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Salmon Escapement Monitoring in the Kuskokwim Area, 2015

Annual Report for Project No. 14-303 and 14-302
USFWS Office of Subsistence Management
Fisheries Resource Monitoring Program

by

Brittany J. Blain

Tracy R. Hansen

Davin V. Taylor

and

Zachary W. Liller

June 2016

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

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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

FISHERY DATA SERIES NO. 16-23

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by
Brittany J. Blain, Tracy R. Hansen, Davin V. Taylor, and Zachary W. Liller
Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1565

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Brittany J. Blain,
brittany.blain@alaska.gov
Tracy R. Hansen,
tracy.hansen1@alaska.gov
Davin V. Taylor,
davin.taylor@alaska.gov
and
Zachary W. Liller,
zachary.liller@alaska.gov
Alaska Department of Fish and Game, Division of Commercial Fisheries
333 Raspberry Road, Anchorage, AK 99518, USA

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ABSTRACT

In 2015, the Alaska Department of Fish and Game (ADF&G), in collaboration with other entities, conducted aerial surveys and operated ground-based weir projects to monitor Pacific salmon *Oncorhynchus* spp. escapement throughout the Kuskokwim Area. This report presents results of sampling activities and escapement monitoring from all aerial surveys and weir projects operated by ADF&G. Chinook salmon *Oncorhynchus tshawytscha* escapements were successfully enumerated on 11 tributaries by aerial survey and 7 tributaries with ground-based fish weirs. Above average Chinook salmon escapements were observed at 3 aerial survey locations and 2 weirs. All other Chinook salmon assessments locations observed below average escapement; however, most escapement observations in 2015 were larger compared to recent years. Sockeye salmon *O. nerka* were successfully enumerated on 3 tributaries by aerial survey and 5 tributaries with ground-based fish weirs. Above average sockeye salmon escapement was observed at 4 of the 8 monitoring location, and below average escapement was observed at the other 4 locations. Chum salmon *O. keta* were successfully enumerated on 6 tributaries with ground-based weirs. Chum salmon escapement was below average at all monitored locations in 2015. Coho salmon escapements were monitored on 4 tributaries with ground-based weirs. Coho salmon *O. kisutch* escapement was above average at all monitored Kuskokwim River tributaries. Efforts to monitor coho salmon escapement to the Goodnews River in Kuskokwim Bay were incomplete.

Key words: Chinook salmon, *Oncorhynchus tshawytscha*, chum salmon, *Oncorhynchus keta*, sockeye salmon, *Oncorhynchus nerka*, coho salmon, *Oncorhynchus kisutch*, Kuskokwim Area, Kuskokwim Bay, Kuskokwim River, North Fork Goodnews River, Middle Fork Goodnews River, Kanektok River, Kisaralik River, Aniak River, Salmon River (Aniak drainage), Kipchuk River, Holokuk River, Oskawalik River, George River, Holitna River, Kogrukluk River, Telaquana River, Cheeneetnuk River, Gagaryah River, Tatlawiksuk River, Salmon River (Pitka Fork drainage), Bear Creek, aerial survey, resistance board weir, fixed picket weir, escapement, age, sex, and length (ASL)

INTRODUCTION

Pacific salmon *Oncorhynchus* spp. runs throughout the Kuskokwim Area are managed to provide for escapements within ranges that will conserve and sustain potential salmon production. As such, long-term escapement monitoring projects are important tools for fishery management. Peak aerial surveys and ground-based weirs are used throughout the Kuskokwim Area to reliably measure annual escapement to key spawning systems (Figures 1–3) and track temporal and spatial patterns in abundance. The Kuskokwim Area comprises the Kuskokwim River and Kuskokwim Bay river systems (Figure 1). Salmon spawn in many tributaries throughout the Kuskokwim River drainage and contribute to the subsistence, commercial, and sport fishery harvests. Because it is not feasible to monitor all tributaries of the Kuskokwim River, a subset of rivers distributed over a broad geographic area is monitored to provide an indicator of Kuskokwim River salmon abundance. The rivers monitored in Kuskokwim Bay are the primary spawning drainages and main producers of salmon harvested in the area.

Formal abundance estimates do not exist for all salmon species returning to Kuskokwim Area systems. Available data indicate sockeye salmon *O. nerka* are the most abundant salmon species in Kuskokwim Bay river systems, followed by chum *O. keta*, coho *O. kisutch*, and Chinook *O. tshawytscha* salmon (Tiernan and Poetter 2015). For the Kuskokwim River, data indicate chum salmon are the most abundant salmon species in the drainage, followed by coho, sockeye, and Chinook salmon. Pink salmon *O. gorbuscha* abundance within the Kuskokwim Area has not been estimated.

Kuskokwim Area salmon support subsistence, commercial, and sport fisheries that contribute to an average annual harvest of approximately 720,000 fish (years 2003–2013: Tiernan and Poetter 2015). The subsistence salmon fishery in the Kuskokwim Area is one of the largest and most important in the state and remains a fundamental component of local culture

(Shelden et al. 2014). Although the subsistence salmon fishery occurs throughout the entire Kuskokwim Area, the majority of fishing effort occurs within the lower 200 miles of the Kuskokwim River, Goodnews Bay, and the Kanektok River within Kuskokwim Bay (Shelden et al. 2014). Since 2001, the commercial salmon fishery has occurred in 3 districts within the Kuskokwim Area (Figure 1; Tiernan and Poetter 2015). District 1 is located in the lower portion of the Kuskokwim River, and Districts 4 and 5 encompass areas in Kuskokwim Bay near the Kanektok and Goodnews river systems, respectively. The sport fishery is the smallest of the 3 fisheries and occurs throughout the Kuskokwim Area.

Peak aerial surveys have been conducted annually since 1959 in select salmon spawning rivers throughout the Kuskokwim Area to index salmon escapement abundance (Molyneaux and Brannian 2006). Aerial surveys flown on Kuskokwim Bay rivers index Chinook and sockeye salmon escapement, and Kuskokwim River surveys index Chinook salmon escapement only. A total of 145 individual rivers and lakes throughout the Kuskokwim Area have been surveyed at least once (Brannian et al. 2006; Arctic-Yukon-Kuskokwim Database Management System [AYKDBMS][1]). In 2015, a subset of 14 rivers was selected to be surveyed (Table 1 and 2). Rivers with existing escapement goals were prioritized and additional rivers were selected based on water clarity, location, salmon abundance, past survey history, and perceived local importance and interest. Although aerial surveys provide the most cost-effective means of monitoring salmon escapements, they are subject to limited reliability and high variability in precision depending on viewing conditions and the surveyor's experience (Burkey et al. 2001).

Weirs have been used annually since the late 1970s throughout the Kuskokwim Area to estimate total escapement and collect age, sex, and length (ASL) data from Chinook, chum, sockeye, and coho salmon (Molyneaux and Brannian 2006; Hansen and Blain 2013). The first weir project in the Kuskokwim Area was established on the Kogrukluk River in 1976 to monitor salmon escapement to the Holitna River drainage. In 1981 and 1982 a weir was operated on the South Fork of the Salmon River (Pitka Fork) to monitor Chinook salmon escapement upriver from McGrath (Molyneaux and Brannian 2006). Throughout the 1990s and early 2000s, 7 additional weir projects were added to monitor salmon escapement in the lower (Kwethluk and Tuluksak river weirs), middle (George and Tatlawiksuk river weirs), and upper (Takotna River weir) portions of the Kuskokwim River and Kuskokwim Bay (Kanektok and Middle Fork Goodnews river weirs). In 2006, a weir was established on the Salmon River (Aniak) to index salmon escapement to the Aniak River. In 2010, a weir was established on Telaquana River to index sockeye salmon escapement into Telaquana Lake. Most recently, the Takotna River weir was discontinued in 2014 and the Salmon River (Pitka Fork) weir was re-established in 2015 downriver of its original location. Weir locations were chosen based on salmon abundance, ability to install and operate a weir, past monitoring history, availability of funding, and perceived local importance and interest. Weirs were operated in 2015 throughout their target operational period, indicating they provided complete estimates of target species in those tributaries (Table 3). Pink salmon escapement data were also collected at the escapement projects; however, the smaller body size of pink salmon may have allowed some to pass through the weirs undetected, making a complete counts impossible. In addition to Pacific salmon, many other resident fish species are commonly observed in the monitored streams. Ground-based weir

[1] AYKDBMS [Arctic-Yukon-Kuskokwim Database Management System] Home Page. http://sf.adfg.state.ak.us/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx.

projects provide a dependable and rigorous approach to escapement monitoring. However, the relatively high costs of weir projects and limitations of installing weirs in large or fast-flowing rivers limit the number of salmon producing tributaries that can be monitored using this method.

Formal escapement goals have been established for Chinook, chum, sockeye, and coho salmon in select monitored Kuskokwim Area tributaries (Conitz et al. 2015; Table 1–3). Within the Kuskokwim River, Chinook salmon escapement goals have been established on 10 tributaries: 3 are assessed using weirs and 7 using aerial surveys. The Kogrukluk River weir is the only weir monitored by the Alaska Department of Fish and Game (ADF&G) that has established escapement goals for chum, sockeye, and coho salmon within the Kuskokwim River drainage. The Kwethluk River weir, monitored by the U.S. Fish and Wildlife Service (USFWS), has established Chinook and coho salmon goals; and the George River, monitored by ADF&G, has an established Chinook salmon goal. Aerial survey escapement goals have been established on the Kanektok and North Fork Goodnews rivers for Chinook and sockeye salmon, in Kuskokwim Bay. The only weir-based escapement goals within Kuskokwim Bay for Chinook, sockeye, chum, and coho salmon have been established on the Middle Fork Goodnews River.

Kuskokwim River Chinook salmon is the only species with an established drainagewide escapement goal (Conitz et al. 2015). Estimates of total annual abundance are achieved using a maximum likelihood model that uses data collected from ground based escapement monitoring projects and aerial surveys (Table 3; Bue et al. 2012). The model estimate is used to determine whether the drainagewide escapement goal for Chinook salmon (65,000–120,000) was met.

This report presents results of sampling activities and escapement monitoring from all aerial surveys and weir projects operated by Alaska Department of Fish and Game (ADF&G) and partner organizations in 2015. The projects discussed in this report provide information necessary for annual assessment of escapement goals in the Kuskokwim Area, including estimation of total run size of Kuskokwim River Chinook salmon. In the Kuskokwim Area, 13 aerial survey rivers were flown, including the North Fork Goodnews, Middle Fork Goodnews, Kanektok, Kisaralik, Aniak, Salmon (Aniak drainage), Kipchuk, Holokuk, Oskawalik, Holitna, Cheeneetnuk, Gagaryah, Salmon (Pitka Fork drainage), and Bear Creek rivers (Figures 2 and 3). Weir projects were operated successfully on the Middle Fork Goodnews River in collaboration with USFWS; on the Kanektok River in collaboration with Native Village of Kwinhagak; on the Salmon River (Pitka Fork) in collaboration with MTNT, Ltd; on the Telaquana River in collaboration with the National Park Service; and on the George, Tatlawiksuk, Salmon (Aniak), and Kogrukluk rivers solely by ADF&G staff (Table 3; Figures 2 and 3). Supplemental to ADF&G monitoring efforts, the USFWS successfully operated salmon weirs on the Kwethluk and Tuluksak rivers in 2015, and the results from these projects are reported by USFWS. All weir projects targeted the Pacific salmon species outlined in Table 3. Data collected to determine ASL compositions are reported in the *Salmon age, sex, and length catalog for the Kuskokwim Area* (e.g., Liller et al. 2016).

OBJECTIVES

1. Conduct aerial surveys of Chinook salmon or sockeye salmon abundance under good or fair survey conditions between 17 July and 5 August on the following Kuskokwim Area rivers in 2015:

   Kuskokwim Bay – Chinook and sockeye salmon

   - North Fork Goodnews River;
   - Middle Fork Goodnews River;
   - Kanektok River;

   Kuskokwim River – Chinook salmon

   - Kisaralik River;
   - Aniak River;
   - Salmon River (Aniak drainage) ;
   - Kipchuk River;
   - Holokuk River;
   - Oskawalik River;
   - Holitna River;
   - Cheeneetnuk River;
   - Gagaryah River;
   - Salmon River (Pitka Fork drainage); and
   - Bear Creek.

2. Estimate daily and annual escapements of Pacific salmon species at weirs operated on the following Kuskokwim Area rivers, during a standard target operational period in 2015:

   Kuskokwim Bay

   - Middle Fork Goodnews River – Chinook, chum, sockeye, and coho salmon between 25 June and 31 August;
   - Kanektok River – Chinook, chum, and sockeye salmon between 25 June and 15 August;

   Kuskokwim River

   - Salmon River (Aniak drainage) – Chinook, chum, and sockeye salmon between 15 June and 15 August;
   - George River – Chinook, chum, and coho salmon between 15 June and 20 September;
   - Kogrukluk River – Chinook, chum, sockeye, and coho salmon between 26 June and 25 September;
   - Telaquana River – sockeye salmon between 3 July and 11 August;
   - Tatlawiksuk River – Chinook, chum, and coho salmon between 15 June and 20 September; and

- Salmon River (Pitka Fork drainage) – Chinook salmon between 1 June and 15 August.

3. Collect age, sex, and length data from adult salmon species using weir traps operated on 8 rivers throughout the Kuskokwim Area in 2015, such that minimum sample sizes meet or exceed the following:

    - Chinook salmon – 230;
    - Kuskokwim River sockeye salmon – 250 (sex and length data only);
    - Kuskokwim Bay sockeye salmon – 600;
    - Chum salmon – 600; and
    - Coho salmon – 400.

METHODS

STUDY AREA

The Kuskokwim Area is defined in regulation (5 AAC 07.100) as all waters of Alaska between the latitude of the westernmost point of the Naskonat Peninsula and the latitude of the southernmost tip of Cape Newenham, including the waters of Alaska surrounding Nunivak and St. Matthews Island and those waters draining into the Bering Sea (Figure 1). For the purposes of this report, the Kuskokwim Area is divided into 2 main components: Kuskokwim Bay and the Kuskokwim River. Kuskokwim Bay includes mainland coastal streams (excluding the Kuskokwim River) and commercial fishing Districts 4 and 5. The Kuskokwim River includes the mainstem, all tributaries of the river, and commercial fishing District 1.

Escapement monitoring was conducted in select salmon spawning tributaries draining into the Kuskokwim Area. In 2015, ADF&G coordinated escapement monitoring in 3 rivers draining into Kuskokwim Bay and 10 tributaries in the Kuskokwim River drainage (Figures 2 and 3). Chinook, chum, sockeye, and coho salmon are present at all monitoring locations; however, not all species are present in large numbers at all locations.

Kuskokwim Bay Assessment Locations

Goodnews River

Monitoring efforts within the North and Middle forks of the Goodnews River provide an index of salmon escapement to the entire Goodnews River drainage and are used to inform sustainable management of the District 5 commercial fishery and local subsistence fisheries. The Goodnews River watershed drains an area approximately 2,636 km^2 (Brown 1983). Originating on the north side of the Aklun Mountains, the Goodnews River flows southwesterly a distance of 127 river kilometers (rkm) until emptying into Goodnews Bay, a small bay nested within Kuskokwim Bay. The mainstem Goodnews River is the northernmost branch of the Goodnews River system and is therefore referred to as the North Fork. Chinook and sockeye salmon escapement to the North Fork was monitored by aerial survey. The Middle Fork of the Goodnews River flows southwesterly a distance of approximately 97 rkm before joining the North Fork a few miles upriver from Goodnews Bay (Buzzell 2011). Chinook and sockeye salmon escapement to the Middle Fork was monitored by aerial survey. In addition, Chinook, sockeye, chum, and coho salmon escapement to the Middle Fork was monitored using a resistance board weir. The weir was located approximately 16 rkm upstream from the confluence with the North Fork at

59°9′36″N, 161°23′17″W. At the weir site, the river measured 61 m wide and 1 m deep during normal summer flow. Due to its proximity to the confluence, the weir accounted for a majority of salmon spawning within the Middle Fork.

Kanektok River

Monitoring efforts within the Kanektok River provide an index of salmon escapement returning to the entire Kanektok River and the data are used to inform sustainable management of the District 4 commercial fishery and local subsistence fisheries. The Kanektok River watershed drains an area approximately 2,261 km^2 (Walsh et al. 2006). The Kanektok River originates from Kagati and Pegati lakes, located between the Eek and Ahklun Mountains, and flows westerly for 147 rkm until emptying into Kuskokwim Bay near the village Quinhagak (Buzzell and Russell 2010). Chinook and sockeye salmon escapement to the Kanektok River was monitored by aerial survey. In addition, Chinook, sockeye, and chum salmon escapements were monitored using a resistance board weir. The weir was located 68 rkm upstream of the confluence with Kuskokwim Bay (approximately mid-drainage) at 59°46′3″N, 161°3′37″W. At the weir site, the river measured 100 m wide and 1 m deep during normal summer operations. We know from observation that salmon spawn downstream of the weir; however, no studies have been conducted to estimate the proportion of the total spawning escapement that is observed by the weir.

Lower Kuskokwim River Assessment Locations

Kisaralik River

The Kisaralik River is located between the Kwethluk and Tuluksak rivers, which are both monitored by USFWS using weirs. Aerial surveys flown on the Kisaralik River are used to index Chinook salmon escapement to the lower Kuskokwim River, in a portion of the drainage where subsistence, commercial, and sport fishing is common. The Kisaralik River originates from Kisaralik Lake in the Kilbuck Mountains and flows northwesterly for approximately 187 rkm until reaching Kuskokuak Slough (at rkm 135; Buzzell 2010), which then flows into the Kuskokwim River (at rkm 131).

