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Salmon Escapement Monitoring on the Kuskokwim River, 2012

Annual Report for Project No. 10-304, 12-303, and 12-304
USFWS Office of Subsistence Management
Fisheries Resource Monitoring Program

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Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat or long
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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ABSTRACT

The Kuskokwim River drainage is a remote area in western Alaska where Pacific salmon *Oncorhynchus* spp. return to spawn and play a fundamental role in the local economy and food supply. Each year the Alaska Department of Fish and Game, in collaboration with other entities, operates escapement monitoring projects throughout Kuskokwim River tributaries. These projects provide the essential datasets managers need through annual assessments of run escapement and age and sex composition. In 2012, 5 Pacific salmon species, including Chinook *O. tshawytscha*, sockeye *O. nerka*, chum *O. keta*, pink *O. gorbuscha* and coho *O. kisutch*, were monitored at 6 locations in the Kuskokwim River drainage: Salmon, George, Kogrukluk, Telaquana, Tatlawiksuk, and Takotna rivers. Total escapements were successfully estimated for Chinook salmon at George (2,302 fish), Tatlawiksuk (1,116 fish), and Takotna (228 fish) river weirs. Total escapements of chum and coho salmon were also successfully estimated for George (34,336 fish and 15,272 fish, respectively), Tatlawiksuk (44,572 fish and 8,070 fish, respectively), and Takotna (6,050 fish and 1,838 fish, respectively) river weirs. Sockeye salmon was also successfully estimated for the Telaquana River weir (22,994 fish). Due to operational difficulties, only coho salmon escapement was successfully estimated for the Kogrukluk River weir (13,697 fish). Species not listed at these projects were either not present in significant numbers or not enumerated because of operational difficulties in 2012.

Key words: Chinook salmon, *Oncorhynchus tshawytscha*, sockeye salmon, *Oncorhynchus nerka*, chum salmon, *Oncorhynchus keta*, coho salmon, *Oncorhynchus kisutch*, Kuskokwim River, Salmon River, George River, Kogrukluk River, Telaquana River, Tatlawiksuk River, Takotna River, resistance board weir, fixed picket weir, escapement, age, sex, length, ASL.

INTRODUCTION

Each year mature Pacific salmon *Oncorhynchus* spp. return to the Kuskokwim River and its tributaries (Figure 1); these salmon support subsistence, commercial, and sport fisheries in the Kuskokwim Area and contribute to an annual harvest of approximately 500,000 fish (Brazil et al. 2013). The subsistence salmon fishery in the Kuskokwim management area is one of the largest and most important in the state and remains a fundamental component of local culture (Brazil et al. 2013). Monitoring salmon species returning to the Kuskokwim River and its tributaries is important to ensure sufficient escapement is met that will result in sustained yields large enough to provide for these important subsistence, commercial, and sport fisheries.

Monitoring salmon returns to the Kuskokwim River and its tributaries is important for ensuring that sufficient escapements are available to propagate and sustain the large harvests vital to the area. Escapement monitoring on Kuskokwim River tributaries began in the late 1960s on the Kogrukluk River, part of the Holitna drainage located in the middle Kuskokwim River (Hansen and Blain 2013). Additional escapement monitoring projects were added beginning in the late 1990s to fill data gaps reflective of Kuskokwim River tributaries distributed throughout the drainage; these include the Salmon, George, Tatlawiksuk, Telaquana, and Takotna rivers. These projects were operated by the Alaska Department of Fish and Game (ADF&G) in collaboration with other entities, including Kuskokwim Native Association (KNA), National Park Service (NPS), Takotna Tribal Council, and Takotna Community Association (TCA; Bue et al. 2008). In addition, the escapement projects have also served as collection sites for weather and stream data and as platforms to support other ADF&G and independent research projects (e.g., mark–recapture, genetic data collection, etc.).

In 2012, escapement and age composition data were collected for Chinook *O. tshawytscha*, sockeye *O. nerka*, chum *O. keta*, and coho salmon *O. kisutch* at the Salmon, George, Kogrukluk, Telaquana, Tatlawiksuk, and Takotna River weirs. Pink salmon *O. gorbuscha* escapement data were also collected at the escapement projects; however, their typically small body size allowed them to pass through the weirs undetected, confounding accurate enumeration of the species. In

addition to Pacific salmon, there are many other species commonly observed in the monitored tributaries, but their presence varies throughout the drainage. Other species that may be observed passing through the weirs include Arctic grayling *Thymallus arcticus*, whitefishes *Coregonus* spp., Dolly Varden *Salvelinus malma*, northern pike *Esox lucius*, longnose suckers *Catostomus catostomus*, rainbow trout *O. mykiss*, and lake trout *S. namaycush*. More information on the species within the Kuskokwim River drainage can be found in the Anadromous Waters Catalog, located at http://www.adfg.alaska.gov/sf/SARR/AWC/.

The projects discussed in this report provide information necessary for annual monitoring assessment of escapement goals on the Kuskokwim River. In 2012, the George and Kogrukluk rivers were the only tributaries monitored in the middle and upper Kuskokwim River with individual sustainable escapement goals in place. Chinook salmon are the only species monitored on the George River with an established escapement goal (3,100–7,900 fish; Brannian et al. 2006a). The Kogrukluk River has established escapement goals for Chinook salmon (5,300–14,000 fish), chum salmon (15,000–49,000 fish), coho salmon (13,000–28,000 fish), and sockeye salmon (4,400–17,000 fish; ADF&G 2004; Volk et al. 2009). These goals were in place for the 2012 season, the time period covered by this report. In addition to these projects, ADF&G also monitors escapement in Kuskokwim River tributaries by flying aerial surveys in 13 tributaries throughout the drainage. Supplemental to ADF&G efforts, the U.S. Fish and Wildlife Service operated salmon weirs on the Kwethluk and Tuluksak rivers located in the lower Kuskokwim River in 2012. Both the Kwethluk and the Tuluksak rivers had established escapement goals in 2012 for Chinook salmon (6,000–11,000 and 1,000–2,100, respectively), and the Kwethluk River also had a goal for coho salmon (≥19,000).

Prior to 2012, separate reports were written for George, Kogrukluk, Tatlawiksuk, and Takotna rivers escapement monitoring projects (Appendix A1). However, because management is primarily focused on the whole Kuskokwim River, reporting of these projects has been combined into a single document and also includes 2 recent escapement monitoring projects on the Salmon and Telaquana Rivers. This report only includes ADF&G escapement monitoring weir projects on the Kuskokwim River. It does not include ADF&G escapement monitoring projects in Kuskokwim Bay, ADF&G aerial survey data, or other outside agency escapement monitoring projects on the Kuskokwim River. Information on age, sex, and length (ASL) compositions previously included in individual project reports is not included in this report but is reported in the *Salmon age, sex, and length catalog for the Kuskokwim Area* (Brodersen et al. 2013).

OBJECTIVES

1. Estimate daily and annual escapement of Chinook, chum, sockeye, and coho salmon using weirs operated in 6 tributaries throughout the Kuskokwim River during the following target operational periods in 2012:

    - Salmon River: 15 June–25 August
    - George River: 15 June–20 September
    - Kogrukluk River: 26 June–25 September
    - Telaquana River: 1 July–31 August

- Tatlawiksuk River: 15 June–20 September
- Takotna River: 24 June–20 September

2. Collect age, sex, and length data from adult Chinook, chum, sockeye, and coho salmon using weir traps operated in 6 tributaries throughout the Kuskokwim River in 2012, such that total sample sizes are sufficient for estimating age composition.

METHODS

STUDY SITES

The Kuskokwim River is the second largest river in Alaska, draining an area approximately 130,000 km^2, or 11% of the total area of Alaska (Baxter 1981). The 6 escapement monitoring projects in the Kuskokwim River drainage that are covered in this report span a vast geographic area; some projects were as far as 835 km from the mouth of the Kuskokwim River.

The Salmon River watershed drains an approximate area of 1,003 km^2 on the northern side of the Kilbuck Mountains, one of the defining barriers separating Bristol Bay and Kuskokwim River drainages (Figure 1). The Salmon River flows northerly for approximately 151river kilometers (rkm) to its confluence with the Aniak River, which continues to flow northerly for 96 km until reaching the Kuskokwim River at river kilometer (rkm) 307) near Aniak.

The George River originates in the northern Kuskokwim Mountains within the middle of the Kuskokwim River basin, draining an area approximately 3,558 km^2 and flowing southerly for approximately 120 rkm to its confluence with the Kuskokwim River (at rkm 446; Figure 1).

The Kogrukluk River watershed drains approximately 2,073 km^2 and is bounded by a low plateau that divides the Tikchik Lakes system and Nushagak River basin to the south from the Holitna River basin to the north (Figure 1). From its headwaters, the Kogrukluk River flows northerly for approximately 80 rkm to its confluence with the Chukowan River to form the Holitna River, which flows northerly 218 rkm to join the Kuskokwim River (at rkm 491) near Sleetmute. The Holitna drainage is a highly productive salmon system that supports a relatively large number of spawning salmon when compared to other Kuskokwim River tributaries of similar size (Molyneaux and Brannian 2006).

The Telaquana River originates in the mountains above Telaquana Lake, located in Lake Clark National Preserve. The Telaquana River watershed is bounded by the Neacola Mountains to the east and a low plateau to the south, separating it from the Bristol Bay watershed (Figure 1). From its headwaters, the Telaquana River flows westerly for approximately 30 rkm before entering Telaquana Lake, which is roughly 45 km^2. From the mouth of the lake, the Telaquana River flows another 50 rkm to its confluence with the Stony River, which then goes on to join the middle Kuskokwim River at rkm 536. Telaquana Lake is one of the major lakes present in the Kuskokwim River drainage that provide requisite habitat for lake-spawning sockeye salmon.

The Tatlawiksuk River originates in the foothills of the Alaska Range and flows southwesterly for 113 km, draining an area of approximately 2,106 km^2, before joining the Kuskokwim River at rkm 563 (Figure 1).

The Takotna River originates in the central Kuskokwim Mountains of the upper Kuskokwim River basin. The Takotna River is about 160 km in length and drains an area of 5,646 km^2 (Brown 1985; Figure 1). Formed by the confluence of Moore Creek and Little Waldren Fork, the Takotna River flows northeasterly and passes the community of Takotna at rkm 80, before turning southeasterly near the confluence of the Nixon Fork at rkm 24, and empties into the Kuskokwim River (at rkm 752) across from McGrath.

WEIR DESIGN

For each project, a fixed picket or resistance board weir design was chosen based on channel and flow characteristics at the project site. A resistance board weir is a floating weir favored for its ability to sink beneath flood waters, which allows debris to pass downstream with little obstruction. Resistance board weirs require optimal site conditions such as a nearly level bottom profile and low enough water levels during the installation period to allow crew, working in snorkel gear, to attach weir components to the stream bed. In the Kuskokwim Area, where seasonal flooding occurs, resistance board weirs are preferred; however, not all rivers have conditions that allow for the installation and operation of resistance board weirs. In such cases, fixed picket weirs were employed. Fixed picket weirs have a rigid structure that requires disassembly for debris to pass freely downstream. These weirs are more prone to damage or "washing out" during flood conditions. However, fixed picket weirs can be installed at higher flows and in more variable channel conditions. All weirs utilized a live fish trap design that was capable of freely passing fish or trapping fish to collect data. The trap design was the same at all projects; details can be found in Linderman (2002).

Resistance Board Weir Design

Details of design and materials used to construct the resistance board weirs are described in Tobin (1994), with panel modifications described by Stewart (2002). The weirs were installed across the entire channel following the techniques described by Stewart (2003). The substrate rail and resistance board panels covered the middle 90% of each channel, and fixed weir materials extended the weirs to each bank. Floating and fixed weir lengths were adjusted inseason based upon minor changes in the width and depth of the river. A skiff gate and a downstream passage chute were installed following techniques described in Linderman (2002).

During weir fabrication there were slight modifications in picket spacing of the weir extensions near shore. The Takotna River weir modification was designed with a gap of 4.29 cm (1-11/16 in) between each picket, while the Tatlawiksuk and George River weir modifications have gaps of 3.33 cm (1-5/16 in) between each picket. Both gap designs prevented most adult Pacific salmon from passing through the weirs undetected; however, pink salmon were observed occasionally passing between pickets.

Fixed Picket Weir Design

All fixed picket weirs shared the common trait of being a rigid upright design but varied in their construction and implementation. The basic design and materials used to construct these weirs, depending on the site, included a series of stringers, pickets or panels, and tripods or bipods (Molyneaux et al. 1997). Picket intervals are 63.5 mm, with a gap of 36.5 mm between each picket (Jasper and Molyneaux 2007). Tripods varied in construction material and were either built from wooden post or schedule 40 steel pipe fastened together with nuts, bolts, and washers.

ESCAPEMENT MONITORING

Each project had a target operational period based on historical run timing information that covered the entire runs of the target species (Appendix A1). The operational plan for each monitoring project specified the weir would be installed and "fish tight" prior to the arrival of salmon migration. However, actual operation dates varied with stream and weather conditions.

Salmon River Weir

Based on the distance from the mouth of the Kuskokwim River and historical run timing observations, the target operational period for the Salmon River weir was set at 15 June through 25 August and focused on monitoring Chinook; however, chum and sockeye salmon were also monitored. The Salmon River weir was located at lat 61°03′46″N, long 159°11′40″W. The weir was a fixed picket design that spanned a 35 m channel and incorporated a fish trap and narrow boardwalk. The Salmon River weir design followed the methods of Molyneaux et al. (1997) with modified weir panels that were 203.2cm (80 in) in total length. Panels had fifteen 1.27 cm (½ in) nominal schedule 40 aluminum pipes welded into place on 3 pieces of hole-punched aluminum T-bar with a 3.5cm (1⅜ in) gap between each pipe, resulting in a total panel width of 84.45cm (33¼ in). The average depth at the weir site was 1.25 m. The weir was installed approximately 1 km upstream the Salmon River from its confluence with the Aniak River. The Salmon River weir was initially operated during 2006–2009 to serve as a recapture site for mark–recapture studies involving Chinook and coho salmon. The weir was not operated in 2010 or 2011; however, in 2012 the weir was reinstalled with the main focus on monitoring Chinook salmon escapement. From 3 July through 23 August, 1 employee from ADF&G and 1 from KNA monitored escapement, which did not cover the entire 2012 target operational period (Table 1).

George River Weir

Based on the distance from the mouth of the Kuskokwim River and historical run timing observations, the target operational period for the George River weir was 15 June through 20 September and focused monitoring on Chinook, chum, and coho salmon; however, in 2012 observations of fish passage only occurred from 30 June through 16 September (Table 1). The George River weir was a resistance board weir located at lat 61°55′24″N, long 157°41′53″W, which is approximately 7 rkm upstream of its confluence with the Kuskokwim River. The George River weir has been in operation since 1996 through the joint effort of KNA and ADF&G and has served as an index site for the middle Kuskokwim River since operations began (Molyneaux and Brannian 2006). Due to its proximity to the mouth, the weir accounts for nearly all salmon migrating upstream to spawning habitat within the drainage. At the weir site, the river channel was about 110 m wide and had a depth of about 1 m during normal summer flow. Daily operations were conducted by 1 employee from ADF&G and 1 from KNA.

Kogrukluk River Weir

The Kogrukluk River provides an index of salmon spawning populations for the Holitna River drainage. Based on the distance from the mouth of the Kuskokwim River and historical run timing observations, the target operational period for the Kogrukluk River weir was established as 26 June through 25 September to monitor Chinook, sockeye, chum and coho salmon. The Kogrukluk River weir was located at lat 60°50′28″N, long 157°50′44″W; it has been operated annually since 1976. The weir was a fixed-picket design, spanned a 70 m channel averaging a depth of 1.25 m, and incorporated a fish trap and narrow boardwalk. Details of design and

materials used to construct the Kogrukluk River weir are described in Baxter (1981), with tighter picket spacing as described in Jasper and Molyneaux (2007). Beginning in 1981, the weir operations were extended to include coho salmon (Baxter 1981). However, in 2012 poor weather conditions caused the weir to be inoperable for over 40 days during the target operational period (Table 1). Daily operations were conducted by 2 ADF&G employees.

Telaquana River Weir

Based on the distance from the mouth of the Kuskokwim River and historical run timing observations, the target operational period for the Telaquana River weir was approximately 1 July through 30 August. In 2012 observations were made from 5 July through 27 August to monitor sockeye salmon (Table 1).

The Telaquana River weir was located at lat 60°57′39″N, long 154°02′40″W and has been operated cooperatively by ADF&G and NPS since 2010. The weir was located approximately 1 km downstream of the Telaquana Lake outlet. It was a fixed-picket design that spanned a 70 m channel and incorporated a fish trap and narrow boardwalk. The weir had modified tripods, panels, and stringers. Stringers were the similar to those described in Molyneaux et al. (1997), with variations that included stringer pipes being 6.35 cm (2-1/2 in) diameter, panels with a 1-inch gap between each pipe, and the use of 16 pipes, resulting in a panel width of 75.57 cm (29-3/4 in). In addition, panels were fabricated in 152.4 cm (60 in), 203.2 cm (80 in), and 228.6 cm (90 in) lengths, with the longer panels placed in the section of the river with the deepest profile. In summer during normal flow, the average channel depth was approximately 1.5 m. Daily operations were conducted by 1 ADF&G employee and 1 NPS employee.

The Telaquana River weir was implemented to fill data gaps in run abundance and stock structure dynamics of sockeye salmon. Although all 5 salmon species have been observed at the weir site, only sockeye salmon return to the system in considerable numbers. Aerial surveys and rafting reconnaissance have indicated that there are no spawning populations of sockeye salmon in the Telaquana River downstream of the weir site.

Tatlawiksuk River Weir

Based on the distance from the mouth of the Kuskokwim River and historical run timing observations, the target operational period for the Tatlawiksuk River weir was 15 June through 20 September to monitor Chinook, chum, and coho salmon. In 2012, observations of fish passage began on 23 June and ended on 15 September (Table 1). The Tatlawiksuk River weir was a resistance board weir located at lat 61°56′03″N, long 156°11′33″W, which is approximately 4.5 rkm upstream from its confluence with the Kuskokwim River. The weir has been operated annually since 1998 through the joint effort of KNA and ADF&G. At the weir site, the river measured 64 m wide and 1 m deep during normal summer operations. Daily operations were conducted by 1 employee from ADF&G and 1 from KNA.

Takotna River Weir

Based on the distance from the mouth of the Kuskokwim River and historical run timing observations, the target operational period for the Takotna River weir was 24 June through 20 September to monitor Chinook, chum, and coho salmon; however, in 2012 observations began on 5 July and ended on 15 September (Table 1). The weir has been installed annually since 2000 at lat 62°58′06″N, long 156°05′54″W, located several hundred meters upstream of the Takotna River Bridge near the community of Takotna. This site allows for enumeration of

spawning salmon in the Takotna River drainage, excluding those in the Nixon Fork tributary. The river channel at this site was about 85 m wide and less than 1 m deep during normal summer flow. Daily operations were conducted by 1 employee from ADF&G and technicians from Takotna Community Association (TCA).

Passage Counts

Passage counts at all weirs were conducted in shifts of approximately one hour, 4 to 8 times per day, between 0700 and 2400 hours. This schedule was adjusted as needed to accommodate variation in fish behavior and abundance or operational constraints, such as reduced visibility in evening hours late in the season. The live trap was used as the primary means of upstream fish passage. A clear plastic viewing window was placed on the stream surface to improve visual identification of fish entering the trap. Fish were only allowed to pass freely through the weir when an observer was present and opened the passage gate. Delays in fish passage occurred only at night or during ASL sampling. Crew members visually identified all species of fish observed passing upstream of the weir and recorded them on a tally counter. At all project locations, any Pacific salmon that passed through the passage gate were documented.

The weir was inspected daily for holes and cleaned of carcasses and debris. If holes were found, a note was made that there was a potential for missed fish passage. Following each shift, crew members recorded total counts in a logbook and zeroed the tally counter. At the end of each day, total daily and cumulative seasonal counts were recorded in a designated logbook. These counts were reported each morning to ADF&G staff in Bethel.

Mixed Passage Estimates

A variety of situations were encountered in which fish passage could not be counted. Missed passage counts resulted from the following factors: water levels preventing installation, requiring disassembly, or prompting removal of the weir; water levels exceeding the top of the weir; water levels causing failure of the weir structure; holes created from scouring or broken pickets; maintenance requiring partial disassembly of the weir; or the counting gate being left open unattended. Missed passage estimates were created postseason for each project's target species. However, if more than 40% of the predicted run was missed, based on historical run timing, estimates were not created and total annual escapement counts were considered incomplete.

In 2012, several methods were used to estimate missed passage; these included the single-day method, linear interpolation, and the nonlinear regression (exponential) method. Estimates reported represent the total daily estimate. Estimates were assumed to be 0 if passage was probably negligible based on historical and inseason data. All other methods were chosen based on the duration of the inoperable period, and the observed fish passage and run timing dynamics before and after that period.

When the weir was not operational for part or all of 1 day, an estimate for the inoperable day was calculated. The single-day method was used to estimate the number of fish that probably passed through the weir during a single day of inoperability. The ability to use this method occurred only when fish were counted 1 day (n_b) and 2 days (n_{b-1}) before, and 1 day (n_a) and 2 days (n_{a+1}) after the inoperable period. An estimate of a single day of inoperability ($\hat{n}_i$) at any of the weirs was estimated as:

$$\hat{n}_i = \left(\frac{\left(n_b + n_{b-1} + n_a + n_{a+1}\right)}{4} \right). \quad (1)$$

When the weir was not operational for 2 or more days but later became operational again, passage estimates for the inoperable period of days (*D*) was calculated using linear interpolation. This methodology was appropriate for short periods of inoperability when fish passage was assumed to increase or decrease linearly over time. Daily passage counts from the 2 days before (n_b, n_{b-1}) and 2 days after (n_a, n_{a+1}) the inoperable period were used to estimate the number of fish that passed during the period of inoperability. The estimated fish count on day *i* (*i*=1,…,*D*) of the inoperable period was estimated as:

$$\hat{n}_i = \left(\frac{n_b + n_{b-1}}{2} \right) + i\left(\frac{\left(n_a + n_{a+1}\right) - \left(n_b + n_{b-1}\right)}{2(D+1)} \right). \quad (2)$$

When the weir was not operational near the beginning or end of a run (when exponential increases and decreases were expected), a nonlinear regression was used to fit an exponential function to existing data surrounding each circumstance. In any instances where data was available before missed passage, the number of days of observation included in the regression data set before the inoperable period (*d*) was added to the day of the inoperable period (*i*). The intercept (*a*) and slope (*b*) derived from the regression were then used to estimate fish count ($\hat{n}$) on day (*i*) of the inoperable period.

$$\hat{n}_i = ae^{b(d+i)}. \quad (3)$$

Unlike the single-day and linear interpolation methods, there are no set observation days from which the nonlinear regression is created. Instead, the observation days that form the nonlinear regression vary between projects and species and are chosen from the appearance of exponential increase or decrease in fish passage before and after the inoperable period. In 2012, this method was used to produce estimates for Chinook, chum, and coho salmon using a variety of formulation dates (Table 2).

Regardless of the estimation method used, the daily estimated missed passage ($\hat{n}_i$) was always reported for the full day, except when it was less than the observed passage on partial days of operation. In these scenarios, the estimate was disregarded and observed passage was considered the daily passage.

Weather and Stream Measurements

Water and air temperatures (°C) were manually measured each day at approximately 0730 and 1700 hours using hand-held thermometers. In addition, notations about wind direction, estimated wind speed, cloud cover, and precipitation were recorded. Daily precipitation was measured (mm) using a rain gauge, and water levels were measured using staff gauges installed approximately 150 m from the weirs. The staff gauge was calibrated to a reliable benchmark using a sight or line level. Calibration of the staff gauge was checked periodically to ensure accuracy. As part of the OSM *Temperature Monitoring* Project 08-701, conducted by the

Aquatic Restoration and Research Institute (ARRI), Hobo®[1] air and water temperature data loggers were installed at select weirs. Data loggers remained installed at the weir site year-round but were replaced at the beginning of field season and downloaded at the end of field season, ensuring that temperatures were continually monitored.

AGE, SEX, AND LENGTH

Sample Size and Distribution

A minimum sample size was determined for each species to achieve 95% confidence intervals of age-sex composition for each sample no wider than ±10% (α = 0.05 and d = 0.10; Bromaghin 1993). Sample size estimates were based on 10 age-sex categories for Chinook salmon (n = 190), 10 age-sex categories for sockeye salmon (n = 190), 8 age-sex categories for chum salmon (n = 180), and 6 age-sex categories for coho salmon (n = 168). Sample sizes were then increased by 20% to account for unreadable scales or collection errors. This yielded a minimum collection goal for each sample of 230 Chinook, 230 sockeye, 220 chum, and 200 coho salmon.

At projects where the abundance of sockeye, chum, and coho salmon was generally high enough to collect a large sample size in a short period of time, a pulse sampling strategy was employed to ensure adequate temporal distribution. The goal was to collect samples from each major portion of the run (i.e., early, middle, and late). Well-spaced pulse samples are thought to better represent temporal changes in ASL composition than other sampling methods (Geiger and Wilbur 1990). Pulse samples were attempted approximately every 7–10 days, and the number of pulses varied by location and species (Table 3). The goal was to collect a sample from each third of the run for coho salmon and Telaquana River sockeye salmon. The collection goal for chum salmon was for each fifth of the run, due to their typically larger run and longer duration.

The relatively low abundance of Chinook and sockeye salmon at the majority of Kuskokwim area projects made pulse sampling impractical. Instead, samples were collected continuously over the run following a daily collection schedule based on historical run timing information. Daily sample sizes were determined by dividing the season goal in proportion to historical average daily escapements to ensure a good distribution across the run.

