, 65.3% of chum migrating between July 20 and September 7 were female (Table 2b,c).

Age composition changed substantially between 2003, 2004 and 2005 (Table 2a, 2b and 2c). In 2003, it was determined that 82.8% of the chum return were age-0.3, 16.9% were age-0.4, 0.3% were age-0.5. Composition did not vary significantly between time stratum. In 2004, it was determined that 10.2% of the chum run were age-0.2, 41.5% were age-0.3, 47.9% were age-0.4 and 0.4% were age-0.5. In 2004, it was determined that 10.2% of the chum return was age-0.2, 41.5% was age-0.3, 47.9% was age-0.4 and 0.4% was age-0.5. Age composition was similar whether the data was weighted by strata or un-weighted. In 2005, weighted and un-weighted analysis showed little difference, 1% of the chum return were age-0.2, 92.8% were age-0.3 and 6.2% were age-0.4. Generally, chum salmon length increased with age and males were larger than the females of similar age. The average length of chum was 576.0 mm in 2003, 584.6 mm in 2004 and 562.7 mm in 2005.

Coho Salmon

Coho salmon migrated past the tower from July 26 to August 31 in 2004, which was the end of the project and July 9 to September 7 in 2005 (Table 1a and 1b, Figures 2 and 6). Coho passage was not estimated in 2003. Total estimated passage in 2004 was 11,799 coho salmon and in 2005 it was 17,718 coho salmon. In 2004, the greatest daily passage of 1,206 coho salmon occurred on August 6, and 50% of the total migration occurred by August 13. In 2005, 1,758 coho salmon moved passed the tower on August 13 and 50% of the total migration occurred by August 18. In 2004, a five-day flood event stopped all counting and the camp was shut down due to high murky water. It is believed that coho salmon passage did occur during this period of high water, however that migration is not reflected in the total coho salmon escapement because counting was not possible during this flood. Recorded water depths ranged from 26 to 186 cm over the three seasons. Daily fluctuations in water depth ranged from 10 to 130 cm.

A total of 189 readable coho scales were collected in 2004 and 142 readable scales were collected in 2005. Estimated age composition of the total spawning escapement was 14.3% age-1.1, 83.6% age-2.1 and 2.1% age-3.1 coho salmon in 2004 and 14.8% age-1.1, 83.8% age-2.1 and 1.4% age-3.1 in 2005. Females represented only 28.0% of the total spawning escapement in 2004 and 24.6% in 2005 (Table 3a and 3b). Generally, coho salmon length increased with age. In 2004, mean length of age-1.1 coho salmon was 553.0 mm, age-2.1 was 575 mm, age-3.1 coho salmon was 623 mm. In 2005, the mean length of age-1.1 was 591.9 mm, age 2.1 was 597.4 mm and the one age-3.1 salmon sampled was 620 mm. Males were generally larger than females of similar age.

Pink Salmon

Pink salmon migrated past the tower from June 28 to August 6, 2003, June 20, to August 31, 2004 and June 25, to August 23, 2005 with total escapements of 13,165, 50,621 and 56,469

(Table 1a, 1b and 1c; Figures 2 and 5). Approximately 50% of the total migration occurred by July 14 (2003), July 14 (2004) and July 18 (2005) with greatest daily passage occurring on July 12 (2,439), July 11 (21,210) and July 22 (15,894) of each consecutive year.

Dolly Varden/Whitefish

Dolly Varden and whitefish species were observed moving up- and downstream at the tower site throughout the 2003, 2004 and 2005 seasons (Table 1). The greatest daily passage of Dolly Varden occurred on June 18 in 2003 (129), August 23 in 2004 (106) and June 24 in 2005 (72). The greatest daily passage of whitefish occurred on June 22 in 2003 (495), June 21 in 2004 (882) and June 29 in 2005 (249). Cumulative passage for the 2003, 2004 and 2005 seasons was 527, 616 and 123 Dolly Varden and 915, 514 and 1609 whitefish. In 2005, net movement of whitefish was downstream which wasn't the case in 2003 and 2004 (Table 1a, 1b, 1c).

Environmental Conditions

Water temperature generally increased from the start of the project until mid July in 2003 and 2004. In 2005, water temperature fluctuated throughout the camp operation (Table 4a, 4b and 4c, Figure 7). Recorded water temperature ranged from 9°C to 17°C over the course of the three seasons. Water temperatures measured at 2000 hours were generally higher than those measured at 0800 hours, and daily differences ranged from 0 to 4 °C.

Water depth did not show a strong trend over the course of the project, although depths were always greater at 0800 hours than at 2000 hours due to daily tidal influence at the tower site (Table 4a, 4b and 4c, Figure 8). A one-week period (August 14 - August 21 2004) of heavy rains did cause the river to flood and stopped counting operations due to a washed out partial weir and murky, deep water.

DISCUSSION

The 2005 season represents the third time total estimates of chum, Chinook and pink salmon spawning escapements were obtained for the Pikmiktalik River, and the second time that coho salmon passage on the Pikmiktalik River was obtained. The project was also notable because an Alaska Native organization, Kawerak, Inc., in cooperation with the local tribal government, rather than a government agency, conducted the work during the three seasons the camp has operated. The project also trained and employed local residents as field technicians.

The project documented the entire Chinook and chum salmon runs on the Pikmiktalik River. In 2003, the project began on June 18, which was 2 days before the first Chinook was counted and 6 days before the first chum was observed moving past the tower, and continued until August 6, when numbers of Chinook, chum, and pink salmon were less than 1% of the total run (Figure 4). In 2004, no salmon were observed moving past the counting site when the project began on June 18. The set-up date was 1 day before the first Chinook was observed, 1 day before the first chum was observed, and 2 days before the first pink salmon was observed moving past the tower. On August 31, 2004, the end date for counting for that year, daily numbers of Chinook and chum salmon were less than 1% of their total runs, however coho salmon were still migrating past the tower. In 2005, chum were counted almost immediately after the partial weir was set up on June 21 and enumeration ended when the coho run was less than 1% of the entire run three days in a row. Generally, chum salmon traveled upstream in schools and seemed to be most abundant about 1 to 2 days after large high-tide events. Coho were also found to migrate after large

amounts of precipitation, however coho numbers were generally strong throughout the latter half of the season.

Higher numbers of five-year-old chum may indicate conditions in either the freshwater or marine system that delayed development or growth, and therefore resulted in a higher proportion of chum salmon returning to spawn as 5-year-old fish in 2004. The large numbers of age-0.2 chum salmon in 2004 were an indication of the large run of four-year-old chum salmon that returned in 2005.

Due to a five-day flood event and the fact that the camp was shut down as of August 31 in 2004, total upstream coho salmon passage is most likely underestimated in 2004. Coho salmon were enumerated as they migrated upstream and a proportion was sampled for age, sex and length information in 2004 and 2005. The age composition found in Pikmiktalik River coho salmon is common throughout the region. The large difference in the sex ratio of coho salmon was first thought to be due to potential early run timing of male coho salmon and late run timing of female coho salmon. Coho sex ratios have been found to vary in other locations. For instance, on the Columbia River where sex ratios were 1:1, coho males were found to return earlier in the run (Marr 1943). Some coho sex ratios have been found to have larger male returns throughout the run ranging from 1.2:1 (Logan 1967) to 2.07:1 (Hunter 1949). In 2005, coho were sampled until September 4 when less than 1% of the run was left. It is plausible that the sampling gear used in collecting samples was selecting more males than females, either due to the male's snout getting caught in the seine or the ability of females to move faster.

Whitefish were observed moving past the tower regularly on the Pikmiktalik River. Greater numbers of whitefish were observed moving downstream at the beginning of the season, and were observed in smaller numbers migrating upstream in the last weeks of the project. Although the original proposal did not include enumeration of whitefish, technicians were first trained in counting fish from the tower by observing the movements of the whitefish, which was the only species present when operations began. This data may be useful since whitefish are an important fisheries resource to local communities.

Dolly Varden were also observed passing the tower in 2003, 2004 and 2005. Dolly Varden were sparse throughout the season, with the exception of August 23, 2004 when 106 Dolly Varden migrated upstream past the tower. This migration was observed two days after a major flood event and may have been influenced by the water conditions due to the flood.

The Pikmiktalik River is located in the Yukon Delta National Wildlife Refuge and is the site of one of few Federal managed fisheries in the Norton Sound area. The Pikmiktalik River is an indicator river for regional rivers and streams that feed the people of St. Michael, Stebbins and Kotlik. Unemployment is common in the region and any available harvest is utilized. Without this resource, residents would be more dependant on outside food sources for survival. For these reasons, management should use escapement data from the Pikmiktalik River as a foundation for decisions to ensure sustainability of these salmon runs. Additional years of escapement data will provide abundance trend information as well as some indication of production. The residents of Stebbins and St. Michael have long been concerned with the absence of salmon monitoring on the rivers they use for subsistence fishing. Therefore, they were very pleased with this project on the Pikmiktalik River, and have offered several ideas for future projects, including studies about the effects of beaver on salmon migration.

CONCLUSIONS

Operations in 2003, 2004 and 2005 proved that it is possible to enumerate Chinook, chum, and pink and coho salmon escapement in Pikmiktalik River using a partial diversion weir and counting tower at the selected site. The success of the Pikmiktalik River enumeration project was due to the productive collaboration of Stebbins IRA, St. Michael IRA, and Kawerak, Inc. Stebbins IRA effectively and efficiently administered day-to-day operations of the field camp. This created a positive camp environment for the technicians, who were able to remain focused and ambitious throughout the season and to collect and record highly accurate data. Hiring local residents as field technicians also provided a valuable source of traditional knowledge of the area. Kawerak, Inc. was able to provide the technical and administrative expertise needed for overall planning, operations, data analysis, and reporting.

Without this project, accurate estimates of run size, strength, timing, age composition, sex ratios and lengths would not be known to managers. This information is vital to the successful management of salmon in the southern Norton Sound, salmon that three communities rely on and cannot afford to live without. It is the responsibility of managers to ensure the subsistence resources used by the people of Alaska will be sustainable year after year. The Pikmiktalik River enumeration project is the most effective way of estimating the size, sex composition and age of salmon returning to spawn.

RECOMMENDATIONS

Salmon enumeration studies on the Pikmiktalik River should continue for at least 3 more years to obtain data on abundance and production.

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Table 1a. Expanded daily and cumulative migration of all fish species past the Pikmiktalik River Tower in 2003.