Middle Kuskokwim River Assessment Locations

Aniak River Drainage

The mainstem Aniak River is a large tributary that drains the southern portion of the middle Kuskokwim River. The Aniak River originates from the Aniak Lake basin in the Kuskokwim Mountains and flows northerly for approximately 151 rkm until entering the Kuskokwim River (at rkm 307) near the community of Aniak (Brown 1983). Chinook salmon escapement was monitored throughout the mainstem Aniak River by aerial survey.

The Salmon River is a tributary of the Aniak River, and assessment provided an index of salmon abundance to the Aniak River. The Salmon River originates in the Kilbuck Mountains and flows northerly for approximately 71 rkm to its confluence with the Aniak River. Chinook salmon abundance was monitored using aerial surveys. In addition, Chinook, chum, and sockeye salmon escapement was monitored using a fixed picket weir. The weir was located approximately 1 km upstream of the confluence with the Aniak River at 61°03′46″N, 159°11′40″W. At the weir site, the river measured 35 m wide and 1.25 m deep during normal summer operations. Due to its

proximity to the confluence, the weir accounted for nearly all salmon spawning within the Salmon River.

The Kipchuk River is a headwater tributary of the Aniak River and provided an index of salmon abundance to the Aniak River. The Kipchuk River originates in the Kuskokwim Mountains, several kilometers northwest of Aniak Lake. The Kipchuk River flows northerly for approximately 106 rkm until reaching the Aniak River. Chinook salmon escapement was monitored using aerial surveys.

Holokuk and Oskawalik Rivers

The Holokuk and Oskawalik rivers are relatively small tributaries that drain the southern portion of the middle Kuskokwim River. The Holokuk River flows northeasterly, approximately 72 rkm from its origins in the Buckstock Mountains, which separate the Holokuk River from the Aniak River. It joins the Kuskokwim River (at rkm 362) near the community of Napaimute (Brown 1983). The Oskawalik River originates from streams draining the Chuilnuk Mountains, which separate the Oskawalik River from the Holitna River basin. This river flows north-northwesterly for approximately 89 rkm until reaching the Kuskokwim River (at rkm 398; Brown 1983). Aerial surveys flown on each river were used to index Chinook salmon escapement to the middle portion of the Kuskokwim River drainage.

George River

The George River was the only monitored tributary that drained the northern portion of the middle Kuskokwim River. The George River originates in the northern Kuskokwim Mountains and flows southerly for approximately 120 rkm to its confluence with the Kuskokwim River (at rkm 446; Brown 1983). Chinook, chum, and coho salmon escapement was monitored using a resistance board weir. The weir was located approximately 7 rkm upstream of its confluence with the Kuskokwim River at 61°55′24″N, 157°41′53″W. At the weir site, the river channel was about 110 m wide and had a depth of about 1 m during normal summer flow. Due to its proximity to the confluence, the weir accounted for nearly all salmon spawning within the George River.

Holitna River Drainage

The Holitna River watershed is one of the largest in the Kuskokwim basin, draining the Kuskokwim, Kiokluk, and Chuilnuk mountains to the west, and the Shotgun and Nushagak hills to the south. The Holitna River is formed from the confluence of the Chukowan and Kogrukluk rivers and flows northerly for approximately 218 rkm until reaching the Kuskokwim River (at rkm 491) near Sleetmute (Brown 1983; ADNR 1988). The Holitna drainage is a highly productive system that supports a large number of spawning salmon (Molyneaux and Brannian 2006). Chinook salmon escapements were monitored throughout the mainstem of the Holitna River using aerial surveys. The Holitna River is also the single largest source of river-type sockeye salmon (Gilk et al. 2011), and the Kogrukluk River weir has provided an annual index of sockeye salmon escapement to the Holitna River since 1976.

The Kogrukluk River is a headwater tributary of the Holitna River and assessment provided an index of salmon abundance to the Holitna River. The Kogrukluk River forms in a low plateau that divides the Tikchik Lakes system and Nushagak River basin to the south from the Holitna River basin to the north. From its headwaters, the Kogrukluk River flows northerly for approximately 80 rkm to its confluence with the Chukowan River to form the Holitna River

(Brown 1983). Chinook, chum, sockeye, and coho salmon escapement was monitored with a fixed picket weir. The weir was located approximately 1.5 rkm from the confluence with the Holitna River at 60°50′28″N, 157°50′44″W. At the weir site, the channel averaged 70 m wide and 1.25 m deep. Due to its proximity to the confluence, the weir accounted for nearly all salmon spawning within the Kogrukluk River.

Stony River Drainage

The Stony River joins the Kuskokwim River at rkm 536 and supports primarily sockeye salmon and a modest return of Chinook salmon. Telaquana Lake and Two Lakes form the headwaters of the Stony River and are the largest lake systems present in the Kuskokwim River drainage. Both lakes provide requisite habitat for lake-spawning sockeye salmon, and they are the primary producers of lake-type sockeye salmon in the Kuskokwim River drainage.

Escapement of sockeye salmon was assessed using a weir located on the Telaquana River near the outlet of Telaquana Lake. 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. From its headwaters, the Telaquana River flows westerly for approximately 30 rkm before entering Telaquana Lake. 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 Kuskokwim River (at rkm 536). The Telaquana River weir was located approximately 1 km downstream of Telaquana Lake outlet at 60°57′39″N, 154°02′40″W. The weir spanned a 70 m channel, and average channel depth was approximately 1.2 m with a maximum depth of 2.1 m. The weir accounted for all sockeye salmon spawning in Telaquana Lake, including those fish spawning in the lake outlet.

Swift River Drainage

The Swift River is a large tributary that flows northwesterly and joins the Kuskokwim River at rkm 560 (Brown 1983). The Cheeneetnuk and Gagaryah rivers are parallel tributaries of the Swift River, and aerial surveys were flown on these rivers to index Chinook salmon escapement to the Swift River. The Cheeneetnuk River originates in the foothills of the Alaska Range and flows southwesterly for approximately 113 rkm before reaching the Swift River (at rkm 27). The Gagaryah River originates in the Lyman Hills and flows southwesterly for approximately 100 rkm before joining the Swift River (at rkm 61).

Tatlawiksuk River

The Tatlawiksuk River originates in the foothills of the Alaska Range and flows southwesterly for 113 rkm before joining the Kuskokwim River (at rkm 563; Brown 1983). Assessment provided an index of salmon abundance to the middle portion of the Kuskokwim River drainage. Chinook, chum, and coho salmon escapement was monitored with a resistance board weir. The weir was located approximately 4.5 rkm upstream from its confluence with the Kuskokwim River at 61°56′03″N, 156°11′33″W. At the weir site, the river measured 64 m wide and 1 m deep during normal summer operations. Due to its proximity to the confluence, the weir accounted for nearly all salmon spawning within the Tatlawiksuk River.

Upper Kuskokwim River Assessment Locations

Pitka Fork Drainage

The Pitka Fork originates in a piedmont area north of the Alaska Range and flows northerly 106 rkm before joining the Middle Fork (Brown 1983). The Middle Fork then flows northwesterly until reaching the Big River, which finally joins the Kuskokwim River at rkm 827 (Brown 1983), upstream from the community of McGrath. Tributaries of the Pitka Fork are the northernmost monitored systems within the Kuskokwim River drainage and provided an index of Chinook salmon escapement in the headwaters of the Kuskokwim River.

The Salmon River is a tributary of the Pitka Fork and flows northwesterly for approximately 47 rkm before joining the Pitka Fork 36 rkm upriver from its confluence with the Middle Fork. Chinook salmon escapement was monitored by aerial survey and a fixed picket weir. In 1981 and 1982 the weir was located on the South Fork of the Salmon River. In 2015, the weir was relocated immediately downriver of the confluence of the north and south forks at 62°53′21″N, 154°30′35″W. The change in location allowed for a more complete assessment of Chinook salmon escapement to the Salmon River. At the weir site, the river measured approximately 45 m wide and 1 m deep during normal summer operations.

Bear Creek is a relatively small northwest-flowing tributary that joins the Pitka Fork approximately 44.8 rkm upriver from its confluence with the Middle Fork. The confluence of Bear Creek is located approximately 9.3 rkm southeast of the Salmon River with a nearly parallel flow direction. Chinook salmon escapement in Bear Creek was monitored by aerial survey.

ESCAPEMENT MONITORING

Aerial Surveys

Aerial surveys focused on Chinook salmon in Kuskokwim River tributaries, and both Chinook and sockeye salmon in Kuskokwim Bay rivers (Table 1). On occasion, other salmon species were counted opportunistically during aerial surveys; however, those counts were not representative of spawning escapement and are considered ancillary. Aerial survey counts of live fish, carcasses, spawning redds, survey ratings, and observer comments are archived in the AYKDBMS.

Aerial surveys were conducted on 11 tributaries in the Kuskokwim River and on 3 rivers in Kuskokwim Bay (Tables 1 and 2; Figures 2 and 3). Standardized index areas were flown within each river to allow for interannual comparisons of aerial survey counts (Appendix A; Schneiderhan 1988). Index areas were defined by geographic coordinates and often coincided with landmarks that are easily recognized from the air. For each river, lists of survey areas (Appendix A) and corresponding maps were created that depict index areas and highlight those areas that must be surveyed (i.e., index objectives) in order to produce a comparable index of escapement. Details regarding survey locations are archived in the AYKDBMS. Maps were obtained by the surveyor, then provided to the pilot prior to surveying.

One-time peak aerial surveys were conducted following standardized procedures. Aerial surveys were conducted with fixed-winged aircraft at an altitude of 150–500 feet, dependent on both surveyor and pilot preference and weather conditions. Aerial surveys were flown between the dates of 17 July and 5 August, which is believed to encompass peak spawning abundance for both Chinook and sockeye salmon across a range of locations and run timings. Observers rated

survey conditions as being good (rating = 1), fair (rating = 2), or poor (rating = 3) based on criteria related to survey method, weather and water conditions, time of survey, and spawning stage (Schneiderhan 1988). During the flight, the surveyor recorded counts of live salmon and carcasses for each index area on a tally counter. Survey counts from only the objective index areas were summed to determine the escapement index (Tables 1 and 2). The escapement index was only reported if survey conditions were rated as good or fair for the entire survey.

Weir Projects

Weir Design and Installation

A fixed picket or resistance board weir design with an integrated fish trap was used at all locations dependent on channel morphology and flow. A resistance board floating weir is designed to sink beneath flood waters, allowing debris to pass downstream with little obstruction. Resistance board weirs require 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 and often require disassembly 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 for sampling purposes. The live fish trap design was the same at all projects (Linderman et al. 2002). Additional details on design and materials used for construction of resistance board weirs can be found in Tobin (1994) and Stewart (2002 and 2003) and for fixed picket weirs in Molyneaux et al. (1997), Baxter (1981), and Jasper and Molyneaux (2007).

Slight differences in picket spacing existed between projects. Weirs on the Goodnews, George, and Tatlawiksuk rivers had a gap of 3.3 cm between each picket, whereas Kanektok River weir had a gap of 4.3 cm. Salmon (Aniak) and Salmon (Pitka Fork) river weirs had a gap of 3.6 cm, Kogrukluk River weir had a gap of 3.7 cm, and Telaquana River weir had a gap of 2.6 cm between each picket. Regardless of the spacing differences, all designs prevented most adult Pacific salmon from passing through the weirs undetected. However, pink salmon and other non-salmon species were occasionally observed passing between pickets.

Weirs were installed across the entire river channel. On tributaries with resistance board weirs, 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 boat gate and a downstream fish passage chute were installed following techniques described by Linderman et al. (2002). Additional details on techniques for weir installation can be found in Stewart (2003).

Operations

Weir projects had a target operational period based on historical run timing information (Table 3). These periods were intended to cover the entire run of the target species. The operational plan for each monitoring project specified that the weir would be installed and operational prior to the arrival of salmon migration and continue until the run ended. However, actual operation dates varied with stream and weather conditions, and availability of funding (Table 3).

Daily operations were conducted by small crews, varying between 2 and 5 people across projects. At least 1 ADF&G employee was present at all projects and acted as the project crew leader. Additional crew members were employed by ADF&G or partner organizations. Escapement counts, weir maintenance, and ASL sampling were completed by the crew.

DATA COLLECTION AND ANALYSIS

Escapement Counts

Daily escapement counts were conducted at all weirs. Crew members visually identified all species of fish observed passing upstream of the weir and recorded them on a tally counter. Fish were counted for approximately 1 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. Following each counting shift, passage numbers were recorded in a designated logbook, and the weir was inspected for holes and cleaned of carcasses and debris. If holes were found, a note was made regarding the size, location, and if there was a potential for missed fish passage. Total daily and cumulative seasonal counts were reported along with operational details to ADF&G staff in Bethel or Anchorage by 8:00 AM the following morning and uploaded to the AYKDBMS that same day.

Missed Escapement Estimates

A variety of conditions occurred in which fish could not be counted through the weir, caused by 1) water levels preventing installation, requiring partial disassembly, or prompting removal of the weir; 2) water levels exceeding the top of the weir; 3) holes created from scouring, debris, or wildlife; 4) maintenance requiring partial disassembly of the weir; or 5) the counting gate being left open unattended. Duration of these inoperable periods varied from a part of a single day to several days. Missed escapement of target species was estimated for all inoperable days within the target operational period. One exception was the Salmon River (Aniak), where estimates were generated for the entire historical target operational period that extends through 20 September. No missed escapement estimates were created for nontarget species.

Missed escapement was estimated using a hierarchical Bayesian estimation technique (Adkison and Su 2001). All historical run timing was fitted to a log-normal distribution, in which each year's parameters were assumed to come from a common distribution (i.e., hierarchical parameters). Further, it was assumed that distribution of daily run timing follows a log-normal distribution (i.e., log plus 1 transformed count, or ln(daily count +1) was normally distributed).

Let y_{it} be the log plus 1 transformed count of year (i) and day (t) (y_{it} = ln(daily weir passage +1)); and assume that y_{it} is a random variable from a normal distribution of mean θ_{it} and standard deviation of day (t), σ_t . Then:

$$y_{it} \sim N(\theta_{it}, \sigma_t^2) \text{ and, } \quad \theta_{it} = a_i \left(\frac{(\ln(t) - \ln(\mu_i))^2}{b_i^2} \right)$$

where

$\sigma_t^2 > 0$, variance of daily passage of the day (t);

$a_i > 0$, the maximum daily passage of the year (i);

$t \geq 1$, passage date;

$\mu_i > 0$, mean passage date of the year (i); and

$b_i^2 > 0$, variance of run timing of the year (i).

The starting passage date and number and range of years with data varied between projects (Table 4). At upper hierarchical level, annual maximum daily passage (a_i), mean passage date (μ_i), and spread (b_i) were assumed to be a random sample from a normal distribution:

$$a_i \sim N(a_0, \sigma_a^2); \qquad \mu_i \sim N(\mu_0, \sigma_\mu^2); \qquad b_i \sim N(b_0, \sigma_b^2).$$

In most cases, prior distributions of the hyper-parameters for a_i, μ_i, and b_i were assumed to be noninformative as:

$a_0 \sim N(5,100)$ $(a_0 > 0)$; $\mu_0 \sim N(25,100)$ $(\mu_0 > 0)$; $b_0 \sim N(0.5,100)$ $(b_0 > 0)$;

$\sigma_a \sim$ uniform(0.1, 10) ; $\sigma_b \sim$ uniform(0.1, 2) ;

$\sigma_\mu \sim$ uniform(0.1, 10) ; $\sigma_t \sim$ uniform(0.1, 10) .

For Kogrukluk River coho salmon, the prior distribution of the spread parameter (b_i) was constrained to values >0.07, which is equal to the smallest (i.e., narrowest spread) parameter value observed for all years, 1981–2014. This constraint was necessary to prevent an unrealistically narrow spread, and allowed for reasonable estimates of missed passage during the last 3 days of the target operational period.

Markov-chain Monte Carlo methods (WinBUGS v1.4; Spiegelhalter et al. 1999) were used to generate the joint posterior probability distribution of all unknowns in the model. Simulations were generated over 10,000 iterations with the first 5,000 iterations discarded (burn-in period), and samples were taken every 2 iterations. This resulted in 2,500 samples, and the median sample value was used to represent the point estimate of daily missed passage. From those, Bayesian credible intervals (95%) were obtained from the percentiles (2.5 and 97.5) of the marginal posterior distribution.

Available historical data limited estimation of missed passage to the dates of each project's target operational period. All missed escapement for Chinook, chum, and sockeye salmon that occurred on or after 1 September through the end of each project's target operational period was assumed 0 based on historical information. However, if more than 40% of the entire run was missed, based on historical run timing, estimates of missed passage were not created and total annual escapement was not determined.

Total annual escapement was estimated as the sum of the daily observed escapement counts and the daily estimates of missed escapement within the target operational period. Estimates of daily escapement were used for each day the weir was inoperable unless the estimate was less than the actual number of fish observed during partial operations. In these scenarios, the estimate was disregarded and the observed escapement was considered a minimum daily escapement estimate.