Sample Collection Procedures and Processing

Salmon were captured for sampling by opening the entrance gate of the live fish trap while the exit gate remained closed for a predetermined amount of time. Conversely, during periods of high fish passage, samplers attempted to capture fish to sample while actively passing and counting all other salmon. This method was often used when sampling Chinook salmon during periods of low Chinook salmon passage or high passage of other species (Linderman et al. 2002). An additional method of capturing fish to sample included waiting at a closed trap until a salmon approached the trap gate. The sampler allowed the salmon into the trap and shut the entry gate after the fish entered. The sampler continued to load the trap in this fashion with the target species while allowing minimal numbers of other species to enter, thus making sampling time more effective and reducing stress caused by holding and handling time.

[1] Product names used in this report are included for scientific completeness but do not constitute a product endorsement.

Following capture in the live fish trap, crew members used a dip net to capture fish within the trap. To obtain length data and aid in scale collection, fish were removed from the dip net and placed into a partially submerged fish "cradle." Scales were taken from the preferred area of the fish (INPFC 1963) and transferred to numbered gum cards. Sex was determined through visual examination of the external morphology, focusing on the prominence of a kype, roundness of the belly, and the presence or absence of an ovipositor. Length from mid eye to tail fork was measured to the nearest millimeter using a straight-edged meter stick. Sex and length data were recorded on standardized numbered data sheets that corresponded with numbers on the gum cards used for scale preservation. After sampling, each fish was released upstream of the weir. The procedure was repeated until the trap was emptied, to ensure no bias was introduced.

After sampling was completed, all ASL data and metadata were copied to Microsoft Excel spreadsheets that corresponded to numbered gum cards. Completed Excel spreadsheets were sent in digital format to the Bethel ADF&G office for processing. The original ASL gum cards, acetates, and paper forms were archived at the ADF&G office in Anchorage. Data were also loaded into the Arctic-Yukon-Kuskokwim (AYK) salmon database management system located at http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx (Brannian et al. 2006b; Brodersen et al. 2013).

RESULTS

WEIR OPERATIONS

Salmon River Weir

The Salmon River weir was installed and operated from 3 July through 23 August in 2012. During this period, the weir was inoperable for 10 days due to high water events and 6 additional days due to holes in the weir. In total, due to the inclement weather conditions, the weir was not operated for the first 18 days and the last 2 days of the target operational period. The weir did not operate for approximately 37% of the target operational period in 2012 (Tables 4–7).

Weather and stream observations were recorded between 5 July and 23 August (Appendix B1). Water temperature at the weir averaged 7.8°C (range 5°C to 11°C), air temperature averaged 10.6°C (range 1°C to 25°C), and river stage averaged 63 cm (range 47 cm to 94 cm; Figure 2). A total of 109 mm of precipitation was recorded throughout the season.

George River Weir

The George River weir operated from 30 June through 16 September. High river stage in June delayed installation of the weir for 16 days past the beginning of the target operational period. In addition, the weir was inoperable for 1 day in the season due to a hole and for 7 days due to high water, and it was removed 4 days prior to the target operational period end date due to high river stage (Tables 4–7).

Water and stream observations were recorded between 8 June and 20 September. The average water temperature was 8.6°C (range 3°C to 14°C), average air temperature was 10.4°C (range -2°C to 26°C), and average river stage was 69 cm (range 45 cm to 150 cm; Figure 3). A total of 297 mm of precipitation was recorded throughout the season (Appendix B2).

Kogrukluk River Weir

The Kogrukluk River weir operated from 29 June until 16 September. The weir became inoperable several times during the season, including structural failure of the weir an unprecedented 3 times due to flooding, totaling 40 inoperable days throughout the season, nearly half of the target operational period. Additional inoperable periods included the following: 1 day due to the passage gate left open unattended; 3 days due to a high water event; and 6 days due to occurrences of holes (Tables 4–7).

Water and stream observations were recorded between 16 June and 23 September. Water temperature averaged 8°C (range 4°C to 12°C), air temperature averaged 12°C (range -1°C to 25°C), and river stage averaged 316 cm (range 274 cm to 446 cm; Figure 4). A total of 376 mm of precipitation was recorded throughout the season (Appendix B3).

Telaquana River Weir

The Telaquana River weir was installed and operated from 5 July through 27 August in 2012 with 1 partial day count on 2 August due to the trap gate being left open unattended (Tables 4-7).

Weather and stream observations were recorded between 5 July and 14 September, 2012 (Appendix B4). At the weir, water temperature averaged 11.8°C (range 8°C to 14°C), air temperature averaged 12°C (range 3°C to 27°C), and river stage averaged 57 cm (range 47 cm to 83 cm; Figure 5). A total of 167 mm of precipitation was recorded throughout the season.

Tatlawiksuk River Weir

Tatlawiksuk River weir operated from 23 June through 15 September. High river stage delayed installation 9 days after the target operational period and prompted removal 6 days before the end of the target operational period. The weir was also inoperable for 7 days in September due to high water (Tables 4–7).

Water and stream observations were recorded between 8 June and 21 September. Water temperature at the weir averaged 8.6°C (range 5.0°C to 19.0°C), air temperature averaged 10.7°C (range -4°C to 26.0°C), and river stage averaged 77 cm (range 39 cm to 206 cm; Figure 6). A total of 376 mm of precipitation was recorded during the 2012 season (Appendix B5).

Takotna River Weir

The Takotna River weir was installed and operated from 4 July through 14 September in 2012. High river stage delayed installation for 12 days past the target operational period. During the season, the weir was inoperable for 3 days due to holes and 6 days due to high water. High water also triggered early removal of the weir, 6 days before the target operational period end date (Tables 4–7).

Weather and stream observations were recorded between 24 June and 14 September (Appendix B6). Water temperature at the weir averaged 10.7°C (range -1°C to 16°C), air temperature averaged 12°C (range -3°C to 24°C), and river stage averaged 79 cm (range 63 cm to 133 cm; Figure 7). A total of 292 mm of precipitation was recorded throughout the season.

ESCAPEMENT MONITORING AND AGE, SEX, LENGTH COLLECTION

Chinook Salmon

Total Chinook salmon escapement into the Salmon River was not estimated due to large inoperable periods. A total of 473 Chinook salmon were counted past the Salmon River weir during the time the weir was operational (Table 4). ASL samples were collected through daily sampling from 73 Chinook salmon from 18 July to 10 August; the sample size goal was not achieved (Table 3).

A total escapement of 2,302 Chinook salmon was estimated to have passed the George River weir during the operational period in 2012; of these, 2,071 fish were observed (90% of total escapement; Table 4). The 2012 escapement goal of 3,100 to 7,900 Chinook salmon was not met. ASL samples were collected through daily sampling from 197 Chinook salmon from 3 July to 3 August (Table 3). The sampling goals were not achieved for Chinook salmon.

Since more than 40% of the Chinook salmon run into the Kogrukluk River was missed, the total escapement count is considered incomplete. A total of 1,156 Chinook salmon was counted past the Kogrukluk River weir (Table 4). Compared with historical run timing data, 2012 Chinook salmon passage exhibited late run timing, and only about 14% of the Chinook salmon run was considered to have been observed (Figure 8). Because of incomplete escapement data, it is unknown whether the escapement goal of 5,300–14,000 of Chinook salmon was achieved. ASL samples were collected from 120 Chinook salmon, with daily sampling from 6 July to 11 August (Table 3). The sample size goal was not achieved for Chinook salmon.

In 2012, 5 Chinook salmon were observed passing the Telaquana River weir (Table 4). Due to their low abundance, any missed passage was not estimated. ASL data were not collected for Chinook salmon (Table 3).

A total escapement of 1,116 Chinook salmon was observed passing the Tatlawiksuk River weir during the operational period in 2012 (Table 4). Any missed passage of Chinook salmon during the first week of the operational period was assumed 0 based on run timing indicators. ASL samples were collected from 159 Chinook salmon, with daily sampling from 5 July to 2 August (Table 3); the sample size goal was not achieved.

A total escapement of 228 Chinook salmon was estimated to have passed the Takotna River weir during the operational period in 2012, all of which were observed (Table 4). No estimates were made for passage missed prior to weir installation (24 June–4 July). Historically, 0% to 22% of Chinook salmon passage occurs by 4 July, dependent on run timing. Chinook salmon run timing in 2012 appeared to be later than average; passage numbers were irregular, and some missed passage may have occurred during this period (Figure 8; Table 4). ASL samples were collected from 67 Chinook salmon, with daily sampling from 11 July to 21 August (Table 3); the sample size goal was not achieved.

Chum Salmon

Total chum salmon escapement was not estimated for 2012 due to large inoperable periods. A total of 3,134 chum salmon was counted past the Salmon River weir during operable periods (Table 5). ASL samples were collected opportunistically from 341 chum salmon from 18 July to 18 August (Table 3). Inoperability due to high water coupled with focused sampling on Chinook

salmon caused difficulties achieving predetermined pulse sample collections for chum salmon. Consequently, the sample size goal was not achieved.

A total escapement of 34,336 chum salmon was estimated to have passed the George River weir during the operational period in 2012; of these, 32,222 were observed (93.8% of total escapement; Table 5). ASL samples were collected in 4 pulses from 6 to 8 June (n = 223), 13 to 15 June (n = 222), 20 to 22 June (n = 223), and 27 to 29 June (n = 220), yielding 888 samples (Table 3). The sample size goal for each pulse was achieved; however, only 4 pulses were collected.

Historical run timing data for the Kogrukluk River showed 2012 chum salmon passage exhibiting late timing (Figure 9), and only an estimated 20% of the chum salmon run was considered to have been observed. Therefore, missed passage was not estimated and the total escapement count of chum salmon is considered incomplete. A total of 14,297 chum salmon were counted past the Kogrukluk River weir during the operational period (Table 5). Due to incomplete escapement data, it is unknown whether the escapement goal of 15,000 to 49,000 chum salmon was achieved. ASL samples were collected in 1 pulse from 7 to 10 August and yielded 304 samples (Table 3). Only 1 pulse sample was collected; sample size was met for that pulse.

A total of 44 chum salmon were observed passing the Telaquana River weir in 2012 (Table 5). Due to their low abundance, any missed passage was not estimated. ASL data was not collected for chum salmon (Table 3).

A total escapement of 44,572 chum salmon was estimated to have passed Tatlawiksuk River weir during the operational period in 2012; of these, 44,569 were observed (Table 5). ASL samples were collected in 4 pulses from 3 to 6 July (n = 214), 14 July (n = 226), 20 July to 22 July (n = 224), and 30 July to 2 August (n = 222), yielding a total sample of 886 fish (Table 3). The target number of pulses was not met; however, the pulses that were completed achieved adequate sample size.

A total escapement of 6,050 chum salmon was estimated to have passed Takotna River weir during the operational period in 2012, of these 6,013 were observed (Table 5). ASL samples were conducted in 4 pulses from 8 to 10 July (n = 287), 14 to 16 July (n = 223), 20 to 23 July (n = 203), and 27 to 29 July (n = 219), yielding 932 samples (Table 3). The sample size goal for each pulse was achieved; however, the target number of pulses was not.

Coho Salmon

The Salmon River weir was removed prior to the end of the coho salmon run and total escapement was not estimated. An observed escapement of 2,209 coho salmon passed the Salmon River weir during the operational period (Table 6). No ASL samples were collected (Table 3).

A total escapement of 15,272 coho salmon was estimated to have passed the George River weir during the operational period in 2012; of these, 14,295 were observed (93.6% of total escapement; Table 6). Missed passages occurring in June and July were assumed to be 0. ASL samples were collected in 2 pulses from 19 to 22 August (n = 200) and 1 to 4 September (n = 225), yielding 425 samples (Table 3). There were 2 pulse samples taken, and the sample size goal was achieved for both.

A total escapement of 13,697 coho salmon was estimated to have passed the Kogrukluk River weir during the operational period in 2012, and of these, 9,612 fish were observed (70.2% of total escapement; Table 6). All missed coho salmon passage occurring prior to 29 July was assumed to be 0 based on run timing indicators. The lower bound of the coho salmon escapement goal (13,000–28,000 fish) was exceeded. ASL samples were collected from 24 to 28 August (n = 201) and 9 September (n = 14), yielding 215 samples (Table 3). Only 1 pulse sample was collected; sample size was met for that pulse.

In 2012, 2 coho salmon were observed passing the Telaquana River weir (Table 6). Due to their low abundance, any missed passage was not estimated. ASL data was not collected for coho salmon (Table 3).

A total escapement of 8,070 coho salmon was estimated to have passed Tatlawiksuk River weir during the operational period in 2012, and of these 7,485 were observed (92.8% of total passage; Table 6). ASL samples were collected in 2 pulses from 14 to 16 August (n = 181) and from 22 to 25 August (n = 203), resulting in a total sample of 384 fish (Table 3). There were 2 pulses of coho salmon samples taken; the sample size goal was only achieved for 1 pulse.

A total escapement of 1,838 coho salmon was estimated to have passed the Takotna River weir during the operational period in 2012, and of these, 1,495 were observed (81.3% of total passage; Table 6). Passage missed caused by the late weir installation and from the partial day count on 18 July was assumed to be 0 based on historic run timing. ASL sampling was conducted in 2 pulses from 21 to 24 August (n = 212) and from 30 August to 2 September (n = 201) and yielded 413 samples (Table 3). The target number of pulses was not met; however, the pulses that were completed achieved adequate sample size.

Sockeye Salmon

Total sockeye salmon escapement was not estimated and considered incomplete due to periods of inoperability at Salmon River weir. An observed escapement of 905 sockeye salmon passed the weir during operational periods (Table 7). ASL samples were collected opportunistically from 150 sockeye salmon from 21 July to 19 August (Table 3). Inoperability due to high water and focused sampling on Chinook salmon caused difficulties for predetermined daily sample collections. Consequently, sampling goals for sockeye salmon were not achieved.

A total of 79 sockeye salmon were observed passing the George River weir (Table 7). All missed passage was assumed to be 0. Due to the low abundance of sockeye salmon at this project, ASL samples were not collected (Table 3).

Historical run timing data showed 2012 sockeye salmon passage exhibiting late run timing, and only an estimated 11% of the sockeye salmon run was considered to have been observed at Kogrukluk River weir. Therefore, missed passage was not estimated and the total escapement count of sockeye salmon is considered incomplete. An observed escapement of 1,320 sockeye salmon passed the weir during operational periods (Table 7). Due to incomplete escapement data, it is unknown whether the escapement goal of 4,400 to 17,000 sockeye salmon was achieved. ASL samples were collected from 47 sockeye salmon from 7 July to 11 August (Table 3); sampling goals were not met.

A total escapement of 22,994 sockeye salmon was estimated to have passed Telaquana River weir during the operational period in 2012, and of these, 22,760 fish were observed (99% of total passage; Table 7). ASL samples were collected in 2 pulses from 16 to 21 July (n = 116) and

27 July to 7 August (n = 119). Though full ASL samples took priority, an additional 50 sex and length samples were also collected during the first pulse for a length frequency analysis project. The total yielded 285 samples (Table 3). Lower than expected numbers of fish in 2012 hindered sampling goals.

Sockeye salmon abundances at the Tatlawiksuk and Takotna rivers were low; in 2012, 9 sockeye salmon were observed passing the Tatlawiksuk River weir and 0 sockeye salmon were observed at the Takotna River weir (Table 7). All missed passage of sockeye salmon was assumed 0 at both projects. ASL samples were not collected (Table 3).

Nontarget Species

In 2012, pink salmon were observed at all projects with the exception of the Takotna River weir (Appendix C1–C6). In addition, longnose suckers were observed at all projects with the exception of the Kogrukluk River weir. Arctic grayling, Dolly Varden, whitefish, and northern pike were observed at multiple projects; Telaquana River weir was the only project to observe lake trout, and the Salmon River weir was the only project to observe rainbow trout (Appendix C1–C6).

DISCUSSION

Weir operations were difficult throughout the Kuskokwim River drainage in 2012; heavy precipitation and high water rendered all projects inoperable at some point in the season, if not multiple times. The late installation and operational difficulties present at many Kuskokwim Area projects during 2012 hindered escapement enumeration and ASL collection. Specifically, river stage at the Salmon and Kogrukluk River weirs prevented enumeration to the extent that estimates could not be generated and severely affected the ability of the crews to collect evenly spaced and complete ASL sampling events.

When compared to historical escapement, projects that successfully operated had higher total escapement in 2012 than in the 2 years prior (Table 8). However, Chinook salmon escapement was overall below average at successfully operated weirs (Table 8). George River did not meet its escapement goal for Chinook salmon, and it is unknown if the Kogrukluk River escapement goal was met due to the inability to estimate total Chinook salmon escapement. In 2010 and 2011, escapement of Chinook salmon was the lowest on record at all projects, even with the implementation of inseason fishing closures (Table 8). The 2012 fishing season also included fishing closures, but the escapement goal was still not met for George River Chinook salmon. However, escapements were higher in 2012 than what were observed in 2010 and 2011 (Table 8). Overall, at projects that operated successfully, Chinook salmon run timings appeared to be later than average but within the historical ranges observed (Figure 8).

Chum salmon escapements were above average at all projects that operated in 2012 (Table 9). At projects that operated successfully, overall chum salmon run timing appeared average to late, but within the historical ranges observed (Figure 9). Although total escapement of chum salmon was not estimated at Kogrukluk River weir in 2012, it should be noted that the number of observed chum salmon was approximately 700 fish below the lower bound of the sustainable escapement goal (15,000 fish). Given that the amount of observed chum salmon was estimated to only represent 20% of the entire escapement based on run timing, it is likely that at least 700 more chum salmon passed the Kogrukluk River weir in 2012, and the lower bound of the escapement goal was therefore probably met.

Coho salmon escapements were average to below average. Total escapements were not as high as the previous year but were within historical ranges (Table 10). The Kogrukluk River coho salmon escapement goal was met in 2012. Across all projects, coho salmon run timing and duration were very similar to the median (Figure 10). At projects that operated successfully, overall coho salmon run timing appeared to be early to average and within the historical range (Figure 10).

Only 3 escapement monitoring projects discussed in this report see considerable runs of sockeye salmon. The Salmon and Telaquana River weirs have not successfully enumerated sockeye salmon escapements for more than 3 seasons because operations of these projects is relatively new. The Kogrukluk River sockeye salmon run appeared later than average (Figure 11); however, the majority of the run was not enumerated. Total escapement data was only collected at Telaquana River weir in 2012, and sockeye salmon escapement was the lowest of the 3 years that observations have been recorded (Table 11).

Although pink salmon play a minimal role in subsistence and management practices in the Kuskokwim drainage, their ecological importance warrants some continuing monitoring. In 2012, several Kuskokwim area projects saw strong escapements of pink salmon. The 6,271 pink salmon enumerated at the George River weir represented the largest historical pink salmon escapement count at that weir (Brannian et al. 2006b).

All data referenced in this report can be found and exported from the Arctic-Yukon-Kuskokwim (AYK) salmon database management system located at http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx.

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TABLES AND FIGURES

Table 1.–Target operational period and total escapement of Chinook, chum, coho, and sockeye salmon at Kuskokwim River escapement monitoring projects, 2012.

	Target Operational Period	Chinook	Chum	Coho	Sockeye
Salmon River weir	15 June–25 August	[a]	[a]	[b]	[a]
George River weir	15 June–20 September	2,302	34,336	15,272	[c]
Kogrukluk River weir	26 June–25 September	[a]	[a]	13,697	[a]
Telaquana River weir	1 July–31 August	[c]	[c]	[c]	22,994
Tatlawiksuk River weir	15 June–20 September	1,116	44,572	8,070	[c]
Takotna River weir	24 June–20 September	228	6,050	1,838	[c]

[a] Total escapement not determined due to operational difficulties.

[b] Project did not fully operate during run timing of this species.

[c] Not a target species with 0 to minimal escapement.

Table 2.–Formulation dates used for estimating missed passage using the nonlinear regression (exponential) method for Chinook, chum, and coho salmon at the George, Kogrukuluk, Tatlawiksuk, and Takotna River weirs, 2012.

	Chinook salmon	Chum salmon	Coho salmon
George River weir	1 July–7 July	1 July–7 July	6 Sept–12 Sept and 17 Sept–20 Sept
Kogrukluk River weir	NA	NA	30 Aug–3 Sept and 13 Sept–15 Sept
Tatlawiksuk River weir	NA	24 June–7 July	31 Aug–5 Sept and 13 Sept–14 Sept
Takotna River weir	NA	5 July–7 July	1 Sept–14 Sept

Table 3.–Age, sex, and length sample collection at Kuskokwim area escapement monitoring projects, 2012.

Species	Camp	Sampling strategy	Target number of pulses	Number of pulses completed	Sampling goal per pulse [a]	Scales per fish sampled	Season total number of samples collected
Chinook	Salmon	Daily	–	–	230	3	73
	George	Daily	–	–	230	3	197
	Kogrukluk	Daily	–	–	230	3	120
	Tatlawiksuk	Daily	–	–	230	3	159
	Takotna	Daily	–	–	230	3	67
chum	Salmon	Pulse	5	0	220	1	341
	George	Pulse	5	4	220	1	888
	Kogrukluk	Pulse	5	1	220	1	304
	Tatlawiksuk	Pulse	5	4	220	1	886
	Takotna	Pulse	5	4	220	1	932
coho	Salmon	Pulse	3	0	200	3	0
	George	Pulse	3	2	200	3	425
	Kogrukluk	Pulse	3	1	200	3	215
	Tatlawiksuk	Pulse	3	2	200	3	384
	Takotna	Pulse	3	2	200	3	413
sockeye	Salmon	Daily	–	–	400	3	150
	Kogrukluk	Daily	–	–	400	3	47
	Telaquana	Pulse	3	2	400	3	285[b]

[a] For species with daily sampling strategies, sampling goal per pulse constitutes the entire season goal, not the daily goal.

[b] Season total contains 50 sex and length samples.

Table 4.–Daily observed, estimated, and cumulative percent passage of Chinook salmon at Kuskokwim River weirs, 2012.

	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
6/15	[b]			[c]	2	0							[d]	0				
6/16	[b]			[c]	2	0							[d]	0				
6/17	[b]			[c]	3	0							[d]	0				
6/18	[b]			[c]	3	0							[d]	0				
6/19	[b]			[c]	4	0							[d]	0				
6/20	[b]			[c]	4	1							[d]	0				
6/21	[b]			[c]	6	1							[d]	0				
6/22	[b]			[c]	7	1							[d]	0				
6/23	[b]			[c]	9	1							0 [e]	0	0			
6/24	[b]			[c]	10	2							1		0	[b]		
6/25	[b]			[c]	13	2							0		0	[b]		
6/26	[b]			[c]	16	3	[b]						0		0	[b]		
6/27	[b]			[c]	19	3	[b]						0		0	[b]		
6/28	[b]			[c]	23	4	[b]						0		0	[b]		
6/29	[b]			[c]	28	5	[b]						2		0	[b]		
6/30	[b]			11 [f]	23	7	0						1		0	[b]		
7/1	[b]			74		10	2			[b]			0		0	[b]		
7/2	[b]			74		13	5			[b]			11		1	[b]		
7/3	0			26		14	2			[b]			4		2	[b]		
7/4	0			28		15	13			[b]			6		2	[b]		
7/5	0			150		22	44			0			6		3	3 [g]		1
7/6	0			146		28	53			0			19		4	1		2
7/7	4			167		36	59			0			32		7	21		11
7/8	8			55		38	83 [g]			0			14		9	0		11
7/9	[b]			45		40	[b]			0			360		41	1		11
7/10	[b]			121		46	[b]			0			77		48	1		12
7/11	[b]			47		48	[b]			0			47		52	9		16
7/12	[b]			40		49	[b]			0			42		56	3		17
7/13	[b]			245		60	[b]			0			75		63	17		25
7/14	[b]			60 [h]	59	66	[b]			0			11		63	5		27
7/15	[b]			90		69	[b]			0			20		65	1		27
7/16	[b]			102		74	[b]			0			27		68	6		30

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	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
7/17	5 [g]			50		76	[b]			0			45		72	5		32
7/18	21 [g]			66		79	[b]			0			102		81	35 [i]		47
7/19	42			87		83	[b]			0			17		82	16		54
7/20	21			31		84	[b]			1			22		84	1		55
7/21	38			69		87	[b]			0			35		88	7		58
7/22	1 [g]			41		89	[b]			0			32		90	29		71
7/23	[b]			29		90	[b]			0			18		92	4		72
7/24	[b]			57		93	[b]			1			9		93	9		76
7/25	8 [g]			58		96	[b]			0			18		94	29		89
7/26	26 [g]			11		96	[b]			0			17		96	9		93
7/27	31			26		97	[b]			1			2		96	3		94
7/28	31			16		98	12 [g]			0			7		97	2		95
7/29	57			4		98	249			0			2		97	2		96
7/30	19			4		98	179 [g]			1			4		97	1		96
7/31	7			6		98	[b]			0			0		97	0		96
8/1	8 [g]			0		98	34 [g]			0			5		98	0		96
8/2	39			2		99	90			0 [g]			4		98	0		96
8/3	30			4		99	87			0			3		98	1		97
8/4	4			4		99	22			0			2		99	0		97
8/5	11			4		99	37 [g]			0			2		99	0		97
8/6	16			5		99	55 [g]			0			3		99	0		97
8/7	4			0		99	23 [g]			1			1		99	0		97
8/8	10			1		99	19			0			5		100	0		97
8/9	7			2		99	13 [g]			0			0		100	0		97
8/10	6			3		100	12			0			1		100	1		97
8/11	4			5		100	7			0			2		100	0		97
8/12	4			2		100	5 [g]			0			0		100	0		97
8/13	3			1		100	10			0			0		100	0		97
8/14	2			0		100	5			0			2		100	0		97
8/15	3			0		100	5			0			0		100	0		97
8/16	1			0		100	5			0			0		100	0		97
8/17	0			0		100	4			0			0		100	0		97

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	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
8/18	1			0		100	2			0			0		100	0		97
8/19	0			0		100	4			0			0		100	1		98
8/20	0			0		100	2			0			1		100	0		98
8/21	0			1		100	1			0			0		100	1		98
8/22	0			0		100	1			0			0		100	0		98
8/23	1			0		100	2			0			0		100	1		99
8/24	[b]			0		100	3			0			0		100	0		99
8/25	[b]			0		100	1			0			0		100	1		99
8/26				0		100	1			0			0		100	0		99
8/27				0		100	2			0			0		100	0 [j]	0	99
8/28				0		100	0			[b]			0		100	0 [j]	0	99
8/29				0		100	0			[b]			0		100	0		99
8/30				0		100	1			[b]			0		100	0		99
8/31				1		100	0						0		100	0		99
9/1				0		100	1						0		100	0		99
9/2				0		100	1						0		100	1		100
9/3				0		100	0						0		100	0		100
9/4				0		100	[b]						0		100	0		100
9/5				0		100	[b]						0		100	0		100
9/6				0 [e]	0	100	[b]						[d]	0	100	[d]	0	100
9/7				0 [e]	0	100	[b]						[d]	0	100	[d]	0	100
9/8				0 [e]	0	100	[b]						[d]	0	100	[d]	0	100
9/9				0 [e]	0	100	[b]						[d]	0	100	[d]	0	100
9/10				0 [e]	0	100	[b]						[d]	0	100	[d]	0	100
9/11				0 [e]	0	100	[b]						[d]	0	100	0 [e]	0	100
9/12				0 [e]	0	100	[b]						0 [e]	0	100	0		100
9/13				0		100	0						0		100	0		100
9/14				0		100	0						0		100	1		100
9/15				0		100	0 [g]						0 [e]	0	100	[d]	0	100
9/16				0		100	0 [g]						[d]	0	100	[d]	0	100
9/17				[d]	0	100	[b]						[d]	0	100	[d]	0	100
9/18				[d]	0	100	[b]						[d]	0	100	[d]	0	100

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	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
9/19				[d]	0	100	[b]						[d]	0	100	[d]	0	100
9/20				[d]	0	100	[b]						[d]	0	100	[d]	0	100
9/21							[b]											
9/22							[b]											
9/23							[b]											
9/24							[b]											
9/25							[b]											
Totals	473	–		2,071	231		1,156	–		5	0		1,116	0		228	0	
Total Esc.		–			2,302			–			5			1,116			228	

[a] Estimate of daily missed passage. On days where a partial day count occurs (i.e., hole discovered midday), the observed passage ("Obs.") has been subtracted from the total day estimate to produce the missed passage estimate displayed ("Est.").