Date 2003	Daily						Cumulative						Cumulative Proportion		
	Chinook	Chum	Pink	Coho	Dolly	Whitefish	Chinook	Chum	Pink	Coho	Dolly	Whitefish	Chinook	Chum	Pink
6/18	0	0	0	0	129	882	0	0	0	0	129	882	0.00	0.00	0.00
6/19	0	0	0	0	75	0	0	0	0	0	204	882	0.00	0.00	0.00
6/20	6	0	0	0	93	-126	6	0	0	0	297	756	0.02	0.00	0.00
6/21	0	0	0	0	24	261	6	0	0	0	321	1017	0.02	0.00	0.00
6/22	0	0	0	0	18	-495	6	0	0	0	339	522	0.02	0.00	0.00
6/23	0	0	0	0	9	30	6	0	0	0	348	552	0.02	0.00	0.00
6/24	3	18	0	0	0	-30	9	18	0	0	348	522	0.03	0.00	0.00
6/25	0	0	0	0	6	-54	9	18	0	0	354	468	0.03	0.00	0.00
6/26	0	0	0	0	6	-39	9	18	0	0	360	429	0.03	0.00	0.00
6/27	-3	0	0	0	-6	-36	6	18	0	0	354	393	0.02	0.00	0.00
6/28	0	6	3	0	6	-114	6	24	3	0	360	279	0.02	0.00	0.00
6/29	0	-3	0	0	0	15	6	21	3	0	360	294	0.02	0.00	0.00
6/30	-6	30	-3	0	-15	6	0	51	0	0	345	300	0.00	0.01	0.00
7/1	6	6	3	0	0	39	6	57	3	0	345	339	0.02	0.01	0.00
7/2	33	117	18	0	6	81	39	174	21	0	351	420	0.11	0.02	0.00
7/3	51	-12	33	0	9	-3	90	162	54	0	360	417	0.26	0.02	0.00
7/4	60	924	1314	0	0	0	150	1086	1368	0	360	417	0.43	0.14	0.10
7/5	21	25	501	0	0	27	171	1111	1869	0	360	444	0.50	0.14	0.14
7/6	9	141	549	0	0	27	180	1252	2418	0	360	471	0.52	0.16	0.18
7/7	6	54	108	0	0	6	186	1306	2526	0	360	477	0.54	0.17	0.19
7/8	0	387	588	0	0	267	186	1693	3114	0	360	744	0.54	0.22	0.24
7/9	0	129	291	0	3	-42	186	1822	3405	0	363	702	0.54	0.24	0.26
7/10	18	39	27	0	0	-15	204	1861	3432	0	363	687	0.59	0.24	0.26
7/11	-3	15	9	0	-9	0	201	1876	3441	0	354	687	0.58	0.24	0.26
7/12	30	1629	2439	0	3	63	231	3505	5880	0	357	750	0.67	0.45	0.45
7/13	3	144	439	0	3	-3	234	3649	6319	0	360	747	0.68	0.47	0.48
7/14	27	231	570	0	3	-9	261	3880	6889	0	363	738	0.76	0.50	0.52
7/15	0	-42	-18	0	2	6	261	3838	6871	0	365	744	0.76	0.50	0.52
7/16	18	282	213	0	9	-21	279	4120	7084	0	374	723	0.81	0.53	0.54
7/17	6	360	565	0	6	0	285	4480	7649	0	380	723	0.83	0.58	0.58
7/18	0	219	891	0	21	84	285	4699	8540	0	401	807	0.83	0.61	0.65
7/19	12	1314	684	0	21	-30	297	6013	9224	0	422	777	0.86	0.78	0.70
7/20	42	243	1089	0	33	36	339	6256	10313	0	455	813	0.98	0.81	0.78
7/21	0	36	321	0	9	-15	339	6292	10634	0	464	798	0.98	0.82	0.81
7/22	0	-12	-78	0	6	6	339	6280	10556	0	470	804	0.98	0.81	0.80
7/23	3	78	408	0	0	-15	342	6358	10964	0	470	789	0.99	0.82	0.83
7/24	0	145	453	0	18	24	342	6503	11417	0	488	813	0.99	0.84	0.87
7/25	0	243	699	0	0	12	342	6746	12116	0	488	825	0.99	0.88	0.92
7/26	0	102	234	0	0	36	342	6848	12350	0	488	861	0.99	0.89	0.94
7/27	3	183	282	0	0	6	345	7031	12632	0	488	867	1.00	0.91	0.96
7/28	0	81	84	0	0	9	345	7112	12716	0	488	876	1.00	0.92	0.97
7/29	0	126	114	6	3	24	345	7238	12830	6	491	900	1.00	0.94	0.97
7/30	0	109	93	9	18	18	345	7347	12923	15	509	918	1.00	0.95	0.98
7/31	0	90	81	0	3	3	345	7437	13004	15	512	921	1.00	0.96	0.99
8/1	0	117	98	3	0	6	345	7554	13102	18	512	927	1.00	0.98	1.00
8/2	0	39	24	0	0	0	345	7593	13126	18	512	927	1.00	0.99	1.00
8/3	0	24	27	33	6	-3	345	7617	13153	51	518	924	1.00	0.99	1.00
8/4	0	36	30	12	0	0	345	7653	13183	63	518	924	1.00	0.99	1.00
8/5	0	0	-9	12	3	0	345	7653	13174	75	521	924	1.00	0.99	1.00
8/6	0	54	-9	12	6	-9	345	7707	13165	87	527	915	1.00	1.00	1.00
TOTAL	345	7,707	13,165	87	527	915	345	7707	13165	87	527	915	1.00	1.00	1.00

Table 1b. Expanded daily and cumulative migration of all fish species past the Pikmiktalik River Tower in 2004.

Date	Daily						Cumulative						Cumulative Proportion			
	Chinook	Chum	Pink	Coho	Dolly	Whitefish	Chinook	Chum	Pink	Coho	Dolly	Whitefish	Chinook	Chum	Pink	Coho
6/18	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00
6/19	9	12	0	0	0	0	9	12	0	0	0	0	0.04	0.00	0.00	0.00
6/20	0	21	42	0	33	-213	9	33	42	0	33	-213	0.04	0.00	0.00	0.00
6/21	0	39	60	0	9	-144	9	72	102	0	42	-357	0.04	0.01	0.00	0.00
6/22	3	21	39	0	21	-93	12	93	141	0	63	-450	0.05	0.01	0.00	0.00
6/23	0	30	66	0	15	-66	12	123	207	0	78	-516	0.05	0.02	0.00	0.00
6/24	12	21	87	0	6	30	24	144	294	0	84	-486	0.11	0.02	0.01	0.00
6/25	6	117	72	0	12	-42	30	261	366	0	96	-528	0.13	0.03	0.01	0.00
6/26	0	6	54	0	3	-18	30	267	420	0	99	-546	0.13	0.03	0.01	0.00
6/27	6	159	297	0	-6	33	36	426	717	0	93	-513	0.16	0.05	0.01	0.00
6/28	30	597	1350	0	15	15	66	1023	2067	0	108	-498	0.29	0.13	0.04	0.00
6/29	42	474	2292	0	15	-51	108	1497	4359	0	123	-549	0.48	0.19	0.09	0.00
6/30	15	210	2262	0	9	-9	123	1707	6621	0	132	-558	0.55	0.21	0.13	0.00
7/1	3	78	984	0	-3	27	126	1785	7605	0	129	-531	0.56	0.22	0.15	0.00
7/2	3	315	2448	0	0	12	129	2100	10053	0	129	-519	0.57	0.26	0.20	0.00
7/3	3	111	849	0	9	-27	132	2211	10902	0	138	-546	0.59	0.27	0.22	0.00
7/4	3	30	237	0	15	3	135	2241	11139	0	153	-543	0.60	0.28	0.22	0.00
7/5	3	141	381	0	39	27	138	2382	11520	0	192	-516	0.61	0.30	0.23	0.00
7/6	24	90	411	0	-39	18	162	2472	11931	0	153	-498	0.72	0.31	0.24	0.00
7/7	12	324	831	0	12	-51	174	2796	12762	0	165	-549	0.77	0.35	0.25	0.00
7/8	6	255	546	0	-6	72	180	3051	13308	0	159	-477	0.80	0.38	0.26	0.00
7/9	3	123	2256	0	-3	6	183	3174	15564	0	156	-471	0.81	0.39	0.31	0.00
7/10	18	372	3003	0	3	72	201	3546	18567	0	159	-399	0.89	0.44	0.37	0.00
7/11	9	258	2643	51	48	12	210	3804	21210	51	207	-387	0.93	0.47	0.42	0.00
7/12	12	567	7518	24	9	36	222	4371	28728	75	216	-351	0.99	0.54	0.57	0.01
7/13	3	87	852	12	9	0	225	4458	29580	87	225	-351	1.00	0.55	0.58	0.01
7/14	0	234	85	0	9	48	225	4692	29665	87	234	-303	1.00	0.58	0.59	0.01
7/15	0	744	4899	0	3	3	225	5436	34564	87	237	-300	1.00	0.68	0.68	0.01
7/16	0	80	1446	9	0	18	225	5516	36010	96	237	-282	1.00	0.69	0.71	0.01
7/17	0	-48	813	0	0	21	225	5468	36823	96	237	-261	1.00	0.68	0.73	0.01
7/18	0	25	2046	16	0	21	225	5493	38869	112	237	-240	1.00	0.68	0.77	0.01
7/19	0	84	402	12	3	51	225	5577	39271	124	240	-189	1.00	0.69	0.78	0.01
7/20	0	162	1251	6	0	7	225	5739	40522	130	240	-182	1.00	0.71	0.80	0.01
7/21	0	195	1245	0	33	12	225	5934	41767	130	273	-170	1.00	0.74	0.83	0.01
7/22	0	165	936	3	0	15	225	6099	42703	133	273	-155	1.00	0.76	0.84	0.01
7/23	0	120	567	3	15	3	225	6219	43270	136	288	-152	1.00	0.77	0.85	0.01
7/24	0	357	1749	0	6	27	225	6576	45019	136	294	-125	1.00	0.82	0.89	0.01
7/25	0	168	1935	0	-3	45	225	6744	46954	136	291	-80	1.00	0.84	0.93	0.01
7/26	0	51	660	3	0	9	225	6795	47614	139	291	-71	1.00	0.84	0.94	0.01
7/27	0	15	114	9	0	-6	225	6810	47728	148	291	-77	1.00	0.85	0.94	0.01
7/28	0	78	294	45	18	9	225	6888	48022	193	309	-68	1.00	0.86	0.95	0.02
7/29	0	75	216	12	12	45	225	6963	48238	205	321	-23	1.00	0.86	0.95	0.02
7/30	0	108	405	39	3	57	225	7071	48643	244	324	34	1.00	0.88	0.96	0.02
7/31	0	42	114	36	30	-30	225	7113	48757	280	354	4	1.00	0.88	0.96	0.02
8/1	0	42	207	54	12	6	225	7155	48964	334	366	10	1.00	0.89	0.97	0.03
8/2	0	60	117	33	9	39	225	7215	49081	367	375	49	1.00	0.90	0.97	0.03
8/3	0	57	120	150	9	18	225	7272	49201	517	384	67	1.00	0.90	0.97	0.04
8/4	0	51	123	66	-3	-27	225	7323	49324	583	381	40	1.00	0.91	0.97	0.05
8/5	0	99	75	252	15	-27	225	7422	49399	835	396	13	1.00	0.92	0.98	0.07
8/6	0	120	162	939	21	21	225	7542	49561	1774	417	34	1.00	0.94	0.98	0.15
8/7	0	24	96	173	18	-33	225	7566	49657	1947	435	1	1.00	0.94	0.98	0.17
8/8	0	9	81	252	0	-6	225	7575	49738	2199	435	-5	1.00	0.94	0.98	0.19
8/9	0	87	180	282	18	33	225	7662	49918	2481	453	28	1.00	0.95	0.99	0.21
8/10	0	126	180	826	0	33	225	7788	50098	3307	453	61	1.00	0.97	0.99	0.28
8/11	0	36	114	582	0	-15	225	7824	50212	3889	453	46	1.00	0.97	0.99	0.33
8/12	0	36	177	1206	3	39	225	7860	50389	5095	456	85	1.00	0.98	1.00	0.43