WEATHER AND STREAM MEASUREMENTS

Weather and stream data were collected at all projects (Appendices B1–B8). Water and air temperatures were manually measured (°C) using handheld thermometers. Notations about cloud cover, precipitation, and river stage were also recorded. Daily precipitation was measured (mm) using a rain gauge, and water levels were measured (cm) using staff gauges installed approximately 150 meters from the weirs. The staff gauge was calibrated to a reliable benchmark using a sight or line level. All data was collected in the morning and evening at all projects except the Middle Fork Goodnews River weir, where data were only recorded in the morning. In addition, water clarity observations were recorded at Kuskokwim River weir projects. Air and water temperature data was monitored year-round by Hobo data loggers, as part of the Office of Subsistence Management Temperature Monitoring Project 14-701, conducted by the Aquatic Restoration and Research Institute.

AGE, SEX, AND LENGTH SAMPLING

A minimum sample size was determined for each species to achieve 95% confidence intervals of age-sex composition estimates no wider than ±10% (α = 0.05 and d = 0.10; Bromaghin 1993). Sample size goals (n) were estimated based on 10 age-sex categories for Chinook salmon (n = 190), 14 age-sex categories for sockeye salmon (n = 205), 8 age-sex categories for chum salmon (n = 180), and 6 age-sex categories for coho salmon (n = 168). Sample size goals were increased to account for unreadable scales, collection errors, and variation in run timing, and to allow for investigation of interannual changes in ASL composition. For most project locations, the collection goal was 230 Chinook, 600 chum, 600 sockeye, and 400 coho salmon. The Chinook salmon sampling goal was increased to 250 fish at the Salmon River (Pitka Fork) weir because the percentage of unreadable scales were expected to be larger than average because of scale reabsorption. At Kuskokwim River weirs, the sockeye salmon collection goal was 250 fish, but only sex and length measurements were collected. Sockeye scales were not collected from Kuskokwim River escapement projects because previous reports indicate that saltwater age cannot be estimated from scales because of excessing deterioration of the scale margins (Liller et al. 2016). Sampling schedules were provided for each Kuskokwim Area weir project. Schedules attempted to guide the collection of samples throughout the season in proportion to historical run timing, and ensure an even distribution of sampling effort across the run.

Age, sex, and length sample collection followed standardized procedures developed for the AYK Area (Eaton 2015). Salmon were captured for sampling using a trap integrated into the weir design. Following capture, crew members used safe handling techniques to place the fish 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 the middle of the eye to the fork in the tail 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. Sampling procedures were not biased for size or sex and were designed to reduced stress caused by holding and handling time. Further details regarding trapping methods or fish handling techniques can be found in Linderman et al. (2002) and Hansen and Blain (2013).

After sampling was completed, all ASL data and metadata were copied to Microsoft Excel[2] 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 AYKDBMS (Brannian et al. 2006).

RESULTS

OPERATIONS

Aerial Surveys

Aerial surveys were conducted on 14 rivers in 2015. All surveyed rivers were only flown once between 20 July and 28 July (Tables 1 and 2). Chinook salmon escapement indices were successfully determined for all surveyed rivers except the Aniak, Oskawalik, and Cheeneetnuk rivers because of poor survey conditions, specifically turbid water (Table 1). Sockeye salmon escapement indices were determined for all surveyed rivers (Table 2).

Ground-based Weir Projects

Middle Fork Goodnews River Weir

The Middle Fork Goodnews River weir was operated from 25 June through 31 August in 2015. During this period, the weir had 9 partial days of operation because of high water and holes in the weir (Tables 5–7). The Middle Fork Goodnews River weir operations ended on 31 August because of a lack of funding. Early termination resulted in insufficient data for estimating total coho salmon escapement and ASL composition. Weather and stream observations were recorded between 26 June and 31 August (Appendix B1). Water temperature at the weir averaged 11°C (range: 7°C–12°C). Air temperature averaged 11°C (range: 8°C–14°C). A total of 151.9 mm of precipitation was recorded throughout the season. River stage averaged 32 cm (range: 22 cm–45 cm) and was near average depth through late June and July and below average for the majority of August (Figure 4).

Kanektok River Weir

The Kanektok River weir was operated from 22 June through 16 August in 2015. The weir had no inoperable periods in 2015 (Tables 5–7). Weather and stream observations were recorded between 20 June and 16 August (Appendix B2). Water temperature at the weir averaged 11°C (range: 1°C–16°C). Air temperature averaged 13°C (range: 3°C–27°C). Minimal precipitation occurred at Kanektok River weir; a total of 12.1 mm of precipitation was recorded throughout the season. River stage averaged 12 cm (range: 3 cm–27 cm) and was well below average depth throughout the entire season, including record lows occurring in mid-July and August (Figure 5).

Salmon River (Aniak) Weir

The Salmon River weir was operated from 20 June through 15 August in 2015. Installation of this weir was delayed by 5 days because of logistical constraints. In addition, the weir did not operate for 2 full days and 5 partial days because of holes in the weir (Tables 5–7). In 2015, operations at the weir ended 36 days earlier than historical targeted operational periods due to a reallocation of project funds. Estimates were generated for the historical target operational period

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

instead of the 2015 target operational period. Weather and stream observations were recorded between 20 June and 15 August (Appendix B3). Water temperature at the weir averaged 11°C (range: 8°C–14°C) and air temperature averaged 13°C (range: 4°C–24°C). A total of 93.5 mm of precipitation was recorded throughout the season. River stage averaged 37 cm (range: 31 cm–41 cm). River stage was below average depth throughout the entire season and the lowest on record in early July and early August (Figure 6).

George River Weir

The George River weir was operated from 15 June through 20 September in 2015. The weir was inoperable for 5 partial days and 4 full days due to high water and holes in the weir (Tables 5, 6, and 8). Weather and stream observations were recorded between 12 June and 21 September (Appendix B4). Water temperature at the weir averaged 9°C (range: 1°C–18°C) and air temperature averaged 11°C (range: -7°C–26°C). A total of 182.4 mm of precipitation was recorded throughout the season. River stage averaged 59 cm (range: 46 cm–103 cm) and was below average until mid-July, above average in late July, below average for much of the month of August, and above average in September (Figure 7).

Kogrukluk River Weir

The Kogrukluk River weir was installed early and operated from 22 June through 22 September in 2015. During this period, the weir was inoperable for 1 full day and 2 partial days due to high water at the weir (Tables 5–8). In addition, the Kogrukluk River weir operations ended 4 days early due to forecasted heavy rain events. Weather and stream observations were recorded between 18 June and 22 September (Appendix B5). Water temperature at the weir averaged 9°C (range: 5°C–15°C). Air temperature averaged 13°C (range: -1°C–32°C). A total of 126.9 mm of precipitation was recorded throughout the season. River stage averaged 277 cm (range: 252 cm–326 cm). River stage was variable until late July and included below average and above average flows. River stage was below average beginning in late July and remained low for majority of the operational period (Figure 8).

Telaquana River Weir

The Telaquana River weir was operated from 11 July through 11 August in 2015. The weir was installed late due to a natural forest fire in the area that required the evacuation of the crew (Table 7). The Telaquana River weir was removed prior to the end of the target operational period because daily escapements had declined dramatically and was less than 1% of the total escapement for 5 consecutive days. Weather and stream observations were recorded between 12 July and 12 August (Appendix B6). Water temperature at the weir averaged 13°C (range: 9°C–18°C). Air temperature averaged 14°C (range: 5°C–25°C). A total of 70.1 mm of precipitation was recorded throughout the season. River stage measurements are considered inaccurate due to a potential misalignment of the benchmark. Observations by local residents indicate that Telaquana Lake levels were below average during the beginning of the summer but held at average depths for the remainder of the summer.

Tatlawiksuk River Weir

The Tatlawiksuk River weir was operated from 13 June through 12 September in 2015. During this period, the weir was inoperable for 1 full day due high water (Tables 5, 6, and 8). Tatlawiksuk River weir was removed 8 days early due to high water levels. Estimates were made for all missed days of passage. Weather and stream observations were recorded between 10 June

and 15 September (Appendix B7). Water temperature at the weir averaged 12°C (range: 6°C–18°C). Air temperature averaged 14°C (range: -5°C–30°C). A total of 271.9 mm of precipitation was recorded throughout the season. River stage averaged 46 cm (range: 21 cm–96 cm). River stage was near record low until mid-July when the stage was above average for approximately 1 week. The river stage was also below average for most of August. During September the river stage stayed around average until mid-September, when levels increased to above average and prompted the early termination of weir operations (Figure 9).

Salmon River (Pitka Fork) Weir

The Salmon River (Pitka Fork) weir was operated from 1 June through 15 August in 2015. The weir was inoperable for 4 full days and 6 partial days due to holes in the weir or high water events (Table 5). Weather and stream observations were recorded between 4 June and 16 August (Appendix B8). Water temperature at the weir averaged 12°C (range: 9°C–18°C). Air temperature averaged 15°C (range: 10°C–26°C). A total of 113.6 mm of precipitation was recorded throughout the season. River stage averaged 44 cm (range: 25 cm–83 cm; Figure 10). No historical data exists for comparison.

ESCAPEMENT COUNTS

Chinook salmon

Aerial Survey

Aerial surveys indicated below average escapements of Chinook salmon throughout Kuskokwim Bay and the lower and middle portions of the Kuskokwim River (Table 9). However, within these areas, aerial surveys were within historical ranges and sustainable escapement goals (SEG) were achieved on all but 2 of the successfully surveyed rivers. The exceptions were the Gagaryah and Holitna rivers. The Gagaryah River had the lowest index count on record (19 fish) and was well below the lower bound of the established SEG range (300–830). The Holitna River count was 662 fish; however, this river has only been successfully surveyed 1 other time during the last 9 years. Poor survey conditions prevented a reliable index of escapement to the Oskawalik River and assessment of the established SEG on the Aniak or Cheeneetnuk rivers (Table 1).

Aerial surveys flown the Salmon River (Pitka Fork) and Bear Creek indicated above average escapements to the upper portion of the Kuskokwim River (Table 1 and 9). The 2015 escapement index to the Salmon River (Pitka Fork) was the second largest on record (2,016 fish), was more than double the long-term average (n = 27 years) of 960 fish (range: 135–2,536), and exceeded the upper bound of the established SEG. The escapement index to Bear Creek was the largest on record (1,381 fish) and was more than 7 times larger than the historical average (n = 17 years) of 179 Chinook salmon (range: 36–367). Similar to previous years, the surveyor indicated good survey conditions for both Bear Creek and the Salmon River (Pitka Fork).

Weir

Annual escapements were successfully estimated for Chinook salmon at the Middle Fork Goodnews (1,494 fish), Kanektok (10,416 fish), Salmon (Aniak; 2,404 fish), George (2,282 fish), Kogrukluk (8,081 fish), Tatlawiksuk (2,104 fish), and Salmon (Pitka Fork; 6,736 fish) river weirs (Table 5). No missed escapement was estimated to have passed the Kanektok River weir and the observed escapement is assumed to be without error (Table 5). Only minimal estimation was required for other weirs. No estimates were made for missed passage at the Salmon River

(Pitka Fork) weir because this was the first year of operations and there was no historical run timing information to inform the Bayesian estimation methods. It is unlikely that much of the total escapement to the Salmon River (Pitka Fork) was missed, because the weir experienced only 2 partial inoperable days during the time period when Chinook salmon were passing in large numbers.

Kuskokwim Area Chinook salmon exhibited a wide range of run timings in 2015. Late timing was observed in the Goodnews and Kanektok rivers in Kuskokwim Bay, and variable timing was observed throughout the Kuskokwim River. Chinook salmon run timing past the weirs on the Tatlawiksuk and George rivers displayed early to average timing (Figure 11). Average Chinook salmon run timing was observed at the Salmon (Aniak) River weir, and late timing was observed at the Kogrukluk River weir. Arrival timing at the weirs did not affect assessment and the established target operational period was adequate to observe the entire run past each weir.

Overall, weir counts indicated that Chinook salmon escapement was below average but within the range of historical escapements observed throughout the Kuskokwim Area. Chinook salmon escapement was larger than the previous year at all weir projects with the exception of George River. Although there was a general increase in Chinook salmon escapement, total passage was below average at all locations except the Kanektok and Tatlawiksuk river weirs (Table 10). Of the 16 years of observations for Tatlawiksuk River weir, 2015 was the fourth largest Chinook salmon escapement on record. Of the 12 years of nonconsecutive data collected at the Kanektok River weir, 2015 was the fourth largest Chinook salmon escapement on record. The SEGs on the George and Kogrukluk rivers were met; however, the Middle Fork Goodnews River was 6 fish less than the lower bound (1,500 fish) of the biological escapement goal (BEG).

Chum salmon

Annual escapements were successfully estimated for chum salmon at the Middle Fork Goodnews (11,517 fish), Kanektok (15,048 fish), Salmon (5,657 fish), George (17,551 fish), Kogrukluk (33,201 fish), and Tatlawiksuk (10,379 fish) river weirs (Table 6). No missed escapement was estimated to have passed the Kanektok River weir and the observed escapement was assumed to be without error (Table 9). The entire target operational period was observed at all targeted locations with the exception of Salmon River (Aniak) and only minimal estimation was required. Chum salmon run timing was late to nearly all the weirs, with Kanektok and Kogrukluk river weirs observing the latest run timing on record. One exception was the Tatlawiksuk River weir, where chum salmon exhibited average run timing (Figure 12). Arrival timing at the weirs did not affect assessment and the established target operational period was adequate to observe the entire run past each weir.

Overall, chum salmon escapement was below average at all weir projects (Table 11). Record low chum salmon escapements were observed throughout Kuskokwim Bay, with the lowest and second lowest escapements on record at the Kanektok River and Middle Fork Goodnews river weirs, respectively. The chum salmon SEG (>12,000) was not met for the Middle Fork Goodnews River weir. Similarly, low chum salmon escapements were observed throughout the Kuskokwim River. In particular, the second and third lowest escapements on record were observed at the Salmon (Aniak) River and Tatlawiksuk River weirs, respectively. In addition, escapement to the George and Kogrukluk rivers were below average, but well within the range of historical escapements observed at those locations. The Kogrukluk River chum salmon SEG was met.

Sockeye salmon

Aerial Survey

Aerial surveys indicated above average escapement of sockeye salmon to the Goodnews drainage and below average escapement to the Kanektok River. All sockeye salmon aerial escapement indices were within the range of historical observations, and the upper bounds of the SEG on the North Fork Goodnews and Kanektok rivers were exceeded (Table 12).

Weir

Annual escapements were successfully estimated for sockeye salmon at the Middle Fork Goodnews (57,809 fish), Kanektok (106,751 fish), Salmon (Aniak; 1,669 fish), Kogrukluk (6,411 fish), and Telaquana (95,516 fish) river weirs (Table 7). Only minimal estimation was required for all weir locations.

Sockeye salmon run timing and total escapement past weir locations in 2015 is considered very accurate because minimal missed passage events occurred at all weirs and the entire target operational period was observed at all targeted locations. Sockeye salmon run timing was late at all weirs except the Salmon (Aniak) River, which exhibited average run timing. In 2015, we observed the latest run timing on record at the Middle Fork Goodnews, Kanektok, and Kogrukluk river weirs and the second latest on record at Telaquana River weir (Figure 13). Arrival timing at the weirs did not affect assessment, and the established target operational period was adequate to observe the entire run past each weir.

Overall, sockeye salmon ground-based escapement was below average at the Kogrukluk, Salmon (Aniak), and Kanektok river weirs but above average at the Middle Fork Goodnews River weir and well above average at the Telaquana River weir (Table 13). Escapement exceeded the upper bound of the SEG for the Middle Fork Goodnews River weir, and escapement past the Telaquana River weir into Telaquana Lake was the largest on record. Similar to 2014, sockeye salmon escapement to the Kogrukluk River was below average but the SEG was achieved.

Coho salmon

Annual escapements were successfully estimated for coho salmon at the George (35,812 fish), Kogrukluk (32,493 fish), and Tatlawiksuk (17,701 fish) river weirs (Table 8). Coho salmon run timing was very late (Figure 14). It was the second latest year on record at the George River weir, the third latest at the Tatlawiksuk River weir, and the fifth latest at the Kogrukluk River weir. Arrival timing at the weirs did not affect assessment, and the established target operational period was adequate to observe nearly the entire run past each weir. Escapement at the George River weir was the highest on record and escapement at the Tatlawiksuk River weir the second highest on record (Table 14). The upper bound of the Kogrukluk River coho salmon SEG was exceeded.

More than 40% of the coho salmon run into the Middle Fork Goodnews River was missed due to early termination of the weir (Figure 14). Therefore, total annual escapement was not determined. The count of coho salmon past the Middle Fork Goodnews River weir in 2015 was considered incomplete. However, the SEG was met 2 days prior to removal of the weir with a total of 15,084 coho salmon counted past the weir by the end of the day on 31 August.

Nontarget species

Nontarget species were observed at all weir projects. In 2015, pink salmon, Arctic grayling *Thymallus arcticus*, and whitefish *Coregonus* spp. were observed at nearly all Kuskokwim Area projects. Coho salmon were observed at the Kanektok and Salmon (Aniak) river weirs, sockeye salmon were observed at the George River weir, and chum salmon were observed at the Telaquana and Salmon (Pitka Fork) river weirs. In addition, Chinook salmon were observed at the Telaquana River weir. Longnose suckers *Catostomus catostomus*, Dolly Varden *Salvelinus malma*, Northern pike *Esox Lucius*, and rainbow trout *O. mykiss* were observed at multiple projects, and lake trout *Salvelinus namaycush* were observed at Telaquana River weir (Appendices C1–C8).