[b] The weir was not operational; missed passage was not estimated.

[c] The weir was not operational; missed passage was estimated using the nonlinear regression method.

[d] The weir was not operational; missed passage was assumed 0.

[e] Partial day count; missed passage was assumed 0.

[f] Partial day count; missed passage was estimated using the nonlinear regression method.

[g] Partial day count; missed passage was not estimated.

[h] Partial day count; missed passage was estimated using the single-day method.

[i] Partial day count; observed passage was larger than total estimated daily passage. Estimate discarded.

[j] Partial day count; missed passage was estimated using the linear interpolation method.

Table 5.–Daily observed, estimated, and cumulative percent passage of chum salmon at Kuskokwim River weirs, 2012.

	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
6/15	[b]			[c]	12	0							[c]	0	0			
6/16	[b]			[c]	15	0							[c]	0	0			
6/17	[b]			[c]	19	0							[c]	0	0			
6/18	[b]			[c]	23	0							[c]	0	0			
6/19	[b]			[c]	29	0							[c]	0	0			
6/20	[b]			[c]	35	0							[c]	0	0			
6/21	[b]			[c]	43	1							[c]	0	0			
6/22	[b]			[c]	53	1							[c]	1	0			
6/23	[b]			[c]	65	1							0 [d]	2	0			
6/24	[b]			[c]	80	1							11		0	[c]	0	0
6/25	[b]			[c]	99	1							4		0	[c]	0	0
6/26	[b]			[c]	122	2	[b]						4		0	[c]	0	0
6/27	[b]			[c]	150	2	[b]						24		0	[c]	0	0
6/28	[b]			[c]	185	3	[b]						184		1	[c]	0	1
6/29	[b]			[c]	227	3	[b]						287		1	[c]	0	1
6/30	[b]			75 [d]	205	4	19						390		2	[c]	1	2
7/1	[b]			449		5	54			[b]			508		3	[c]	1	3
7/2	[b]			528		7	134			[b]			780		5	[c]	4	5
7/3	10			431		8	95			[b]			419		6	[c]	9	6
7/4	15			296		9	126			[b]			709		7	[c]	22	8
7/5	10			888		12	346			0			1,144		10	56 [d]	0	10
7/6	7			1,092		15	700			0			1,787		14	136		12
7/7	81			1,507		19	925			0			2,270		19	352		17
7/8	105			1,012		22	1,089 [e]			0			925		21	99		19
7/9	[b]			564		24	[b]			0			1,382		24	232		22
7/10	[b]			1,099		27	[b]			0			1,387		27	208		26
7/11	[b]			1,115		30	[b]			0			1,135		30	260		29
7/12	[b]			866		33	[b]			0			1,675		34	263		33
7/13	[b]			1,491		37	[b]			1			2,250		39	258		37
7/14	[b]			567 [f]		41	[b]			3			1,184		41	265		41
7/15	[b]			1,232		45	[b]			0			1,898		46	315		46
7/16	[b]			1,688		50	[b]			1			2,167		51	270		50

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	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
7/17	74 [e]			1,550		54	[b]			0			2,989		57	263		55
7/18	135 [e]			1,387		58	[b]			3			2,693		63	336 [g]		60
7/19	178			1,984		64	[b]			0			1,807		67	364		65
7/20	307			964		67	[b]			2			1,607		71	198		68
7/21	294			1,276		70	[b]			7			1,431		74	334		73
7/22	8 [e]			1,321		74	[b]			3			1,299		77	246		77
7/23	[b]			1,291		78	[b]			7			1,325		80	226		80
7/24	[b]			1,285		82	[b]			0			1,290		83	156		83
7/25	99 [e]			1,059		85	[b]			1			1,256		86	160		85
7/26	97 [e]			698		87	[b]			1			1,075		88	157		87
7/27	118			559		88	[b]			2			691		90	126		89
7/28	119			651		90	442 [e]			0			862		92	121		91
7/29	87			418		92	3,318			1			633		93	109		92
7/30	73			303		92	2,300 [e]			0			517		94	77		94
7/31	59			286		93	[b]			1			293		95	73		95
8/1	44 [e]			189		94	389 [e]			1			347		96	48		95
8/2	113			304		95	1,022			0 [e]			349		96	54		96
8/3	144			304		96	786			0			296		97	28		97
8/4	70			234		96	376			0			160		97	36		97
8/5	105			200		97	231 [e]			1			184		98	25		98
8/6	135			180		97	394 [e]			0			168		98	45		98
8/7	72			163		98	287 [e]			0			125		99	14		99
8/8	47			109		98	248			1			98		99	25		99
8/9	114			84		98	78 [e]			0			98		99	29		99
8/10	73			75		99	173			0			92		99	12		99
8/11	63			69		99	111			0			67		99	9		100
8/12	68			61		99	95 [e]			1			48		99	8		100
8/13	55			50		99	73			2			92		100	0		100
8/14	38			44		99	68			0			30		100	10		100
8/15	31			29		99	52			2			26		100	3		100
8/16	19			33		100	77			0			15		100	2		100
8/17	11			49		100	62			1			11		100	0		100

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Table 5.–Page 3 of 4.

	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
8/18	12			8		100	33			0			13		100	0		100
8/19	19			8		100	53			1			13		100	3		100
8/20	9			10		100	22			0			8		100	0		100
8/21	5			3		100	28			0			12		100	0		100
8/22	5			6		100	23			0			6		100	0		100
8/23	6			11		100	13			1			0		100	2		100
8/24	[b]			7		100	9			0			3		100	0		100
8/25	[b]			6		100	8			0			1		100	0		100
8/26				5		100	12			0			0		100	0		100
8/27				3		100	8			0			2		100	0 [h]	0	100
8/28				9		100	2			[b]			4		100	0 [h]	0	100
8/29				14		100	7			[b]			1		100	0		100
8/30				6		100	1			[b]			4		100	0		100
8/31				4		100	1			[b]			3		100	0		100
9/1				3		100	3			[b]			0		100	0		100
9/2				4		100	1			[b]			0		100	0		100
9/3				3		100	1			[b]			1		100	0		100
9/4				0		100	[b]			[b]			0		100	0		100
9/5				1		100	[b]			[b]			0		100	0		100
9/6				0 [i]	0	100	[b]			[b]			[j]	0	100	[j]	0	100
9/7				1 [i]		100	[b]			[b]			[j]	0	100	[j]	0	100
9/8				0 [i]	0	100	[b]			[b]			[j]	0	100	[j]	0	100
9/9				0 [i]	0	100	[b]			[b]			[j]	0	100	[j]	0	100
9/10				0 [i]	0	100	[b]			[b]			[j]	0	100	[j]	0	100
9/11				0 [i]	0	100	[b]			[b]			[j]	0	100	0 [h]	0	100
9/12				0 [i]	0	100	[b]			[b]			0 [h]	0	100	0		100
9/13				0		100	0			[b]			0		100	0		100
9/14				0		100	2			[b]			0		100	0		100
9/15				1		100	0 [e]			[b]			0 [h]	0	100	[j]	0	100
9/16				0		100	0 [e]			[b]			[j]	0	100	[j]	0	100
9/17				[j]	0	100	[b]			[b]			[j]	0	100	[j]	0	100
9/18				[j]	0	100	[b]			[b]			[j]	0	100	[j]	0	100

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Table 5.–Page 4 of 4.

	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
9/19				[d]	0	100	[b]						[d]	0	100	[d]	0	100
9/20				[d]	0	100	[b]						[d]	0	100	[d]	0	100
9/21							[b]											
9/22							[b]											
9/23							[b]											
9/24							[b]											
9/25							[b]											
Totals	473	–		2,071	231		1,156	–		5	0		1,116	0	–	228	0	
Total Esc.	–				2,302		–				5			1,116			228	

[a] Estimate of daily missed passage. On days where a partial day count occurs (i.e., hole discovered midday), the observed passage ("Obs.") has been subtracted from the total day estimate to produce the missed passage estimate displayed ("Est.").

[b] The weir was not operational; missed passage was not estimated.

[c] The weir was not operational; missed passage was estimated using the nonlinear regression method.

[d] The weir was not operational; missed passage was assumed 0.

[e] Partial day count; missed passage was assumed 0.

[f] Partial day count; missed passage was estimated using the nonlinear regression method.

[g] Partial day count; missed passage was not estimated.

[h] Partial day count; missed passage was estimated using the single-day method.

[i] Partial day count; observed passage was larger than total estimated daily passage. Estimate discarded.

[j] Partial day count; missed passage was estimated using the linear interpolation method.

Table 6.–Daily observed, estimated, and cumulative percent passage of coho salmon at Kuskokwim River weirs, 2012.

	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
6/15	[b]			[c]	0	0							[c]	0				
6/16	[b]			[c]	0	0							[c]	0				
6/17	[b]			[c]	0	0							[c]	0				
6/18	[b]			[c]	0	0							[c]	0				
6/19	[b]			[c]	0	0							[c]	0				
6/20	[b]			[c]	0	0							[c]	0				
6/21	[b]			[c]	0	0							[c]	0				
6/22	[b]			[c]	0	0							[c]	0				
6/23	[b]			[c]	0	0							0 [d]	0	0			
6/24	[b]			[c]	0	0							0		0	[c]	0	0
6/25	[b]			[c]	0	0							0		0	[c]	0	0
6/26	[b]			[c]	0	0	[d]	0					0		0	[c]	0	0
6/27	[b]			[c]	0	0	[d]	0					0		0	[c]	0	0
6/28	[b]			[c]	0	0	[d]	0					0		0	[c]	0	0
6/29	[b]			[c]	0	0	[d]	0	0				0		0	[c]	0	0
6/30	[b]			0 [d]	0	0	0		0				0		0	[c]	0	0
7/1	[b]			0		0	0		0	[b]			0		0	[c]	0	0
7/2	[b]			0		0	0		0	[b]			0		0	[c]	0	0
7/3	0			0		0	0		0	[b]			0		0	[c]	0	0
7/4	0			0		0	0		0	[b]			0		0	[c]	0	0
7/5	0			0		0	0		0	0			0		0	0 [d]	0	0
7/6	0			0		0	0		0	0			0		0	0		0
7/7	0			0		0	0		0	0			0		0	0		0
7/8	0			0		0	0 [d]	0	0	0			0		0	0		0
7/9	[b]			0		0	[c]	0	0	0			0		0	0		0
7/10	[b]			0		0	[c]	0	0	0			0		0	0		0
7/11	[b]			0		0	[c]	0	0	0			0		0	0		0
7/12	[b]			0		0	[c]	0	0	0			0		0	0		0
7/13	[b]			0		0	[c]	0	0	0			0		0	0		0
7/14	[b]			0 [d]	0	0	[c]	0	0	0			0		0	0		0
7/15	[b]			0		0	[c]	0	0	0			0		0	0		0
7/16	[b]			0		0	[c]	0	0	0			0		0	0		0

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Table 6.–Page 2 of 4.

	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
7/17	0 [e]			0		0	[c]	0	0	0			0		0	0		0
7/18	0 [e]			0		0	[c]	0	0	0			0		0	0 [c]	0	0
7/19	0			0		0	[c]	0	0	0			0		0	0		0
7/20	0			0		0	[c]	0	0	0			0		0	0		0
7/21	0			0		0	[c]	0	0	0			0		0	0		0
7/22	0 [e]			0		0	[c]	0	0	0			0		0	0		0
7/23	[b]			0		0	[c]	0	0	0			0		0	0		0
7/24	[b]			0		0	[c]	0	0	0			0		0	0		0
7/25	0 [e]			0		0	[c]	0	0	0			4		0	0		0
7/26	0 [e]			1		0	[c]	0	0	0			0		0	0		0
7/27	0			0		0	[c]	0	0	0			0		0	0		0
7/28	0			0		0	0 [d]	0	0	0			0		0	0		0
7/29	0			5		0	0		0	0			1		0	0		0
7/30	1			5		0	3 [f]	0	0	0			1		0	0		0
7/31	1			6		0	[g]	7	0	0			10		0	0		0
8/1	1 [e]			10		0	1 [f]	9	0	0			18		0	0		0
8/2	5			18		0	12		0	0 [e]			21		1	2		0
8/3	8			23		0	15		0	0			47		1	0		0
8/4	5			26		1	14		0	0			39		2	0		0
8/5	2			23		1	12 [f]	5	1	0			61		3	2		0
8/6	7			29		1	14 [f]	6	1	0			65		3	0		0
8/7	1			67		1	21 [f]	1	1	0			102		5	6		1
8/8	23			66		2	41		1	0			126		6	2		1
8/9	22			75		2	24 [f]	3	1	0			94		7	1		1
8/10	36			44		3	35		2	0			150		9	3		1
8/11	91			48		3	25		2	0			165		11	7		1
8/12	108			52		3	41 [h]		2	0			184		13	10		2
8/13	119			95		4	46		2	0			215		16	4		2
8/14	189			50		4	40		3	0			352		21	18		3
8/15	147			175		5	44		3	0			365		25	5		3
8/16	39			173		6	110		4	0			426		30	40		5
8/17	154			553		10	132		5	0			232		33	15		6

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Table 6.–Page 3 of 4.

	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
8/18	167			210		11	57		5	0			432		39	11		7
8/19	287			798		17	292		7	0			413		44	177		16
8/20	196			502		20	345		10	0			376		48	63		20
8/21	81			71		20	477		13	0			324		52	61		23
8/22	159			181		22	229		15	1			206		55	42		26
8/23	360			725		26	442		18	0			254		58	113		32
8/24	[b]			987		33	737		24	0			159		60	93		37
8/25	[b]			1,071		40	577		28	0			240		63	108		43
8/26				736		45	620		32	0			211		66	88		47
8/27				1,336		53	827		38	1			212		68	37 [f]	65	53
8/28				691		58	235		40	[b]			167		70	18 [f]	87	59
8/29				730		63	399		43	[b]			225		73	139		66
8/30				830		68	800		49	[b]			311		77	79		71
8/31				454		71	824		55				337		81	43		73
9/1				223		73	522		59				202		84	74		77
9/2				316		75	274		61				191		86	48		79
9/3				642		79	666		66				191		88	62		83
9/4				350		81	[i]	450	69				102		90	52		86
9/5				423		84	[i]	414	72				114		91	33		87
9/6				287 [j]	65	86	[i]	380	75				[i]	108	92	[i]	34	89
9/7				186 [j]	122	88	[i]	349	77				[i]	94	94	[i]	30	91
9/8				155 [j]	115	90	[i]	321	80				[i]	81	95	[i]	26	92
9/9				115 [j]	122	92	[i]	294	82				[i]	71	95	[i]	22	94
9/10				49 [j]	158	93	[i]	270	84				[i]	61	96	[i]	20	95
9/11				112 [j]	70	94	[i]	248	86				[i]	53	97	0 [j]	17	96
9/12				106 [j]	53	95	[i]	228	87				31 [j]	15	97	14		96
9/13				137		96	225		89				51		98	10		97
9/14				122		97	215		90				31		98	15		98
9/15				113		98	160 [j]	17	92				27 [j]	3	99	[i]	10	98
9/16				93		98	59 [j]	103	93				[i]	26	99	[i]	8	99
9/17				[i]	82	99	[i]	149	94				[i]	22	99	[i]	7	99
9/18				[i]	72	99	[i]	137	95				[i]	19	100	[i]	6	99

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Table 6.–Page 4 of 4.

	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
9/19				[i]	63	100	[i]	126	96				[i]	17	100	[i]	6	100
9/20				[i]	55	100	[i]	116	97				[i]	15	100	[i]	5	100
9/21							[i]	106	97									
9/22							[i]	98	98									
9/23							[i]	90	99									
9/24							[i]	82	99									
9/25							[i]	76	100									
Totals	2,209	–		14,295	977		9,612	4,085		2	0		7,485	585		1,495	343	
Total Esc.		–			15,272			13,697			2			8,070			1,838	

[a] Estimate of daily missed passage. On days where a partial day count occurs (i.e., hole discovered midday), the observed passage ("Obs.") has been subtracted from the total day estimate to produce the missed passage estimate displayed ("Est.").

[b] The weir was not operational; missed passage was not estimated.

[c] The weir was not operational; missed passage was estimated using the nonlinear regression method.

[d] The weir was not operational; missed passage was assumed 0.

[e] Partial day count; missed passage was assumed 0.

[f] Partial day count; missed passage was estimated using the nonlinear regression method.

[g] Partial day count; missed passage was not estimated.

[h] Partial day count; missed passage was estimated using the single-day method.

[i] Partial day count; observed passage was larger than total estimated daily passage. Estimate discarded.

[j] Partial day count; missed passage was estimated using the linear interpolation method.

Table 7.–Daily observed, estimated, and cumulative percent passage of sockeye salmon at Kuskokwim River weirs, 2012.

	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
6/15	[b]			[c]	0					[b]			[c]	0				
6/16	[b]			[c]	0					[b]			[c]	0				
6/17	[b]			[c]	0					[b]			[c]	0				
6/18	[b]			[c]	0					[b]			[c]	0				
6/19	[b]			[c]	0					[b]			[c]	0				
6/20	[b]			[c]	0					[b]			[c]	0				
6/21	[b]			[c]	0					[b]			[c]	0				
6/22	[b]			[c]	0					[b]			[c]	0				
6/23	[b]			[c]	0					[b]			0 [d]	0				
6/24	[b]			[c]	0					[b]			0			[c]	0	
6/25	[b]			[c]	0		[b]			[b]			0			[c]	0	
6/26	[b]			[c]	0		[b]			[b]			0			[c]	0	
6/27	[b]			[c]	0		[b]			[b]			0			[c]	0	
6/28	[b]			[c]	0		[b]			[b]			0			[c]	0	
6/29	[b]			[c]	0		[b]			[b]			0			[c]	0	
6/30	[b]			0 [d]	0		0			[b]			0			[c]	0	
7/1	[b]			0			2			[b]			0			[c]	0	
7/2	[b]			0			1			[b]			0			[c]	0	
7/3	0			0			0			[b]			0			[c]	0	
7/4	0			0			0			[b]			0			[c]	0	
7/5	0			0			15			0		0	0			0 [d]	0	
7/6	0			1			28			0		0	1			0		
7/7	0			0			56			0		0	0			0		
7/8	0			0			24 [e]			0		0	0			0		
7/9	[b]			0			[b]			0		0	0			0		
7/10	[b]			1			[b]			0		0	0			0		
7/11	[b]			0			[b]			0		0	0			0		
7/12	[b]			0			[b]			3		0	0			0		
7/13	[b]			0			[b]			194		1	0			0		
7/14	[b]			1 [d]	0		[b]			403		3	0			0		
7/15	[b]			0			[b]			472		5	4			0		
7/16	[b]			0			[b]			1,982		13	0			0		

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Table 7.–Page 2 of 4.

	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
7/17	0 [e]			0			[b]			1,582		20	1			0		
7/18	4 [e]			0			[b]			1,630		27	0			0 [d]	0	
7/19	1			1			[b]			748		31	0			0		
7/20	0			0			[b]			1,609		38	0			0		
7/21	5			0			[b]			1,611		45	2			0		
7/22	0 [e]			0			[b]			1,233		50	0			0		
7/23	[b]			2			[b]			1,826		58	0			0		
7/24	[b]			3			[b]			1,329		64	0			0		
7/25	1 [e]			1			[b]			1,162		69	0			0		
7/26	1 [e]			1			[b]			659		72	1			0		
7/27	6			5			[b]			526		74	0			0		
7/28	2			4			19 [e]			995		78	0			0		
7/29	9			4			455			880		82	0			0		
7/30	6			2			274 [e]			1,043		86	0			0		
7/31	10			1			[b]			422		88	0			0		
8/1	7 [e]			1			23 [e]			469		90	0			0		
8/2	30			1			66			115 [f]	234	92	0			0		
8/3	69			0			78			242		93	0			0		
8/4	52			2			46			263		94	0			0		
8/5	42			5			15 [e]			303		95	0			0		
8/6	45			5			52 [e]			125		96	0			0		
8/7	51			9			49 [e]			170		97	0			0		
8/8	52			1			52			186		97	0			0		
8/9	95			0			18 [e]			54		98	0			0		
8/10	70			0			10			124		98	0			0		
8/11	83			2			8			57		99	0			0		
8/12	82			3			3 [e]			78		99	0			0		
8/13	26			6			2			55		99	0			0		
8/14	54			2			1			74		99	0			0		
8/15	38			2			3			9		99	0			0		
8/16	19			8			4			31		100	0			0		
8/17	18			4			2			8		100	0			0		

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Table 7.–Page 3 of 4.

	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
8/18	7			0			1			17		100	0			0		
8/19	8			0			4			8		100	0			0		
8/20	3			0			1			12		100	0			0		
8/21	3			0			2			7		100	0			0		
8/22	3			0			0			13		100	0			0		
8/23	3			1			0			11		100	0			0		
8/24	[b]			0			1			8		100	0			0		
8/25	[b]			0			3			2		100	0			0		
8/26				0			1			5		100	0			0		
8/27				0			0			5		100	0			0 [d]	0	
8/28				0			0						0			0 [d]	0	
8/29				0			0						0			0		
8/30				0			0						0			0		
8/31				0			0						0			0		
9/1				0			0						0			0		
9/2				0			0						0			0		
9/3				0			1						0			0		
9/4				0			[b]						0			0		
9/5				0			[b]						0			0		
9/6				0 [d]	0		[b]						[c]	0		[c]	0	
9/7				0 [d]	0		[b]						[c]	0		[c]	0	
9/8				0 [d]	0		[b]						[c]	0		[c]	0	
9/9				0 [d]	0		[b]						[c]	0		[c]	0	
9/10				0 [d]	0		[b]						[c]	0		[c]	0	
9/11				0 [d]	0		[b]						[c]	0		0 [d]	0	
9/12				0 [d]	0		[b]						0 [d]	0		0		
9/13				0			0						0			0		
9/14				0			0						0			0		
9/15				0			0 [e]						0 [d]	0		[c]	0	
9/16				0			0 [e]						[c]	0		[c]	0	
9/17				[c]	0		[b]						[c]	0		[c]	0	
9/18				[c]	0		[b]						[c]	0		[c]	0	

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Table 7.–Page 4 of 4.

	Salmon River			George River			Kogrukluk River			Telaquana River			Tatlawiksuk River			Takotna River		
Date	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%	Obs.	Est. [a]	%
9/19				[c]	0		[b]						[c]	0	100	[c]	0	
9/20				[c]	0		[b]						[c]	0	100	[c]	0	
9/21							[b]											
9/22							[b]											
9/23							[b]											
9/24							[b]											
9/25							[b]											
Totals	905	–		79	0		1,320	0		22,760	234		9	0		0	0	
Total Esc.		–			79			1,320			22,994			9			0	

[a] Estimate of daily missed passage. On days where a partial day count occurs (i.e., hole discovered midday), the observed passage ("Obs.") has been subtracted from the total day estimate to produce the missed passage estimate displayed ("Est.").

[b] The weir was not operational; missed passage was not estimated.

[c] The weir was not operational; missed passage was estimated using the nonlinear regression method.

[d] The weir was not operational; missed passage was assumed 0.

[e] Partial day count; missed passage was assumed 0.

[f] Partial day count; missed passage was estimated using the nonlinear regression method.

[g] Partial day count; missed passage was not estimated.

[h] Partial day count; missed passage was estimated using the single-day method.

[i] Partial day count; observed passage was larger than total estimated daily passage. Estimate discarded.