Table 1b continued

Date	Daily						Cumulative						Cumulative Proportion			
	Chinook	Chum	Pink	Coho	Dolly	Whitefish	Chinook	Chum	Pink	Coho	Dolly	Whitefish	Chinook	Chum	Pink	Coho
8/13	0	6	84	747	6	36	225	7866	50473	5842	462	121	1.00	0.98	1.00	0.50
8/14	-	-	-	-	-	-	225	7866	50473	5842	462	121	1.00	0.98	1.00	0.50
8/15	-	-	-	-	-	-	225	7866	50473	5842	462	121	1.00	0.98	1.00	0.50
8/16	-	-	-	-	-	-	225	7866	50473	5842	462	121	1.00	0.98	1.00	0.50
8/17	-	-	-	-	-	-	225	7866	50473	5842	462	121	1.00	0.98	1.00	0.50
8/18	-	-	-	-	-	-	225	7866	50473	5842	462	121	1.00	0.98	1.00	0.50
8/19	-	-	-	-	-	-	225	7866	50473	5842	462	121	1.00	0.98	1.00	0.50
8/20	-	-	-	-	-	-	225	7866	50473	5842	462	121	1.00	0.98	1.00	0.50
8/21	0	93	0	507	0	72	225	7959	50473	6349	462	193	1.00	0.99	1.00	0.54
8/22	0	50	12	1113	9	72	225	8009	50485	7462	471	265	1.00	0.99	1.00	0.63
8/23	0	18	24	853	106	24	225	8027	50509	8315	577	289	1.00	1.00	1.00	0.70
8/24	0	9	0	577	3	96	225	8036	50509	8892	580	385	1.00	1.00	1.00	0.75
8/25	0	0	6	307	6	21	225	8036	50515	9199	586	406	1.00	1.00	1.00	0.78
8/26	0	3	16	122	12	30	225	8039	50531	9321	598	436	1.00	1.00	1.00	0.79
8/27	0	0	15	504	6	15	225	8039	50546	9825	604	451	1.00	1.00	1.00	0.83
8/28	0	0	6	813	9	9	225	8039	50552	10638	613	460	1.00	1.00	1.00	0.90
8/29	0	0	12	477	0	30	225	8039	50564	11115	613	490	1.00	1.00	1.00	0.94
8/30	0	6	27	327	0	15	225	8045	50591	11442	613	505	1.00	1.00	1.00	0.97
8/31	0	6	30	357	3	9	225	8051	50621	11799	616	514	1.00	1.00	1.00	1.00
Total	225	8051	50621	11799	616	514	225	8051	50621	11799	616	514	1.00	1.00	1.00	1.00

Table 1c. Expanded daily and cumulative migration of all fish species past the Pikmiktalik River Tower in 2005.

Date	Daily						Cumulative						Cumulative Proportion			
	Chinook	Chum	Pink	Coho	Dolly	Whitefish	Chinook	Chum	Pink	Coho	Dolly	Whitefish	Chinook	Chum	Pink	Coho
6/21	3	3	0	0	0	-39	3	3	0	0	0	-39	0.02	0.00	0.00	0.00
6/22	0	0	0	0	-89	-134	3	3	0	0	-89	-173	0.02	0.00	0.00	0.00
6/23	3	0	0	0	-52	-100	6	3	0	0	-141	-273	0.04	0.00	0.00	0.00
6/24	0	0	0	0	-72	-297	6	3	0	0	-213	-570	0.04	0.00	0.00	0.00
6/25	0	27	6	0	24	-102	6	30	6	0	-189	-672	0.04	0.00	0.00	0.00
6/26	0	0	0	0	18	-96	6	30	6	0	-171	-768	0.04	0.00	0.00	0.00
6/27	0	6	0	0	-21	-75	6	36	6	0	-192	-843	0.04	0.00	0.00	0.00
6/28	0	6	0	0	-12	-69	6	42	6	0	-204	-912	0.04	0.00	0.00	0.00
6/29	0	12	9	0	18	-249	6	54	15	0	-186	-1161	0.04	0.01	0.00	0.00
6/30	0	6	3	0	6	-129	6	60	18	0	-180	-1290	0.04	0.01	0.00	0.00
7/1	0	12	0	0	-3	-6	6	72	18	0	-183	-1296	0.04	0.01	0.00	0.00
7/2	27	1368	48	0	9	9	33	1440	66	0	-174	-1287	0.21	0.16	0.00	0.00
7/3	6	330	168	0	12	30	39	1770	234	0	-162	-1257	0.25	0.20	0.00	0.00
7/4	30	834	90	0	3	-10	69	2604	324	0	-159	-1267	0.44	0.29	0.01	0.00
7/5	12	723	219	0	15	69	81	3327	543	0	-144	-1198	0.52	0.38	0.01	0.00
7/6	39	474	666	0	0	12	120	3801	1209	0	-144	-1186	0.77	0.43	0.02	0.00
7/7	27	216	291	0	0	24	147	4017	1500	0	-144	-1162	0.94	0.45	0.03	0.00
7/8	3	30	840	0	0	24	150	4047	2340	0	-144	-1138	0.96	0.46	0.04	0.00
7/9	-6	-108	117	27	3	-51	144	3939	2457	27	-141	-1189	0.92	0.45	0.04	0.00
7/10	-3	120	1140	6	0	0	141	4059	3597	33	-141	-1189	0.90	0.46	0.06	0.00
7/11	0	-9	-90	24	0	12	141	4050	3507	57	-141	-1177	0.90	0.46	0.06	0.00
7/12	0	25	933	12	3	21	141	4075	4440	69	-138	-1156	0.90	0.46	0.08	0.00
7/13	0	162	3324	57	36	21	141	4237	7764	126	-102	-1135	0.90	0.48	0.14	0.01
7/14	0	111	5247	3	0	-42	141	4348	13011	129	-102	-1177	0.90	0.49	0.23	0.01
7/15	0	765	7905	6	42	0	141	5113	20916	135	-60	-1177	0.90	0.58	0.37	0.01
7/16	0	453	1818	0	0	21	141	5566	22734	135	-60	-1156	0.90	0.63	0.40	0.01
7/17	0	378	4428	30	9	9	141	5944	27162	165	-51	-1147	0.90	0.67	0.48	0.01
7/18	0	102	1494	6	0	-12	141	6046	28656	171	-51	-1159	0.90	0.68	0.51	0.01
7/19	0	51	251	9	15	-18	141	6097	28907	180	-36	-1177	0.90	0.69	0.51	0.01
7/20	0	510	1863	6	3	15	141	6607	30770	186	-33	-1162	0.90	0.75	0.54	0.01
7/21	0	330	5103	36	0	9	141	6937	35873	222	-33	-1153	0.90	0.78	0.64	0.01
7/22	0	897	15894	180	0	6	141	7834	51767	402	-33	-1147	0.90	0.89	0.92	0.02
7/23	0	144	1593	12	3	-6	141	7978	53360	414	-30	-1153	0.90	0.90	0.94	0.02
7/24	0	42	864	12	0	-3	141	8020	54224	426	-30	-1156	0.90	0.91	0.96	0.02
7/25	3	6	261	3	0	-3	144	8026	54485	429	-30	-1159	0.92	0.91	0.96	0.02
7/26	0	12	87	3	0	12	144	8038	54572	432	-30	-1147	0.92	0.91	0.97	0.02
7/27	0	63	114	6	0	15	144	8101	54686	438	-30	-1132	0.92	0.92	0.97	0.02
7/28	3	6	61	3	0	3	147	8107	54747	441	-30	-1129	0.94	0.92	0.97	0.02
7/29	0	147	495	45	12	12	147	8254	55242	486	-18	-1117	0.94	0.93	0.98	0.03
7/30	0	21	45	15	12	-15	147	8275	55287	501	-6	-1132	0.94	0.93	0.98	0.03
7/31	0	42	312	48	0	-9	147	8317	55599	549	-6	-1141	0.94	0.94	0.98	0.03
8/1	0	75	120	45	6	3	147	8392	55719	594	0	-1138	0.94	0.95	0.99	0.03
8/2	0	105	327	78	6	-66	147	8497	56046	672	6	-1204	0.94	0.96	0.99	0.04
8/3	0	36	72	66	6	6	147	8533	56118	738	12	-1198	0.94	0.96	0.99	0.04
8/4	0	27	81	66	6	-45	147	8560	56199	804	18	-1243	0.94	0.97	1.00	0.05
8/5	9	12	18	18	0	-12	156	8572	56217	822	18	-1255	1.00	0.97	1.00	0.05
8/6	0	30	66	90	0	12	156	8602	56283	912	18	-1243	1.00	0.97	1.00	0.05
8/7	0	33	24	78	3	-12	156	8635	56307	990	21	-1255	1.00	0.98	1.00	0.06
8/8	0	-12	30	18	12	-24	156	8623	56337	1008	33	-1279	1.00	0.97	1.00	0.06
8/9	0	27	36	102	3	-48	156	8650	56373	1110	36	-1327	1.00	0.98	1.00	0.06
8/10	0	21	96	375	3	72	156	8671	56469	1485	39	-1255	1.00	0.98	1.00	0.08
8/11	0	18	27	294	3	6	156	8689	56496	1779	42	-1249	1.00	0.98	1.00	0.10
8/12	0	48	0	1641	15	9	156	8737	56496	3420	57	-1240	1.00	0.99	1.00	0.19
8/13	0	51	-6	1758	21	9	156	8788	56490	5178	78	-1231	1.00	0.99	1.00	0.29
8/14	0	24	3	1197	9	12	156	8812	56493	6375	87	-1219	1.00	1.00	1.00	0.36
8/15	0	18	-24	255	9	0	156	8830	56469	6630	96	-1219	1.00	1.00	1.00	0.37
8/16	0	12	-3	1146	0	-66	156	8842	56466	7776	96	-1285	1.00	1.00	1.00	0.44
8/17	0	6	3	393	0	-24	156	8848	56469	8169	96	-1309	1.00	1.00	1.00	0.46
8/18	0	3	9	1299	0	-45	156	8851	56478	9468	96	-1354	1.00	1.00	1.00	0.53
8/19	0	0	-3	1059	0	-21	156	8851	56475	10527	96	-1375	1.00	1.00	1.00	0.59
8/20	0	0	-6	972	0	-12	156	8851	56469	11499	96	-1387	1.00	1.00	1.00	0.65
8/21	0	-3	3	489	0	-18	156	8848	56472	11988	96	-1405	1.00	1.00	1.00	0.68
8/22	-3	-3	-3	1362	0	-12	153	8845	56469	13350	96	-1417	1.00	1.00	1.00	0.75
8/23	0	-3	3	576	0	-6	153	8842	56472	13926	96	-1423	1.00	1.00	1.00	0.79
8/24	0	0	0	114	0	3	153	8842	56472	14040	96	-1420	1.00	1.00	1.00	0.79