AGE, SEX, AND LENGTH COLLECTION

Chinook Salmon

Age, sex, and length samples were collected from Chinook salmon at the Middle Fork Goodnews (126 fish), Kanektok (355 fish), Salmon (Aniak; 157 fish), George (196 fish), Kogrukluk (246 fish), Tatlawiksuk (229 fish), and Salmon (Pitka Fork; 209 fish) river weirs. At each project, samples were collected on a near daily basis spanning approximately the central 90% of the run. The Chinook salmon sample size goal was only achieved at the Kanektok and Kogrukluk river weirs (Table 15).

Chum Salmon

Age, sex, and length samples were collected from chum salmon at the Middle Fork Goodnews (487 fish), Kanektok (695 fish), Salmon (Aniak; 581 fish), George (674 fish), Kogrukluk (817 fish), and Tatlawiksuk (316 fish) river weirs. At each project, samples were collected on a daily or weekly basis spanning approximately the central 92% of the run. The chum salmon sample size goal was achieved at 3 out of 6 projects (Table 15).

Sockeye Salmon

Sex and length samples were collected from the Middle Fork Goodnews (454 fish), Kanektok (700 fish), Kogrukluk (109 fish), and Telaquana (292 fish) river weirs. In addition, Middle Fork Goodnews and Kanektok river weirs collected paired scales for age data. At each project, samples were collected on a near daily basis spanning approximately the central 93% of the run. The sockeye salmon sample size goal was achieved at Kanektok and Telaquana river weirs (Table 15).

Coho Salmon

Age, sex, and length samples were collected from coho salmon at the George (439 fish), Kogrukluk (385 fish), and Tatlawiksuk (392 fish) river weirs. At each project, samples were collected on a daily or weekly basis spanning approximately the central 94% of the run. The Middle Fork Goodnews and Salmon (Aniak) river weirs historically collected ASL samples for coho salmon; however, no sample collection was attempted due to the early termination of the projects. The coho salmon sample size goal was only achieved at the George River weir (Table 15).

DISCUSSION

The escapement data collected in 2015 are comparable to data collected in prior years at the individual monitoring locations and can be used to index variation in spawning abundance over time. However, aerial survey indices and weir counts should not be considered directly comparable. Air surveys provide only an index of peak spawning abundance to a broad geographic area, whereas weir counts are used to estimate the total number of salmon that escaped past a specific location over the entire season. In addition, aerial survey indices are not directly comparable among monitored locations within the same year, due to differences in observation error and differences in the size of the survey area. Air survey and weir data can be used to evaluate changes in relative abundance over time (e.g., years) for a single monitored location as long as standardized methodology are used. In addition, weir counts may be compared among the various monitoring locations within the same year, as long as total annual escapement was estimated.

Throughout the Kuskokwim Area, most efforts to monitor escapement were successful in 2015. Standardized methods were used for all aerial survey and weir assessments. In general, conditions were adequate for collecting high quality escapement information at the various monitoring locations.

CHINOOK SALMON

Kuskokwim River

Annual run sizes of Kuskokwim River Chinook salmon have been persistently low since 2010; however, escapement of Chinook salmon has been increasing in recent years. The smallest total run on record was observed in 2013 (Liller and Hamazaki 2016), and established escapement goals were only achieved for 1 tributary. The 2014 run size was 44% larger when compared to 2013 (Liller and Hamazaki 2016), and escapement goals were achieved for 7 tributaries in addition to the drainagewide goal. In 2015, all weir-based Chinook salmon escapement goals were met for the first time since 2009. This included the Kwethluk River (weir operated by USFWS, Ken Harper, Fisheries Biologist, Kenai Office), where the largest escapement since 2007 was observed. In addition, 3 of the 5 aerial survey goals assessed in the Kuskokwim River drainage were met.

Although the escapement of Kuskokwim Area Chinook salmon generally improved in 2015, there were still a few tributaries that continued to experience low escapement. The Holokuk River escapement was less than 2014 and has been well below average since 2010. The Gagaryah River escapement was the smallest on record. Although the Gagaryah River survey was rated fair based on survey condition, the observer comments noted reduced visibility throughout the lower portion of the survey area. The Holitna River aerial survey was well below average; however, a general lack of survey data since 2006 precludes any assessment of increasing or decreasing trends.

Similar to 2014, record high escapements were observed in headwater tributaries in 2015 and may be attributed to conservative management of Kuskokwim River Chinook salmon. Specifically, subsistence harvest during the early portion of the annual run was heavily restricted in both 2014 and 2015 (Poetter 2015), greatly reducing exploitation on early migrating fish. There is some evidence that high proportions of these early migrating fish spawn in more distant

portions of the drainage. The reduced exploitation of these sub-stocks may explain the larger than expected escapements to the Salmon River (Pitka Fork) and Bear Creek in recent years.

In 2015, ADF&G successfully operated a new weir on the Salmon River (Pitka Fork) to index Chinook salmon escapement in the headwaters of the Kuskokwim drainage, upriver from McGrath. Chinook salmon escapement past the weir was higher than anticipated. This weir will operate again in 2016 with funding from the State of Alaska, Chinook Salmon Research Initiative. Funding to continue weir operations in 2017–2019 was secured through the U.S. Fish and Wildlife Service, Office of Subsistence Management. The ADF&G plans to continue conducting aerial surveys of this river concurrent with weir operations. Paired weir and aerial survey data will provide context for interpreting historical aerial survey data and improve our ability to evaluate Chinook salmon abundance to the headwaters of the Kuskokwim River in future years.

Drainagewide goal

In 2015, the drainagewide escapement of Kuskokwim River Chinook salmon was estimated to be 155,464 (95% CI: 112,524–212,685), which exceeded the upper bound of the established escapement goal of 65,000–120,000 fish (Liller and Hamazaki 2016). The 2015 model estimate was informed by direct observations of the 2015 escapement at 11 locations (5 weirs and 6 aerial surveys) combined with historical observations of escapement, harvest, and run size dating back to 1976. Escapement data from the new Salmon River (Pitka Fork) weir and the Salmon River (Aniak) weir were not used to estimate the 2015 drainagewide escapement because they were not part of the original model design (Bue et al. 2012). In addition, aerial survey counts from the Gagaryah River and Bear Creek were not used because the counts were extreme and would have biased the drainagewide escapement estimate high (Liller and Hamazaki 2016).

Kuskokwim Bay

Chinook salmon escapements throughout Kuskokwim Bay have been persistently low since 2010, but the 2015 escapement to both the Kanektok and Middle Fork Goodnews rivers was improved compared to recent years. Specifically, the count of Chinook salmon past the Kanektok River weir exceeded the historical average and was the largest observed since 2007. The Kanektok River aerial survey goal was achieved. Chinook salmon escapements to the Goodnews River have rebounded but to a lesser extent compared to other systems in the Kuskokwim Area. Record low escapements were observed in 2012–2014. In 2015, escapement was again below average but similar to escapements observed in the early 1990s. The 2015 escapement to the North Fork was within the established SEG for the first time since 2011, and the Middle Fork escapement was within 6 fish of the lower bound of the BEG. The Middle Fork BEG was last achieved in 2011, but the improved escapement observed in 2015 and similarity with the lower bound of the goal is encouraging.

CHUM SALMON

Kuskokwim Area chum salmon escapements have been below average over the last 2–3 years, but within the range of historical escapements at all monitoring locations. The below average chum salmon escapements observed in 2014 and 2015 were larger than escapements observed in the late 1990s and early 2000s, which were followed by a series of record high chum salmon returns to the Kuskokwim Area in 2005–2007. Chum salmon escapements in 2015 were similar or larger than escapements observed in 2014. The chum salmon escapement goal on the

Kogrukluk River was achieved in 2015, and annual escapement has been greater than the lower bound of the goal range since 2001. The chum salmon escapement goal on the Middle Fork Goodnews River was not achieved in 2012, 2014, or 2015, but it was achieved in all other years because the goal was implemented in 2005. In both 2014 and 2015, chum salmon escapement on the Middle Fork Goodnews River was within 500 fish of the established SEG (>12,000).

SOCKEYE SALMON

Kuskokwim River

The addition of the Telaquana weir in 2010 and recent long-term funding commitments by ADF&G has greatly improved assessment of sockeye salmon. Since 2010, escapement of sockeye salmon to Telaquana Lake has been 3.6–4.4 times larger compared to the Kogrukluk River escapement (Hansen et al. 2015), giving the impression that relative abundance of these 2 sub-stocks are consistent over time. However, in 2015, the escapement of sockeye salmon to Telaquana Lake was nearly 15 times larger than the escapement past the Kogrukluk River weir. The Telaquana Lake escapement was also the largest on record, and the Kogrukluk River escapement was below average. This recent information suggests that variation in the relative abundance of lake and river-type sockeye salmon may be high. The historical dataset is not yet long enough to adequately understand the dynamics between lake and river-type sockeye salmon returning to the Kuskokwim River. Long-term monitoring of the Telaquana Lake and Kogrukluk River runs ensures that both life history strategies are included in our assessment program and that fisheries managers will have adequate information to develop sustainable harvest practices for both population types.

Kuskokwim Bay

Aerial survey and weir data indicate that Kuskokwim Bay sockeye salmon escapements have been large relative to established escapement goals. In the past 15 years, observed escapement has never fallen below the lower bound of the SEG for any of the 3 tributaries and has exceeded the upper bound in 50%, 67%, and 71% of years for Middle Fork Goodnews, North Fork Goodnews, and Kanektok rivers respectively. The long-term average escapement for each of these systems exceeds the upper bound of the established SEG.

COHO SALMON

Kuskokwim River

Coho salmon escapement in 2015 was above average throughout the Kuskokwim River, and run timing was among the latest on record. Water levels were below average during the beginning of the coho run, which likely contributed to the late run timing and made interpreting inseason escapement counts difficult. Fish were observed by staff holding downriver from the weir for extended periods of time prior to moving upriver. Large numbers of fish moving upriver coincided with significant precipitation in late August at many of the weirs. Coho salmon escapement to the George River was the largest on record, and escapement to the Tatlawiksuk River was the second largest on record. Escapement to the Kogrukluk River was the fourth largest on record and the escapement goal was exceeded. In addition, the Kwethluk River escapement goal was achieved (weir operated by USFWS, Ken Harper, Fisheries Biologist, Kenai Office).

Kuskokwim Bay

Since 2007, the Middle Fork Goodnews River weir has provided the only assessment of coho salmon within Kuskokwim Bay, but monitoring efforts in recent years have been inadequate. Historically, the Middle Fork Goodnews River weir operated until September 20, and the majority of the coho salmon escapement was monitored. Since 2012, annual weir operations have ended on August 31, largely due to inadequate funding. August 31 is consistent with the historical 50% passage date for coho salmon, but the abbreviated operational period has made it difficult to evaluate the escapement goal due to variable run timing. Of 14 years with reliable coho salmon counts through September 20, the goal was achieved in 13 years. However, in over half of those successful years the goal had not been achieved by August 31. For years in which the goal was achieved by August 31, the escapement was only barely above the goal on that date. For the last 4 years, when operations ended August 31, the goal was only achieved in 2015 after a surge of escapement in the final days of operation. This indicates that the timing of weir operations is not adequate to evaluate the existing coho salmon escapement goal.

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TABLES AND FIGURES

Table 1.–Kuskokwim Area Chinook salmon aerial survey locations, survey dates, ratings, index objectives, and escapement indices, 2015.

River	Survey date	Overall survey rating	Index objective	Index area survey counts					Escapement index	Escapement goal range
				101	102	103	104	Supplemental		
Kuskokwim Bay Rivers										
North Fork Goodnews R.	27 July	Fair (2)	101,102,103	507	407	77	1	[a]	991	640–3,300
Middle Fork Goodnews R.	27 July	Fair (2)	101, 103, 104	426	0	16	73	[a]	515	[b]
Kanektok R.	28 July	Fair (2)	101, 102, 103	1,997	2,630	292	0	139	4,919	3,500–8,500
Kuskokwim River Tributaries										
Kisaralik R.	26 July	Good (1)	102, 103	279	656	53	[a]	[a]	709	400–1,200
Aniak R.	28 July	Poor (3)	102, 103, 104	–	–	653	81	[a]	[c]	1,200–2,300
Salmon R. (Aniak)	28 July	Fair (2)	101, 102, 103	547	230	33	[a]	[a]	810	330–1,200
Kipchuk R.	27 July	Good (1)	101, 102, 103	516	288	113	[a]	[a]	917	[b]
Holokuk R.	25 July	Fair (2)	101, 102, 103, 104	14	17	24	22	[a]	77	[b]
Oskawalik R.	28 July	Poor (3)	101, 102, 103	47	39	16	[a]	[a]	[c]	[b]
Holitna R.	24 July	Fair (2)	102, 103	0	177	485	143	[a]	662	970–2,100
Cheeneetnuk R.	24 July	Poor (3)	101, 102	–	0	[a]	[a]	[a]	[c]	340–1,300
Gagaryah R.	24 July	Fair (2)	101, 102	8	11	[a]	[a]	[a]	19	300–830
Salmon R. (Pitka Fork)	20 July	Good (1)	102, 103, 104	346	320	217	1,479	[a]	2,016	470–1,600
Bear Cr.	21 July	Good (1)	101	1,381	[a]	[a]	[a]	[a]	1,381	[b]

Note: Survey ratings were based on criteria related to survey method, weather and water conditions, time of survey, and spawning stage (Schneiderhan 1988). The index objective defines the specific index areas that must be surveyed in order to produce a Chinook salmon escapement index count. Survey counts are not adjusted or expanded in any way. Escapement indices are only reported when index objectives were achieved, survey conditions were rated good (1) or fair (2), and survey occurred between the target date range of 17 July and 5 August. Dashes indicate no data.

[a] Index reach doesn't exist for the river.

[b] No escapement goal established.

[c] Escapement index not reported due to inadequate survey rating, index objective not achieved, or unestablished index objective.

Table 2.–Sockeye salmon aerial survey escapement indices in the Kuskokwim Area, 2015.

River	Survey date	Overall survey rating	Index objective	Index area survey counts					Escapement index	Escapement goal range
				101	102	103	104	Supplemental		
Kuskokwim Bay Rivers										
North Fork Goodnews R.	27 July	Fair (2)	101, 102, 103, 104	3,520	3,750	4,120	27,000	[a]	38,390	5,500–19,500
Middle Fork Goodnews R.	27 July	Fair (2)	101, 102, 103, 104	5,230	0	3,210	16,340	[a]	24,780	[b]
Kanektok R.	28 July	Fair (2)	101, 102, 103, 104	15,940	10,310	1,400	12,320	5,600	39,970	14,000–34,000

Note: Survey ratings were based on criteria related to survey method, weather and water conditions, time of survey, and spawning stage (Schneiderhan 1988). The index objective defines the specific index areas that must be surveyed in order to produce a sockeye salmon escapement index count. Survey counts are not adjusted or expanded in any way. Escapement indices are only reported when index objectives were achieved, survey conditions were rated good (1) or fair (2), and survey occurred between the target date range of 17 July and 5 August. Dashes indicate no data.

[a] Index reach does not exist for the river.

[b] No escapement goal established.

Table 3.–Target operational periods, actual operational periods, species targeted, and escapement goals at Kuskokwim Area weir projects, 2015.

Project	Target operational period	Actual operational period	Species targeted			
Kuskokwim Bay rivers			Chinook salmon	Chum salmon	Sockeye salmon	Coho salmon
Middle Fork Goodnews River weir	25 June–31 August[a]	25 June–31 August	BEG: 1,500–2,900	SEG: >12,000	SEG: 18,000–40,000	SEG: >12,000
Kanektok River weir	25 June–15 August	22 June–15 August	x	x	x	
Kuskokwim River tributaries						
Kwethluk River	[b]	10 June–7 September	SEG: 4,100–7,500	x	x	>19,000
Tuluksak River	[b]	17 June–7 September	x	x	x	x
Salmon River (Aniak) weir	15 June–15 August[a]	20 June–15 August	x	x	x	
George River weir	15 June–20 September	15 June–20 September	SEG: 1,800–3,300	x		x
Kogrukluk River weir	26 June–25 September	22 June–22 September	SEG: 4,800–8,800	SEG: 15,000–49,000	SEG: 4,400–17,000	SEG: 13,000–28,000
Telaquana River weir	3 July–26 August	11 July–11 August			x	
Tatlawiksuk River weir	15 June–20 September	13 June–12 September	x	x		x
Salmon River (Pitka Fork) weir	1 June–15 August	3 June–15 August	x			

Note: The *x* indicates that species is monitored in significant numbers but there is no established escapement goal. The drainagewide Chinook salmon sustainable escapement; goal (SEG) for the Kuskokwim River is 65,000-120,000. The years that escapement goals were established varies by location and species (Conitz et al. 2015).

[a] The end of the target operational period was reduced prior to the start of the season due to a lack of funding (Middle Fork Goodnews River) or reallocation of existing funds (Salmon River, Aniak).

[b] Kwethluk and Tuluksak river weirs are operated by the U.S. Fish and Wildlife Service and information is displayed to show all active salmon monitoring projects in the Kuskokwim River. For further information contact USFWS.

Table 4.–Starting passage dates, and passage years used in the hierarchical Bayesian estimation technique to estimate missed escapement at Kuskokwim Area weir projects, 2015.