[j] Partial day count; missed passage was estimated using the linear interpolation method.

Table 8.–Total cumulative Chinook salmon escapement past 5 Kuskokwim area tributary weirs, 1998–2012.

Year	Salmon River	George River	Kogrukluk River	Tatlawiksuk River	Takotna River
1998	[a]	[b]	[b]	[b]	[a]
1999	[a]	[b]	5,570	1,490	[a]
2000	[a]	2,960	3,310	810	345
2001	[a]	3,309	9,296	2,010	721
2002	[a]	2,444	10,105	2,237	316
2003	[a]	[b]	11,771	[b]	378
2004	[a]	5,206	19,651	2,833	461
2005	[a]	3,845	21,999	2,918	499
2006	[c]	4,355	19,414	1,700	541
2007	6,220	4,883	[b]	2,061	418
2008	2,376	2,698	9,730	1,071	413
2009	[c]	3,663	9,701	1,071	311
2010	[a]	1,500	5,693	569	178
2011	[a]	1,571	6,890	1,014	148
2012	[b]	2,302	[b]	1,116	228

[a] Weir did not operate this year.

[b] Weir experienced operational difficulties; total escapement was not determined.

[c] Season was incomplete due to project priorities; total escapement was not determined.

Table 9.–Total cumulative chum salmon escapement past 5 Kuskokwim Area tributary weirs, 1998–2012.

Year	Salmon River	George River	Kogrukluk River	Tatlawiksuk River	Takotna River
1998	[a]	[b]	[b]	[b]	[a]
1999	[a]	11,553	13,820	9,600	[a]
2000	[a]	3,492	11,491	6,965	1,265
2001	[a]	11,601	30,571	23,719	5,411
2002	[a]	6,544	51,570	24,542	4,399
2003	[a]	33,663	23,412	[b]	3,388
2004	[a]	14,408	24,201	21,245	1,633
2005	[a]	14,828	197,723	55,723	6,488
2006	[c]	41,467	180,601	32,303	12,652
2007	25,379	55,843	49,509	83,246	8,874
2008	9,459	29,979	44,978	30,896	5,704
2009	[c]	7,941	84,940	19,975	2,528
2010	[a]	26,154	63,582	36,702	4,057
2011	[a]	44,641	76,386	84,204	8,413
2012	[b]	34,336	[a]	44,572	6,050

[a] Weir did not operate this year.

[b] Weir experienced operational difficulties; total escapement was not determined.

[c] Season was incomplete due to project priorities; total escapement was not determined.

Table 10.–Total cumulative coho salmon escapement past 5 Kuskokwim Area tributary weirs, 1998–2012.

Year	Salmon River	George River	Kogrukluk River	Tatlawiksuk River	Takotna River
1998	[a]	[b]	24,346	[b]	[a]
1999	[a]	8,914	12,609	3,449	[a]
2000	[a]	11,262	33,135	[b]	3,944
2001	[a]	14,398	19,387	[b]	2,606
2002	[a]	6,759	14,518	11,345	3,982
2003	[a]	33,281	74,605	[b]	7,146
2004	[a]	12,499	27,042	16,410	3,201
2005	[a]	8,200	24,115	7,496	2,209
2006	[c]	11,294	17,011	[b]	5,556
2007	[c]	29,317	27,034	8,686	2,836
2008	11,022	21,931	29,661	11,065	2,807
2009	6,391	12,464	22,981	10,148	2,704
2010	[a]	12,961	13,970	3,521	3,217
2011	[a]	30,028	24,174	12,927	4,062
2012	[c]	15,272	13,697	8,070	1,838

[a] Weir did not operate this year.

[b] Weir experienced operational difficulties; total escapement was not determined.

[c] Season was incomplete due to project priorities; total escapement was not determined.

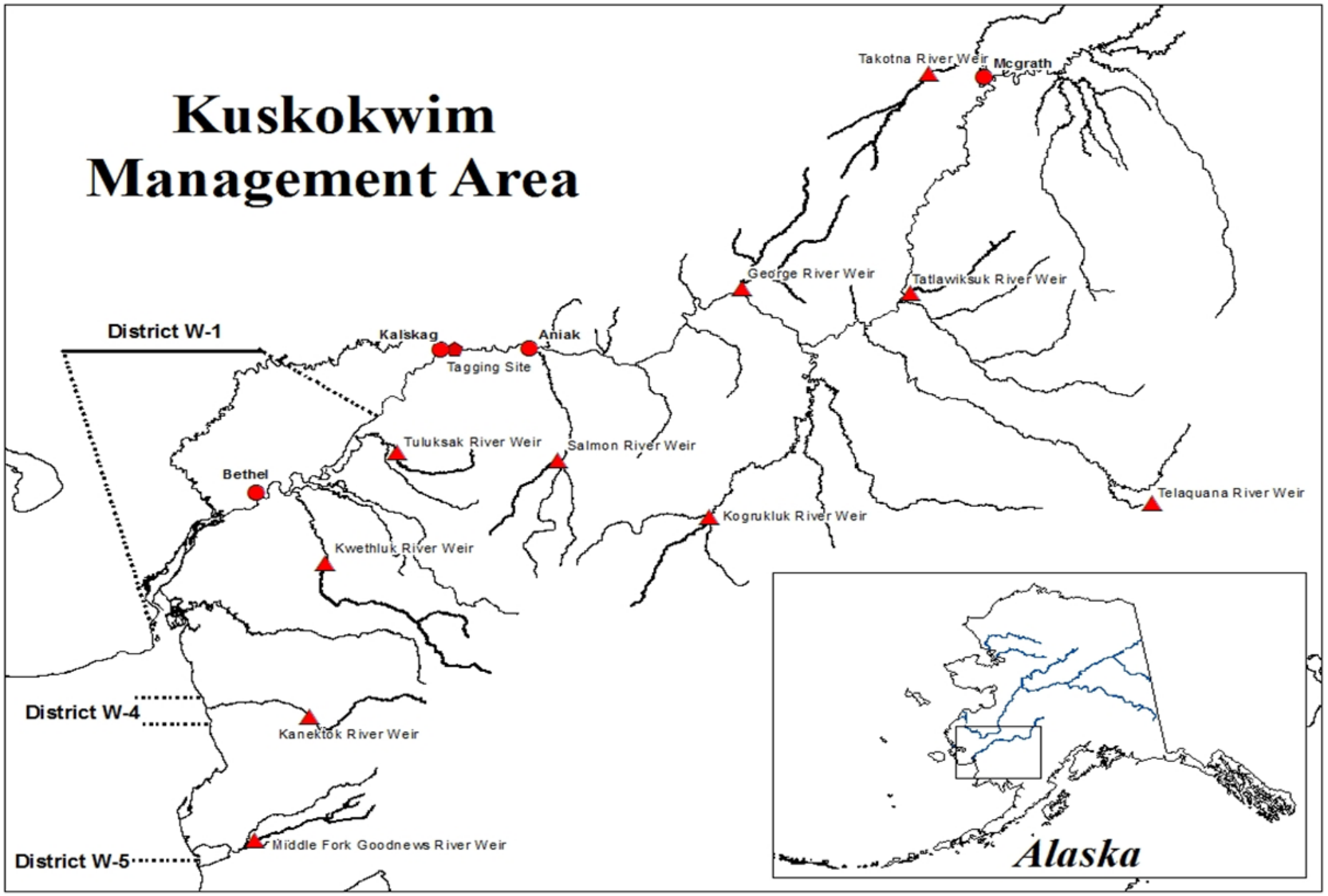
Table 11.–Total cumulative sockeye salmon escapement past 3 Kuskokwim Area tributary weirs, 1998–2012.

Year	Salmon River	Kogrukluk River	Telaquana River
1998	[a]	16,772	[a]
1999	[a]	5,864	[a]
2000	[a]	2,865	[a]
2001	[a]	8,775	[a]
2002	[a]	4,050	[a]
2003	[a]	9,164	[a]
2004	[a]	6,775	[a]
2005	[a]	37,939	[a]
2006	[c]	60,807	[a]
2007	2,130	16,526	[a]
2008	1,181	19,675	[a]
2009	[c]	23,785	[a]
2010	[a]	13,997	72,020
2011	[a]	8,135	35,105
2012	[b]	[b]	22,994

[a] Weir did not operate this year.

[b] Weir experienced operational difficulties; total escapement was not determined.

[c] Season was incomplete due to project priorities; total escapement was not determined.



Note: Triangles represent weir sites, circles represent communities, and the pentagon represents the tagging site.

Figure 1.–Kuskokwim Area salmon management districts and escapement monitoring projects with emphasis on weir tributaries.

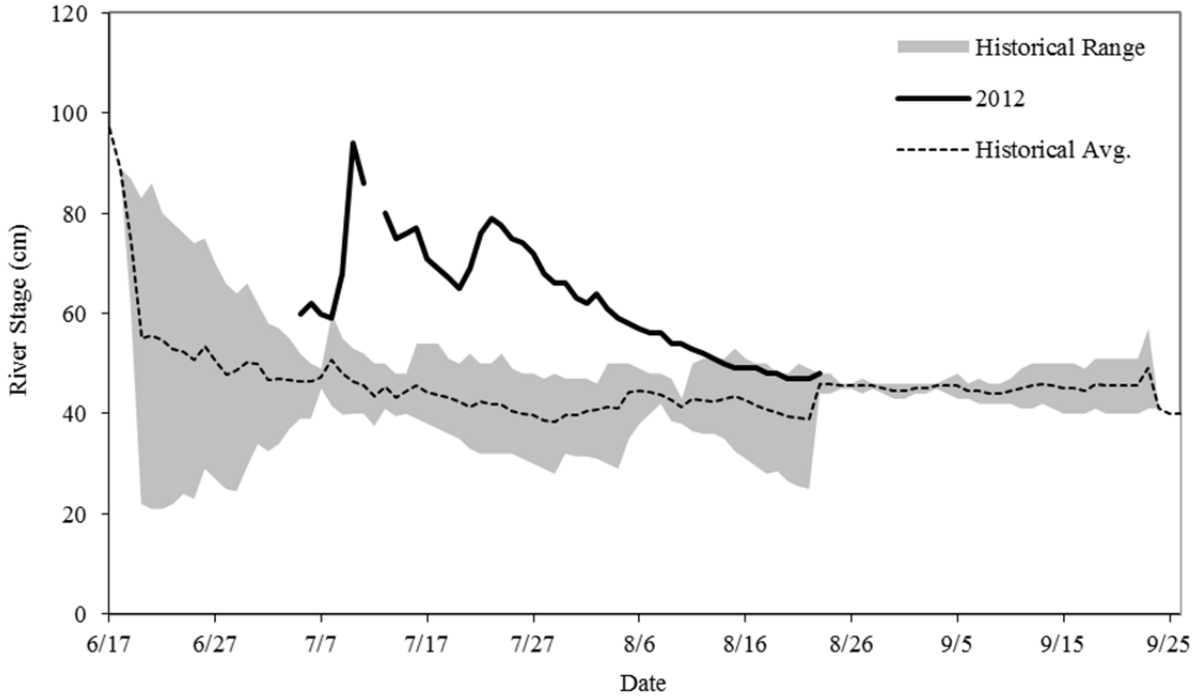


Figure 2.–Daily morning river stage at Salmon River weir in 2012 relative to its historical average, minimum, and maximum morning readings, 2006–2009.

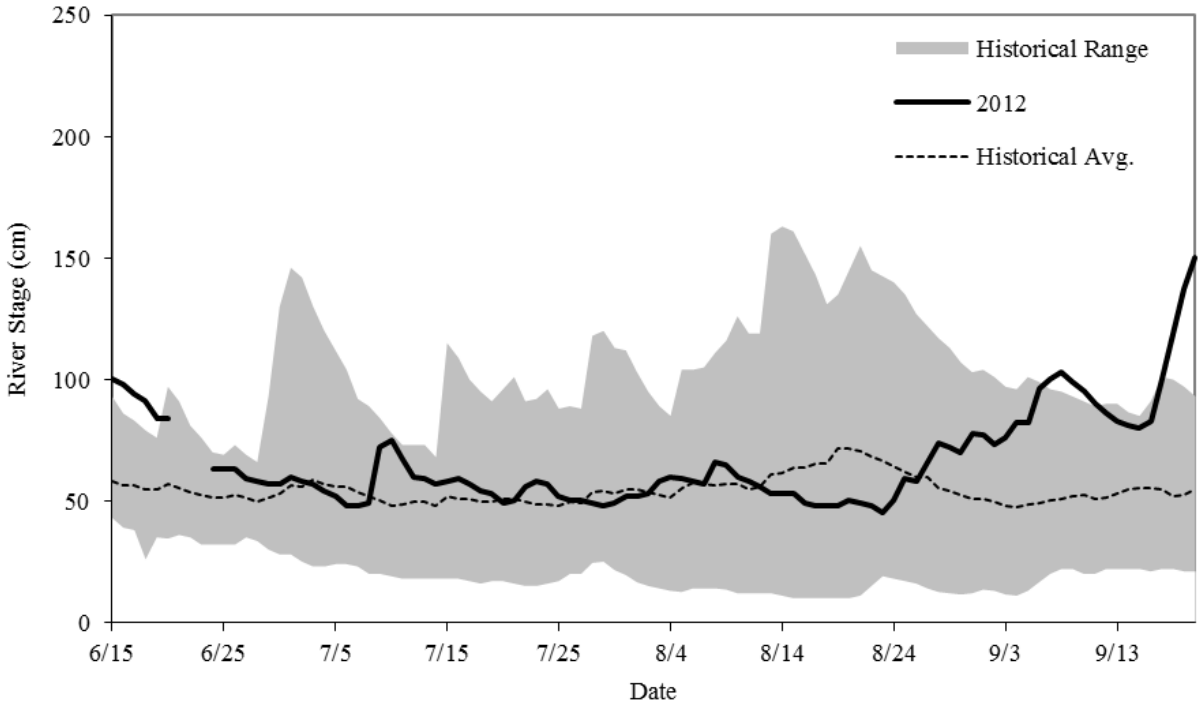


Figure 3.–Daily morning river stage at George River weir in 2012 relative to its historical average, minimum, and maximum morning readings, 2000–2011.

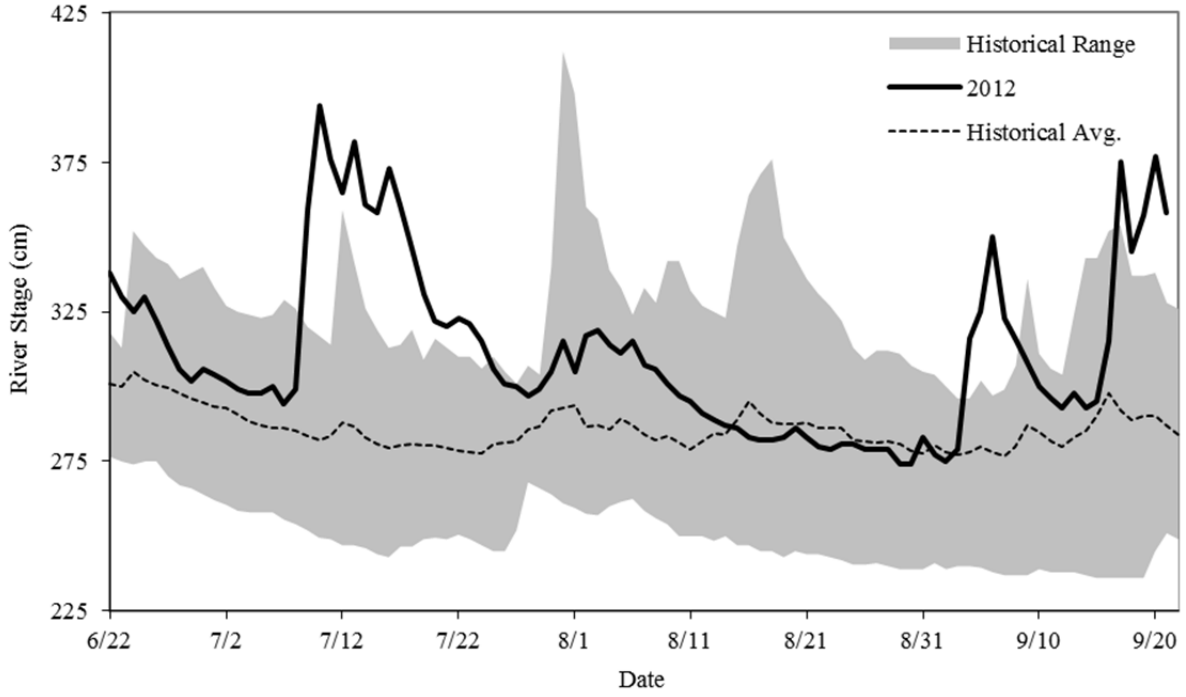


Figure 4.–Daily morning river stage at Kogrukluk River weir in 2012 relative to its historical average, minimum, and maximum morning readings, 2002–2011.

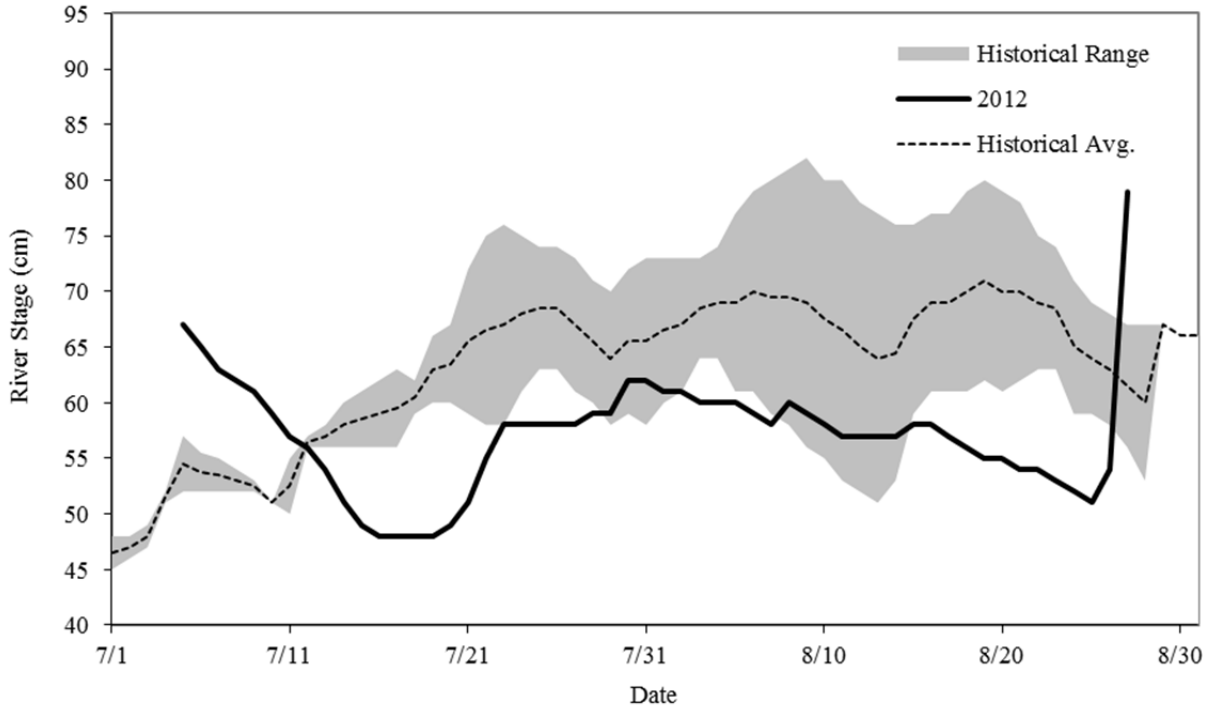


Figure 5.–Daily morning river stage at Telaquana River weir in 2012 relative to its historical average, minimum, and maximum morning readings, 2010–2011.

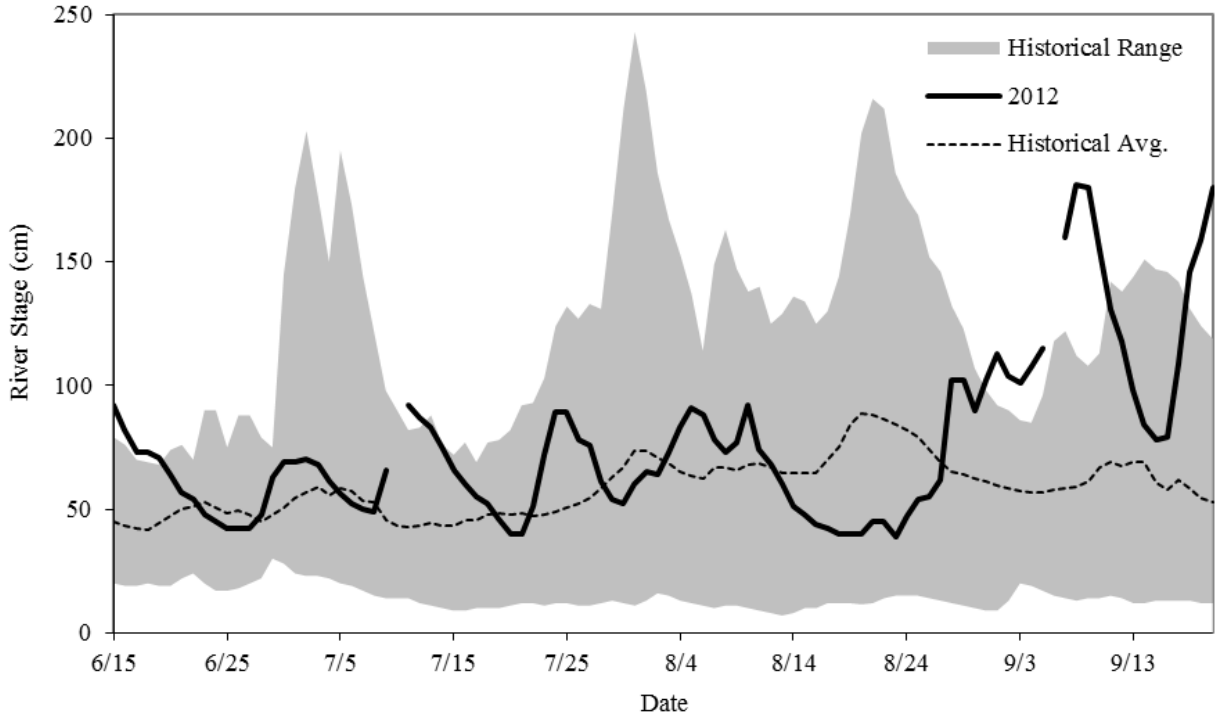


Figure 6.–Daily morning river stage at Tatlawiksuk River weir in 2012 relative to its historical average, minimum, and maximum morning readings, 1998–2011.