Table 1c continued

Date	Daily						Cumulative						Cumulative Proportion			
	Chinook	Chum	Pink	Coho	Dolly	Whitefish	Chinook	Chum	Pink	Coho	Dolly	Whitefish	Chinook	Chum	Pink	Coho
8/25	0	0	0	294	0	-33	153	8842	56472	14334	96	-1453	1.00	1.00	1.00	0.81
8/26	0	0	0	456	6	-3	153	8842	56472	14790	102	-1456	1.00	1.00	1.00	0.83
8/27	0	-6	0	258	6	-33	153	8836	56472	15048	108	-1489	1.00	1.00	1.00	0.85
8/28	0	0	0	144	3	6	153	8836	56472	15192	111	-1483	1.00	1.00	1.00	0.86
8/29	0	-9	-3	291	12	-54	153	8827	56469	15483	123	-1537	1.00	1.00	1.00	0.87
8/30	0	0	0	921	0	6	153	8827	56469	16404	123	-1531	1.00	1.00	1.00	0.93
8/31	0	0	0	-33	0	0	153	8827	56469	16371	123	-1531	1.00	1.00	1.00	0.92
9/2	0	-3	0	141	0	-24	153	8824	56469	16512	123	-1555	1.00	1.00	1.00	0.93
9/3	0	0	0	234	0	0	153	8824	56469	16746	123	-1555	1.00	1.00	1.00	0.94
9/4	0	0	0	666	0	3	153	8824	56469	17412	123	-1552	1.00	1.00	1.00	0.98
9/5	0	0	0	168	0	-36	153	8824	56469	17580	123	-1588	1.00	1.00	1.00	0.99
9/6	0	0	0	147	0	-18	153	8824	56469	17727	123	-1606	1.00	1.00	1.00	1.00
9/7	0	0	0	-9	0	-3	153	8824	56469	17718	123	-1609	1.00	1.00	1.00	1.00
Total	153	8824	56469	17718	123	-1609	153	8824	56469	17718	123	-1609	1.00	1.00	1.00	1.00

Table 2a. Age, sex, and length of chum salmon sampled, and estimated contribution to escapement Píkmíktalik River, 2003.

		Brood Year and Age Group ^a			Total
		1999	1998	1997	
		0.3	0.4	0.5	
Stratum Dates:	6/18 - 7/7				
Sampling Dates:	6/27 - 7/7				
Samle Size	192				
Female	Percent of Sample	38	12	0	50.0
	Number in Escapement	496	157	0	653
	Average Length	558	575	-	562
Male	Percent of Sample	39	11	0	50.0
	Number in Escapement	509	144	0	653
	Average Length	595	608	-	598
Total	Percent of Sample	77	23	0	100.0
	Number in Escapement	1006	300	0	1306
	Average Length	577	592	-	580
Stratum Dates:	7/8 - 8/6				
Sampling Dates:	7/15 - 8/4				
Samle Size	147				
Female	Percent of Sample	48	4	0	52.0
	Number in Escapement	3072	256	0	3329
	Average Length	558	570	-	559
Male	Percent of Sample	43	4	1	48.0
	Number in Escapement	2752	256	64	3072
	Average Length	583	605	610	584
Total	Percent of Sample	91	8	1	100.0
	Number in Escapement	5825	512	64	6401
	Average Length	570	588	610	572
Stratum Dates:	Season (Weighted by Strata)				
Samle Size	339				
Female	Percent of Sample	46.3	5.4	0.0	51.7
	Number in Escapement	3569	413	0	3982
	Average Length	558	574	0	560
Male	Percent of Sample	42.3	5.2	0.8	48.3
	Number in Escapement	3262	400	64	3725
	Average Length	590	608	610	593
Total	Percent of Sample	88.6	10.5	0.8	100.0
	Number in Escapement	6831	812	64	7707
	Average Length	573	591	610	576.0
Stratum Dates:	Season (Un-weighted)				
Samle Size	339				
Female	Percent of Sample	42.6	8.6	0	51.2
	Number in Escapement	3283	663	0	3946
Male	Percent of Sample	40.2	8.3	0.3	48.8
	Number in Escapement	3098	640	23	3761
Total	Percent of Sample	82.8	16.9	0.3	100.0
	Number in Escapement	6381	1302	23	7707

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

Table 2b. Age, sex, and length of chum salmon sampled, and estimated contribution to escapement, Pikmiktalik River, 2004.

		Brood Year and Age Group				
		<u>2001</u>	<u>2000</u>	<u>1999</u>	<u>1998</u>	Total
		0.2	0.3	0.4	0.5	
Sampling Date(s):	6/29-7/06					
Sample Size:	162					
Male	Percent of Sample	2.5	22.8	19.8	0.6	45.7
	Number in Escapement	61	565	488	15	1129
	Average Length (mm)	547.5	599.0	623.8	580.0	606.3
Female	Percent of Sample	4.3	21.6	28.4	0.0	54.3
	Number in Escapement	107	534	702	0	1343
	Average Length (mm)	520.0	555.4	567.6	-	558.7
Total	Percent of Sample	6.8	44.4	48.1	0.6	100.0
	Number in Escapement	168	1099	1190	15	2472
	Average Length (mm)	530.0	578.1	590.6	580.0	580.8
Sampling Date(s):	7/11-7/15					
Sample Size:	76					
Male	Percent of Sample	6.6	19.7	25.0	0.0	51.3
	Number in Escapement	195	585	741	0	1521
	Average Length (mm)	566.0	600.7	613.7	-	603.8
Female	Percent of Sample	11.8	14.5	22.4	0.0	48.7
	Number in Escapement	351	429	663	0	1443
	Average Length (mm)	532.8	546.4	575.3	-	555.5
Total	Percent of Sample	18.4	34.2	47.4	0.0	100.0
	Number in Escapement	546	1014	1404	0	2964
	Average Length (mm)	544.6	577.9	595.6	-	580.5
Sampling Date(s):	7/19-8/03					
Sample Size:	46					
Male	Percent of Sample	8.7	26.1	30.4	0.0	65.2
	Number in Escapement	227	682	796	0	1705
	Average Length (mm)	535.0	601.7	616.4	-	599.1
Female	Percent of Sample	0.0	17.4	17.4	0.0	34.8
	Number in Escapement	0	455	455	0	910
	Average Length (mm)	0.0	548.8	570.0	-	556.5
Total	Percent of Sample	8.7	43.5	47.8	0.0	100.0
	Number in Escapement	227	1137	1251	0	2615
	Average Length (mm)	535.0	580.5	599.5	-	584.6

Table 2b. Continued

		Brood Year and Age Group				Total
		<u>2001</u>	<u>2000</u>	<u>1999</u>	<u>1998</u>	
		0.2	0.3	0.4	0.5	
Sampling Date(s):	Season (Weighted by Strata)	Season Total				
Sample Size:	284					
Male	Percent of Sample	6.0	22.8	25.2	0.2	54.1
	Number in Escapement	483	1832	2025	15	4356
	Average Length (mm)	550.8	600.2	619.2	580.0	604.1
Female	Percent of Sample	5.7	17.6	22.6	0.0	45.9
	Number in Escapement	458	1418	1820	0	3695
	Average Length (mm)	527.2	552.6	569.7	-	557.6
Total	Percent of Sample	11.7	40.4	47.8	0.2	100.0
	Number in Escapement	941	3250	3845	15	8051
	Average Length (mm)	537.8	578.4	593.4	580.0	581.3
Sampling Date(s):	Season (Un-weighted)	Season Total				
Sample Size:	284					
Male	percent of sample	4.6	22.5	22.9	0.4	50.4
	Number in Escapement	369	1814	1843	28	4054
Female	percent of sample	5.6	19.0	25.0	0.0	49.6
	Number in Escapement	454	1531	2013	0	3997
Total	percent of sample	10.2	41.5	47.9	0.4	100.0
	Number in Escapement	822	3345	3855	28	8051

Table 2c. Age, sex, and length of chum salmon sampled, and estimated contribution to escapement, Pikmiktalik River, 2005.

		Brood Year and Age Group			
		<u>2002</u>	<u>2001</u>	<u>2000</u>	Total
		0.2	0.3	0.4	
Sampling Date(s):	6/21-7/9				
Sample Size:	72				
Male	Percent of Sample	0.0	59.7	5.6	65.3
	Number in Escapement	0	2352	221	2572
	Average Length (mm)	-	597.4	592.5	597.0
Female	Percent of Sample	0.0	31.9	2.8	34.7
	Number in Escapement	0	1257	110	1367
	Average Length (mm)	-	544.3	555.0	545.2
Total	Percent of Sample	0.0	91.6	8.4	100.0
	Number in Escapement	0	3608	331	3939
	Average Length (mm)	-	578.9	580.0	579.0
Sampling Date(s):	7/10-7/19				
Sample Size:	51				
Male	Percent of Sample	0.0	47.1	3.9	51.0
	Number in Escapement	0	1016	84	1101
	Average Length (mm)	-	600.7	613.7	603.8
Female	Percent of Sample	0.0	43.1	5.9	49.0
	Number in Escapement	0	930	127	1057
	Average Length (mm)	-	530.9	540.0	532.0
Total	Percent of Sample	0.0	90.2	9.8	100.0
	Number in Escapement	0	1947	211	2158
	Average Length (mm)	-	556.3	548.0	555.5
Sampling Date(s):	7/20-9/07				
Sample Size:	86				
Male	Percent of Sample	0.0	32.6	0.0	32.6
	Number in Escapement	0	887	0	887
	Average Length (mm)	-	588.9	-	588.9
Female	Percent of Sample	2.3	62.8	2.3	67.4
	Number in Escapement	63	1710	63	1837
	Average Length (mm)	560.0	548.7	575.0	550.0
Total	Percent of Sample	2.3	95.3	2.3	100.0
	Number in Escapement	63	2597	63	2724
	Average Length (mm)	560.0	566.6	575.0	562.7

Table 2c. Continued

		Brood Year and Age Group			
		<u>2002</u>	<u>2001</u>	<u>2000</u>	Total
		0.2	0.3	0.4	
Sampling Date(s):	Season (Weighted by Strata)	Season Total			
Sample Size:	284				
Male	Percent of Sample	0.0	48.2	3.5	51.7
	Number in Escapement	0	4255	305	4560
	Average Length (mm)	-	590.4	581.7	589.9
Female	Percent of Sample	0.0	44.2	3.4	48.3
	Number in Escapement	0	3897	301	4261
	Average Length (mm)	-	543.4	554.3	544.4
Total	Percent of Sample	0.0	92.4	6.9	100.0
	Number in Escapement	0	8152	606	8821
	Average Length (mm)	-	566.3	566.9	566.3
Sampling Date(s):	Season (Un-weighted)	Season Total			
Sample Size:	209				
Male	Percent of Sample	0.0	45.5	2.9	48.3
	Number in Escapement	0	4010	253	4263
Female	Percent of Sample	1.0	47.4	3.3	51.7
	Number in Escapement	84	4178	295	4558
Total	Percent of Sample	1.0	92.8	6.2	100.0
	Number in Escapement	84	8188	549	8821

Table 3a. Age, sex, and length of coho salmon sampled, and estimated contribution to escapement, Pikmiktalik River, 2004.