Project	Starting passage date	Weir passage years
Middle Fork Goodnews River weir	15 June[a]	2001–2015
Salmon (Aniak) River weir	15 June	2006–2009, 2012–2015
George River weir	15 June	1996–2015
Kogrukluk River weir	26 June	1976–2015[b]
Telaquana River weir	3-Jul	2010–2015
Tatlawiksuk River weir	15 June	1998–2015

Note: Starting passage dates and weir passage years only apply to target species at each project.

[a] Starting passage date is for Chinook and sockeye salmon only. Chum salmon starting passage date is 20 June.

[b] Weir passage years are for Chinook, chum, and sockeye salmon only. Coho salmon passage years are 1981–2015.

Table 5.–Daily and annual estimated escapement of Chinook salmon at Kuskokwim Area weir projects, 2015.

	Kuskokwim Bay		Kuskokwim River				
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	George R	Kogrukluk	Tatlawiksuk	Salmon (Pitka Fork)
6/1	[a]	[a]	[a]	[a]	[a]	[a]	[b]
6/2	[a]	[a]	[a]	[a]	[a]	[a]	[b]
6/3	[a]	[a]	[a]	[a]	[a]	[a]	0 [b]
6/4	[a]	[a]	[a]	[a]	[a]	[a]	0
6/5	[a]	[a]	[a]	[a]	[a]	[a]	0
6/6	[a]	[a]	[a]	[a]	[a]	[a]	0
6/7	[a]	[a]	[a]	[a]	[a]	[a]	0
6/8	[a]	[a]	[a]	[a]	[a]	[a]	0
6/9	[a]	[a]	[a]	[a]	[a]	[a]	0 [b]
6/10	[a]	[a]	[a]	[a]	[a]	[a]	[c]
6/11	[a]	[a]	[a]	[a]	[a]	[a]	[c]
6/12	[a]	[a]	[a]	[a]	[a]	[a]	[c]
6/13	[a]	[a]	[a]	[a]	[a]	[a]	0 [b]
6/14	[a]	[a]	[a]	[a]	[a]	[a]	0
6/15	[a]	[a]	0 [d]	0 [d]	[a]	0	0
6/16	[a]	[a]	0 [d]	3	[a]	0	0
6/17	[a]	[a]	0 [d]	0	[a]	0	0
6/18	[a]	[a]	0 [d]	0	[a]	0	0
6/19	[a]	[a]	0 [d]	10	[a]	0	0
6/20	[a]	[a]	0	0	[a]	0	0
6/21	[a]	[a]	1	7	[a]	1	0
6/22	[a]	[a]	1	32	[a]	1	0
6/23	[a]	[a]	0	96	[a]	4	0
6/24	[a]	[a]	0	49	[a]	1	0
6/25	3 [e]	1	0	20	[a]	1	0
6/26	12	2	0	4 [e]	2	0	0
6/27	3	0	0 [d]	2	8	0	19
6/28	0	8	0 [d]	32	20	29	1
6/29	12	3	0 [d]	36	8	20	81
6/30	32	18	0 [d]	33	50	35	111
7/1	12	71	5	74	35	39	35
7/2	23	56	0	27	46	24	164
7/3	83	148	0	17	51	53	102
7/4	10	213	35	79	49	261	116
7/5	36	149	47	157	105	171	15
7/6	39 [e]	124	44	282	164	116	533
7/7	16	38	5	259	577	367	248
7/8	13	85	43	90	150	196	68
7/9	43	58	6	32	115	36	87

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Table 5.–Page 2 of 4.

	Kuskokwim Bay		Kuskokwim River				
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	George R	Kogrukluk	Tatlawiksuk	Salmon (Pitka Fork)
7/10	40	153	6	83	217	47	113
7/11	28	247	104	119	320	189	252 [b]
7/12	11	243	78	50	657	55	624
7/13	88	325	83	84	180	71	49 [b]
7/14	134	448	106	68	421	93	240
7/15	66	362	165	63	238	32	905
7/16	52	229	16	17	251	44	147
7/17	55 [d]	317	76	20	378 [e]	28	112
7/18	57	302	180	27	304 [f]	31	271
7/19	13	327	82	22	290 [d]	8 [f]	68
7/20	76	390	140 [e]	50	215	15	221
7/21	62	449	108 [d]	32	171	20	331
7/22	12	369	162	29	122	27	398
7/23	42 [d]	543	84	21	217	6	295
7/24	53	318	106	23	419	8	243
7/25	38	488	52	17	195	10	112
7/26	62	428	55	18	256	5	100
7/27	24	474	62	29	260	10	82
7/28	61	461	76	31	238	7	55
7/29	18	269	49	27	105	3	148
7/30	18	235	64	16	195	6	26
7/31	3	164	51	17	213	1	67
8/1	59	286	57	11	98	2	100
8/2	14	211	20	11	110	3	39
8/3	7	134	26	4 [e]	65	0	20
8/4	5	191	14	4	103	0	30
8/5	2	183	18	5	60	4	22
8/6	4	136	19	5	49	1	16
8/7	2	93	15	4	39	2	14
8/8	0	68	7	1	51	1	5
8/9	8	153	17	0	40	0	14
8/10	6	75	39	3	39	1	9

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Table 5.–Page 3 of 4.

	Kuskokwim Bay		Kuskokwim River				
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	George	Kogrukluk	Tatlawiksuk	Salmon (Pitka Fork)
8/11	1	55	1	4	21	5	5
8/12	0	76	22	0	25	4	6
8/13	0	78	18	6	15	2	5
8/14	1	103	6 [d]	4	20	0	2
8/15	5 [d]	59	11	4	24	4	10
8/16	5 [d]	[a]	4 [f]	2	12	1	[a]
8/17	6	[a]	3 [f]	3	9	0	[a]
8/18	4 [d]	[a]	3 [f]	0	9	0	[a]
8/19	3 [d]	[a]	2 [f]	0	15	0	[a]
8/20	3 [d]	[a]	2 [f]	0	5	0	[a]
8/21	0	[a]	2 [f]	1	6	1	[a]
8/22	1	[a]	1 [f]	0	4	0	[a]
8/23	0	[a]	1 [f]	0	1	0	[a]
8/24	3	[a]	1 [f]	0	1	1	[a]
8/25	0	[a]	1 [f]	1	4	0	[a]
8/26	0	[a]	1 [f]	0	2	0	[a]
8/27	3	[a]	1 [f]	1	0	0	[a]
8/28	0	[a]	0 [f]	0	0	0	[a]
8/29	1	[a]	0 [f]	0	1	0	[a]
8/30	0	[a]	0 [f]	0	0	0	[a]
8/31	1	[a]	0 [f]	1	2	0	[a]
9/1	[h]	[a]	0 [g]	1	1	0	[a]
9/2	[h]	[a]	0 [g]	0	1	0	[a]
9/3	[h]	[a]	0 [g]	1	1	1	[a]
9/4	[h]	[a]	0 [g]	1	2	0	[a]
9/5	[h]	[a]	0 [g]	0	1	0	[a]
9/6	[h]	[a]	0 [g]	0	0	0	[a]
9/7	[h]	[a]	0 [g]	0	0	0	[a]
9/8	[h]	[a]	0 [g]	0	0	0	[a]
9/9	[h]	[a]	0 [g]	0	0	0	[a]
9/10	[h]	[a]	0 [g]	0	2	0	[a]
9/11	[h]	[a]	0 [g]	0	0	0	[a]

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Table 5.–Page 4 of 4.

	Kuskokwim Bay		Kuskokwim River				
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	George	Kogrukluk	Tatlawiksuk	Salmon (Pitka Fork)
9/12	[h]	[a]	0 [g]	0	0	0	[a]
9/13	[h]	[a]	0 [g]	0	0	0 [g]	[a]
9/14	[h]	[a]	0 [g]	0 [h]	0	0 [g]	[a]
9/15	[h]	[a]	0 [g]	0 [g]	0	0 [g]	[a]
9/16	[h]	[a]	0 [g]	0 [g]	0	0 [g]	[a]
9/17	[h]	[a]	0 [g]	0 [g]	1	0 [g]	[a]
9/18	[h]	[a]	0 [g]	0 [g]	0	0 [g]	[a]
9/19	[h]	[a]	0 [g]	0 [h]	0	0 [g]	[a]
9/20	[h]	[a]	0 [g]	0	0	0 [g]	[a]
9/21	[a]	[a]	[a]	[a]	0	[a]	[a]
9/22	[a]	[a]	[a]	[a]	0	[a]	[a]
9/23	[a]	[a]	[a]	[a]	0 [h]	[a]	[a]
9/24	[a]	[a]	[a]	[a]	0 [h]	[a]	[a]
9/25	[a]	[a]	[a]	[a]	0 [h]	[a]	[a]
Annual Esc	1,494	10,416	2,404	2,282	8,081	2,104	6,736
95% CI	1,461–1,536	–	2,367–2,471	2,282–2,282	8,001–8,166	2,100–2,117	–

Note: The sum of daily escapement that occurred within the project's target operational period is considered the annual escapement estimate for the project. Counts may have been conducted outside of the target operational period; however, those data are not displayed in this table and are not used in determining annual escapement. Confidence intervals are only reported for species with missed escapement estimates created from the Bayesian estimation method.

[a] The date is outside of the project's target operational period.

[b] Partial day count; no estimates created or used.

[c] The weir was not operational; no estimates were created or used.

[d] Partial day count; missed passage was estimated using the Bayesian method.

[e] Partial day count; Bayesian estimate rejected due to observed passage being larger than estimate.

[f] The weir was not operational; missed passage was estimated using the Bayesian method.

[g] The weir was not operational; missed passage was assumed zero.

[h] Partial day count; missed passage was assumed zero.

Table 6.–Daily and annual estimated escapement of chum salmon at Kuskokwim Area weir projects, 2015.

	Kuskokwim Bay		Kuskokwim River			
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	George	Kogrukluk	Tatlawiksuk
6/15	[a]	[a]	0 [b]	1 [c]	[a]	0
6/16	[a]	[a]	0 [b]	11	[a]	0
6/17	[a]	[a]	0 [b]	3	[a]	0
6/18	[a]	[a]	0 [b]	6	[a]	1
6/19	[a]	[a]	0 [b]	8	[a]	0
6/20	[a]	[a]	0 [b]	2	[a]	1
6/21	[a]	[a]	0	4	[a]	0
6/22	[a]	[a]	0	42	[a]	1
6/23	[a]	[a]	2	32	[a]	11
6/24	[a]	[a]	3	18	[a]	12
6/25	9 [c]	26	4	27	[a]	2
6/26	23	37	0	14 [c]	12	2
6/27	5	4	0 [d]	12	21	1
6/28	14	55	0 [b]	60	38	66
6/29	35	51	0 [b]	104	13	88
6/30	82	56	1 [c]	58	47	59
7/1	42	64	11	138	40	106
7/2	58	86	14	48	34	108
7/3	145	140	0	42	59	192
7/4	48	134	8	110	56	382
7/5	113	88	26	149	76	398
7/6	46 [d]	73	13	441	165	279
7/7	114	81	11	235	260	318
7/8	90	95	16	137	282	349
7/9	224	119	51	128	265	225
7/10	182	139	80	211	291	341
7/11	185	228	78	276	463	642
7/12	108	348	69	367	370	513
7/13	238	292	72	347	247	339
7/14	466	455	49	272	324	542
7/15	395	458	162	632	330	273
7/16	347	301	132	381	411	489

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	Kuskokwim Bay		Kuskokwim River			
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	George	Kogrukluk	Tatlawiksuk
7/17	407 [d]	345	253	437	517	525
7/18	351	356	170	838	639	590
7/19	186	502	243	949	763	365 [b]
7/20	813	625	282 [c]	739	705	419
7/21	371	813	229 [d]	952	977	423
7/22	199	339	340	688	1,172	389
7/23	442 [d]	437	152	698	1,307	168
7/24	290	413	262	490	1,216	74
7/25	479	520	128	563	811	128
7/26	596	475	131	502	786	139
7/27	440	696	137	571	1,927	142
7/28	723	585	296	657	1,674	90
7/29	372	561	243	659	992	94
7/30	375	651	222	541	1,983	92
7/31	123	483	194	403	1,300	36
8/1	427	504	209	443	1,169	82
8/2	229	387	166	379	1,056	167
8/3	266	423	138	328 [d]	996	97
8/4	153	622	122	238	1,205	87
8/5	86	352	137	287	1,119	49
8/6	226	270	116	201	879	37
8/7	65	280	114	176	778	32
8/8	57	175	68	123	614	40
8/9	114	178	27	107	507	40
8/10	66	141	60	98	494	50
8/11	74	85	17	57	486	25
8/12	68	146	47	30	357	24
8/13	48	142	58	141	267	27
8/14	48	131	41 [d]	137	439	19
8/15	68 [c]	81	39	124	474	35
8/16	67 [d]	[a]	32 [b]	80	319	27
8/17	67	[a]	28 [b]	73	247 [d]	25

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Table 6.–Page 3 of 4.

	Kuskokwim Bay		Kuskokwim River			
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	George	Kogrukluk	Tatlawiksuk
8/18	48 [d]	[a]	24 [b]	68	223 [b]	14
8/19	42 [d]	[a]	21 [b]	35	176 [d]	4
8/20	38 [d]	[a]	18 [b]	20	148	8
8/21	14	[a]	16 [b]	32	108	7
8/22	22	[a]	14 [b]	33	114	10
8/23	14	[a]	12 [b]	24	64	7
8/24	4	[a]	10 [b]	16	116	13
8/25	4	[a]	9 [b]	24	55	7
8/26	22	[a]	7 [b]	54	53	3
8/27	28	[a]	6 [b]	14	25	1
8/28	5	[a]	5 [b]	16	14	2
8/29	4	[a]	5 [b]	21	10	1
8/30	3	[a]	4 [b]	18	10	10
8/31	4	[a]	3 [b]	13	17	1
9/1	0 [e]	[a]	0 [e]	11	11	1
9/2	0 [e]	[a]	0 [e]	21	11	5
9/3	0 [e]	[a]	0 [e]	11	9	0
9/4	0 [e]	[a]	0 [e]	12	18	2
9/5	0 [e]	[a]	0 [e]	19	14	0
9/6	0 [e]	[a]	0 [e]	17	1	0
9/7	0 [e]	[a]	0 [e]	5	6	1
9/8	0 [e]	[a]	0 [e]	7	3	1
9/9	0 [e]	[a]	0 [e]	5	3	1
9/10	0 [e]	[a]	0 [e]	11	8	1
9/11	0 [e]	[a]	0 [e]	5	0	2
9/12	0 [e]	[a]	0 [e]	3	1	0
9/13	0 [e]	[a]	0 [e]	5	0	0 [e]
9/14	0 [e]	[a]	0 [e]	6	1	0 [e]
9/15	0 [e]	[a]	0 [e]	0 [f]	2	0 [e]
9/16	0 [e]	[a]	0 [e]	0 [e]	0	0 [e]
9/17	0 [e]	[a]	0 [e]	0 [e]	0	0 [e]
9/18	0 [e]	[a]	0 [e]	0 [e]	1	0 [e]

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Table 6.–Page 4 of 4.

	Kuskokwim Bay		Kuskokwim River			
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	George	Kogrukluk	Tatlawiksuk
9/19	[e]	[a]	0 [e]	0 [f]	0	0 [e]
9/20	[e]	[a]	0 [e]	0	0	0 [e]
9/21	[a]	[a]	[a]	[a]	0	[a]
9/22	[a]	[a]	[a]	[a]	0	[a]
9/23	[a]	[a]	[a]	[a]	0 [e]	[a]
9/24	[a]	[a]	[a]	[a]	0 [e]	[a]
9/25	[a]	[a]	[a]	[a]	0 [e]	[a]
Annual Esc	11,517	15,048	5,657	17,551	33,201	10,379
95% CI	11,285–11,802	–	5,525–5,841	17,507–17,590	32,926–33,500	10,344–10,412

Note: The sum of daily escapement that occurred within the project's target operational period is considered the annual escapement estimate for the project. Counts may have been conducted outside of the target operational period; however, those data are not displayed in this table and are not used in determining annual escapement. Confidence intervals are only reported for species with missed escapement estimates created from the Bayesian estimation method.

[a] The date is outside of the project's target operational period.

[b] The weir was not operational; missed passage was estimated using the Bayesian method.

[c] Partial day count; Bayesian estimate rejected due to observed passage being larger than estimate.

[d] Partial day count; missed passage was estimated using the Bayesian method.

[e] The weir was not operational; missed passage was assumed zero.

[f] Partial day count; missed passage was assumed zero.

Table 7.–Daily and annual estimated escapement of sockeye salmon at Kuskokwim Area weir projects, 2015.