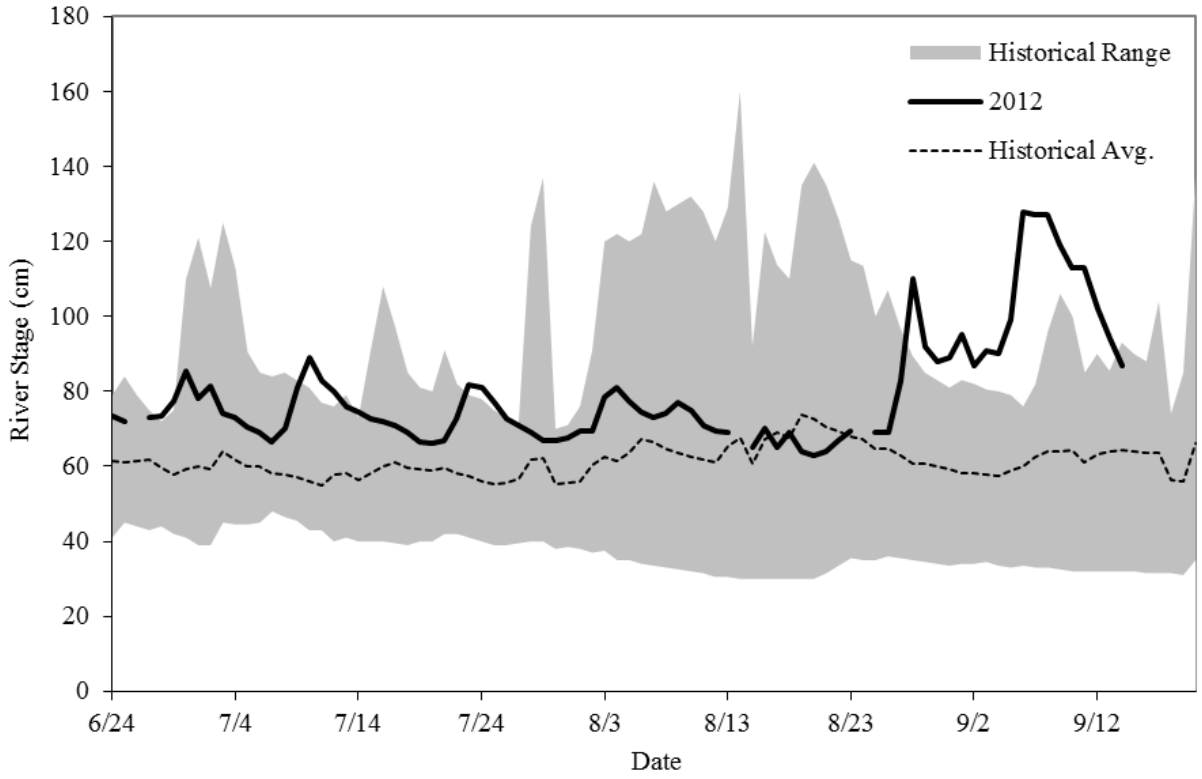
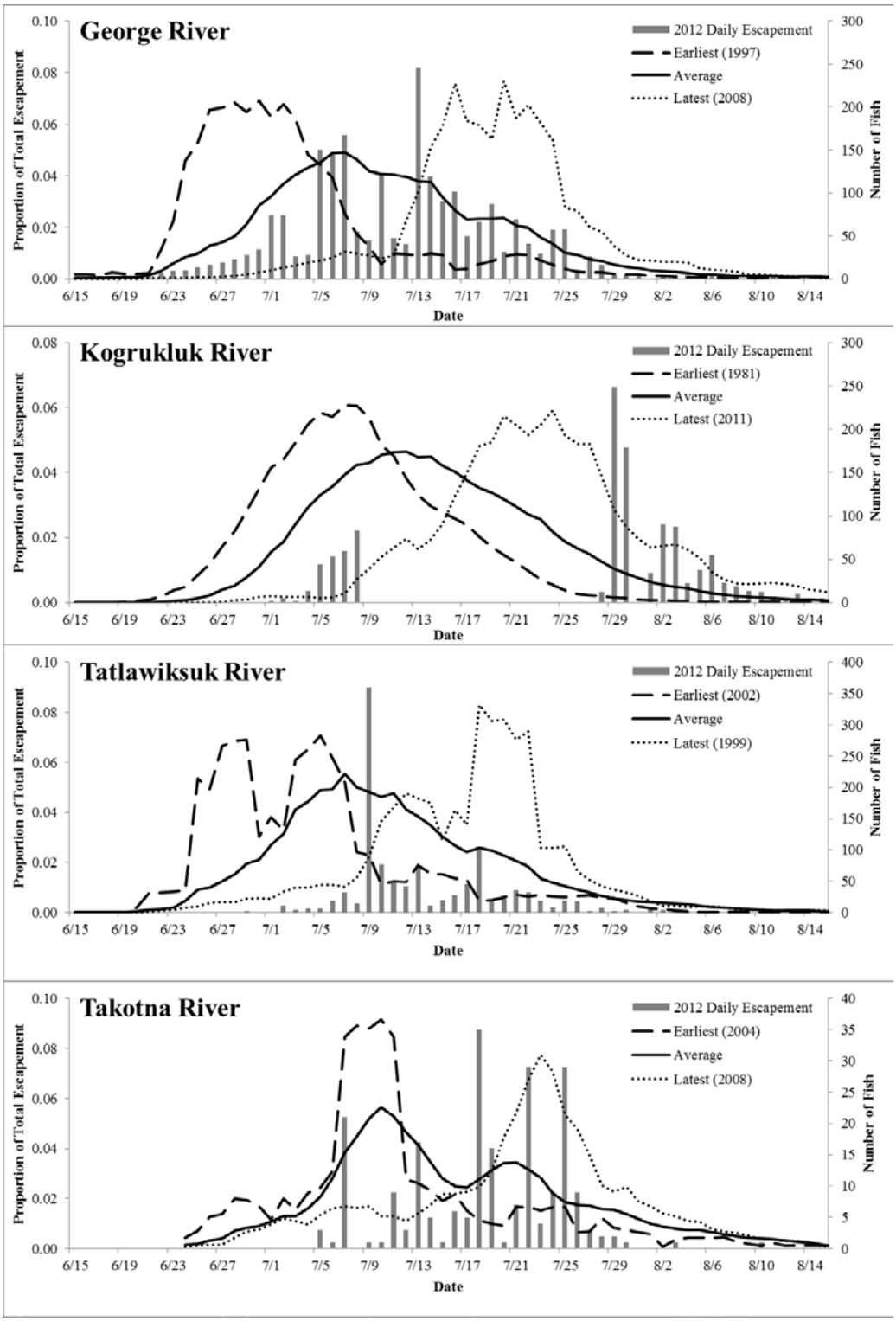
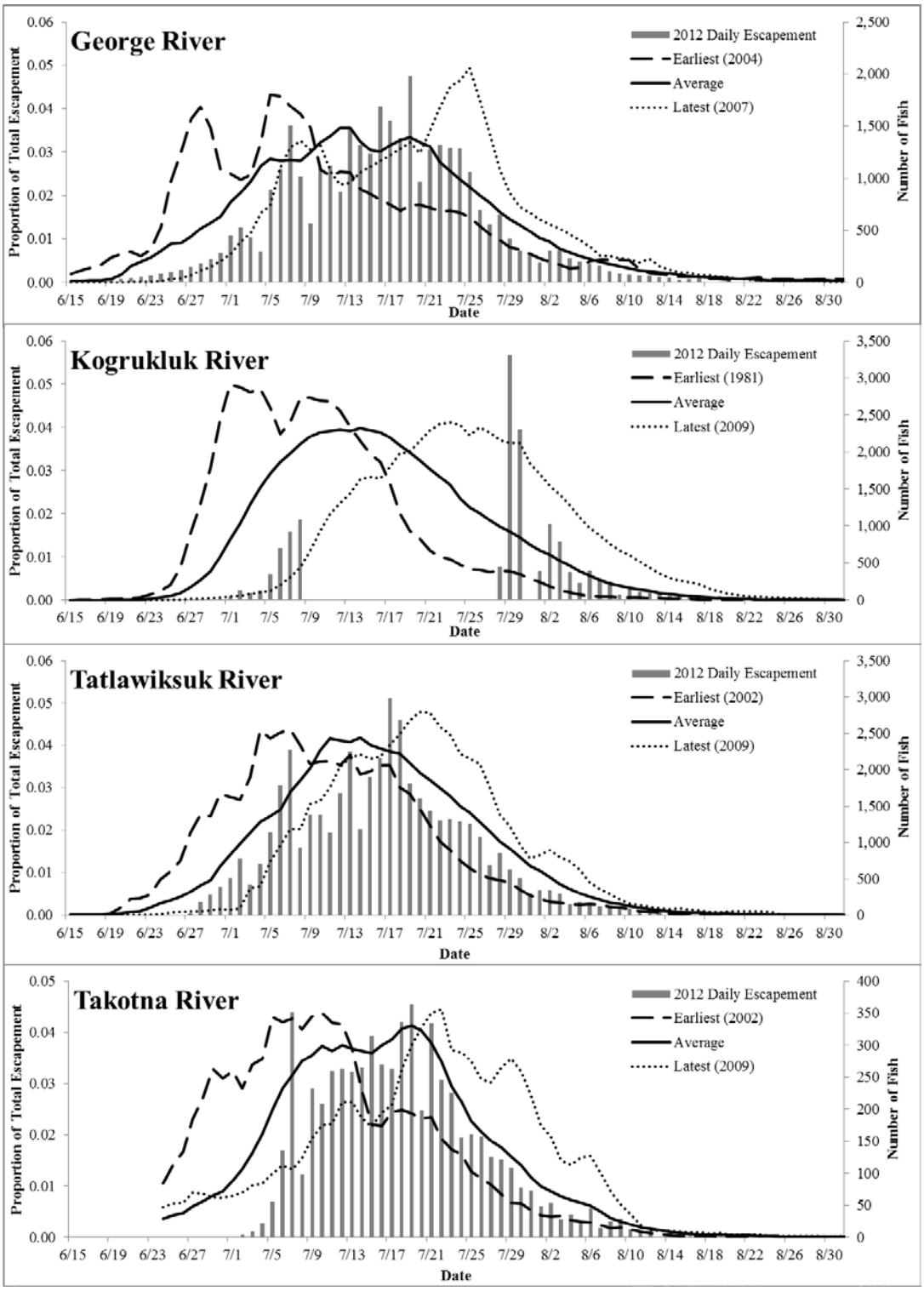


Figure 7.–Daily morning river stage at Takotna River weir in 2012 relative to its historical average and range, 2000–2011.



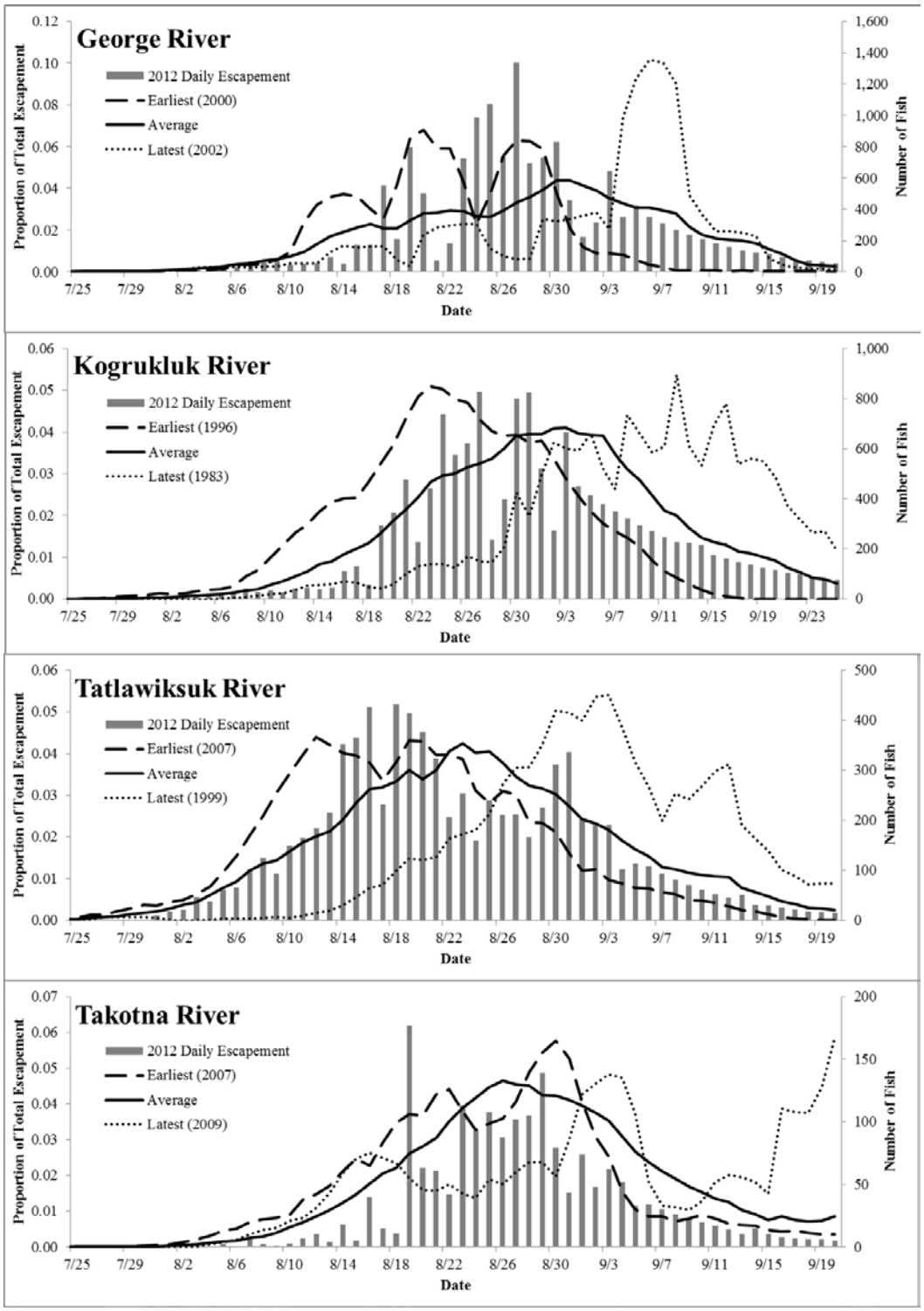
Note: Lines represent run timings displayed in proportions of total escapement (left *y*-axis); columns represent daily escapements displayed in number of fish (right *y*-axis). Run timings shown are 5-day averages. Average run timing derived from all weir escapements available for the project that meet a minimum of 80% observed escapement.

Figure 8.–Earliest, average, and latest run timings on record at Kuskokwim Area tributary weirs and 2012 daily escapements for Chinook salmon.



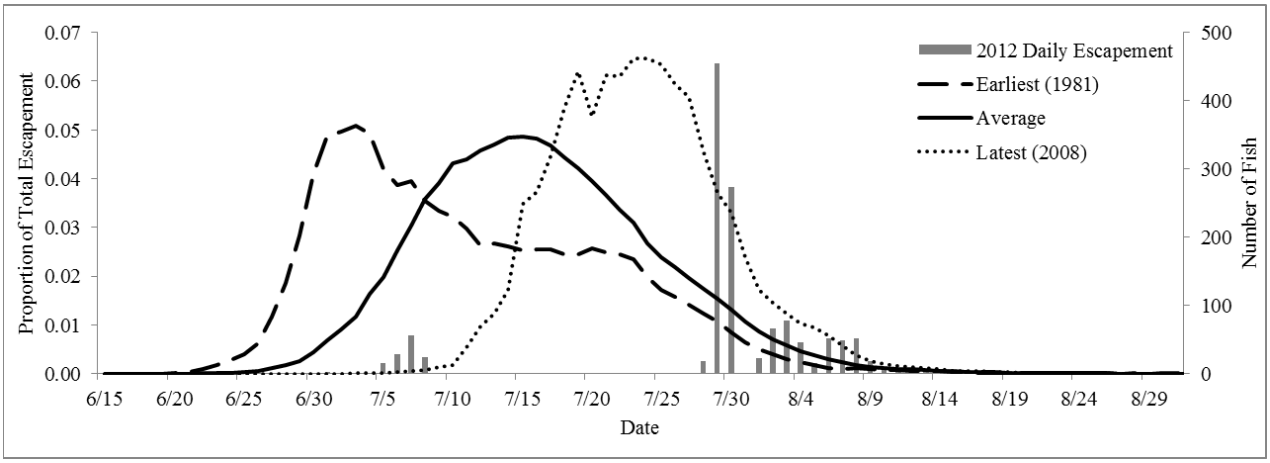
Note: Lines represent run timings displayed in proportions of total escapement (left *y*-axis); columns represent daily escapements displayed in number of fish (right *y*-axis). Run timings shown are 5-day averages. Average run timing derived from all weir escapements available for the project that meet a minimum of 80% observed escapement.

Figure 9.–Earliest, average, and latest run timings on record at Kuskokwim Area tributary weirs and 2012 daily escapements for chum salmon.



Note: Lines represent run timings displayed in proportions of total escapement (left *y*-axis); columns represent daily escapements displayed in number of fish (right *y*-axis). Run timings shown are 5-day averages. Average run timing derived from all weir escapements available for the project that meet a minimum of 80% observed escapement.

Figure 10.–Earliest, average, and latest run timings on record at Kuskokwim Area tributary weirs and 2012 daily escapements for coho salmon.



Note: Run timings shown are 5-day averages. Average run timing derived from all weir escapements available for the project that meet a minimum of 80% observed escapement.

Figure 11.–Earliest, average, and latest run timing on record at Kogrukluk River weir and 2012 daily escapement for sockeye salmon.

APPENDIX A: HISTORICAL MONITORING PROJECTS

Appendix A1.–Kuskokwim area escapement monitoring projects from 1969 to 2012.

Project	Year	Project type	Operational dates	Report available
Salmon (Aniak) River Target Operational Period: (6/15–8/25) Latitude: N 61°03'46" Longitude: W 159°11'40"	2006	Fixed Weir	6/20–8/8	No
	2007	Fixed Weir	6/14–8/22	No
	2008	Fixed Weir	6/23–9/22	No
	2009	Fixed Weir	7/13–9/26	No
	2010		Not Operated	
	2011		Not Operated	
	2012	Fixed Weir	7/3–8/23	In Progress
George River weir Target Operational Period: (6/15–9/20) Latitude: N 61°55'24" Longitude: W 157°41'53"	1996	Fixed Weir	6/21–7/26	RIR 3A97-27
	1997	Fixed Weir	6/9/–9/15	RIR 3A03-17
	1998	Fixed Weir	6/22–8/2	RIR 3A03-17
	1999	Resistance Board Weir	7/14–9/25	RIR 3A03-17
	2000	Resistance Board Weir	6/17–9/16	RIR 3A03-17
	2001	Resistance Board Weir	6/25–9/22	RIR 3A03-17
	2002	Resistance Board Weir	6/21–9/20	RIR 3A03-17
	2003	Resistance Board Weir	7/1–9/19	RIR 3A04-17
	2004	Resistance Board Weir	6/27–9/25	FDS 05-72
	2005	Resistance Board Weir	6/15–9/20	FDS 06-29
	2006	Resistance Board Weir	6/15–9/20	FDS 07-59
	2007	Resistance Board Weir	6/14–9/17	FDS 08-63
	2008	Resistance Board Weir	6/16–9/22	FDS 09-70
	2009	Resistance Board Weir	6/17–9/25	FDS 10-51
	2010	Resistance Board Weir	6/15–9/20	FDS 11-36
	2011	Resistance Board Weir	6/16–9/20	FDS 12-71
	2012	Resistance Board Weir	6/30–9/16	In Progress
Kogrukluk River weir Target Operational Period: (June 26 – Sept 25) Latitude: N 60°50'28" Longitude: W 157°50'44"	1969	Tower	6/29–7/30	Kusko Esc. Report #4
	1970	Tower	6/27–7/31	Kusko Esc. Report #4
	1971	Tower and Fixed Weir	6/26–7/25	Kusko Esc. Report #5
	1972	Tower	6/28–8/5	Kusko Esc. Report #6
	1973	Tower	6/29–8/3	Kusko Esc. Report #7
	1974	Tower	6/19–9/23	Kusko Esc. Report #8
	1975	Tower	7/1–8/1	Kusko Esc. Report #9

-continued-

Project	Year	Project type	Operational dates	Report available
Kogrukluk – Continued	1976	Tower and Fixed Weir	6/29–7/31	Kusko Esc. Report #10 & 11
	1977	Tower and Fixed Weir	7/7–7/26	Kusko Esc. Report #12 & 13
	1978	Tower and Fixed Weir	6/25–7/31	Kusko Esc. Report #14 & 15
	1979	Fixed Weir	7/1–7/24	Kusko Esc. Report #17
	1980	Fixed Weir	7/1–7/11	Kusko Esc. Report #20
	1981	Fixed Weir	6/27–10/05	Kusko Esc. Report #25
	1982	Fixed Weir	7/9–9/14	Kusko Esc. Report #30
	1983	Fixed Weir	6/24–9/27	Kusko Esc. Report #31
	1984	Fixed Weir	6/19–9/15	Kusko Esc. Report #24
	1985	Fixed Weir	6/24–9/23	RIR 3A88-16
	1986	Fixed Weir	6/29–10/6	RIR 3A88-16
	1987	Fixed Weir	7/15–9/24	RIR 3A88-16
	1988	Fixed Weir	7/5–9/17	RIR 3A89-09
	1989	Fixed Weir	7/7–8/24	RIR 3A89-27
	1990	Fixed Weir	6/28–9/19	RIR 3B91-19
	1991	Fixed Weir	7/5–9/16	RIR 3A95-24
	1992	Fixed Weir	7/1–8/21	RIR 3A95-24
	1993	Fixed Weir	7/2–9/6	RIR 3A95-24
	1994	Fixed Weir	7/2–9/14	RIR 3A95-24
	1995	Fixed Weir	7/2–9/6	RIR 3A97-18
	1996	Fixed Weir	6/29–9/15	RIR 3A97-18
	1997	Fixed Weir	6/28–9/21	RIR 3A98-17
	1998	Fixed Weir	7/7–9/19	RIR 3A00-22
	1999	Fixed Weir	7/6–9/17	RIR 3A00-22
	2000	Fixed Weir	7/2–9/20	RIR 3A01-25
	2001	Fixed Weir	7/5–9/25	RIR 3A02-16
	2002	Fixed Weir	6/26–9/24	RIR 3A03-11
	2003	Fixed Weir	6/21–9/20	RIR 3A04-22
	2004	Fixed Weir	6/21–9/25	FDS 05-58

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Project	Year	Project type	Operational dates	Report available
Kogrukluk – Continued	2005	Fixed Weir	6/21–9/22	FDS 07-12
	2006	Fixed Weir	6/28–9/14	FDS 08-26
	2007	Fixed Weir	6/26–9/23	FDS 08-60
	2008	Fixed Weir	7/3–9/13	FDS 10-24
	2009	Fixed Weir	6/24–9/27	FDS 10-73
	2010	Fixed Weir	6/27–9/22	FDS 11-49
	2011	Fixed Weir	6/20–9/15	FDS 13-13
	2012	Fixed Weir	6/29–9/16	In Progress
Telaquana River weir Target Operational Period: (7/1 – 8/31) Latitude: N 60°57'39" Longitude: W 154°02'40"	2010	Fixed Weir	6/28–9/7	No
	2011	Fixed Weir	6/29–8/26	No
	2012	Fixed Weir	7/5–8/27	In Progress
Tatlawiksuk River weir Target Operational Period: (6/15–9/20) Latitude: N 61°56'03" Longitude: W 156°11'33"	1998	Fixed Weir	6/18–7/7	RIR 3A02-11
	1999	Resistance Board Weir	6/15–9/20	RIR 3A02-11
	2000	Resistance Board Weir	6/15–8/14	RIR 3A02-11
	2001	Resistance Board Weir	6/20–9/15	RIR 3A02-11
	2002	Resistance Board Weir	6/17–9/22	RIR 3A03-16
	2003	Resistance Board Weir	6/20–7/4	RIR 3A04-16
	2004	Resistance Board Weir	6/15–9/18	FDS 05-47
	2005	Resistance Board Weir	6/12–9/22	FDS 06-28
	2006	Resistance Board Weir	6/15–8/18	FDS 07-56
	2007	Resistance Board Weir	6/14–9/15	FDS 08-59
	2008	Resistance Board Weir	6/14–9/18	FDS 09-66
	2009	Resistance Board Weir	6/14–9/25	FDS 10-66
	2010	Resistance Board Weir	6/17–9/17	FDS 11-47
	2011	Resistance Board Weir	6/14–9/19	FDS 13-11
	2012	Resistance Board Weir	6/23–9/15	In Progress

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Project	Year	Project type	Operational dates	Report available
Takotna River weir Target Operational Period: (6/24–9/20)	1995	Tower	7/7–9/1	RIR 3A00-13
	1996	Tower	6/15–7/25	RIR 3A00-13
	1997	Tower	6/17–8/4	RIR 3A00-13
	1998	Tower	6/28–7/5	RIR 3A00-13
Latitude: N 62°58'06"	1999		Not operated	RIR 3A00-13
Longitude: W 156°05'54"	2000	Resistance Board Weir	6/24–9/20	RIR 3A01-02
	2001	Resistance Board Weir	6/23–9/14	RIR 3A02-09
	2002	Resistance Board Weir	6/23–9/20	RIR 3A03-10
	2003	Resistance Board Weir	7/2–9/20	RIR 3A04-25
	2004	Resistance Board Weir	6/22–9/20	FDS 05-71
	2005	Resistance Board Weir	6/13–9/20	FDS 06-26
	2006	Resistance Board Weir	6/16–9/22	FDS 07-61
	2007	Resistance Board Weir	6/20–9/19	FDS 08-38
	2008	Resistance Board Weir	6/20–9/23	FDS 09-75
	2009	Resistance Board Weir	6/20–9/25	FDS 10-52
	2010	Resistance Board Weir	6/27–9/17	FDS 11-28
	2011	Resistance Board Weir	6/29–9/18	FDS 13-01
	2012	Resistance Board Weir	7/4–9/14	In Progress

APPENDIX B: WEATHER OBSERVATIONS

Appendix B1.–Daily weather and stream observations at the Salmon River weir, 2012.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/5	AM	ND	ND	ND	ND	60	ND
7/5	PM	ND	ND	ND	ND	ND	ND
7/6	AM	ND	ND	ND	ND	62	ND
7/6	PM	ND	ND	ND	ND	ND	ND
7/7	AM	ND	ND	ND	ND	60	ND
7/7	PM	ND	ND	ND	ND	ND	ND
7/8	AM	4	2.0	12.0	9.0	59	1
7/8	PM	4	8.2	10.0	9.0	60	1
7/9	AM	4	13.5	6.0	8.0	68	2
7/9	PM	4	3.0	9.0	7.0	94	3
7/10	AM	2	0.0	4.0	6.0	94	2
7/10	PM	4	0.0	12.0	7.0	90	2
7/11	AM	4	0.0	6.0	6.0	86	2
7/11	PM	4	0.0	10.0	7.0	84	2
7/12	AM	ND	ND	ND	ND	ND	ND
7/12	PM	ND	ND	ND	ND	ND	ND
7/13	AM	4	1.0	5.0	6.0	80	1
7/13	PM	3	0.0	12.0	8.0	78	1
7/14	AM	4	0.0	8.0	7.0	75	1
7/14	PM	4	1.0	9.0	7.0	74	1
7/15	AM	4	3.2	6.0	6.0	76	2
7/15	PM	4	6.5	10.0	7.0	82	2
7/16	AM	4	0.2	7.0	6.0	77	1
7/16	PM	4	0.0	14.0	8.0	75	1
7/17	AM	3	0.0	5.0	7.0	71	1
7/17	PM	4	0.0	14.0	8.0	70	1
7/18	AM	1	0.0	4.0	7.0	69	1
7/18	PM	1	0.0	18.0	9.0	68	1
7/19	AM	2	0.0	9.0	8.0	67	1
7/19	PM	2	0.0	16.0	9.0	66	1
7/20	AM	4	0.0	9.0	8.0	65	1
7/20	PM	4	7.5	12.0	8.0	66	1
7/21	AM	4	5.3	9.0	7.0	69	1
7/21	PM	4	6.8	14.0	8.0	71	1
7/22	AM	4	7.0	10.0	7.0	76	1
7/22	PM	4	0.0	14.0	8.0	78	2
7/23	AM	4	1.0	10.0	7.0	79	2

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Appendix B1.–Page 2 of 3.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/23	PM	4	0.0	15.0	8.0	78	2
7/24	AM	4	1.0	10.0	7.0	77.5	2
7/24	PM	4	0.0	15.0	7.0	77.5	2
7/25	AM	2	0.0	7.0	7.0	75	1
7/25	PM	4	0.0	14.0	8.0	75	1
7/26	AM	4	6.0	10.0	8.0	74	1
7/26	PM	4	0.7	14.0	8.0	76	1
7/27	AM	4	0.0	5.0	7.0	72	1
7/27	PM	4	0.0	18.0	9.0	70	1
7/28	AM	4	0.0	11.0	8.0	68	1
7/28	PM	2	0.0	18.0	10.0	67	1
7/29	AM	4	0.0	10.0	9.0	66	1
7/29	PM	4	1.0	9.0	8.0	65	1
7/30	AM	4	6.0	7.0	6.0	66	1
7/30	PM	4	0.1	10.0	8.0	65	1
7/31	AM	4	0.0	2.0	6.0	63	1
7/31	PM	4	0.4	10.0	6.0	62	1
8/1	AM	4	4.8	8.0	6.0	62	1
8/1	PM	4	8.5	10.0	7.0	62	1
8/2	AM	4	3.0	6.0	6.0	64	1
8/2	PM	3	0.2	13.0	8.0	63	1
8/3	AM	4	0.6	8.0	7.0	61	1
8/3	PM	4	0.0	13.0	7.0	60	1
8/4	AM	4	0.0	6.0	6.0	59	1
8/4	PM	4	0.0	13.0	8.0	59	1
8/5	AM	2	0.0	3.0	6.0	58	1
8/5	PM	3	0.0	15.0	7.0	58	1
8/6	AM	4	0.0	8.0	6.0	57	1
8/6	PM	2	0.0	15.0	9.0	57	1
8/7	AM	4	0.4	8.0	8.0	56	1
8/7	PM	4	0.0	10.0	7.0	56	1
8/8	AM	4	0.0	8.0	7.0	56	1
8/8	PM	2	0.0	16.0	9.0	56	1
8/9	AM	1	0.0	6.0	5.0	54	1
8/9	PM	1	0.0	18.0	9.0	54	1
8/10	AM	3	0.0	5.0	7.0	54	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
8/10	PM	3	0.0	18.0	8.0	53	1
8/11	AM	3	0.0	10.0	6.0	53	1
8/11	PM	2	0.0	20.0	11.0	53	1
8/12	AM	2	0.0	5.0	8.0	52	1
8/12	PM	1	0.0	23.0	11.0	52	1
8/13	AM	1	0.0	8.0	9.0	51	1
8/13	PM	1	0.0	25.0	11.0	51	1
8/14	AM	1	0.0	5.0	8.0	50	1
8/14	PM	2	0.0	20.0	10.0	50	1
8/15	AM	2	0.0	7.0	9.0	49	1
8/15	PM	4	0.0	17.0	10.0	49	1
8/16	AM	2	0.0	5.0	8.0	49	1
8/16	PM	4	0.0	17.0	9.0	49	1
8/17	AM	4	0.0	10.0	8.0	49	1
8/17	PM	4	0.0	15.0	9.0	49	1
8/18	AM	4	0.4	10.0	8.0	48	1
8/18	PM	3	0.1	14.0	9.0	48	1
8/19	AM	3	0.0	10.0	8.0	48	1
8/19	PM	4	0.0	13.0	9.0	47	1
8/20	AM	4	2.2	6.0	7.0	47	1
8/20	PM	4	0.4	9.0	8.0	47	1
8/21	AM	2	0.0	1.0	6.0	47	1
8/21	PM	4	0.0	13.0	7.0	47	1
8/22	AM	4	2.0	9.0	7.0	47	1
8/22	PM	4	0.5	10.0	8.0	47	1
8/23	AM	4	4.4	7.0	7.0	48	1
8/23	PM	3	0.1	11.0	9.0	48	1

Note: ND = no data.