		Brood Year and Age Group			Total
		<u>2001</u>	<u>2000</u>	<u>1999</u>	
		1.1	2.1	3.1	
Sampling Dates:	8/03-8/30				
Sample Size:	189				
Male	Percent of Sample	10.1	59.8	2.1	72.0
	Number in Escapement	1186	7054	250	8490
	Average Length (mm)	550.0	577.3	622.5	574.8
Female	Percent of Sample	4.2	23.8	0.0	28.0
	Number in Escapement	499	2809	0	3309
	Average Length (mm)	560.0	569.6	-	568.1
Total	Percent of Sample	14.3	83.6	2.1	100.0
	Number in Escapement	1686	9864	250	11799
	Average Length (mm)	553.0	575.1	622.5	572.9

Table 3b. Age, sex, and length of coho salmon sampled, and estimated contribution to escapement, Pikmiktalik River, 2005.

		Brood Year and Age Group			Total
		<u>2002</u>	<u>2001</u>	<u>2000</u>	
		1.1	2.1	3.1	
Sampling Dates:	7/18-9/05				
Sample Size:	142				
Male	Percent of Sample	12.7	61.3	1.4	75.4
	Number in Escapement	2263	10922	249	13434
	Average Length (mm)	592.8	601.8	620.0	600.7
Female	Percent of Sample	2.1	22.5	0.0	24.6
	Number in Escapement	374	4009	0	4383
	Average Length (mm)	586.7	585.3	-	585.4
Total	Percent of Sample	14.8	83.8	1.4	100.0
	Number in Escapement	2637	14931	249	17817
	Average Length (mm)	591.9	597.4	620.0	596.9

Note: Coho were not counted in 2003.

Table 4a. Daily water temperature and water depth taken at 0800 and 2000 hours, at the Pikmiktalik River, 2003.

Date	Water Temp (°C)		Gage (cm)		Date	Water Temp (°C)		Gage (cm)	
	AM	PM	AM	PM		AM	PM	AM	PM
6/18	-	-	-	-	7/13	14	17	135	28
6/19	-	-	-	-	7/14	14	16	140	28
6/20	11	11			7/15	11	13	100	28
6/21	-	-	77	28	7/16	10	13	67	30
6/22	-	-	77	30	7/17	9	14	86	28
6/23	-	-	53	34	7/18	11	16	59	28
6/24	-	-	60	36	7/19	13	17	110	27
6/25	-	-	80	36	7/20	13	16	90	27
6/26	-	-	110	35	7/21	13	12	90	26
6/27	12	14	108	33	7/22	11	13	92	26
6/28	11	13	100	31	7/23	12	13	118	28
6/29	12	12	160	30	7/24	13	15	119	24
6/30	11	12	126	32	7/25	13	15	110	31
7/1	10	12	150	34	7/26	12	12	140	30
7/2	12	14	140	35	7/27	11	13	138	33
7/3	11	12	154	75	7/28	9	14	87	35
7/4	11	12	112	34	7/29	13	12	100	40
7/5	12	12	115	32	7/30	11	12	140	40
7/6	11	12	73	32	7/31	9	13	80	40
7/7	10	14	67	30	8/1	10	12	66	38
7/8	12	15	47	30	8/2	11	11	57	36
7/9	13	14	61	30	8/3	10	11	50	34
7/10	11	13	117	28	8/4	10	11	46	36
7/11	11	14	106	28	8/5	9	12	78	36
7/12	12	16	120	28	8/6	10	-	70	-

Table 4b. Daily water temperature and depth taken at 0800 and 2000 hours at Pikmiktalik River, 2004.

Date	Temperature (°C)		Depth (cm)		Date	Temperature (°C)		Depth (cm)	
	AM	PM	AM	PM		AM	PM	AM	PM
6/18	-	-	-	-	7/26	14	14	60	32
6/19	-	-	-	-	7/27	13	14	74	32
6/20	11	14	125	40	7/28	13	14	117	36
6/21	12	13	107	40	7/29	13	16	130	36
6/22	11	11	115	40	7/30	14	16	122	36
6/23	10	11	85	42	7/31	15	15	164	37
6/24	9	11	89	53	8/1	14	13	171	36
6/25	10	12	68	90	8/2	12	14	119	35
6/26	-	-	-	-	8/3	13	14	96	34
6/27	12	16	68	44	8/4	13	15	58	35
6/28	13	17	60	42	8/5	12	16	36	36
6/29	14	16	111	40	8/6	12	16	36	32
6/30	12	14	104	40	8/7	13	13	60	32
7/1	12	12	141	40	8/8	12	13	60	46
7/2	12	13	124	40	8/9	13	14	81	37
7/3	12	13	124	40	8/10	12	16	47	38
7/4	12	13	120	40	8/11	13	15	97	42
7/5	12	15	80	40	8/12	13	13	104	43
7/6	12	14	59	38	8/13	13	14	153	65
7/7	10	14	64	39	8/14	13	13	175	93
7/8	12	13	37	30	8/15	-	-	-	-
7/9	12	16	43	35	8/16	-	-	-	-
7/10	12	16	54	34	8/17	-	-	-	-
7/11	13	17	89	31	8/18	-	-	-	-
7/12	13	17	100	36	8/19	-	-	-	-
7/13	15	17	115	30	8/20	-	-	-	-
7/14	14	17	144	33	8/21	13	15	63	75
7/15	14	15	138	34	8/22	13	15	50	50
7/16	15	15	138	32	8/23	12	15	59	45
7/17	14	15	155	32	8/24	12	15	65	45
7/18	14	15	137	35	8/25	12	14	80	45
7/19	14	17	90	36	8/26	11	12	73	45
7/20	14	15	100	35	8/27	10	12	50	45
7/21	13	17	70	35	8/28	9	11	78	43
7/22	14	16	70	30	8/29	10	11	80	42
7/23	14	16	57	30	8/30	10	12	80	39
7/24	13	17	59	32	8/31	10	11	83	38
7/25	14	17	66	32					

Table 4c. Daily water temperature and depth taken at 0800 and 2000 hours at Pikmiktalik River, 2005.

Date	Temperature (°C)		Depth (cm)		Date	Temperature (°C)		Depth (cm)	
	AM	PM	AM	PM		AM	PM	AM	PM
6/21	10	12	110	48	7/31	13	15	97	26
6/22	10	14	109	44	8/1	14	15	119	27
6/23	10	14	110	43	8/2	15	16	117	29
6/24	10	14	110	43	8/3	14	15	118	26
6/25	11	15	80	43	8/4	14	15	119	26
6/26	11	15	57	41	8/5	13	14	170	26
6/27	12	15	40	40	8/6	13	14	166	48
6/28	12	16	40	40	8/7	13	14	186	33
6/29	12	15	44	47	8/8	12	14	98	26
6/30	11	13	68	47	8/9	14	17	110	28
7/1	11	13	91	37	8/10	14	13	83	26
7/2	11	15	109	38	8/11	13	14	80	26
7/3	11	15	105	37	8/12	13	16	87	26
7/4	12	17	120	37	8/13	14	16	73	26
7/5	12	16	113	37	8/14	15	15	90	27
7/6	12	15	140	36	8/15	13	15	100	27
7/7	12	14	138	33	8/16	13	15	96	27
7/8	12	12	120	33	8/17	16	14	122	27
7/9	11	13	120	33	8/18	14	14	120	27
7/10	10	12	103	38	8/19	15	-	130	26
7/11	10	12	98	33	8/20	-	-	124	26
7/12	11	11	69	33	8/21	-	-	138	28
7/13	10	14	60	30	8/22	-	-	62	29
7/14	12	15	60	30	8/23	-	-	118	26
7/15	12	15	58	30	8/24	-	-	118	44
7/16	14	15	52	30	8/25	-	-	42	50
7/17	13	14	58	30	8/26	16	14	32	26
7/18	12	12	128	30	8/27	10	10	70	32
7/19	11	14	129	29	8/28	10	11	60	59
7/20	12	14	126	29	8/29	10	11	77	36
7/21	13	16	122	30	8/30	10	12	86	45
7/22	14	16	140	30	8/31	10	12	80	40
7/23	14	17	123	30	9/1	9	11	90	57
7/24	13	17	122	29	9/2	10	10	104	40
7/25	14	17	107	30	9/3	9	10	79	43
7/26	14	16	48	30	9/4	9	10	90	46
7/27	13	17	31	33	9/5	9	10	60	48
7/28	14	17	107	30	9/6	10	10	43	40
7/29	13	14	39	36	9/7	10	9	110	41
7/30	13	13	67	26					