	Kuskokwim Bay		Kuskokwim River		
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	Kogrukluk	Telaquana
6/15	[a]	[a]	0 [b]	[a]	[a]
6/16	[a]	[a]	0 [b]	[a]	[a]
6/17	[a]	[a]	0 [b]	[a]	[a]
6/18	[a]	[a]	0 [b]	[a]	[a]
6/19	[a]	[a]	0 [b]	[a]	[a]
6/20	[a]	[a]	0	[a]	[a]
6/21	[a]	[a]	0	[a]	[a]
6/22	[a]	[a]	0	[a]	[a]
6/23	[a]	[a]	0	[a]	[a]
6/24	[a]	[a]	0	[a]	[a]
6/25	203 [c]	110	0	[a]	[a]
6/26	436	167	0	0	[a]
6/27	397	10	0 [d]	0	[a]
6/28	338	244	0 [b]	0	[a]
6/29	1,257	242	0 [b]	0	[a]
6/30	1,276	437	0 [d]	1	[a]
7/1	1,308	767	0	0	[a]
7/2	1,197	1,137	0	0	[a]
7/3	1,586	1,670	0	3	0 [b]
7/4	768	2,034	0	0	0 [b]
7/5	2,306	1,790	0	1	0 [b]
7/6	2,405 [d]	1,730	0	3	0 [b]
7/7	2,714	1,082	0	42	0 [b]
7/8	1,602	2,079	0	14	0 [b]
7/9	4,361	2,489	0	7	2 [b]
7/10	2,900	3,183	1	7	10 [b]
7/11	1,623	4,904	0	34	42 [d]
7/12	1,866	5,970	1	64	872
7/13	4,109	4,206	0	10	638
7/14	3,588	5,574	0	74	603 [c]
7/15	2,368	5,094	1	35	2,374
7/16	2,458	3,919	0	6	2,793

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Table 7.–Page 2 of 4.

	Kuskokwim Bay		Kuskokwim River		
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	Kogrukluk	Telaquana
7/17	2,061 [d]	3,402	4	28 [c]	1,376
7/18	1,748	2,876	9	8 [b]	3,521
7/19	1,176	4,364	0	20 [d]	4,904 [c]
7/20	2,719	4,437	29 [c]	54	5,560
7/21	973	4,469	13 [d]	63	5,610 [d]
7/22	988	2,985	26	38	5,275
7/23	1,109 [d]	3,280	36	114	3,522
7/24	679	2,430	39	474	6,165
7/25	731	2,678	11	265	7,711
7/26	619	2,581	20	217	6,631
7/27	500	2,706	26	797	6,195
7/28	439	2,464	62	601	5,128
7/29	469	2,679	79	141	4,344 [d]
7/30	399	2,248	90	645	4,946
7/31	184	1,822	64	662	2,622
8/1	417	1,923	77	293	2,654
8/2	212	1,683	97	247	1,834
8/3	144	1,280	89	279	2,304
8/4	86	1,653	66	274	1,806
8/5	76	1,024	68	170	954
8/6	93	845	81	159	972
8/7	56	650	77	107	521
8/8	47	516	40	63	437
8/9	127	612	44	65	592
8/10	82	507	109	56	352
8/11	45	288	21	28	365
8/12	46	399	82	37	381 [b]
8/13	26	408	52	17	308 [b]
8/14	67	390	40 [c]	24	249 [b]
8/15	36 [d]	314	22	34	201 [b]
8/16	77 [c]	[a]	31 [d]	16	162 [b]
8/17	72	[a]	27 [d]	24	130 [b]

-continued-

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	Kuskokwim Bay		Kuskokwim River		
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	Kogrukluk	Telaquana
8/18	40 [c]	[a]	23 [d]	9	104 [b]
8/19	24 [c]	[a]	20 [d]	12	83 [b]
8/20	26 [c]	[a]	17 [d]	10	67 [b]
8/21	20	[a]	14 [d]	5	53 [b]
8/22	17	[a]	12 [d]	5	43 [b]
8/23	23	[a]	10 [d]	2	34 [b]
8/24	22	[a]	9 [d]	9	27 [b]
8/25	7	[a]	7 [d]	4	22 [b]
8/26	10	[a]	6 [d]	6	17 [b]
8/27	27	[a]	5 [d]	1	[a]
8/28	6	[a]	4 [d]	0	[a]
8/29	4	[a]	3 [d]	0	[a]
8/30	7	[a]	3 [d]	0	[a]
8/31	7	[a]	2 [d]	4	[a]
9/1	0 [e]	[a]	0 [e]	1	[a]
9/2	0 [e]	[a]	0 [e]	1	[a]
9/3	0 [e]	[a]	0 [e]	4	[a]
9/4	0 [e]	[a]	0 [e]	5	[a]
9/5	0 [e]	[a]	0 [e]	1	[a]
9/6	0 [e]	[a]	0 [e]	0	[a]
9/7	0 [e]	[a]	0 [e]	1	[a]
9/8	0 [e]	[a]	0 [e]	0	[a]
9/9	0 [e]	[a]	0 [e]	0	[a]
9/10	0 [e]	[a]	0 [e]	5	[a]
9/11	0 [e]	[a]	0 [e]	0	[a]
9/12	0 [e]	[a]	0 [e]	0	[a]
9/13	0 [e]	[a]	0 [e]	0	[a]
9/14	0 [e]	[a]	0 [e]	0	[a]
9/15	0 [e]	[a]	0 [e]	2	[a]
9/16	0 [e]	[a]	0 [e]	0	[a]
9/17	0 [e]	[a]	0 [e]	1	[a]
9/18	0 [e]	[a]	0 [e]	2	[a]

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	Kuskokwim Bay		Kuskokwim River		
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	Kogrukluk	Telaquana
9/19	[a]	[a]	0 [e]	0	[a]
9/20	[a]	[a]	0 [e]	0	[a]
9/21	[a]	[a]	[a]	0	[a]
9/22	[a]	[a]	[a]	0	[a]
9/23	[a]	[a]	[a]	0 [e]	[a]
9/24	[a]	[a]	[a]	0 [e]	[a]
9/25	[a]	[a]	[a]	0 [e]	[a]
Annual Esc	57,809	106,751	1,669	6,411	95,516
95% CI	57,633–57,993	–	1,566–1,812	6,391–6,458	95,213–95,844

Note: The sum of daily escapement that occurred within the project's target operational period is considered the annual escapement estimate for the project. Counts may have been conducted outside of the target operational period; however, those data are not displayed in this table and are not used in determining annual escapement. Confidence intervals are only reported for species with missed escapement estimates created from the Bayesian estimation method.

[a] The date is outside of the project's target operational period.

[b] The weir was not operational; missed passage was estimated using the Bayesian method.

[c] Partial day count; Bayesian estimate rejected due to observed passage being larger than estimate.

[d] Partial day count; missed passage was estimated using the Bayesian method.

[e] The weir was not operational; missed passage was assumed zero.

Table 8.–Daily and annual estimated escapement of coho salmon at Kuskokwim Area weir projects, 2015.

	Kuskokwim Bay	Kuskokwim River		
Date	Middle Fork Goodnews R	George R	Kogrukluk R	Tatlawiksuk R
6/15	[a]	0 [b]	[a]	0
6/16	[a]	0	[a]	0
6/17	[a]	0	[a]	0
6/18	[a]	0	[a]	0
6/19	[a]	0	[a]	0
6/20	[a]	0	[a]	0
6/21	[a]	0	[a]	0
6/22	[a]	0	[a]	0
6/23	[a]	0	[a]	0
6/24	[a]	0	[a]	0
6/25	0	0	[a]	0
6/26	0	0 [b]	0	0
6/27	0	0	0	0
6/28	0	0	0	0
6/29	0	0	0	0
6/30	0	0	0	0
7/1	0	0	0	0
7/2	0	0	0	0
7/3	0	0	0	0
7/4	0	0	0	0
7/5	0	0	0	0
7/6	0	0	0	0
7/7	0	0	0	0
7/8	0	0	0	0
7/9	0	0	0	0
7/10	0	0	0	0
7/11	0	0	0	0
7/12	0	0	0	0
7/13	0	0	0	0
7/14	0	0	0	0
7/15	0	0	0	0
7/16	0	0	0	0

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	Kuskokwim Bay	Kuskokwim River		
Date	Middle Fork Goodnews R	George R	Kogrukluk R	Tatlawiksuk R
7/17	0	0	0 [b]	0
7/18	0	0	0 [c]	0
7/19	0	0	0 [b]	0 [c]
7/20	0	0	0	0
7/21	0	0	0	0
7/22	0	0	0	0
7/23	0	0	0	2
7/24	0	0	0	4
7/25	0	3	0	2
7/26	0	0	2	0
7/27	0	5	3	2
7/28	0	17	1	3
7/29	0	12	2	3
7/30	0	24	3	4
7/31	2	6	4	1
8/1	14	16	9	4
8/2	6	17	8	10
8/3	6	5	6	28
8/4	8	32	24	28
8/5	7	108	21	61
8/6	0	107	18	39
8/7	4	94	11	75
8/8	3	29	10	144
8/9	20	45	19	131
8/10	2	70	22	175
8/11	4	9	8	277
8/12	0	5	14	169
8/13	3	100	22	167
8/14	3	184	25	391
8/15	8	253	144	740
8/16	6	203	215	665
8/17	14	374	165	576

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	Kuskokwim Bay	Kuskokwim River		
Date	Middle Fork Goodnews R	George R	Kogrukluk R	Tatlawiksuk R
8/18	21	159	265	784
8/19	5	141	150	623
8/20	2	16	133	414
8/21	0	164	82	576
8/22	30	67	262	947
8/23	14	775	92	510
8/24	380	105	137	422
8/25	26	677	426	1,272
8/26	1,646	6,941	528	1,971
8/27	2,812	2,246	112	943
8/28	33	841	75	324
8/29	8,901	445	20	387
8/30	28	174	30	298
8/31	1,076	553	977	703
9/1	[d]	734	923	361
9/2	[d]	294	1,394	464
9/3	[d]	892	3,630	508
9/4	[d]	3,829	5,764	282
9/5	[d]	3,368	2,017	674
9/6	[d]	1,576	835	273
9/7	[d]	1,718	2,878	178
9/8	[d]	1,038	1,419	181
9/9	[d]	1,126	1,300	182
9/10	[d]	952	1,853	130
9/11	[d]	1,089	958	133
9/12	[d]	319	740	78 [b]
9/13	[d]	543	908	88 [c]
9/14	[d]	892 [e]	640	72 [c]
9/15	[d]	619 [c]	786	59 [c]
9/16	[d]	539 [c]	707	48 [c]
9/17	[d]	466 [c]	764	39 [c]
9/18	[d]	400 [c]	252	31 [c]

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	Kuskokwim Bay	Kuskokwim River		
Date	Middle Fork Goodnews R	George R	Kogrukluk R	Tatlawiksuk R
9/19	[a]	341 [b]	226	25 [c]
9/20	[a]	55	145	20 [c]
9/21	[a]	[a]	116	[a]
9/22	[a]	[a]	157	[a]
9/23	[a]	[a]	18 [c]	[a]
9/24	[a]	[a]	11 [c]	[a]
9/25	[a]	[a]	7 [c]	[a]
Annual Esc	–	35,812	32,493	17,701
95% CI	–	35,514-36,114	32,490–32,499	17,537–17,905

Note: The sum of daily escapement that occurred within the project's target operational period is considered the annual escapement estimate for the project. Counts may have been conducted outside of the target operational period; however, those data are not displayed in this table and are not used in determining annual escapement. Confidence intervals are only reported for species with missed escapement estimates created from the Bayesian estimation method. Dashes (–) indicates that annual escapement was not determined.

[a] The date is outside of the project's target operational period.

[b] Partial day count; missed passage was estimated using the Bayesian method.

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

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

[e] Partial day count; Bayesian estimate rejected due to observed passage being larger than estimate.

Table 9.–Chinook salmon aerial survey escapement indices, Kuskokwim Area, 2000–2015.

	Kuskokwim Bay			Kuskokwim River										
Year	North Fork Goodnews	Middle Fork Goodnews	Kanektok	Kisaralik	Aniak	Salmon (Aniak)	Kipchuk	Holokuk	Oskawalik	Holitna	Cheeneetnuk	Gagaryah	Salmon (Pitka Fork)	Bear Creek
2000	–	–	–	–	714	238	182	–	–	301	–	–	362	–
2001	–	–	–	–	–	598	–	52	–	4,156	–	143	1,033	175
2002	1,470	1,195	–	1,727	–	1,236	1,615	513	295	733	730	–	–	211
2003	3,935	2,131	6,206	654	3,514	1,242	1,493	1,096	844	–	810	1,093	–	176
2004	7,482	2,617	28,375	5,157	5,362	2,177	1,868	539	293	4,051	918	670	1,138	206
2005	–	–	12,780	2,206	–	4,097	1,679	510	582	1,760	–	–	1,801	367
2006	–	–	–	4,734	5,639	–	1,618	705	386	1,866	1,015	531	862	347
2007	–	–	–	692	3,984	1,458	2,147	–	–	–	–	1,035	943	165
2008	2,155	2,190	–	1,074	3,222	589	1,061	418	213	–	290	177	1,033	245
2009	–	–	–	–	–	–	–	565	379	–	323	303	632	209
2010	–	–	1,208	235	–	–	–	229	–	–	–	62	135	75
2011	853	–	–	–	–	79	116	61	26	–	249	96	767	145
2012	378	355	–	588	–	49	193	36	51	–	229	178	670	–
2013	–	–	2,277	599	754	154	261	–	38	532	138	74	469	64
2014	630	612	1,840	622	3,201	497	1,220	80	200	–	340	359	1,865	–
2015	991	515	4,919	709	–	810	917	77	–	662	–	19	2,016	1,381
Average	1,926	1,409	8,396	1,186	2,768	792	1,028	387	304	1,723	725	486	960	195
Escapement goal[a]	640–3,300	[b]	3,500–8,500	400–1,200	1,200–2,300	330–1,200	[b]	[b]	[b]	970–2,100	340–1,300	300–830	470–1,600	[b]

Note: Average is derived from all annual escapements on record at each project except 2015, and may include escapements prior to 2000. Escapement data for all projects' entirety are archived in the Arctic-Yukon-Kuskokwim salmon database management system (http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx).

[a] Date of escapement goal establishment varies by location.

[b] No escapement goal established.

Table 10.–Annual escapement of Chinook salmon past Kuskokwim Area weir projects, 2000–2015.

	Kuskokwim Bay		Kuskokwim River				
Year	Middle Fork Goodnews River	Kanektok River	Salmon (Aniak) River	George River	Kogrukluk River	Tatlawiksuk River	Salmon (Pitka Fork) River
2000	2,670	[a]	[a]	2,959	3,242	807	[a]
2001	5,351	[b]	[a]	3,277	7,475	1,978	[a]
2002	3,025	5,304	[a]	2,443	10,025	2,237	[a]
2003	2,248	8,211	[a]	[b]	12,008	[b]	[a]
2004	4,438	19,569	[a]	5,488	19,819	2,833	[a]
2005	4,781	14,177	[a]	3,845	21,819	2,864	[a]
2006	4,572	[a]	7,075	4,355	20,205	1,700	[a]
2007	3,914	13,965	6,255	4,011	[b]	2,032	[a]
2008	2,223	[b]	2,376	2,563	9,750	1,075	[a]
2009	1,669	7,065	1,656	3,663	9,528	1,071	[a]
2010	2,176	6,537	[a]	1,498	5,812	546	[a]
2011	2,045	5,170	[a]	1,547	6,731	992	[a]
2012	524	1,561	[b]	2,201	[b]	1,116	[a]
2013	1,187	3,569	625	1,292	1,819	495	[a]
2014	750	3,594	1,757	2,993	3,732	1,904	[a]
2015	1,494	10,416	2,404	2,282	8,081	2,104	6,736
Average	2,831	8,066	3,291	3,607	10,316	1,542	–
Escapement goal	BEG: 1,500–2,900	–	–	SEG: 1,800–3,300	SEG: 4,800–8,800	–	–

Note: Average is derived from all annual escapements on record at each project except 2015, and may include escapements prior to 2000. Escapement data for all projects' entirety are archived in the Arctic-Yukon-Kuskokwim salmon database management system (http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx).

Dashes (–) indicate no escapement goal exists.

[a] Weir did not operate this year.

[b] Historical run timing indicates that more than 40% of the run was missed; annual escapement was not determined.

Table 11.–Annual escapement of chum salmon past Kuskokwim Area weir projects, 2000–2015.

	Kuskokwim Bay		Kuskokwim River			
Year	Middle Fork Goodnews River	Kanektok River	Salmon (Aniak) River	George River	Kogrukluk River	Tatlawiksuk River
2000	14,405	[a]	[a]	3,507	11,416	7,076
2001	26,820	[b]	[a]	11,287	31,587	23,863
2002	29,905	41,912	[a]	6,534	52,973	24,539
2003	21,778	40,086	[a]	33,648	23,779	[b]
2004	32,442	46,008	[a]	15,012	24,405	21,245
2005	26,501	55,340	[a]	14,834	194,887	55,599
2006	54,689	[a]	42,825	42,318	188,003	32,776
2007	50,232	131,000	25,340	61,531	52,961	83,484
2008	39,548	[b]	9,459	29,396	44,744	30,129
2009	19,236	55,846	9,392	7,944	82,483	19,975
2010	24,789	68,186	[a]	26,275	69,258	37,737
2011	19,974	53,050	[a]	46,650	76,823	88,202
2012	9,065	28,726	[b]	33,310	[b]	44,569
2013	27,682	43,040	7,723	37,879	65,644	32,249
2014	11,518	18,602	2,890	17,148	30,763	12,455
2015	11,517	15,048	5,657	17,551	33,201	10,379
Average	26,394	52,891	16,272	23,671	47,231	34,909
Escapement goal	SEG: >12,000	–	–	–	SEG: 15,000–49,000	–

Note: Average is derived from all annual escapements on record at each project except 2015, and may include escapements prior to 2000. Escapement data for all projects' entirety are archived in the Arctic-Yukon-Kuskokwim salmon database management system (http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx).

[a] Weir did not operate this year.

[b] Historical run timing indicates that more than 40% of the run was missed; annual escapement was not determined.