[a] Sky condition codes:

1 = clear or mostly clear; < 10% cloud cover
2 = partly cloudy; < 50% cloud cover
3 = mostly cloudy; > 50% cloud cover
4 = complete overcast
5 = thick fog

[b] Water clarity codes:

1 = visibility greater than 1 meter
2 = visibility between 0.5 and 1 meter
3 = visibility less than 0.5 meter

Appendix B2.–Daily weather and stream observations at the George River weir, 2012.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
6/8	AM	4	7.1	ND	ND	ND	ND
6/8	PM	4	6.8	ND	ND	94	ND
6/9	AM	4	5.2	ND	ND	103	ND
6/9	PM	3	4.8	ND	ND	106	ND
6/10	AM	4	1.0	ND	ND	99	ND
6/10	PM	ND	ND	ND	ND	ND	ND
6/11	AM	ND	ND	ND	ND	ND	ND
6/11	PM	4	4.0	ND	ND	109	ND
6/12	AM	4	5.9	ND	ND	100	ND
6/12	PM	ND	6.8	ND	ND	106	3
6/13	AM	3	0.0	ND	ND	110	3
6/13	PM	3	0.0	ND	ND	108	3
6/14	AM	5	3.5	ND	ND	108	3
6/14	PM	2	0.0	18.5	ND	107	3
6/15	AM	1	0.0	ND	ND	100	3
6/15	PM	2	0.0	ND	ND	99	3
6/16	AM	1	0.0	ND	ND	98	3
6/16	PM	3	0.0	12.0	9.0	96	3
6/17	AM	2	0.0	8.0	8.0	94	3
6/17	PM	3	0.0	22.0	9.5	93	3
6/18	AM	3	1.5	10.0	9.0	91	3
6/18	PM	3	0.7	20.0	11.0	88	2
6/19	AM	3	0.0	11.0	10.0	84	3
6/19	PM	3	0.0	22.5	12.0	84	3
6/20	AM	1	0.0	12.0	11.0	84	3
6/20	PM	ND	ND	ND	ND	ND	ND
6/21	AM	ND	ND	ND	ND	ND	ND
6/21	PM	ND	ND	ND	ND	ND	ND
6/22	AM	ND	ND	ND	ND	ND	ND
6/22	PM	ND	ND	ND	ND	ND	ND
6/23	AM	ND	ND	ND	ND	ND	ND
6/23	PM	ND	ND	ND	ND	65	2
6/24	AM	4	2.0	11.0	10.5	63	2
6/24	PM	4	0.4	10.5	10.5	63	2

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Appendix B2.–Page 2 of 7.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
6/25	AM	4	5.0	7.0	10.0	63	2
6/25	PM	4	1.9	9.0	9.5	63	2
6/26	AM	4	0.1	9.0	9.0	63	1
6/26	PM	4	0.0	14.0	10.0	62	1
6/27	AM	4	0.0	9.0	8.5	59	1
6/27	PM	4	0.1	15.0	10.0	58	1
6/28	AM	4	0.5	10.0	8.5	58	1
6/28	PM	3	1.4	15.0	10.0	55	1
6/29	AM	3	0.2	10.0	9.0	57	1
6/29	PM	3	0.0	18.0	12.0	56	1
6/30	AM	4	0.1	10.0	10.0	57	1
6/30	PM	3	0.6	18.0	12.0	57	1
7/1	AM	5	3.9	9.0	10.0	60	1
7/1	PM	3	0.0	17.0	12.5	58	1
7/2	AM	5	0.2	8.0	10.0	58	1
7/2	PM	2	0.8	15.0	12.0	57	1
7/3	AM	4	0.1	8.0	10.5	57	1
7/3	PM	4	0.0	11.0	10.0	55	1
7/4	AM	3	0.0	8.0	9.0	54	1
7/4	PM	4	0.2	13.0	10.5	52	1
7/5	AM	2	0.5	5.0	10.0	52	1
7/5	PM	3	0.0	19.0	12.0	50	1
7/6	AM	5	0.2	5.0	10.5	48	1
7/6	PM	3	0.0	20.5	14.0	48	1
7/7	AM	4	0.0	10.5	12.0	48	1
7/7	PM	3	4.0	17.5	13.5	48	1
7/8	AM	4	1.8	11.0	12.0	49	1
7/8	PM	4	17.0	9.0	10.5	52	1
7/9	AM	4	9.5	7.0	8.0	72	2
7/9	PM	4	0.6	12.5	8.0	79	3
7/10	AM	4	0.3	3.0	7.0	75	2
7/10	PM	2	0.0	17.5	9.5	69	1
7/11	AM	1	0.0	3.0	8.0	67	2

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Appendix B2.–Page 3 of 7.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/12	AM	4	1.6	9.0	8.0	60	1
7/12	PM	3	1.2	13.0	9.0	60	1
7/13	AM	3	0.5	6.0	8.0	59	1
7/13	PM	3	0.0	16.0	11.0	59	1
7/14	AM	4	0.4	9.0	8.0	57	1
7/14	PM	4	1.8	12.0	10.0	58	1
7/15	AM	4	5.2	8.0	9.0	58	1
7/15	PM	3	2.2	ND	ND	62	1
7/16	AM	4	5.0	7.0	9.0	59	1
7/16	PM	3	0.2	14.0	10.0	59	1
7/17	AM	4	0.0	6.0	8.0	57	1
7/17	PM	3	0.0	15.0	9.5	56	1
7/18	AM	5	0.0	3.0	8.0	54	1
7/18	PM	2	0.0	19.0	9.0	54	1
7/19	AM	4	0.0	10.0	10.5	53	1
7/19	PM	4	0.0	13.0	10.5	52	1
7/20	AM	4	0.0	11.0	8.0	49	1
7/20	PM	3	0.6	14.5	10.0	50	1
7/21	AM	4	6.0	11.0	9.0	50	1
7/21	PM	4	2.2	14.0	9.5	52	1
7/22	AM	4	2.8	11.0	9.0	56	1
7/22	PM	4	1.5	14.0	9.5	59	1
7/23	AM	4	0.2	11.0	9.0	58	1
7/23	PM	4	0.3	15.0	10.0	58	1
7/24	AM	4	0.3	11.0	9.0	57	1
7/24	PM	4	0.0	17.5	10.5	55	1
7/25	AM	4	0.0	11.0	8.0	52	1
7/25	PM	4	0.0	15.0	11.5	53	1
7/26	AM	4	0.0	14.0	10.0	50	1
7/26	PM	4	0.2	14.5	11.0	50	1
7/27	AM	4	1.4	10.0	8.0	50	1
7/27	PM	3	0.4	18.0	11.5	49	1
7/28	AM	4	0.3	11.0	10.0	49	1
7/28	PM	2	0.0	18.0	13.0	48	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/29	AM	4	1.8	12.0	10.0	48	1
7/29	PM	4	0.3	11.0	11.0	48	1
7/30	AM	4	5.6	8.0	9.0	49	1
7/30	PM	4	0.4	10.5	10.0	51	1
7/31	AM	4	0.4	7.0	9.0	52	1
7/31	PM	4	0.3	14.0	10.0	52	1
8/1	AM	4	5.2	9.0	8.0	52	1
8/1	PM	4	2.0	11.0	10.0	52	1
8/2	AM	4	3.9	8.0	8.0	53	1
8/2	PM	3	1.7	9.0	9.5	53	1
8/3	AM	4	2.8	9.5	8.5	58	1
8/3	PM	4	0.6	ND	ND	58	1
8/4	AM	3	0.3	8.0	8.5	60	1
8/4	PM	3	0.0	14.0	9.0	59	1
8/5	AM	2	0.0	7.0	9.0	59	1
8/5	PM	2	0.0	ND	ND	59	1
8/6	AM	5	0.0	5.0	8.0	58	1
8/6	PM	2	0.0	18.0	14.0	57	1
8/7	AM	4	3.8	9.0	10.0	57	1
8/7	PM	4	7.4	9.0	9.0	60	1
8/8	AM	3	1.0	9.0	9.0	66	1
8/8	PM	2	0.2	16.0	10.0	67	1
8/9	AM	5	0.2	2.0	7.0	65	1
8/9	PM	1	0.0	20.0	11.0	63	1
8/10	AM	4	0.0	6.0	8.0	60	1
8/10	PM	2	0.0	21.0	11.0	59	1
8/11	AM	4	0.0	6.0	8.0	58	1
8/11	PM	2	0.0	20.0	10.0	57	1
8/12	AM	2	0.0	7.0	9.0	56	1
8/12	PM	1	0.0	ND	ND	56	1
8/13	AM	0	0.0	3.0	9.0	53	1
8/13	PM	1	0.0	26.0	13.5	53	1
8/14	AM	5	0.0	4.0	10.0	53	1
8/14	PM	1	0.0	26.0	13.0	53	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
8/15	AM	0	0.0	ND	ND	53	1
8/15	PM	4	0.0	18.0	11.0	50	1
8/16	AM	3	0.0	12.0	10.0	49	1
8/16	PM	ND	ND	ND	ND	ND	1
8/17	AM	4	0.0	11.0	9.0	48	1
8/17	PM	3	0.0	15.0	11.5	48	1
8/18	AM	4	0.0	12.0	8.0	48	1
8/18	PM	4	5.9	11.0	8.0	48	1
8/19	AM	4	5.3	10.0	7.0	48	1
8/19	PM	3	0.2	14.5	10.0	50	1
8/20	AM	4	0.0	7.0	9.0	50	1
8/20	PM	4	0.2	8.5	9.5	50	1
8/21	AM	1	0.0	5.0	8.0	49	1
8/21	PM	4	0.0	8.0	13.0	48	1
8/22	AM	4	2.8	7.0	8.0	48	1
8/22	PM	4	1.8	8.5	8.5	45	1
8/23	AM	4	2.4	7.0	8.0	45	1
8/23	PM	2	0.6	8.0	9.5	50	1
8/24	AM	4	8.0	6.0	7.0	50	1
8/24	PM	2	4.0	14.5	9.5	52	1
8/25	AM	4	0.3	6.0	7.0	59	1
8/25	PM	3	0.0	17.0	10.0	57	1
8/26	AM	4	7.8	9.0	9.0	58	1
8/26	PM	4	8.3	13.0	9.5	56	1
8/27	AM	4	1.0	6.0	7.0	66	1
8/27	PM	3	0.0	ND	ND	70	2
8/28	AM	4	0.6	1.0	6.0	74	2
8/28	PM	1	0.0	17.0	9.5	72	2
8/29	AM	4	1.2	8.0	7.0	72	2
8/29	PM	3	0.4	16.5	9.0	70	2
8/30	AM	4	2.3	10.0	9.0	70	2
8/30	PM	3	0.0	15.0	9.0	70	2
8/31	AM	3	0.0	2.0	8.0	78	2
8/31	PM	3	0.0	12.5	8.5	78	2

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
9/1	AM	5	0.0	-1.0	7.0	77	2
9/1	PM	3	0.0	12.5	7.0	75	2
9/2	AM	4	0.0	2.0	6.0	73	2
9/2	PM	4	3.6	9.0	7.5	73	2
9/3	AM	4	3.2	9.0	7.0	76	2
9/3	PM	4	3.0	ND	ND	78	2
9/4	AM	4	0.3	6.0	6.0	82	2
9/4	PM	4	1.8	9.0	6.0	80	2
9/5	AM	4	3.6	8.0	6.0	82	2
9/5	PM	4	1.8	9.0	6.5	88	2
9/6	AM	4	0.3	6.0	6.0	96	2
9/6	PM	4	0.2	8.5	6.0	99	2
9/7	AM	3	0.3	4.0	5.0	100	2
9/7	PM	2	0.2	8.0	5.0	101	2
9/8	AM	5	0.2	1.0	4.5	103	2
9/8	PM	1	0.0	5.5	10.0	101	2
9/9	AM	4	0.6	3.0	4.0	99	2
9/9	PM	4	0.2	8.0	4.5	99	2
9/10	AM	1	0.0	-2.0	3.0	95	2
9/10	PM	1	0.0	11.5	4.0	95	2
9/11	AM	3	0.0	-1.0	3.0	90	2
9/11	PM	4	0.0	9.5	3.5	90	2
9/12	AM	4	0.0	3.0	3.0	86	2
9/12	PM	4	0.0	14.0	4.5	87	2
9/13	AM	4	0.0	-1.0	4.0	83	2
9/13	PM	3	0.0	11.5	5.0	83	2
9/14	AM	4	1.4	4.0	4.0	81	2
9/14	PM	3	0.9	11.5	5.0	80	2
9/15	AM	4	1.0	4.0	3.0	80	2
9/15	PM	4	2.1	8.5	4.5	78	2
9/16	AM	4	15.0	2.0	5.0	83	2
9/16	PM	4	2.8	7.0	5.0	90	2
9/17	AM	4	7.6	4.0	4.0	100	2
9/17	PM	3	0.3	7.0	5.0	120	3

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
9/18	AM	4	4.2	8.0	5.0	119	3
9/18	PM	2	4.5	12.5	5.0	120	3
9/19	AM	4	8.0	6.0	4.0	137	3
9/19	PM	4	4.2	8.0	5.0	141	3
9/20	AM	4	1.6	5.0	5.0	150	3
9/20	PM	4	0.5	8.0	5.0	150	3

Note: ND = no data.

[a] Sky condition codes:

1 = clear or mostly clear; < 10% cloud cover

2 = partly cloudy; < 50% cloud cover

3 = mostly cloudy; > 50% cloud cover

4 = complete overcast

5 = thick fog

[b] Water clarity codes:

1 = visibility greater than 1 meter

2 = visibility between 0.5 and 1 meter

3 = visibility less than 0.5 meter

Appendix B3.–Daily weather and stream observations at the Kogrukluk River weir, 2012.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
6/16	PM	4	1.0	ND	ND	0	ND
6/17	AM	3	3.6	ND	ND	0	ND
6/17	PM	ND	ND	ND	ND	ND	ND
6/18	AM	2	0.0	9.0	ND	0	ND
6/18	PM	3	0.0	20.0	ND	0	ND
6/19	AM	1	0.0	9.0	8.0	0	ND
6/19	PM	1	0.0	21.0	9.0	0	ND
6/20	AM	1	0.0	11.0	9.0	0	2
6/20	PM	1	0.0	22.0	10.0	0	2
6/21	AM	1	0.0	8.0	9.0	0	2
6/21	PM	1	0.0	23.0	10.0	0	2
6/22	AM	1	0.0	7.0	9.0	0	2
6/22	PM	2	0.0	25.0	11.0	0	2
6/23	AM	3	0.0	12.0	9.0	0	1
6/23	PM	4	0.0	16.0	10.0	0	1
6/24	AM	4	3.8	10.0	8.0	0	1
6/24	PM	4	0.0	ND	8.5	0	1
6/25	AM	4	1.0	6.0	7.0	0	1
6/25	PM	4	0.8	11.0	8.0	0	1
6/26	AM	3	0.0	6.0	7.0	0	1
6/26	PM	3	0.0	16.0	8.0	0	1
6/27	AM	3	0.0	10.0	7.0	0	1
6/27	PM	4	0.4	15.0	8.0	0	1
6/28	AM	4	0.0	9.0	7.0	0	1
6/28	PM	3	0.0	19.0	9.0	0	1
6/29	AM	3	0.0	11.0	8.0	0	1
6/29	PM	4	0.7	19.0	10.0	0	1
6/30	AM	4	0.0	11.0	8.5	0	1
6/30	PM	3	0.5	21.0	10.5	0	1
7/1	AM	4	0.0	10.0	9.0	0	1
7/1	PM	3	0.0	22.0	10.0	0	1
7/2	AM	4	0.0	9.0	9.0	0	1
7/2	PM	3	0.0	17.0	11.0	0	1
7/3	AM	4	0.1	9.0	9.0	0	1
7/3	PM	4	3.0	11.0	8.0	0	1
7/4	AM	4	2.2	8.0	7.0	0	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/4	PM	4	1.8	13.0	8.0	0	1
7/5	AM	4	2.1	8.0	8.0	0	1
7/5	PM	4	2.2	15.0	8.0	0	1
7/6	AM	4	8.0	8.0	7.0	0	1
7/6	PM	3	0.6	20.0	11.0	0	1
7/7	AM	2	0.0	11.0	9.0	0	1
7/7	PM	4	2.2	22.0	11.0	0	1
7/8	AM	4	19.8	9.5	9.0	0	2
7/8	PM	4	15.5	10.0	9.0	0	3
7/9	AM	4	16.0	8.0	7.0	0	3
7/9	PM	4	2.2	12.0	8.0	0	3
7/10	AM	5	0.5	5.5	7.0	0	3
7/10	PM	4	2.2	11.0	8.0	0	3
7/11	AM	4	2.0	8.0	7.0	0	3
7/11	PM	4	2.4	10.0	7.0	0	3
7/12	AM	4	4.8	8.0	7.0	0	3
7/12	PM	4	0.5	14.0	8.0	0	3
7/13	AM	3	0.0	10.0	8.0	0	3
7/13	PM	4	2.2	14.0	9.0	0	3
7/14	AM	4	1.8	9.0	7.0	0	3
7/14	PM	4	1.4	12.0	7.5	0	3
7/15	AM	4	1.0	9.0	7.0	0	3
7/15	PM	4	4.2	13.0	7.5	0	3
7/16	AM	4	3.2	10.0	7.0	0	3
7/16	PM	3	2.4	12.0	7.5	0	3
7/17	AM	3	1.0	9.0	8.0	0	2
7/17	PM	2	0.0	16.0	9.0	0	2
7/18	AM	1	0.0	5.0	8.0	0	2
7/18	PM	1	0.0	24.0	10.0	0	2
7/19	AM	1	0.0	9.0	9.0	0	2
7/19	PM	3	0.0	24.0	10.0	0	1
7/20	AM	4	1.8	10.0	9.0	0	1
7/20	PM	4	3.2	15.0	9.0	0	1
7/21	AM	4	4.0	11.0	8.0	0	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/21	PM	4	5.0	14.5	8.5	0	1
7/22	AM	4	6.5	11.0	8.0	0	2
7/22	PM	4	4.8	15.0	8.5	0	2
7/23	AM	4	1.0	10.5	8.0	0	2
7/23	PM	4	0.0	14.0	9.0	0	2
7/24	AM	4	0.0	11.0	8.0	0	2
7/24	PM	3	0.0	19.0	10.0	0	2
7/25	AM	2	0.0	9.0	9.0	0	1
7/25	PM	4	0.0	16.0	9.0	0	1
7/26	AM	4	0.0	11.0	9.0	0	1
7/26	PM	4	0.4	15.5	9.0	0	1
7/27	AM	1	0.9	ND	9.0	0	1
7/27	PM	1	0.0	20.0	10.0	0	1
7/28	AM	1	0.0	9.0	9.0	0	1
7/28	PM	1	0.0	23.0	11.0	0	1
7/29	AM	4	1.8	11.0	9.0	0	1
7/29	PM	4	1.0	11.5	9.0	0	1
7/30	AM	3	12.5	9.0	8.0	0	1
7/30	PM	3	0.0	14.5	9.5	0	1
7/31	AM	4	0.3	9.0	8.5	0	1
7/31	PM	4	1.0	14.0	9.0	0	2
8/1	AM	4	8.0	9.0	7.5	0	2
8/1	PM	4	0.8	12.0	8.0	0	2
8/2	AM	4	2.4	8.0	7.0	0	2
8/2	PM	4	0.5	13.0	8.0	0	2
8/3	AM	3	0.0	10.0	7.0	0	2
8/3	PM	4	1.8	10.0	8.0	0	2
8/4	AM	4	1.6	8.0	6.5	0	2
8/4	PM	4	0.6	14.0	8.0	0	1
8/5	AM	3	6.0	9.0	7.0	0	2
8/5	PM	3	1.2	15.0	9.0	0	2
8/6	AM	2	0.0	9.5	7.0	0	2
8/6	PM	2	0.0	17.0	9.0	0	1
8/7	AM	4	1.0	11.0	9.0	0	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
8/7	PM	4	0.3	11.0	9.0	0	1
8/8	AM	4	1.4	10.0	8.0	0	1
8/8	PM	3	0.2	16.0	9.0	0	1
8/9	AM	1	0.0	4.0	7.0	0	1
8/9	PM	2	0.0	22.0	10.0	0	1
8/10	AM	4	0.0	10.0	9.0	0	1
8/10	PM	4	0.0	19.0	10.5	0	1
8/11	AM	4	0.8	11.0	9.0	0	1
8/11	PM	2	0.0	23.0	11.0	0	1
8/12	AM	1	0.0	8.0	9.0	0	1
8/12	PM	1	0.0	25.0	11.0	0	1
8/13	AM	1	0.0	8.0	8.0	0	1
8/13	PM	1	0.0	24.0	11.5	0	1
8/14	AM	1	2.0	8.0	9.0	0	1
8/14	PM	3	0.0	24.0	12.0	0	1
8/15	AM	3	0.0	11.0	8.0	0	1
8/15	PM	4	0.0	15.0	10.0	0	1
8/16	AM	4	0.0	9.0	7.0	0	1
8/16	PM	4	0.5	14.0	9.5	0	1
8/17	AM	4	0.0	10.0	9.0	0	1
8/17	PM	4	0.0	15.0	10.0	0	1
8/18	AM	4	0.0	10.0	8.0	0	1
8/18	PM	4	0.3	11.0	8.0	0	1
8/19	AM	4	0.0	10.0	8.0	0	1
8/19	PM	3	0.0	17.0	9.5	0	1
8/20	AM	4	1.0	8.0	8.0	0	1
8/20	PM	3	1.2	14.0	9.0	0	1
8/21	AM	1	0.0	1.0	7.5	0	1
8/21	PM	4	0.0	15.0	8.0	0	1
8/22	AM	4	0.6	10.0	8.0	0	1
8/22	PM	4	2.0	14.0	8.5	0	1
8/23	AM	4	5.6	10.0	7.0	0	1
8/23	PM	1	0.6	15.0	10.0	0	1
8/24	AM	4	6.0	8.0	8.0	0	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
8/24	PM	2	3.0	20.0	10.0	0	1
8/25	AM	5	0.0	6.0	8.0	0	1
8/25	PM	1	0.0	20.0	10.0	0	1
8/26	AM	4	7.0	10.0	8.5	0	1
8/26	PM	4	7.0	18.0	10.0	0	1
8/27	AM	3	0.8	9.0	8.0	0	1
8/27	PM	1	0.0	22.0	9.0	0	1
8/28	AM	1	0.0	4.0	6.0	0	1
8/28	PM	1	0.0	18.0	8.0	0	1
8/29	AM	1	0.0	10.0	6.0	0	1
8/29	PM	3	0.0	15.0	7.0	0	1
8/30	AM	4	2.0	11.0	7.0	0	1
8/30	PM	1	2.8	17.0	8.5	0	1
8/31	AM	2	1.2	7.0	7.0	0	1
8/31	PM	2	0.0	18.0	9.0	0	1
9/1	AM	3	0.0	6.0	7.0	0	1
9/1	PM	3	0.2	17.0	9.0	0	1
9/2	AM	4	1.2	7.0	7.0	0	1
9/2	PM	4	6.5	12.0	8.0	0	1
9/3	AM	4	3.4	9.0	6.0	0	1
9/3	PM	4	4.2	12.0	7.0	0	1
9/4	AM	4	1.6	7.0	6.0	0	3
9/4	PM	4	8.0	11.0	8.0	0	3
9/5	AM	4	9.8	9.0	6.0	0	3
9/5	PM	3	0.0	11.0	7.5	0	3
9/6	AM	4	0.0	5.0	5.5	0	3
9/6	PM	4	0.0	14.0	7.0	0	3
9/7	AM	4	2.0	6.0	6.0	0	3
9/7	PM	4	0.7	9.0	6.0	0	3
9/8	AM	1	0.4	2.0	5.0	0	2
9/8	PM	3	0.0	10.0	7.0	0	2
9/9	AM	1	0.0	0.0	5.0	0	2
9/9	PM	2	0.0	11.0	7.0	0	1
9/10	AM	1	0.0	-1.0	4.0	0	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
9/10	PM	1	0.0	11.0	11.0	0	1
9/11	AM	4	0.0	3.5	4.0	0	1
9/11	PM	4	0.7	7.0	4.5	0	1
9/12	AM	4	1.4	7.0	4.5	0	1
9/12	PM	4	0.3	12.0	6.0	0	1
9/13	AM	2	0.0	4.0	5.0	0	1
9/13	PM	2	0.0	10.0	6.0	0	1
9/14	AM	4	5.6	5.0	6.0	0	1
9/14	PM	4	0.8	10.0	6.0	0	1
9/15	AM	4	3.8	8.0	5.5	0	1
9/15	PM	4	4.4	10.0	6.0	0	1
9/16	AM	2	16.0	6.0	6.0	0	2
9/16	PM	4	5.2	9.0	7.0	0	3
9/17	AM	3	0.7	3.0	4.5	0	3
9/17	PM	4	0.3	9.0	5.0	0	3
9/18	AM	4	3.4	9.0	5.0	0	3
9/18	PM	2	1.0	12.0	6.0	0	3
9/19	AM	4	12.5	8.0	6.0	0	3
9/19	PM	4	7.0	10.0	6.0	0	3
9/20	AM	4	0.8	7.0	6.0	0	3
9/20	PM	4	2.0	8.0	6.0	0	3
9/21	AM	3	4.6	7.0	5.0	0	3
9/21	PM	4	0.6	9.0	5.5	0	3
9/22	AM	4	22.5	8.0	5.0	0	3
9/22	PM	4	7.0	13.0	6.0	0	3
9/23	AM	4	6.5	4.0	5.5	0	3
9/23	PM	3	0.0	5.0	ND	0	3

Note: ND = no data.