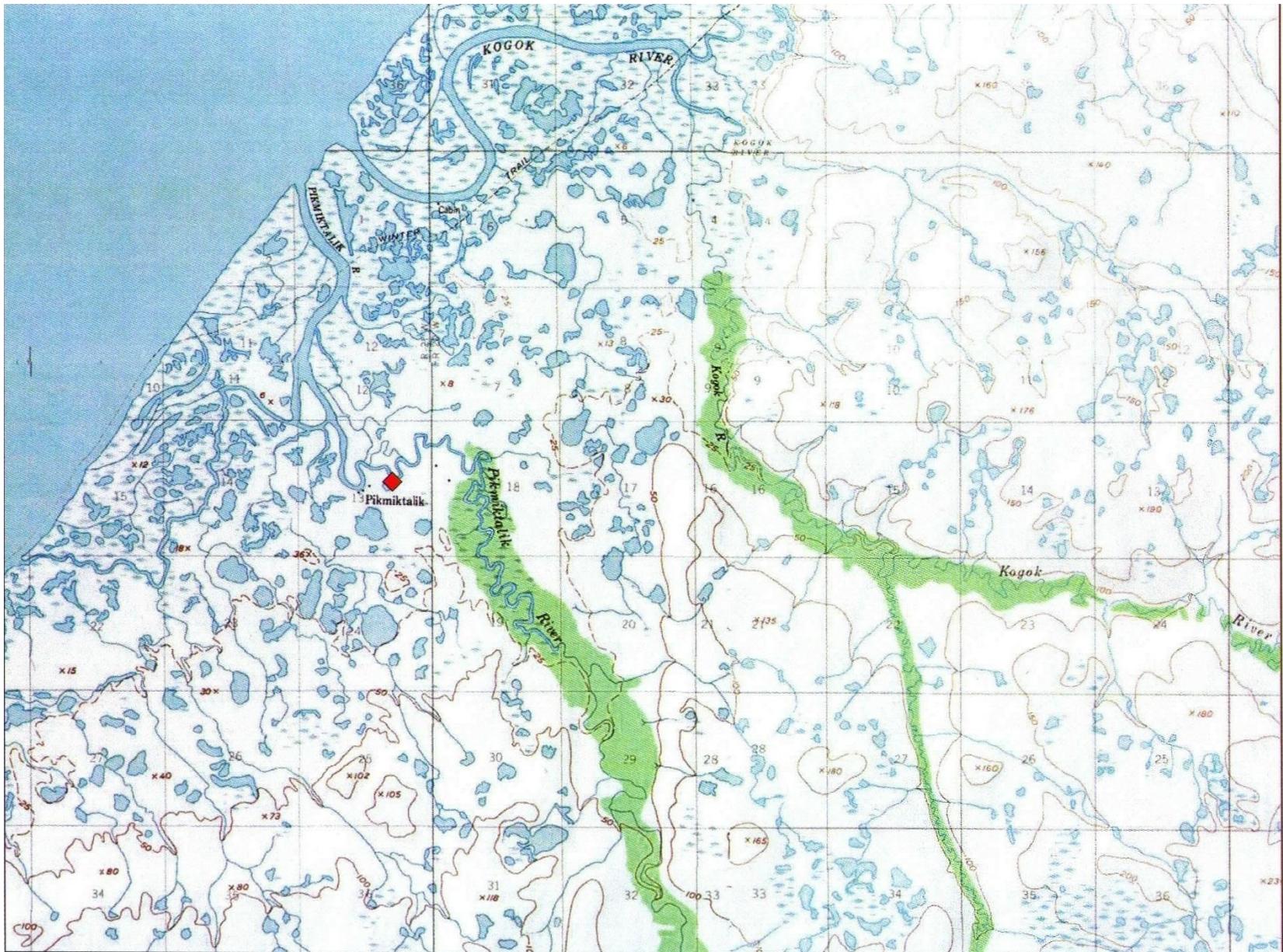


Figure 1. Location of the Pikmiktalik River enumeration project.

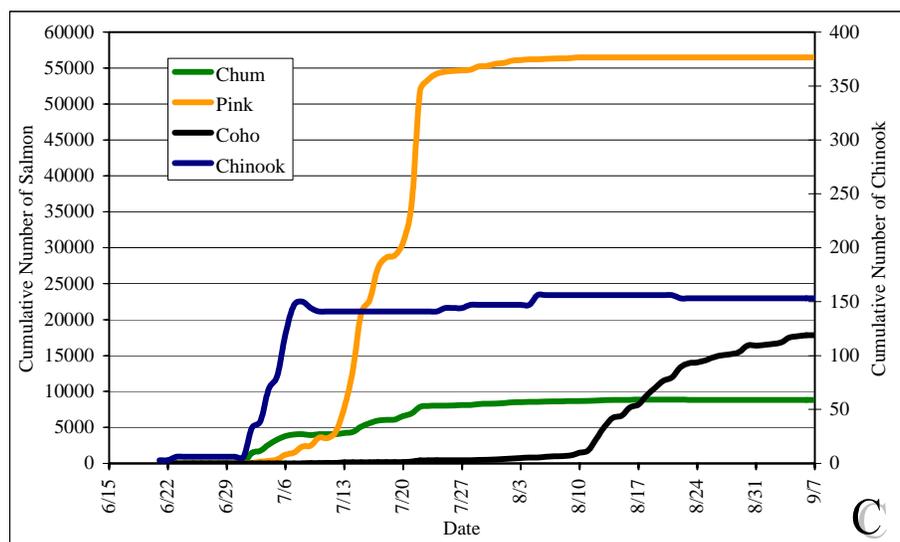
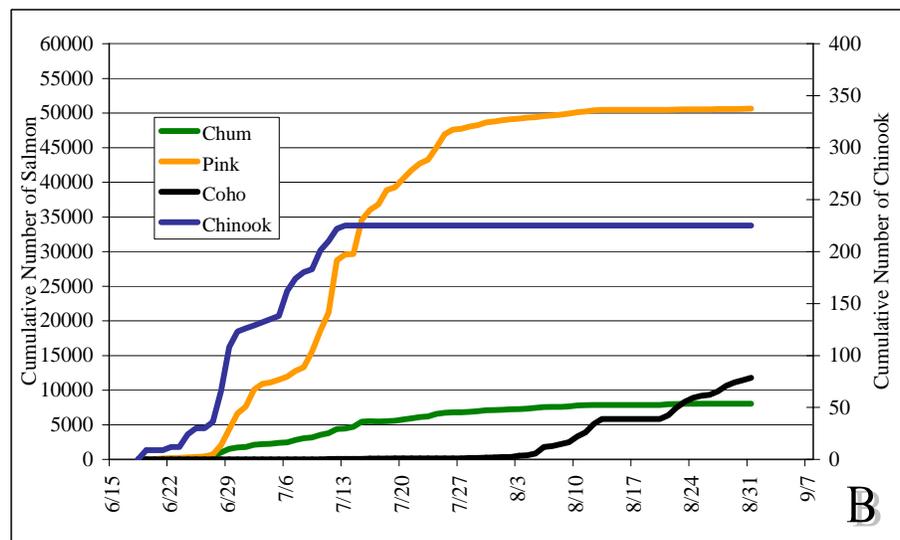
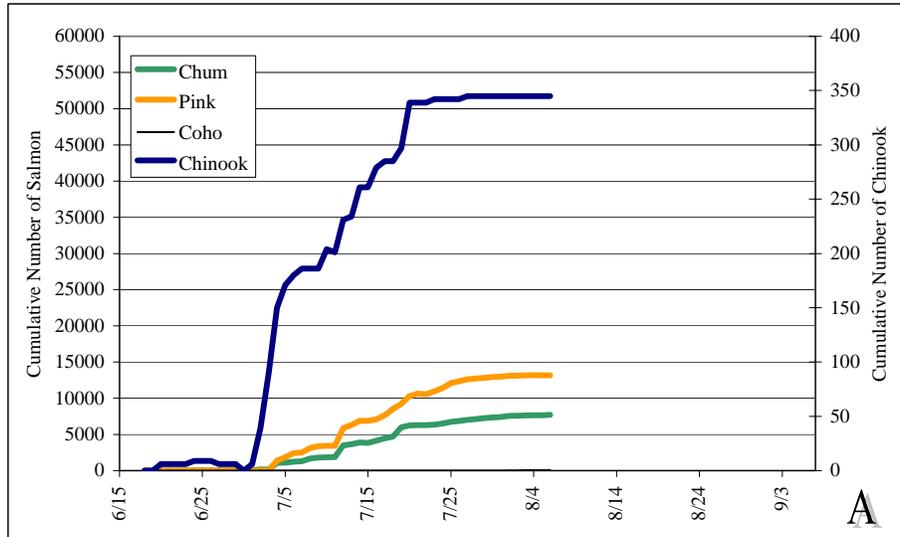


Figure 2. Cumulative number of chinook, chum, pink and coho salmon migrating past Pikmiktalik River tower site in, A) 2003, B) 2004 and C) 2005.

Note: Coho were not counted in 2003.

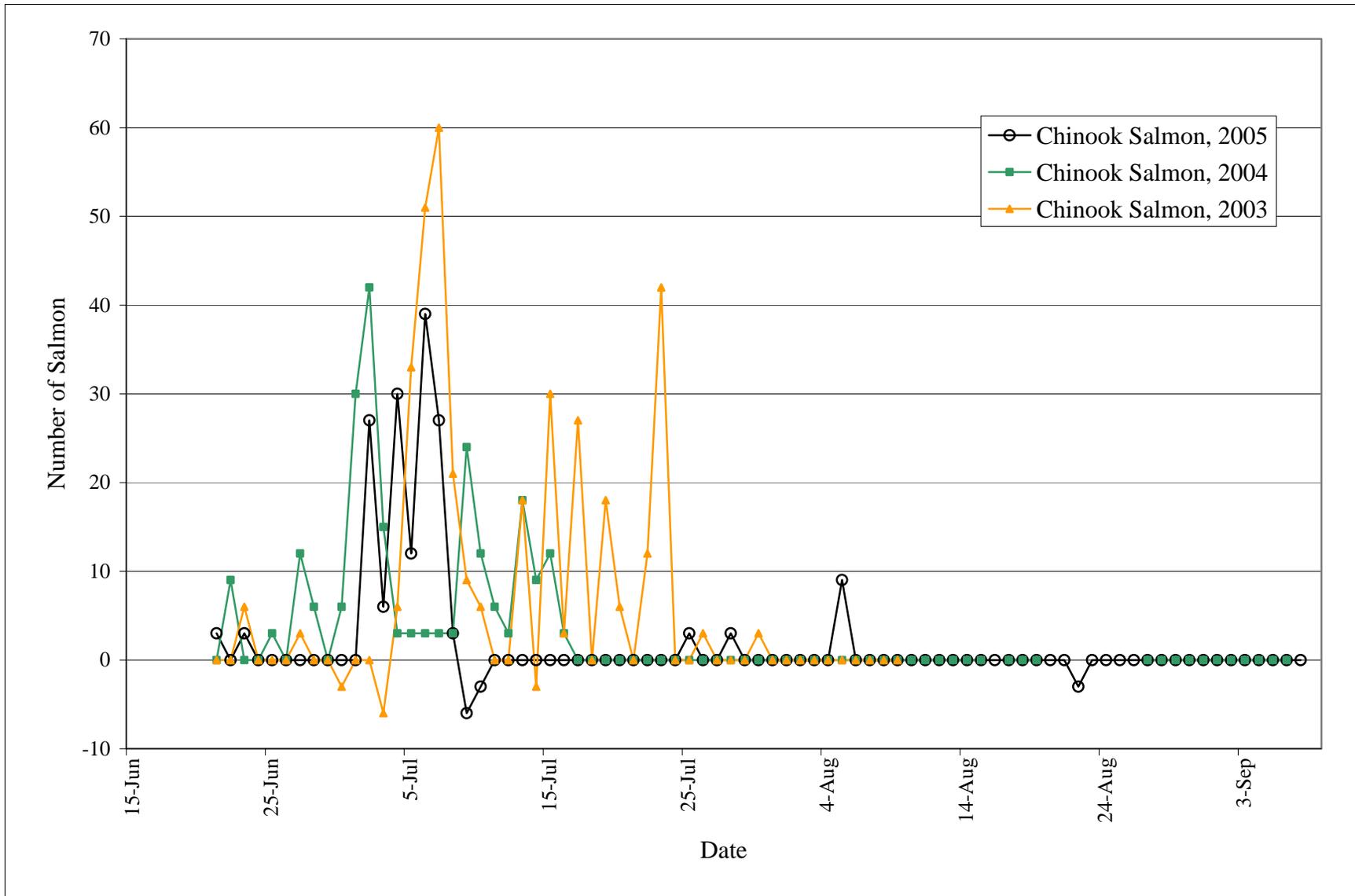


Figure 3. Daily escapements of chinook salmon on the Pikmiktalik River recorded in 2003, 2004 and 2005.