Table 12.–Sockeye salmon aerial survey escapement indices, Kuskokwim Area, 2000–2015.

Year	North Fork Goodnews River	Middle Fork Goodnews River	Kanektok River
2000	–	–	–
2001	–	–	–
2002	–	2,627	–
2003	50,140	29,150	21,335
2004	31,695	33,670	77,780
2005	–	–	95,900
2006	–	–	–
2007	–	–	–
2008	32,500	13,935	–
2009	–	–	–
2010	–	–	16,180
2011	14,140	–	–
2012	16,710	–	–
2013	–	–	51,517
2014	–	12,262	136,400
2015	38,390	24,780	39,970
Average	22,765	17,427	47,756
Escapement goal	5,500–19,500	–	14,000–34,000

Note: Average is derived from all aerial survey escapement indices on record for each river except 2015, and may include indices prior to 2000. For additional aerial survey data refer to the Arctic-Yukon-Kuskokwim salmon database management system (http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx). Dashes (–) indicate the escapement index was not estimated or no escapement goal exists.

Table 13.–Annual escapement of sockeye salmon past Kuskokwim Area weir projects, 2000–2015.

	Kuskokwim Bay		Kuskokwim River		
Year	Middle Fork Goodnews River	Kanektok River	Salmon (Aniak) River	Kogrukluk River	Telaquana River
2000	40,828	[a]	[a]	2,895	[a]
2001	21,194	[b]	[a]	7,177	[a]
2002	21,329	60,228	[a]	4,084	[a]
2003	37,933	128,030	[a]	9,302	[a]
2004	54,035	105,135	[a]	6,895	[a]
2005	118,969	268,537	[a]	37,787	[a]
2006	127,245	[a]	7,086	61,382	[a]
2007	73,768	304,086	2,189	17,211	[a]
2008	43,879	[b]	1,181	19,675	[a]
2009	27,494	305,756	1,366	22,826	[a]
2010	36,574	204,954	[a]	17,139	71,932
2011	19,643	88,177	[a]	7,974	35,102
2012	29,531	115,021	924	[b]	23,005
2013	23,545	128,761	966	7,808	28,050
2014	41,473	259,406	894	6,413	24,293
2015	57,809	106,751	1,669	6,411	95,516
Average	45,476	178,917	2,087	12,652	36,476
Escapement goal	BEG: 18,000–40,000	–	–	SEG: 4,400–17,000	–

Note: Average is derived from all annual escapements on record at each project except 2015, and may include escapements prior to 2000. Escapement data for all projects' entirety are archived in the Arctic-Yukon-Kuskokwim salmon database management system (http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx).

[a] Weir did not operate this year.

[b] Historical run timing indicates that more than 40% of the run was missed; annual escapement was not determined.

Table 14.–Annual escapement of coho salmon past Kuskokwim Area weir projects, 2000–2015.

	Kuskokwim Bay	Kuskowim River		
Year	Middle Fork Goodnews River	George River	Kogrukluk River	Tatlawiksuk River
2000	[a]	11,269	33,063	[a]
2001	18,300	16,724	19,983	[a]
2002	27,643	6,759	14,515	11,156
2003	52,504	32,873	74,915	[a]
2004	42,049	12,499	26,078	16,446
2005	20,168	8,294	25,407	7,076
2006	26,909	12,705	16,268	[a]
2007	19,442	28,398	26,423	8,500
2008	37,690	21,931	29,237	11,022
2009	19,123	12,490	22,289	10,148
2010	26,287	12,639	14,689	3,773
2011	24,668	29,120	21,800	14,184
2012	[a]	14,478	13,421	8,015
2013	[a]	15,308	21,207	12,764
2014	[a]	35,771	52,975	19,814
2015	[a]	35,812	32,457	17,701
Average	26,634	17,033	23,350	10,543
Escapement goal	SEG: >12,000	–	SEG: 13,000–28,000	–

Note: Average is derived from all annual escapements on record at each project except 2015, and may include escapements prior to 2000. Escapement data for all projects' entirety are archived in the Arctic-Yukon-Kuskokwim salmon database management system (http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx).

[a] Historical run timing indicates that more than 40% of the run was missed; annual escapement was not determined.

Table 15.–Age, sex, and length sample collection at Kuskokwim Area weir projects, 2015.

Species	Project	Season sample goal	Scales per fish sampled	Season total number of samples collected	Dates samples collected
Chinook	Middle Fork Goodnews	230	3	126	29 June–30 July
	Kanektok	230	3	355	28 June–9 August
	Salmon (Aniak)	230	3	157	7 July–7 August
	George	230	3	196	24 June–4 August
	Kogrukluk	230	3	246	1 July–1 August
	Tatlawiksuk	230	3	229	20 June–18 July
	Salmon (Pitka Fork)	250	3	209	1 July–28 July
Chum	Middle Fork Goodnews	600	1	487	3 July–8 August
	Kanektok	600	1	695	29 June–8 August
	Salmon (Aniak)	600	1	581	9 July–8 August
	George	600	1	674	27 June–8 August
	Kogrukluk	600	1	817	1 July–17 August
	Tatlawiksuk	600	1	316	30 June–6 August
Sockeye	Middle Fork Goodnews	600	3	454	27 June–1 August
	Kanektok	600	3	700	29 June–30 July
	Kogrukluk	250	0	109	3 July–12 August
	Telaquana	250	0	292	13 July–7 August
Coho	George	400	3	439	13 August–13 September
	Kogrukluk	400	3	385	17 August–22 September
	Tatlawiksuk	400	3	392	4 August–9 September

Note: In 2015, only length and sex information was collected from sockeye salmon at Kogrukluk and Telaquana river weirs.

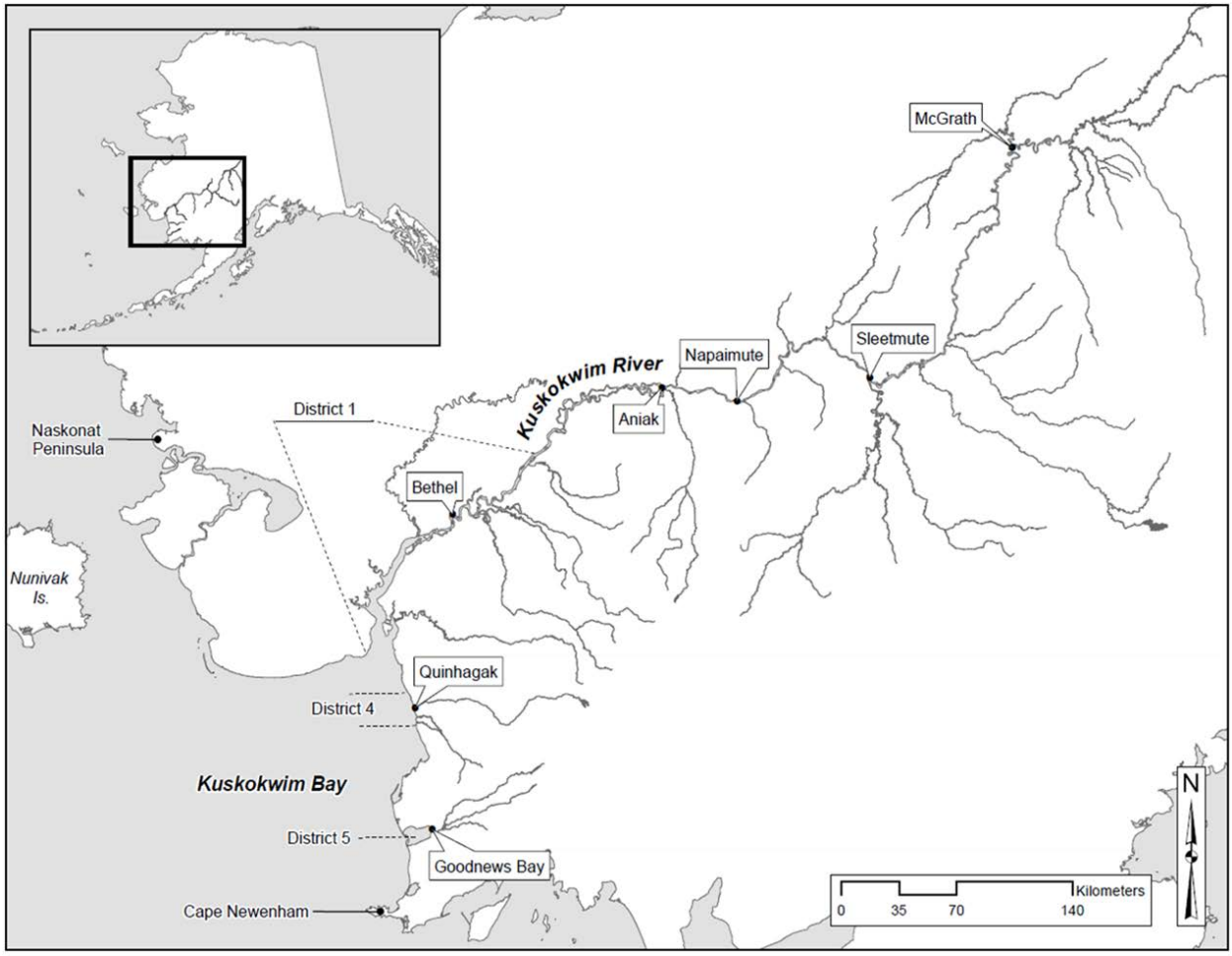

Figure 1.–Kuskokwim Management Area, including Kuskokwim Bay, the Kuskokwim River, and select commercial fishing districts.

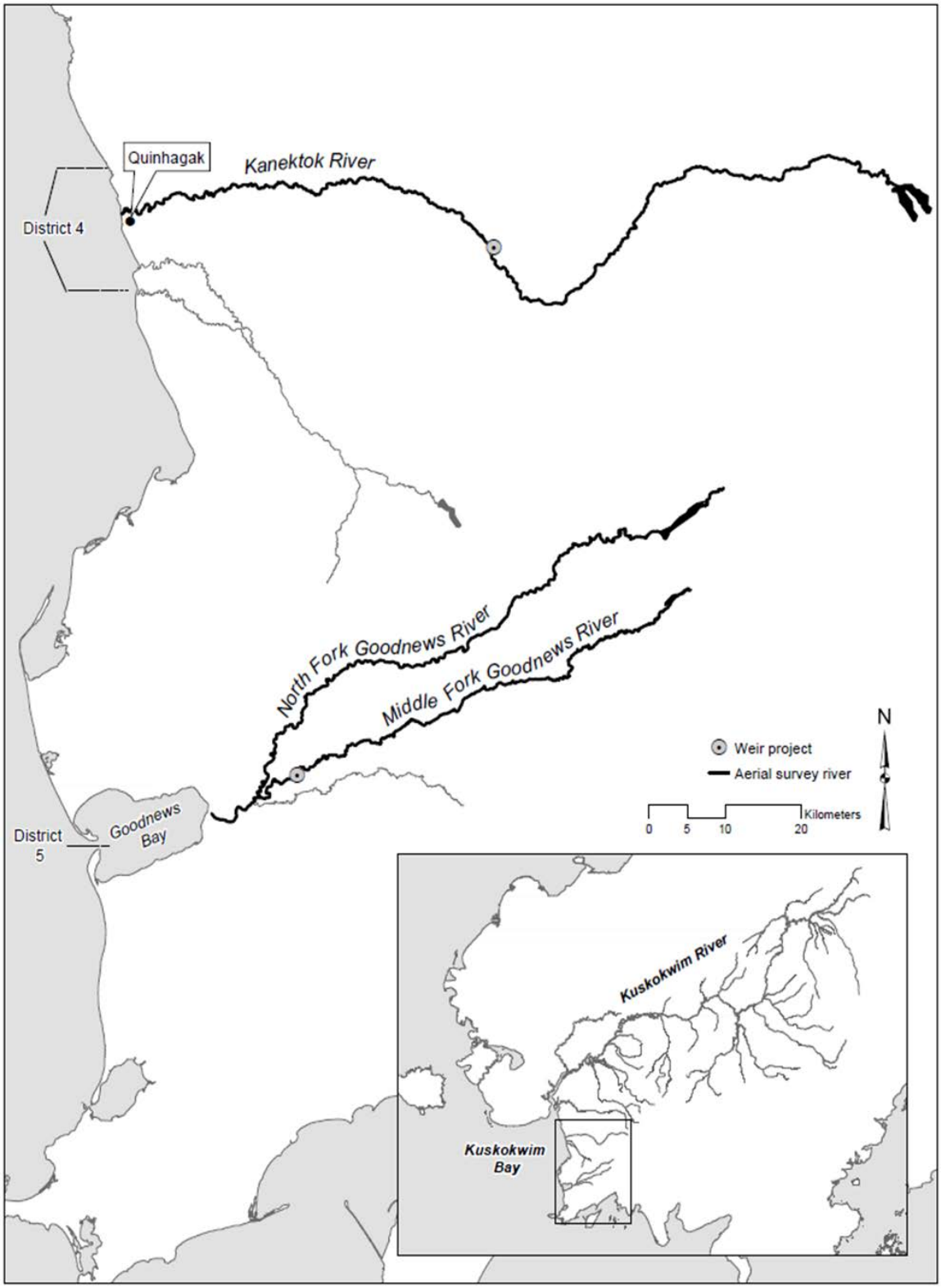

Figure 2.–Kuskokwim Bay rivers where salmon escapement is monitored by ADF&G and partners, 2015.

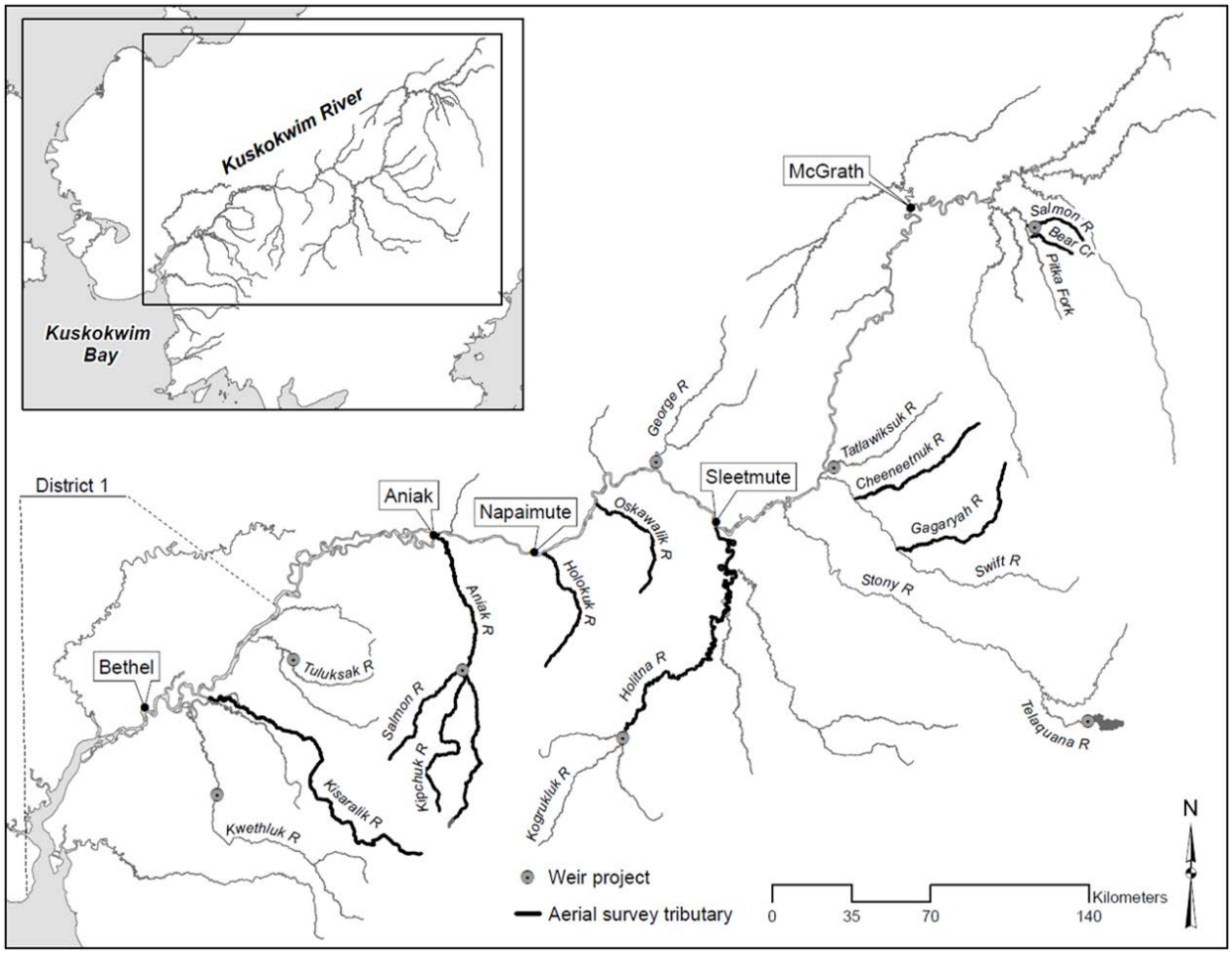

Figure 3.–Kuskokwim River tributaries where salmon escapement is monitored by ADF&G and partners, 2015.

Note: Kwethluk and Tuluksak river weirs are operated by the U.S. Fish and Wildlife Service and are displayed to show all active salmon monitoring projects in the Kuskokwim River.