[a] Sky condition codes:

1 = clear or mostly clear; < 10% cloud cover
2 = partly cloudy; < 50% cloud cover
3 = mostly cloudy; > 50% cloud cover
4 = complete overcast
5 = thick fog

[b] Water clarity codes:

1 = visibility greater than 1 meter
2 = visibility between 0.5 and 1 meter
3 = visibility less than 0.5 meter

Appendix B4.–Daily weather and stream observations at the Telaquana River weir, 2012.

Date	Time	Sky Conditions[a]	Precipitation (Inches)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/5	AM	2	0.0	5.0	10.0	67	1
7/5	PM	2	0.0	12.0	12.0	66	1
7/6	AM	1	0.0	7.0	12.0	65	1
7/6	PM	4	0.0	17.0	11.0	64	1
7/7	AM	3	0.0	9.0	11.0	63	1
7/7	PM	4	0.1	12.0	12.0	62	1
7/8	AM	4	0.2	8.0	11.0	62	1
7/8	PM	4	0.3	12.0	11.0	62	1
7/9	AM	4	0.0	5.0	11.0	61	1
7/9	PM	2	0.0	18.0	11.0	59	1
7/10	AM	1	0.0	3.0	11.0	59	1
7/10	PM	1	0.0	17.0	13.0	59	1
7/11	AM	4	0.0	8.0	11.0	57	1
7/11	PM	4	0.0	14.0	12.0	57	1
7/12	AM	4	0.0	9.0	10.0	56	1
7/12	PM	4	0.0	16.0	12.0	55	1
7/13	AM	4	0.0	9.0	12.0	54	1
7/13	PM	2	0.0	16.0	13.0	52	1
7/14	AM	4	0.0	5.0	11.0	51	1
7/14	PM	4	0.0	11.0	11.0	52	1
7/15	AM	4	0.1	8.0	11.0	49	1
7/15	PM	4	0.1	9.0	11.0	49	1
7/16	AM	4	0.0	8.0	11.0	48	1
7/16	PM	2	0.0	19.0	13.0	48	1
7/17	AM	4	0.0	9.0	11.0	48	1
7/17	PM	1	0.0	24.0	14.0	48	1
7/18	AM	1	0.0	5.0	11.0	48	1
7/18	PM	1	0.0	20.0	14.0	48	1
7/19	AM	3	0.0	14.0	12.0	48	1
7/19	PM	3	0.0	20.0	14.0	47	1
7/20	AM	3	0.0	11.0	12.0	49	1
7/20	PM	4	0.1	14.0	13.0	49	1
7/21	AM	4	0.4	12.0	12.0	51	1
7/21	PM	4	0.2	12.0	12.0	53	1

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Date	Time	Sky Conditions[a]	Precipitation (Inches)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/22	AM	4	0.2	10.0	10.0	55	1
7/22	PM	4	0.1	11.0	10.0	56	1
7/23	AM	4	0.2	10.0	10.0	58	1
7/23	PM	4	0.0	11.0	10.0	58	1
7/24	AM	4	0.0	9.0	10.0	58	1
7/24	PM	3	0.0	16.0	12.0	58	1
7/25	AM	1	0.0	13.0	11.0	58	1
7/25	PM	1	0.0	20.0	12.0	58	1
7/26	AM	4	0.0	12.0	11.0	58	1
7/26	PM	4	0.0	17.0	13.0	58	1
7/27	AM	4	0.0	13.0	11.0	58	1
7/27	PM	2	0.0	19.0	13.0	58	1
7/28	AM	2	0.0	13.0	12.0	59	1
7/28	PM	1	0.0	27.0	14.0	59	1
7/29	AM	4	0.1	9.0	12.0	59	1
7/29	PM	4	0.3	13.0	12.0	59	1
7/30	AM	4	0.2	7.0	12.0	62	1
7/30	PM	4	0.0	10.0	11.0	62	1
7/31	AM	2	0.0	7.0	12.0	62	1
7/31	PM	4	0.0	15.0	13.0	62	1
8/1	AM	4	0.2	8.0	12.0	61	1
8/1	PM	4	0.0	9.0	12.0	61	1
8/2	AM	4	0.2	5.0	11.0	61	1
8/2	PM	4	0.0	7.0	11.0	61	1
8/3	AM	4	0.0	7.0	11.0	60	1
8/3	PM	4	0.1	7.0	12.0	59	1
8/4	AM	4	0.4	7.0	11.0	60	1
8/4	PM	4	0.0	10.0	12.0	61	1
8/5	AM	4	0.0	7.0	11.0	60	1
8/5	PM	2	0.0	13.0	12.0	60	1
8/6	AM	4	0.0	7.0	8.0	59	1
8/6	PM	2	0.0	20.0	12.0	58	1
8/7	AM	4	0.2	12.0	11.0	58	1
8/7	PM	4	0.0	10.0	12.0	58	1

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Date	Time	Sky Conditions[a]	Precipitation (Inches)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
8/8	AM	2	0.0	9.0	10.0	60	1
8/8	PM	1	0.0	20.0	12.0	59	1
8/9	AM	1	0.0	9.0	11.0	59	1
8/9	PM	4	0.0	15.0	12.0	59	1
8/10	AM	1	0.0	5.0	10.0	58	1
8/10	PM	1	0.0	20.0	12.0	58	1
8/11	AM	4	0.0	9.0	11.0	57	1
8/11	PM	1	0.0	24.0	12.0	57	1
8/12	AM	3	0.0	11.0	12.0	57	1
8/12	PM	1	0.0	26.0	13.0	57	1
8/13	AM	1	0.0	11.0	13.0	57	1
8/13	PM	1	0.0	24.0	13.0	57	1
8/14	AM	2	0.0	8.0	13.0	57	1
8/14	PM	1	0.0	26.0	14.0	57	1
8/15	AM	3	0.0	10.0	14.0	58	1
8/15	PM	4	0.0	20.0	14.0	58	1
8/16	AM	3	0.0	8.0	13.0	58	1
8/16	PM	2	0.0	18.0	14.0	57	1
8/17	AM	4	0.0	8.0	14.0	57	1
8/17	PM	4	0.0	17.0	13.0	57	1
8/18	AM	1	0.1	4.0	13.0	56	1
8/18	PM	4	0.0	11.0	13.0	58	1
8/19	AM	4	0.0	8.0	13.0	55	1
8/19	PM	4	0.0	13.0	13.0	55	1
8/20	AM	4	0.0	8.0	13.0	55	1
8/20	PM	3	0.0	15.0	13.0	55	1
8/21	AM	3	0.0	6.0	11.0	54	1
8/21	PM	1	0.0	18.0	13.0	54	1
8/22	AM	1	0.0	3.0	11.0	54	1
8/22	PM	4	0.0	16.0	12.0	53	1
8/23	AM	4	0.4	8.0	11.0	53	1
8/23	PM	4	0.0	11.0	12.0	53	1
8/24	AM	4	0.1	8.0	11.0	52	1
8/24	PM	4	0.0	10.0	11.0	52	1

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Date	Time	Sky Conditions[a]	Precipitation (Inches)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
8/25	AM	5	0.0	3.0	11.0	51	1
8/25	PM	1	0.0	20.0	12.0	51	1
8/26	AM	4	1.0	10.0	12.0	54	1
8/26	PM	4	0.1	14.0	12.0	56	1
8/27	AM	4	0.8	8.0	10.0	79	1
8/27	PM	2	0.0	11.0	11.0	83	1

Note: ND = no data.

[a] Sky condition codes:

1 = clear or mostly clear; < 10% cloud cover

2 = partly cloudy; < 50% cloud cover

3 = mostly cloudy; > 50% cloud cover

4 = complete overcast

5 = thick fog

[b] Water clarity codes:

1 = visibility greater than 1 meter

2 = visibility between 0.5 and 1 meter

3 = visibility less than 0.5 meter

Appendix B5.–Daily weather and stream observations at the Tatlawiksuk River weir, 2012.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
6/8	PM	ND	ND	ND	ND	67	ND
6/9	AM	4	2.2	ND	ND	68	ND
6/9	PM	3	0.3	13.0	7.5	70	3
6/10	AM	4	0.0	9.0	8.0	78	3
6/10	PM	4	0.0	15.0	9.0	81	3
6/11	AM	4	0.6	10.0	7.0	77	3
6/11	PM	4	2.0	14.0	9.0	74	3
6/12	AM	4	3.1	9.0	8.0	74	3
6/12	PM	4	8.0	10.0	7.0	77	3
6/13	AM	2	0.5	9.0	7.0	82	3
6/13	PM	3	0.0	15.0	9.0	89	3
6/14	AM	1	0.0	7.0	8.5	ND	3
6/14	PM	1	0.0	23.0	8.5	98	3
6/15	AM	1	0.0	8.0	9.0	92	3
6/15	PM	1	0.0	24.0	8.5	87	3
6/16	AM	5	0.0	7.5	8.5	82	3
6/16	PM	1	0.0	19.0	9.0	78	3
6/17	AM	3	0.0	12.0	10.0	73	3
6/17	PM	4	0.0	18.0	11.0	73	3
6/18	AM	2	3.8	11.0	8.0	73	3
6/18	PM	4	1.1	15.0	11.0	71	3
6/19	AM	1	0.6	12.0	10.0	71	3
6/19	PM	3	0.0	21.0	12.0	70	3
6/20	AM	3	0.7	12.0	10.0	64	3
6/20	PM	1	0.0	22.0	10.0	64	3
6/21	AM	1	0.0	10.0	11.0	57	3
6/21	PM	1	0.0	20.0	19.0	57	3
6/22	AM	3	0.0	4.0	10.0	54	3
6/22	PM	3	0.0	23.5	13.0	51	3
6/23	AM	2	0.0	10.0	11.0	48	3
6/23	PM	2	0.0	26.0	11.5	47	3
6/24	AM	4	2.7	12.0	11.0	45	3
6/24	PM	4	0.6	10.0	10.0	44	3
6/25	AM	4	0.0	7.0	6.0	42	3

-continued-

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
6/25	PM	4	0.0	9.5	7.5	42	3
6/26	AM	5	0.0	6.0	8.0	42	2
6/26	PM	3	0.0	13.0	8.0	42	2
6/27	AM	4	3.9	8.0	5.0	42	2
6/27	PM	4	7.0	12.0	8.0	43	2
6/28	AM	4	0.0	10.0	6.0	48	2
6/28	PM	3	0.0	16.0	10.0	56	2
6/29	AM	4	0.0	10.0	8.0	63	3
6/29	PM	3	0.0	15.0	10.0	63	3
6/30	AM	3	1.6	11.0	10.0	69	3
6/30	PM	2	0.0	14.0	10.0	69	3
7/1	AM	4	1.2	10.0	10.0	69	3
7/1	PM	2	0.0	18.0	13.0	67	3
7/2	AM	3	0.0	10.0	11.0	70	3
7/2	PM	3	0.0	14.0	13.0	72	3
7/3	AM	3	0.0	8.0	10.0	68	3
7/3	PM	3	0.0	10.0	12.0	66	3
7/4	AM	4	0.0	7.0	8.0	61	3
7/4	PM	3	0.0	19.0	11.0	59	3
7/5	AM	2	0.0	5.0	7.5	56	2
7/5	PM	4	0.0	17.0	11.0	53	2
7/6	AM	2	0.0	5.0	8.0	52	2
7/6	PM	1	0.0	17.0	13.0	52	2
7/7	AM	4	0.0	9.0	10.0	50	2
7/7	PM	2	0.0	19.0	12.0	48	2
7/8	AM	4	10.6	10.0	8.5	49	2
7/8	PM	4	15.0	8.0	7.0	49	2
7/9	AM	4	8.0	6.0	8.0	66	2
7/9	PM	3	0.5	15.0	9.0	81	3
7/10	AM	5	0.0	3.0	9.0	ND	3
7/10	PM	1	0.0	19.0	9.0	101	3
7/11	AM	2	0.0	6.0	7.0	92	3
7/11	PM	4	0.9	15.0	9.0	89	3
7/12	AM	4	0.4	8.0	8.0	87	3

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/12	PM	4	0.6	13.0	8.0	84	3
7/13	AM	3	0.0	9.0	9.0	83	3
7/13	PM	3	0.0	15.0	9.0	80	3
7/14	AM	4	1.2	7.0	8.5	75	3
7/14	PM	3	2.3	12.0	9.0	73	3
7/15	AM	4	0.7	8.0	9.0	66	3
7/15	PM	4	0.7	12.0	10.0	65	3
7/16	AM	3	0.0	9.0	8.0	60	3
7/16	PM	4	0.0	14.0	10.0	58	2
7/17	AM	3	0.0	8.0	6.0	55	2
7/17	PM	1	0.0	17.0	9.0	54	2
7/18	AM	1	0.0	2.0	9.0	52	2
7/18	PM	1	0.0	19.0	9.0	49	2
7/19	AM	4	0.0	10.0	8.0	46	2
7/19	PM	4	0.0	14.0	9.0	45	2
7/20	AM	4	0.0	11.0	6.0	40	2
7/20	PM	4	0.0	15.0	10.0	40	2
7/21	AM	4	8.0	11.0	7.0	40	2
7/21	PM	4	0.7	9.0	9.0	40	2
7/22	AM	4	5.2	10.0	9.0	51	2
7/22	PM	4	6.4	14.0	11.0	60	3
7/23	AM	4	3.2	10.0	10.0	72	3
7/23	PM	4	0.6	14.0	9.0	80	3
7/24	AM	4	0.0	9.0	9.0	89	3
7/24	PM	4	0.0	16.0	10.0	89	3
7/25	AM	2	0.0	10.0	10.0	89	3
7/25	PM	4	0.0	16.0	10.0	83	3
7/26	AM	4	0.0	11.0	9.0	78	3
7/26	PM	4	0.0	14.0	9.0	76	3
7/27	AM	3	0.0	10.0	10.0	76	3
7/27	PM	3	0.0	19.0	11.0	75	3
7/28	AM	2	0.0	6.0	9.0	61	3
7/28	PM	2	0.0	19.0	13.0	58	3
7/29	AM	4	0.0	12.0	10.0	54	2

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/29	PM	4	0.5	11.0	9.0	52	2
7/30	AM	4	21.5	9.0	9.0	52	2
7/30	PM	3	1.0	13.0	9.0	55	2
7/31	AM	3	0.0	8.0	8.0	60	3
7/31	PM	4	0.0	13.0	9.0	64	3
8/1	AM	4	5.9	10.0	9.0	65	3
8/1	PM	4	0.6	12.0	8.0	60	3
8/2	AM	4	15.2	7.0	8.0	64	3
8/2	PM	4	0.0	11.0	9.0	66	3
8/3	AM	4	2.0	9.0	9.0	73	3
8/3	PM	4	0.8	10.0	8.0	78	3
8/4	AM	4	2.0	7.0	8.0	83	3
8/4	PM	3	0.0	11.0	9.0	87	3
8/5	AM	1	0.0	5.0	7.0	91	3
8/5	PM	3	0.0	15.0	10.0	91	3
8/6	AM	1	0.0	6.0	8.0	88	3
8/6	PM	2	0.0	19.0	8.5	80	3
8/7	AM	4	1.1	9.0	8.0	78	3
8/7	PM	4	8.9	10.0	9.0	75	3
8/8	AM	4	1.4	9.0	8.0	73	3
8/8	PM	1	0.0	17.0	9.0	76	3
8/9	AM	1	0.0	1.0	8.0	77	3
8/9	PM	2	0.0	17.0	9.0	86	3
8/10	AM	4	0.0	8.0	9.0	92	3
8/10	PM	1	0.0	21.0	9.0	79	3
8/11	AM	4	0.0	10.0	9.0	74	3
8/11	PM	2	0.0	19.0	9.0	70	3
8/12	AM	1	0.0	6.0	9.0	68	3
8/12	PM	1	0.0	24.0	9.0	62	3
8/13	AM	1	0.0	2.0	9.0	60	3
8/13	PM	1	0.0	21.0	12.0	55	2
8/14	AM	1	0.0	2.0	9.0	51	2
8/14	PM	1	0.0	22.0	12.0	50	2
8/15	AM	1	0.0	4.0	9.0	48	2

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
8/15	PM	2	0.0	19.0	13.0	46	2
8/16	AM	4	0.0	11.0	8.0	44	2
8/16	PM	3	0.0	15.0	9.0	44	2
8/17	AM	4	0.0	9.0	9.0	42	2
8/17	PM	3	0.0	12.0	9.0	41	2
8/18	AM	3	0.0	7.0	9.0	40	2
8/18	PM	3	3.6	11.0	8.0	40	2
8/19	AM	4	8.7	10.0	9.0	40	2
8/19	PM	4	0.8	9.0	9.0	40	2
8/20	AM	4	0.0	7.0	8.5	40	2
8/20	PM	4	1.0	10.0	8.0	45	2
8/21	AM	4	0.0	5.0	6.0	45	2
8/21	PM	3	0.0	12.0	9.0	45	2
8/22	AM	4	0.0	8.0	9.0	45	2
8/22	PM	4	0.0	14.0	8.5	40	2
8/23	AM	4	15.0	8.0	8.0	39	2
8/23	PM	4	3.1	12.0	8.5	40	2
8/24	AM	4	2.3	8.0	8.0	47	2
8/24	PM	4	6.2	9.0	8.0	52	2
8/25	AM	4	0.0	8.0	8.0	54	2
8/25	PM	4	0.0	15.0	8.5	55	2
8/26	AM	4	8.8	7.0	8.5	55	3
8/26	PM	4	10.9	14.0	9.0	55	3
8/27	AM	4	4.0	8.0	9.0	62	3
8/27	PM	2	0.0	13.0	9.0	80	3
8/28	AM	4	0.0	5.0	8.5	102	3
8/28	PM	2	0.0	15.0	9.0	108	3
8/29	AM	4	0.0	9.0	9.0	102	3
8/29	PM	4	0.0	17.0	9.0	101	3
8/30	AM	4	9.0	12.0	9.0	90	3
8/30	PM	4	6.0	12.0	9.0	92	3
8/31	AM	4	2.0	6.0	9.0	102	3
8/31	PM	3	0.5	11.0	9.0	106	3
9/1	AM	2	0.0	1.0	9.0	113	3

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
9/1	PM	3	0.0	12.5	8.5	113	3
9/2	AM	4	0.0	5.0	7.0	104	3
9/2	PM	4	3.2	10.0	8.0	102	3
9/3	AM	4	8.3	9.0	8.5	101	3
9/3	PM	4	1.4	9.0	7.5	102	3
9/4	AM	3	4.0	5.0	7.0	108	3
9/4	PM	3	8.0	8.0	7.0	110	3
9/5	AM	4	2.0	9.0	7.0	115	3
9/5	PM	4	3.8	9.0	7.5	119	3
9/6	AM	4	2.0	5.0	6.0	ND	3
9/6	PM	3	0.5	7.0	6.0	147	3
9/7	AM	3	1.1	6.0	7.0	160	3
9/7	PM	3	0.0	11.0	7.0	168	3
9/8	AM	3	0.0	4.0	6.5	181	3
9/8	PM	3	0.0	7.0	7.0	182	3
9/9	AM	3	0.6	-1.0	6.0	180	3
9/9	PM	3	0.0	10.0	6.0	174	3
9/10	AM	1	0.0	-4.0	6.0	155	3
9/10	PM	2	0.0	12.0	6.0	148	3
9/11	AM	2	0.0	-1.0	5.0	131	3
9/11	PM	4	0.0	9.0	5.0	125	3
9/12	AM	3	0.0	0.0	6.0	118	3
9/12	PM	3	0.0	11.0	5.5	104	3
9/13	AM	4	0.0	1.0	5.0	98	3
9/13	PM	3	0.0	10.0	5.0	95	3
9/14	AM	4	0.7	4.0	5.0	84	3
9/14	PM	4	2.4	9.0	5.0	84	3
9/15	AM	4	3.0	5.0	5.0	78	3
9/15	PM	4	3.8	8.0	5.0	78	3
9/16	AM	4	20.1	5.0	6.0	79	3
9/16	PM	4	17.5	9.0	6.0	86	3
9/17	AM	4	0.6	9.0	5.5	109	3
9/17	PM	3	0.0	6.0	6.0	129	3
9/18	AM	4	11.0	5.0	5.0	146	3

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
9/18	PM	3	4.1	9.0	5.5	152	3
9/19	AM	3	12.5	7.0	6.0	159	3
9/19	PM	4	15.0	7.0	6.0	165	3
9/20	AM	4	3.0	3.0	6.0	180	3
9/20	PM	ND	ND	ND	ND	ND	3
9/21	AM	ND	ND	ND	ND	206	ND

Note: ND = no data.