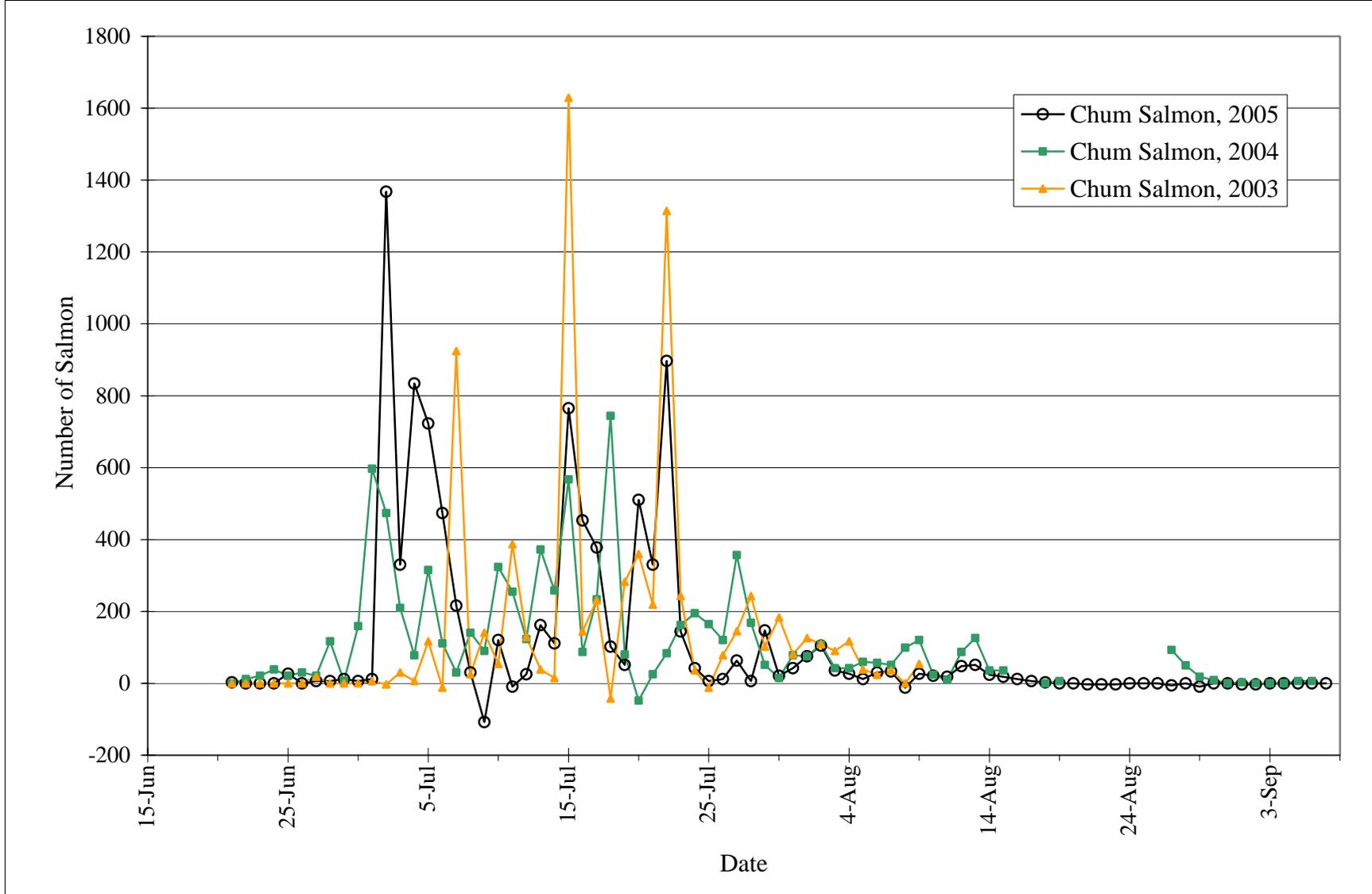


Figure 4. Daily escapements of chum salmon on the Pikmiktalik River recorded in 2003, 2004 and 2005.

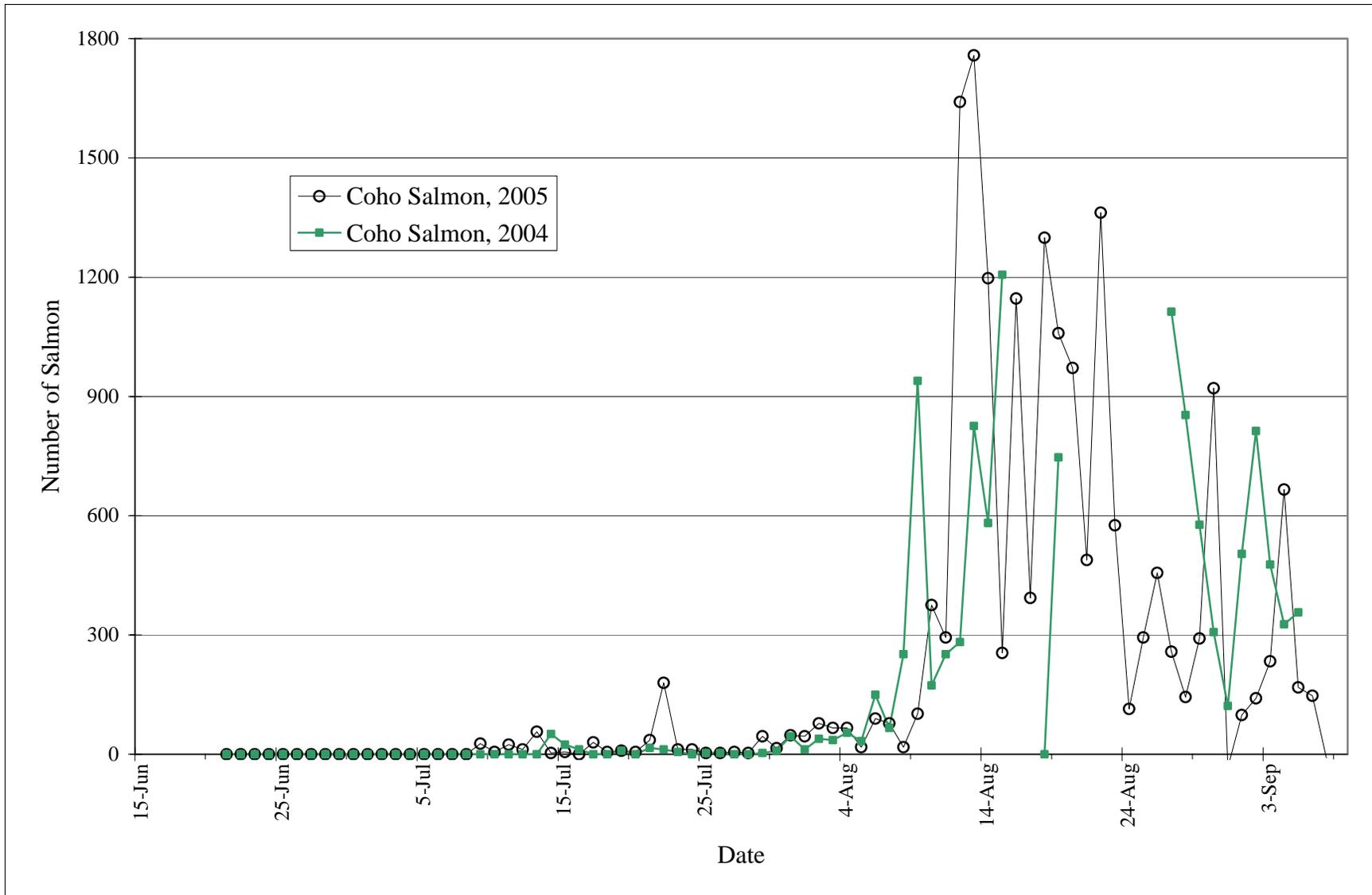


Figure 5. Daily escapements of coho salmon on the Pikmiktalik River recorded in 2004 and 2005.

Note: Coho were not counted in 2003.