[a] Sky condition codes:

1 = clear or mostly clear; < 10% cloud cover

2 = partly cloudy; < 50% cloud cover

3 = mostly cloudy; > 50% cloud cover

4 = complete overcast

5 = thick fog

[b] Water clarity codes:

1 = visibility greater than 1 meter

2 = visibility between 0.5 and 1 meter

3 = visibility less than 0.5 meter

Appendix B6.–Daily weather and stream observations at the Takotna River weir, 2012.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
6/24	AM	4	0.7	12.3	13.1	73.5	ND
6/24	PM	3	0.2	13.7	14.9	73	ND
6/25	AM	4	0.0	10.0	12.0	72	ND
6/25	PM	4	0.0	11.5	12.0	72	ND
6/26	AM	ND	ND	ND	ND	ND	ND
6/26	PM	ND	ND	ND	ND	ND	ND
6/27	AM	4	2.6	12.0	10.5	73	ND
6/27	PM	4	0.6	16.0	12.0	72	ND
6/28	AM	4	0.1	13.0	10.0	73.5	ND
6/28	PM	4	0.6	16.0	12.0	76	ND
6/29	AM	4	7.0	12.0	10.0	77.5	ND
6/29	PM	2	0.5	17.0	12.0	79	ND
6/30	AM	3	0.1	15.0	10.0	85.5	ND
6/30	PM	4	0.0	15.0	13.0	83	ND
7/1	AM	2	2.0	15.0	11.5	78	ND
7/1	PM	2	0.5	21.0	14.0	78	ND
7/2	AM	3	0.2	10.0	11.5	81.5	2
7/2	PM	4	0.0	18.0	13.0	77	2
7/3	AM	4	0.0	12.0	11.0	74	1
7/3	PM	3	0.0	15.0	13.5	73.5	1
7/4	AM	2	0.0	11.5	12.0	73	1
7/4	PM	2	0.0	16.5	14.0	72.5	1
7/5	AM	1	2.6	12.5	12.0	70.5	1
7/5	PM	3	0.0	18.0	14.0	69.5	1
7/6	AM	3	0.5	8.0	12.0	69	1
7/6	PM	4	0.0	23.0	16.0	67.5	1
7/7	AM	1	0.0	15.0	14.7	66.5	1
7/7	PM	4	1.1	15.0	14.7	68	1
7/8	AM	4	16.0	10.0	12.5	70	1
7/8	PM	4	9.0	12.5	11.0	72	1
7/9	AM	3	0.6	9.0	10.0	81	3
7/9	PM	2	0.0	15.0	11.0	87	3
7/10	AM	4	15.0	10.0	10.5	89	3
7/10	PM	3	0.6	10.0	ND	88	2
7/11	AM	1	20.0	8.0	9.0	83	2
7/11	PM	2	6.5	16.5	12.0	86	2

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/12	AM	4	0.0	10.0	11.0	80	2
7/12	PM	4	0.0	ND	ND	80	1
7/13	AM	4	2.0	10.0	10.5	76	2
7/13	PM	2	0.2	16.0	12.5	77	2
7/14	AM	4	0.2	8.0	11.5	74.5	1
7/14	PM	4	0.0	18.0	12.5	73	2
7/15	AM	4	1.0	10.0	10.5	72.5	1
7/15	PM	4	2.0	12.0	12.0	72	1
7/16	AM	2	0.6	13.0	10.5	72	1
7/16	PM	3	0.1	15.0	11.0	72	1
7/17	AM	4	0.0	9.0	11.0	71	1
7/17	PM	3	0.0	16.0	12.0	71	1
7/18	AM	1	0.0	11.5	11.5	69	1
7/18	PM	4	0.0	19.0	14.0	68	1
7/19	AM	4	0.0	10.5	12.0	66.5	1
7/19	PM	ND	ND	ND	ND	ND	1
7/20	AM	4	0.0	11.0	12.0	66	1
7/20	PM	4	0.0	15.0	ND	65	1
7/21	AM	4	13.5	12.0	12.0	67	1
7/21	PM	4	6.0	15.0	12.8	70	1
7/22	AM	4	34.0	13.0	12.0	72.5	1
7/22	PM	4	5.0	14.0	13.0	76	2
7/23	AM	4	3.0	12.0	10.0	81.7	3
7/23	PM	4	1.8	13.0	11.0	81	3
7/24	AM	4	0.5	12.0	11.0	81	3
7/24	PM	4	0.1	15.0	12.0	81	3
7/25	AM	2	0.0	13.0	11.0	77	2
7/25	PM	3	0.0	17.0	14.0	75	2
7/26	AM	3	0.0	14.0	12.0	72.5	2
7/26	PM	4	0.0	13.0	14.0	72	2
7/27	AM	4	0.0	11.5	12.0	71	1
7/27	PM	1	0.2	19.0	15.0	70	1
7/28	AM	3	0.0	14.0	13.0	69	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/28	PM	1	0.0	21.0	16.0	69	1
7/29	AM	4	0.0	14.0	14.0	67	1
7/29	PM	4	0.0	14.5	13.0	68.5	1
7/30	AM	4	7.0	10.0	12.0	67	1
7/30	PM	2	1.0	14.0	14.0	69	1
7/31	AM	4	0.0	10.0	12.0	67.5	1
7/31	PM	4	0.4	14.0	13.0	69	1
8/1	AM	4	4.5	10.0	12.0	69.5	1
8/1	PM	4	0.6	13.0	12.0	69	1
8/2	AM	4	3.6	9.0	10.0	69.5	1
8/2	PM	ND	ND	ND	ND	ND	1
8/3	AM	4	9.0	10.0	11.0	78.5	2
8/3	PM	4	2.0	13.0	12.0	82	2
8/4	AM	4	0.2	9.0	9.5	81	2
8/4	PM	ND	ND	ND	ND	ND	2
8/5	AM	4	0.0	9.0	8.0	77.5	2
8/5	PM	3	0.0	14.0	9.0	78	2
8/6	AM	1	0.0	7.0	9.0	74.5	1
8/6	PM	1	0.0	20.0	13.0	74	1
8/7	AM	4	3.0	10.0	11.0	73	2
8/7	PM	4	9.8	10.0	9.0	74	2
8/8	AM	1	1.2	7.0	9.0	74	2
8/8	PM	2	0.0	15.0	12.0	76	1
8/9	AM	3	0.0	9.0	10.0	77	1
8/9	PM	1	0.0	19.0	12.0	77	1
8/10	AM	1	0.0	6.0	9.0	75	1
8/10	PM	3	0.0	20.0	12.0	74.5	1
8/11	AM	4	0.0	10.0	11.0	71	1
8/11	PM	1	0.0	24.0	12.0	71	1
8/12	AM	1	0.0	9.0	11.0	69.5	1
8/12	PM	1	0.0	23.0	10.0	69	1
8/13	AM	1	0.0	8.0	12.0	69	1
8/13	PM	1.0	0.0	24.0	14.0	69	1
8/14	AM	ND	ND	ND	ND	ND	ND

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
8/14	PM	1	0.0	24.0	12.0	66	1
8/15	AM	1	0.0	15.0	14.0	65	1
8/15	PM	1	0.0	21.0	16.0	65	1
8/16	AM	2	0.0	15.0	11.5	70	1
8/16	PM	2	0.0	12.0	14.0	68	1
8/17	AM	4	0.0	10.5	10.5	65	1
8/17	PM	4	0.0	15.0	13.0	64	1
8/18	AM	4	0.0	11.0	10.5	69	1
8/18	PM	4	2.5	12.0	11.0	63	1
8/19	AM	3	1.0	9.5	10.0	64	1
8/19	PM	4	2.0	13.0	11.0	64.5	1
8/20	AM	4	1.5	8.0	9.0	63	1
8/20	PM	4	0.7	9.0	11.0	66.5	1
8/21	AM	4	0.1	8.0	10.0	64	1
8/21	PM	4	0.0	13.0	12.0	66.5	1
8/22	AM	4	0.2	9.0	9.5	67	1
8/22	PM	4	0.0	13.0	11.0	64	1
8/23	AM	4	9.0	9.0	9.5	69.5	1
8/23	PM	3	2.6	18.0	11.5	64.5	1
8/24	AM	4	7.0	8.0	9.5	ND	1
8/24	PM	4	1.4	10.0	10.0	68	1
8/25	AM	4	3.6	11.0	10.0	69	1
8/25	PM	4	0.1	13.0	11.0	69.5	1
8/26	AM	4	9.6	9.0	9.5	69	ND
8/26	PM	4	5.4	13.0	10.0	74	ND
8/27	AM	2	0.7	9.0	10.0	83	2
8/27	PM	4	0.6	12.0	10.5	100	2
8/28	AM	3	0.5	6.0	8.5	110	3
8/28	PM	ND	ND	ND	ND	ND	ND
8/29	AM	4	0.6	9.0	8.0	92	1
8/29	PM	ND	ND	ND	ND	ND	ND
8/30	AM	4	5.6	13.0	9.5	88	2
8/30	PM	4	0.7	11.0	10.0	87	2
8/31	AM	4	0.7	10.0	9.0	89	2

-continued-

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
8/31	PM	4	0.0	14.0	8.0	95	3
9/1	AM	4	0.2	8.0	9.0	95	2
9/1	PM	2	0.0	13.0	10.0	90.5	2
9/2	AM	4	0.0	9.0	8.0	87	2
9/2	PM	ND	ND	ND	ND	ND	ND
9/3	AM	4	6.0	10.0	8.0	91	2
9/3	PM	4	1.2	10.0	9.0	88	1
9/4	AM	4	0.6	7.0	8.0	90	2
9/4	PM	4	10.4	8.0	8.0	98	2
9/5	AM	4	6.0	8.0	9.0	99	3
9/5	PM	4	3.0	9.0	8.0	107	3
9/6	AM	4	6.0	10.0	6.0	128	3
9/6	PM	4	0.2	8.0	7.0	129	3
9/7	AM	4	0.0	8.0	8.0	127	3
9/7	PM	4	2.5	7.0	7.0	133	3
9/8	AM	5	0.0	-1.0	6.0	127	3
9/8	PM	3	0.5	10.0	7.0	123	3
9/9	AM	2	0.0	11.0	5.0	119	3
9/9	PM	2	0.0	11.0	7.0	112	2
9/10	AM	1	0.0	-3.0	5.0	113	2
9/10	PM	1	0.0	11.0	8.0	113	2
9/11	AM	1	0.0	-3.0	5.0	113	1
9/11	PM	2	0.0	10.0	5.5	110	1
9/12	AM	3	0.0	1.0	4.0	102	1
9/12	PM	2	0.0	13.0	7.0	98	1
9/13	AM	2	0.0	0.0	-1.0	94	1
9/13	PM	3	0.0	11.0	5.0	90	1
9/14	AM	3	0.0	-1.0	4.0	87	1
9/14	PM	4	0.1	8.0	5.0	86	1

Note: ND = no data.

[a] Sky condition codes:

1 = clear or mostly clear; < 10% cloud cover

2 = partly cloudy; < 50% cloud cover

3 = mostly cloudy; > 50% cloud cover

4 = complete overcast

5 = thick fog

[b] Water clarity codes:

1 = visibility greater than 1 meter

2 = visibility between 0.5 and 1 meter

3 = visibility less than 0.5 meter

APPENDIX C: OBSERVATION OF NONTARGET SPECIES

Appendix C1.–Daily observed passage of nontarget species at Salmon River weir, 2012.

Date		Pink Salmon	Longnose Sucker	Arctic Grayling	Dolly Varden	Rainbow Trout
7/3	[a]	0	0	0	0	0
7/4	[a]	0	0	0	0	0
7/5		0	2	0	0	0
7/6		0	2	0	0	0
7/7		0	3	2	0	0
7/8		0	0	0	0	0
7/9	[b]					
7/10	[b]					
7/11	[b]					
7/12	[b]					
7/13	[b]					
7/14	[b]					
7/15	[b]					
7/16	[b]					
7/17	[a]	0	0	0	0	0
7/18	[a]	4	0	0	0	0
7/19		9	2	0	3	0
7/20		3	3	0	2	0
7/21		9	2	0	3	2
7/22	[a]	1	0	0	0	0
7/23	[b]					
7/24	[b]					
7/25	[a]	0	2	1	0	0
7/26	[a]	6	1	0	2	0
7/27		1	0	0	3	0
7/28		6	2	2	2	0
7/29		4	6	0	3	0
7/30		0	0	0	1	0
7/31		0	0	0	2	0
8/1	[a]	0	0	0	1	0
8/2		0	3	2	1	0
8/3		2	4	0	3	0
8/4		0	0	0	3	0
8/5		1	1	0	5	0
8/6		0	1	0	1	0
8/7		2	1	0	2	0
8/8		4	1	0	12	0
8/9		0	0	0	12	0
8/10		3	0	1	36	0
8/11		0	0	0	26	0
8/12		3	0	0	19	0
8/13		1	1	0	34	0
8/14		0	0	0	54	0
8/15		0	0	0	31	0

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Date	Pink Salmon	Longnose Sucker	Arctic Grayling	Dolly Varden	Rainbow Trout
8/16	1	0	0	12	0
8/17	2	0	0	15	0
8/18	0	0	0	6	0
8/19	0	0	0	8	1
8/20	0	0	0	5	0
8/21	0	0	0	1	0
8/22	0	0	0	3	0
8/23	0	0	0	3	0
Total	62	37	8	311	3

Note: Blank cells indicate no data.

[a] Partial day count.

[b] Weir was not operational.

Appendix C2.–Daily observed passage of nontarget species at George River weir, 2012.

Date		Pink Salmon	Longnose Sucker	Dolly Varden	Whitefish	Northern Pike
6/15	[a]					
6/16	[a]					
6/17	[a]					
6/18	[a]					
6/19	[a]					
6/20	[a]					
6/21	[a]					
6/22	[a]					
6/23	[a]					
6/24	[a]					
6/25	[a]					
6/26	[a]					
6/27	[a]					
6/28	[a]					
6/29	[a]					
6/30	[b]	3	22	0	0	0
7/1		19	624	0	0	0
7/2		17	313	0	1	0
7/3		17	120	0	0	0
7/4		11	53	0	0	0
7/5		29	36	0	0	0
7/6		12	41	0	0	0
7/7		54	126	0	0	0
7/8		48	267	0	0	0
7/9		17	17	0	0	0
7/10		45	55	0	0	0
7/11		66	61	0	0	0
7/12		78	14	0	0	0
7/13		142	44	0	0	0
7/14	[b]	87	32	0	0	0
7/15		132	83	0	0	0
7/16		227	45	0	0	0
7/17		306	38	0	0	0
7/18		282	50	0	0	0
7/19		383	111	0	0	0
7/20		305	147	0	0	0
7/21		333	70	0	0	0
7/22		442	42	0	0	0
7/23		587	61	0	0	0
7/24		397	105	0	0	0
7/25		475	101	0	0	0
7/26		423	25	0	0	0
7/27		316	35	1	0	0
7/28		391	47	0	0	0

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Date	Pink Salmon	Longnose Sucker	Dolly Varden	Whitefish	Northern Pike
7/29	144	16	0	0	0
7/30	93	0	0	0	0
7/31	74	5	1	0	0
8/1	50	0	0	0	0
8/2	37	3	0	0	0
8/3	55	1	0	0	0
8/4	36	2	0	0	0
8/5	28	1	0	0	0
8/6	29	1	0	0	0
8/7	18	0	0	0	0
8/8	10	1	0	0	0
8/9	12	4	0	0	0
8/10	6	1	0	0	0
8/11	6	2	0	0	0
8/12	4	4	0	0	0
8/13	5	9	0	0	0
8/14	5	4	0	0	0
8/15	5	1	0	0	0
8/16	1	14	0	0	0
8/17	1	7	0	0	0
8/18	1	2	0	0	0
8/19	0	2	0	0	1
8/20	0	6	0	0	0
8/21	0	0	0	0	0
8/22	0	1	0	0	0
8/23	1	1	0	0	0
8/24	0	3	0	0	0
8/25	0	6	0	0	0
8/26	0	7	0	0	0
8/27	0	1	0	0	0
8/28	4	0	0	0	0
8/29	0	1	0	0	0
8/30	1	1	0	0	0
8/31	0	8	0	0	0
9/1	0	0	0	0	0
9/2	0	0	0	0	0
9/3	0	0	0	0	0
9/4	0	0	0	0	0
9/5	1	0	0	0	0
9/6 [b]	0	0	0	0	0
9/7 [b]	0	0	0	0	0
9/8 [b]	0	0	0	0	0
9/9 [b]	0	0	0	0	0
9/10 [b]	0	0	0	0	0

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Date	Pink Salmon	Longnose Sucker	Dolly Varden	Whitefish	Northern Pike
9/11 [b]	0	0	0	0	0
9/12 [b]	0	0	0	0	0
9/13	0	0	0	0	0
9/14	0	0	0	0	0
9/15	0	0	0	0	0
9/16 [b]	0	0	0	0	0
9/17 [a]			0	0	0
9/18 [a]			0	0	0
9/19 [a]			0	0	0
9/20 [a]			0	0	0
Total	6,271	2,900	2	1	1

Note: Blank cells indicate no data.

[a] Partial day count.

[b] Weir was not operational.

Appendix C3.–Daily observed passage of nontarget species at Kogrukluk River weir, 2012.

Date		Pink Salmon	Dolly Varden	Whitefish
6/28	[a]			
6/29	[a]			
6/30	[b]	0	1	0
7/1		0	0	2
7/2		0	1	0
7/3		0	0	1
7/4		0	3	1
7/5		0	0	0
7/6		2	3	0
7/7		2	3	0
7/8	[b]	0	3	0
7/9	[a]			
7/10	[a]			
7/11	[a]			
7/12	[a]			
7/13	[a]			
7/14	[a]			
7/15	[a]			
7/16	[a]			
7/17	[a]			
7/18	[a]			
7/19	[a]			
7/20	[a]			
7/21	[a]			
7/22	[a]			
7/23	[a]			
7/24	[a]			
7/25	[a]			
7/26	[a]			
7/27	[a]			
7/28	[b]	0	0	0
7/29		7	2	0
7/30	[b]	8	3	0
7/31	[a]			
8/1	[b]	9	0	0
8/2		19	0	0
8/3		21	0	0
8/4		13	0	0
8/5	[b]	9	0	0
8/6	[b]	11	0	0
8/7	[b]	17	1	0

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Date		Pink Salmon	Dolly Varden	Whitefish
8/8		19	0	0
8/9	[b]	14	3	0
8/10		20	0	0
8/11		11	0	0
8/12	[b]	6	3	0
8/13		4	4	0
8/14		7	1	0
8/15		4	11	0
8/16		3	6	0
8/17		5	19	0
8/18		2	5	0
8/19		2	17	0
8/20		5	5	1
8/21		2	24	2
8/22		4	9	0
8/23		3	21	0
8/24		0	18	1
8/25		2	12	0
8/26		1	30	3
8/27		2	10	5
8/28		2	5	0
8/29		1	19	2
8/30		0	3	3
8/31		0	6	2
9/1		0	4	4
9/2		0	2	0
9/3		0	1	2
9/4	[a]			
9/5	[a]			
9/6	[a]			
9/7	[a]			
9/8	[a]			
9/9	[a]			
9/10	[a]			
9/11	[a]			
9/12	[a]			
9/13		0	1	0
9/14		0	0	1
9/15	[b]	0	0	5
9/16	[b]	0	0	0
9/17	[a]			

-continued-

Date	Pink Salmon	Dolly Varden	Whitefish
9/18 [a]			
9/19 [a]			
9/20 [a]			
9/21 [a]			
9/22 [a]			
9/23 [a]			
9/24 [a]			
9/25 [a]			
Total	237	259	35

Note: Blank cells indicate no data.

[a] Partial day count.

[b] Weir was not operational.

Appendix C4.–Daily observed passage of nontarget species at Telaquana River weir, 2012.

Date	Pink Salmon	Longnose Sucker	Arctic Grayling	Whitefish	Northern Pike	Lake Trout
7/5	0	0	0	0	0	0
7/6	0	24	0	3	0	0
7/7	0	5	0	1	0	0
7/8	0	36	1	0	0	0
7/9	0	2	0	0	0	0
7/10	0	1	0	0	0	0
7/11	0	38	0	0	0	0
7/12	0	0	0	0	0	0
7/13	0	9	0	0	1	1
7/14	0	4	0	0	0	0
7/15	0	59	0	4	0	0
7/16	0	64	1	1	0	0
7/17	1	86	0	0	0	0
7/18	0	24	2	0	0	0
7/19	0	49	0	0	0	0
7/20	0	50	3	0	0	0
7/21	0	32	1	0	0	0
7/22	0	1	2	0	0	0
7/23	0	34	2	6	0	0
7/24	0	25	0	0	0	0
7/25	0	77	0	0	0	0
7/26	0	6	0	3	0	0
7/27	0	6	0	2	0	0
7/28	0	67	3	1	0	0
7/29	0	103	0	1	0	0
7/30	0	12	1	0	0	1
7/31	0	10	0	0	0	1
8/1	1	19	0	1	0	0
8/2 [a]	0	0	0	1	0	0
8/3	0	1	1	0	0	0
8/4	0	0	0	0	0	0
8/5	0	1	1	0	0	0
8/6	0	35	5	7	0	0
8/7	0	1	3	4	0	0
8/8	0	0	3	2	0	0
8/9	0	7	2	2	0	0
8/10	0	10	5	8	0	1
8/11	0	8	4	9	0	0
8/12	0	1	1	9	0	0
8/13	0	0	2	7	0	2
8/14	0	5	0	3	0	0
8/15	0	5	1	3	0	0
8/16	0	10	2	6	0	2
8/17	0	9	0	3	0	1

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Date	Pink Salmon	Longnose Sucker	Arctic Grayling	Whitefish	Northern Pike	Lake Trout
8/18	0	16	1	2	0	1
8/19	0	3	0	4	1	0
8/20	0	7	0	3	0	0
8/21	0	0	0	1	0	0
8/22	0	14	2	3	2	0
8/23	0	4	0	0	0	1
8/24	0	0	1	1	0	0
8/25	0	0	0	0	0	0
8/26	0	5	0	2	0	0
8/27	0	5	4	2	0	0
Total	2	990	54	105	4	11

Note: Blank cells indicate no data.

[a] Partial day count.

Appendix C5.–Daily observed passage of nontarget species at Tatlawiksuk River weir, 2012.

Date		Pink Salmon	Longnose Sucker	Arctic Grayling	Whitefish	Northern Pike
6/15	[a]					
6/16	[a]					
6/17	[a]					
6/18	[a]					
6/19	[a]					
6/20	[a]					
6/21	[a]					
6/22	[a]					
6/23	[b]	0	12	0	0	0
6/24		0	103	0	0	0
6/25		0	11	0	0	0
6/26		0	2	0	0	0
6/27		0	4	0	0	0
6/28		0	4	0	0	0
6/29		0	31	0	0	0
6/30		0	85	0	0	0
7/1		0	48	0	0	0
7/2		0	56	0	0	0
7/3		0	9	0	0	0
7/4		0	2	0	0	0
7/5		0	2	0	0	0
7/6		0	13	0	0	0
7/7		0	129	0	0	0
7/8		0	13	0	0	0
7/9		0	6	0	0	0
7/10		0	1	0	0	0
7/11		1	8	0	0	0
7/12		0	16	0	0	0
7/13		3	10	0	0	0
7/14		0	1	0	0	1
7/15		0	1	0	0	0
7/16		0	3	0	0	0
7/17		0	0	0	0	0
7/18		1	3	1	0	0
7/19		1	8	0	0	0
7/20		1	2	0	0	0
7/21		4	0	0	0	0
7/22		0	3	0	0	0
7/23		2	18	0	0	0
7/24		5	8	0	0	0
7/25		8	0	2	0	0
7/26		1	13	1	0	0
7/27		0	2	0	0	0
7/28		0	0	0	0	0

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Date	Pink Salmon	Longnose Sucker	Arctic Grayling	Whitefish	Northern Pike
7/29	0	1	3	1	0
7/30	0	2	0	0	0
7/31	0	0	0	0	0
8/1	0	0	0	0	0
8/2	0	1	0	0	0
8/3	0	1	0	0	0
8/4	0	0	0	0	0
8/5	0	1	0	0	0
8/6	0	2	0	0	0
8/7	0	2	2	0	0
8/8	0	1	0	0	0
8/9	0	0	2	0	1
8/10	0	0	0	1	0
8/11	0	1	0	0	0
8/12	0	0	0	0	1
8/13	0	1	0	0	0
8/14	0	0	1	1	0
8/15	0	0	0	0	1
8/16	0	0	1	0	0
8/17	0	0	0	0	0
8/18	0	0	0	0	0
8/19	0	0	0	0	0
8/20	0	0	1	0	0
8/21	0	0	0	0	0
8/22	0	0	0	0	0
8/23	0	0	0	0	0
8/24	0	0	0	0	0
8/25	0	0	0	0	0
8/26	0	0	0	0	0
8/27	0	0	0	0	0
8/28	0	0	0	0	0
8/29	0	0	0	0	0
8/30	0	0	0	0	0
8/31	0	0	0	0	2
9/1	0	0	0	0	0
9/2	0	0	0	0	0
9/3	0	0	0	0	0
9/4	0	0	0	0	0
9/5	0	0	0	0	0
9/6 [a]					
9/7 [a]					
9/8 [a]					
9/9 [a]					
9/10 [a]					

-continued-

Date		Pink Salmon	Longnose Sucker	Arctic Grayling	Whitefish	Northern Pike
9/11	[a]					
9/12	[b]	0	0	0	0	0
9/13		0	0	0	0	0
9/14		0	0	0	0	0
9/15	[b]	0	0	0	0	0
9/16	[a]					
9/17	[a]					
9/18	[a]					
9/19	[a]					
9/20	[a]					
Total		27	640	14	3	6

Note: Blank cells indicate no data.

[a] Partial day count.

[b] Weir was not operational.

Appendix C6.–Daily observed passage of nontarget species at Takotna River weir, 2012.

Date		Longnose Sucker	Arctic Grayling
6/24	[a]		
6/25	[a]		
6/26	[a]		
6/27	[a]		
6/28	[a]		
6/29	[a]		
6/30	[a]		
7/1	[a]		
7/2	[a]		
7/3	[a]		
7/4	[a]		
7/5	[b]	0	2
7/6		0	1
7/7		7	3
7/8		1	1
7/9		0	0
7/10		8	0
7/11		0	0
7/12		0	0
7/13		0	0
7/14		0	0
7/15		0	0
7/16		0	1
7/17		0	0
7/18	[b]	0	0
7/19		1	0
7/20		0	0
7/21		0	0
7/22		0	0
7/23		0	0
7/24		0	0
7/25		0	0
7/26		0	0
7/27		0	0
7/28		0	0
7/29		0	0
7/30		0	0
7/31		0	0
8/1		0	0
8/2		0	0
8/3		0	0
8/4		0	1
8/5		0	0
8/6		0	0
8/7		0	0
8/8		0	0

-continued-

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Date		Longnose Sucker	Arctic Grayling
8/9		0	0
8/10		0	0
8/11		0	0
8/12		0	0
8/13		0	1
8/14		0	0
8/15		0	0
8/16		0	0
8/17		0	0
8/18		0	0
8/19		0	0
8/20		0	1
8/21		0	0
8/22		0	0
8/23		0	0
8/24		0	0
8/25		0	0
8/26		0	0
8/27	[b]	0	0
8/28	[b]	0	0
8/29		0	0
8/30		0	0
8/31		0	0
9/1		0	0
9/2		0	0
9/3		0	0
9/4		0	0
9/5		0	0
9/6	[a]		
9/7	[a]		
9/8	[a]		
9/9	[a]		
9/10	[a]		
9/11	[b]	0	0
9/12		0	0
9/13		0	0
9/14		0	0
9/15	[a]		
9/16	[a]		
9/17	[a]		
9/18	[a]		
9/19	[a]		
9/20	[a]		
Total		17	11

Note: Blank cells indicate no data.

[a] Partial day count.

[b] Weir was not operational.