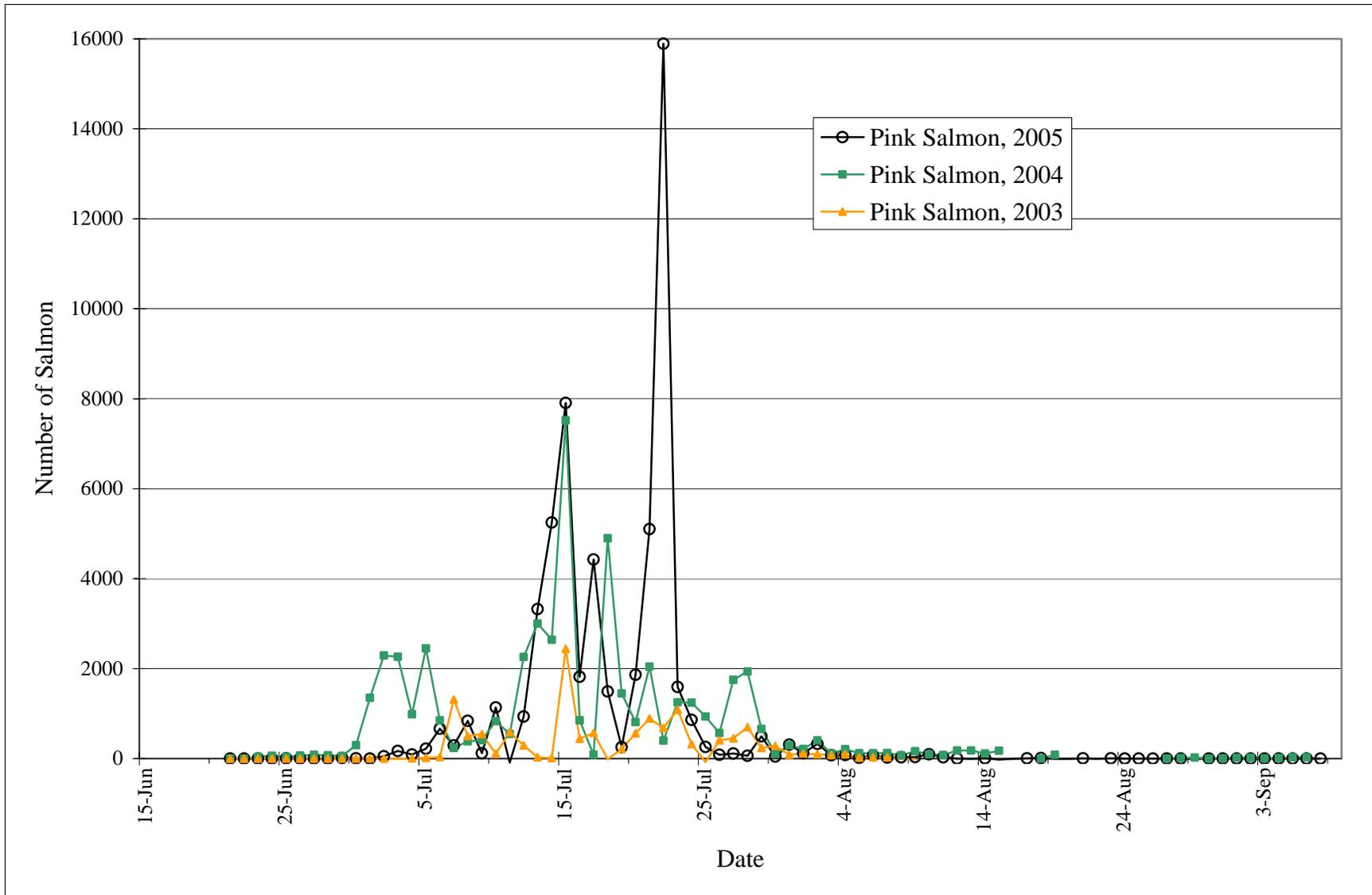


Figure 6. Daily escapements of pink salmon on the Pikmiktalik River recorded in 2003, 2004 and 2005.

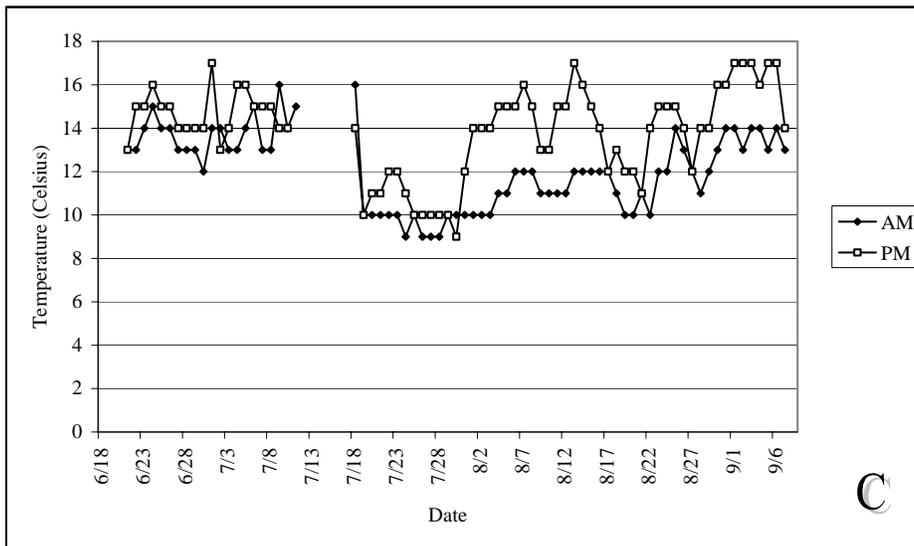
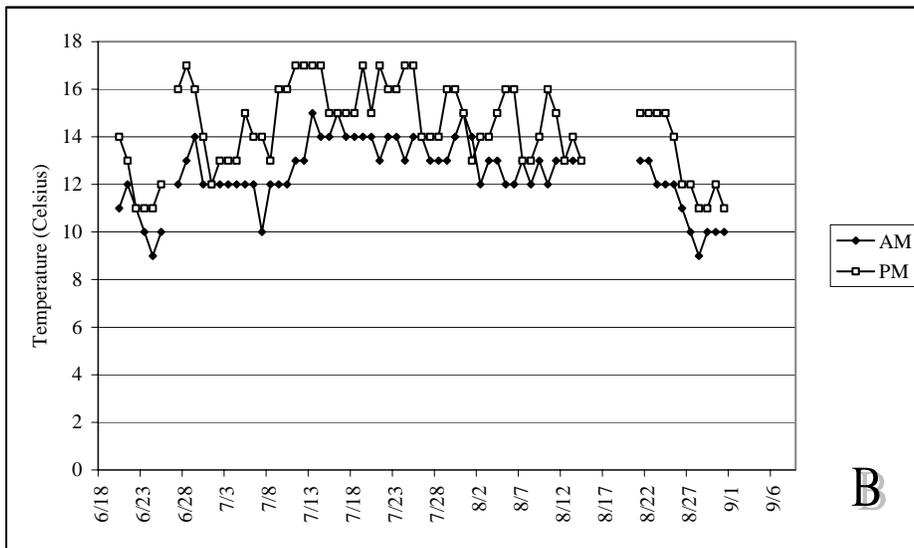
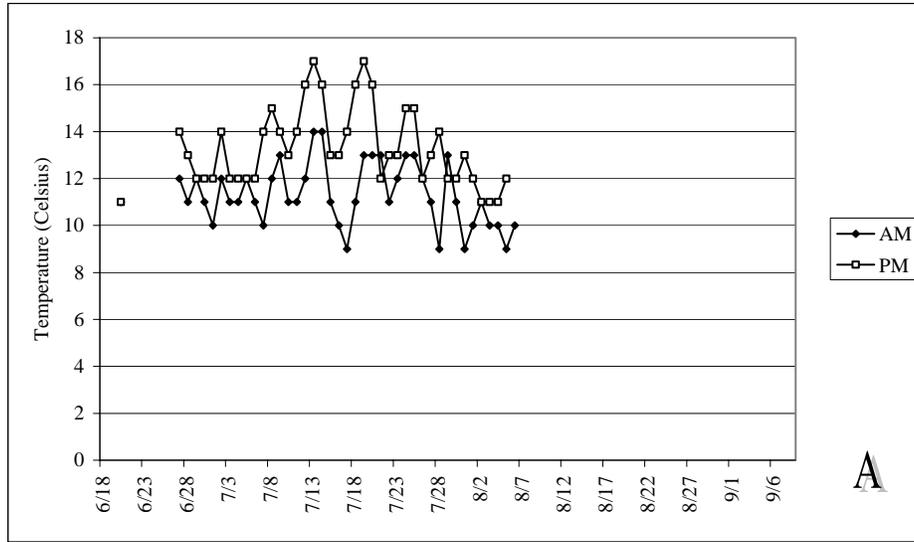


Figure 7. Pikmiktalik River water temperature at 0800 and 2000 hours in A) 2003, B) 2004 and C) 2005.

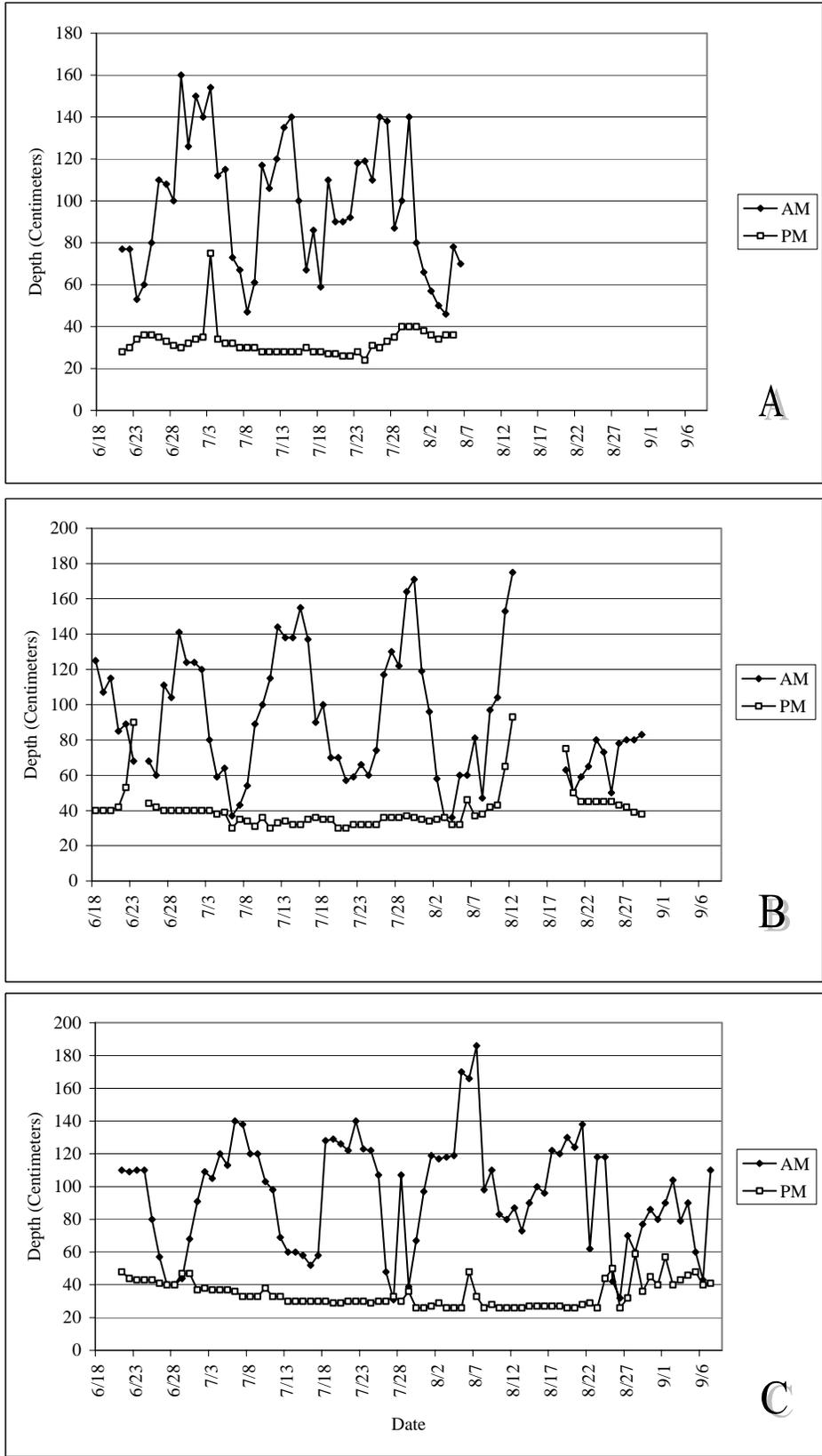


Figure 8. Pikmiktalik River water depth at 0800 and 2000 hours in A) 2003, B) 2004 and C) 2005.

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