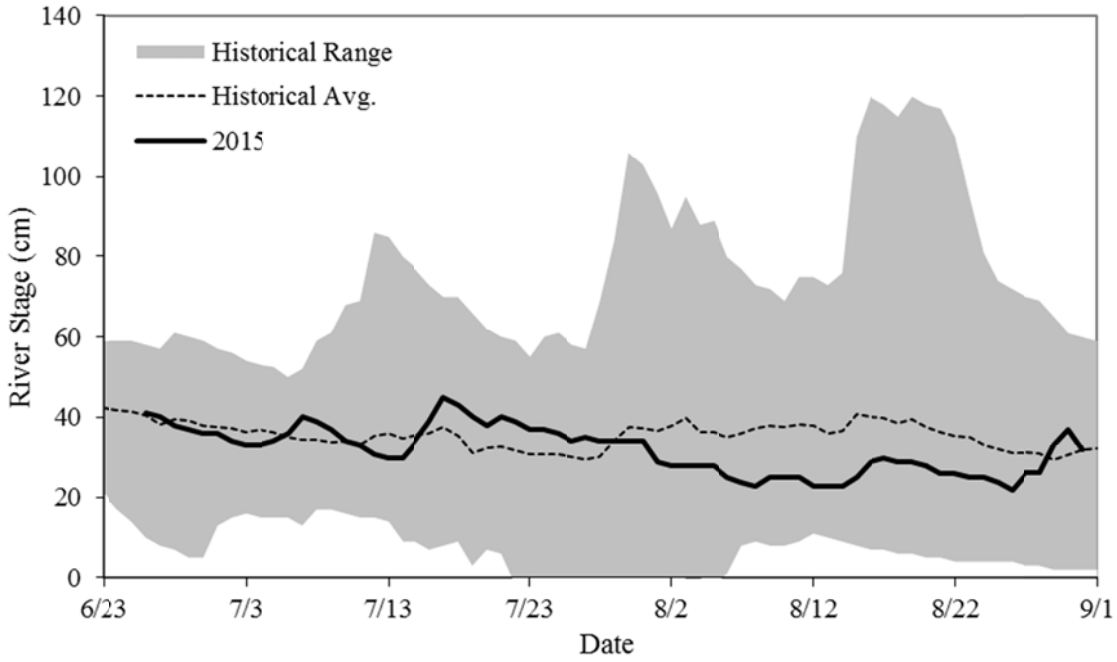

Figure 4.–Daily morning river stage at Middle Fork Goodnews River weir in 2015 relative to historical average, minimum, and maximum morning readings, 2004–2014.

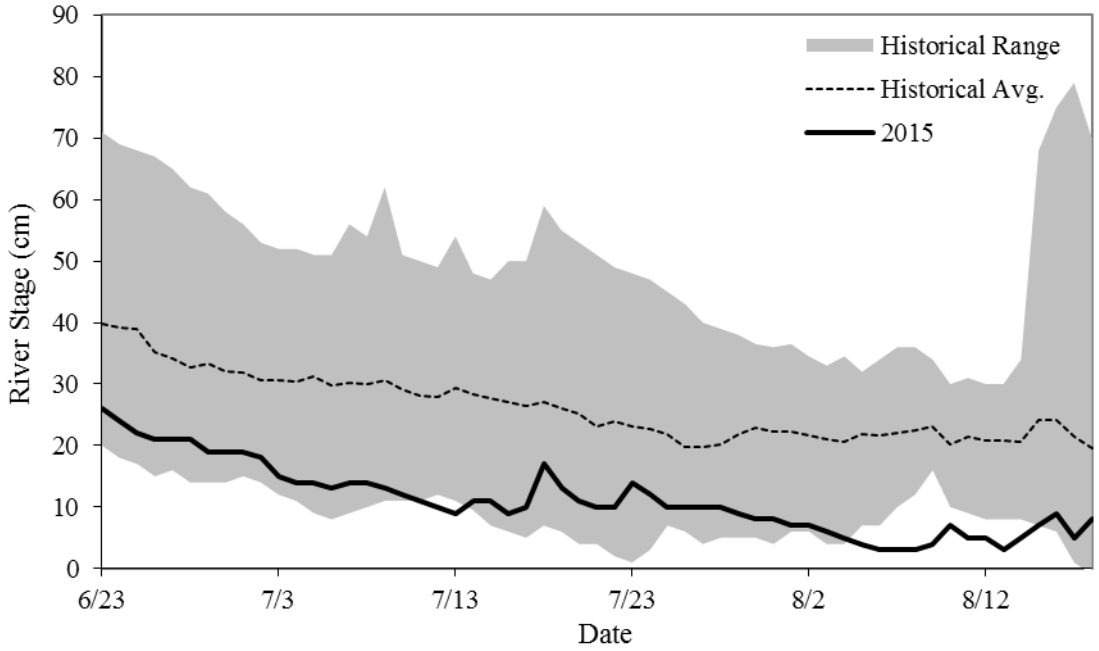

Figure 5.–Daily morning river stage at Kanektok River weir in 2015 relative to historical average, minimum, and maximum morning readings, 2004–2014.

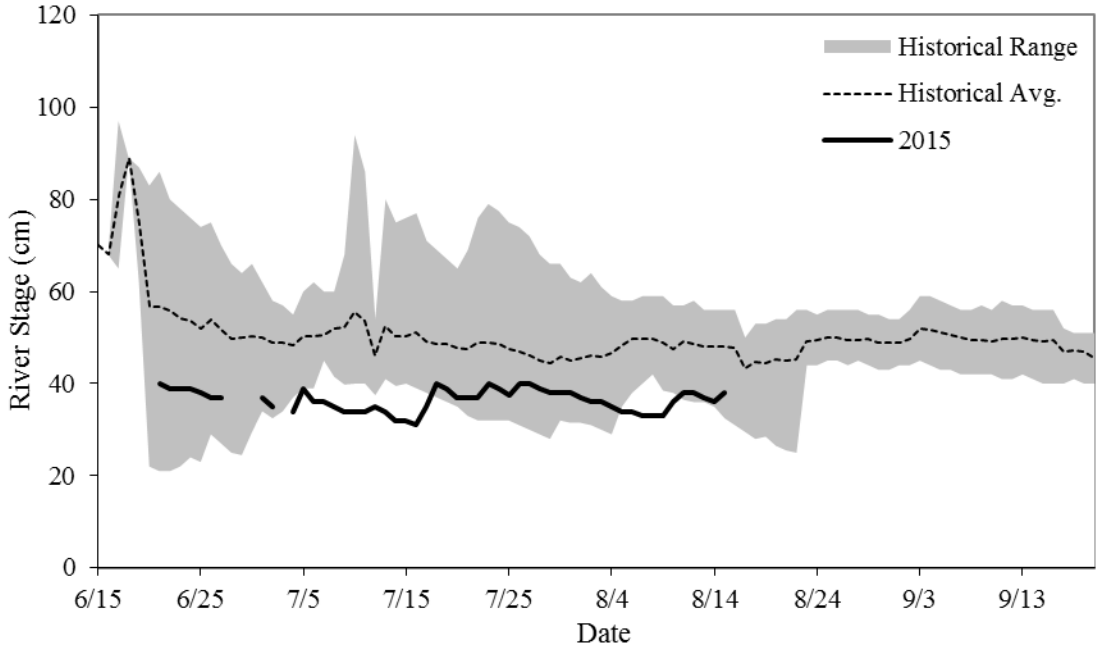

Figure 6.–Daily morning river stage at Salmon River (Aniak) weir in 2015 relative to historical average, minimum, and maximum morning readings, 2006–2009 and 2012–2014.

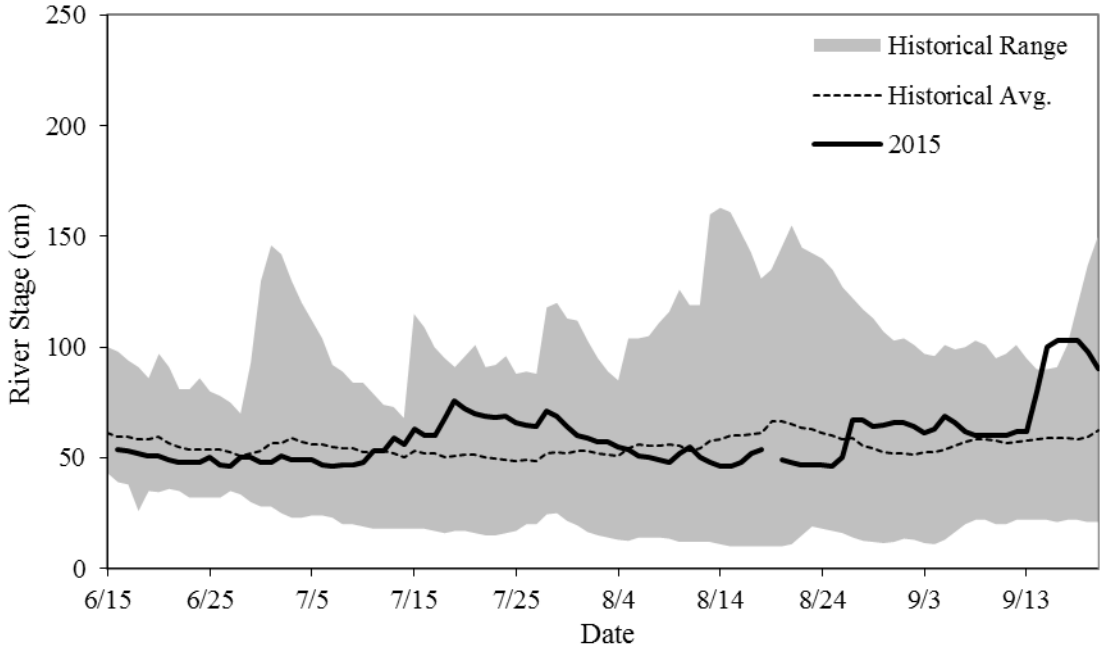

Figure 7.–Daily morning river stage at George River weir in 2015 relative to historical average, minimum, and maximum morning readings, 2000–2014.

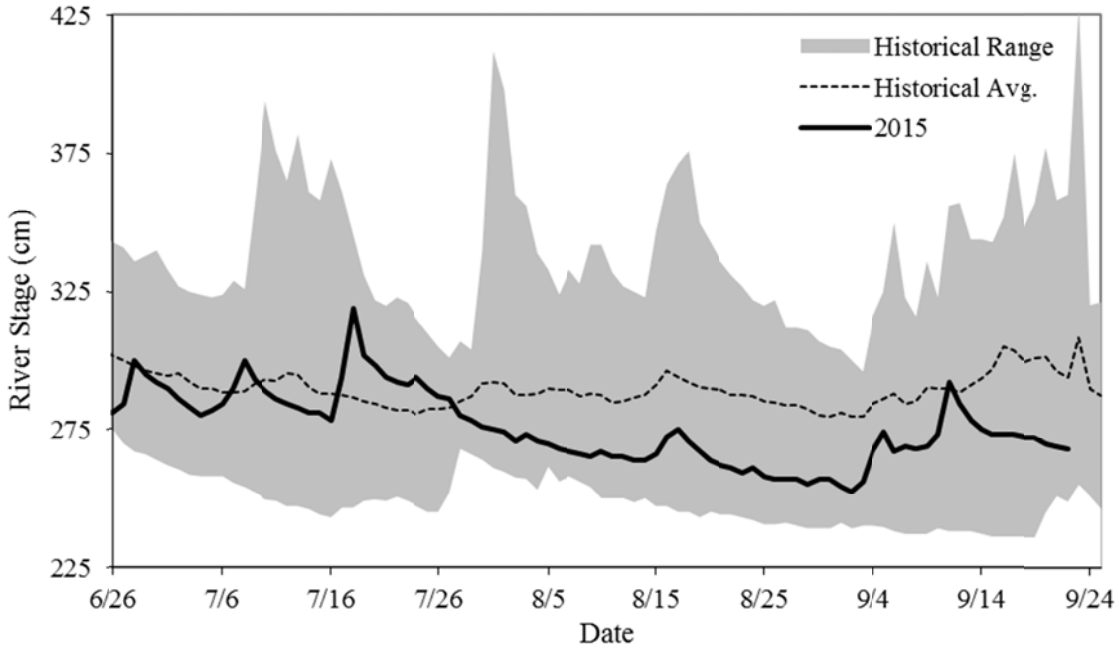

Figure 8.–Daily morning river stage at Kogrukluk River weir in 2015 relative to historical average, minimum, and maximum morning readings, 2002–2014.

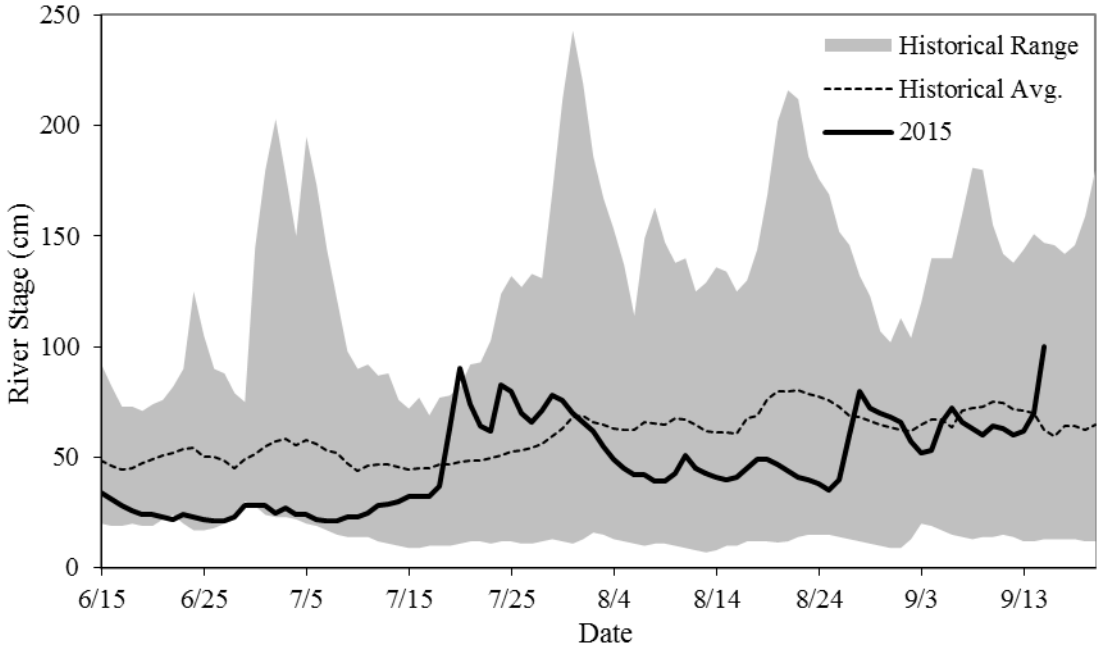

Figure 9.–Daily morning river stage at Tatlawiksuk River weir in 2015 relative to historical average, minimum, and maximum morning readings, 1998–2014.

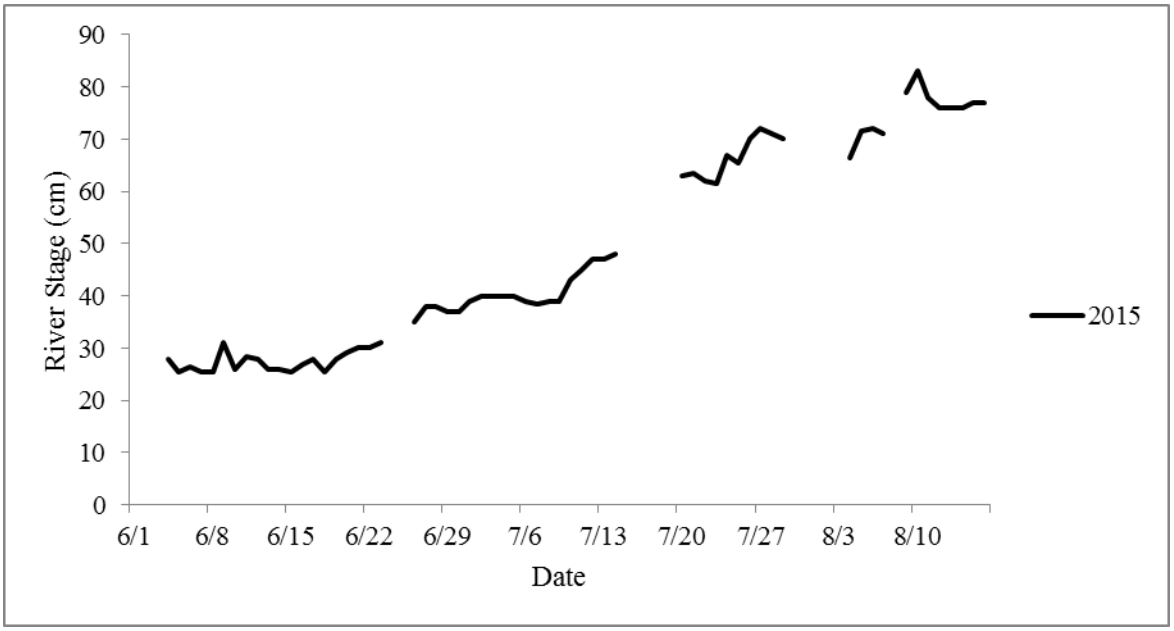

Figure 10.–Daily morning river stage at Salmon River (Pitka Fork) weir in 2015.

Note: Data from 2015 is the only information available on river stage at this weir.

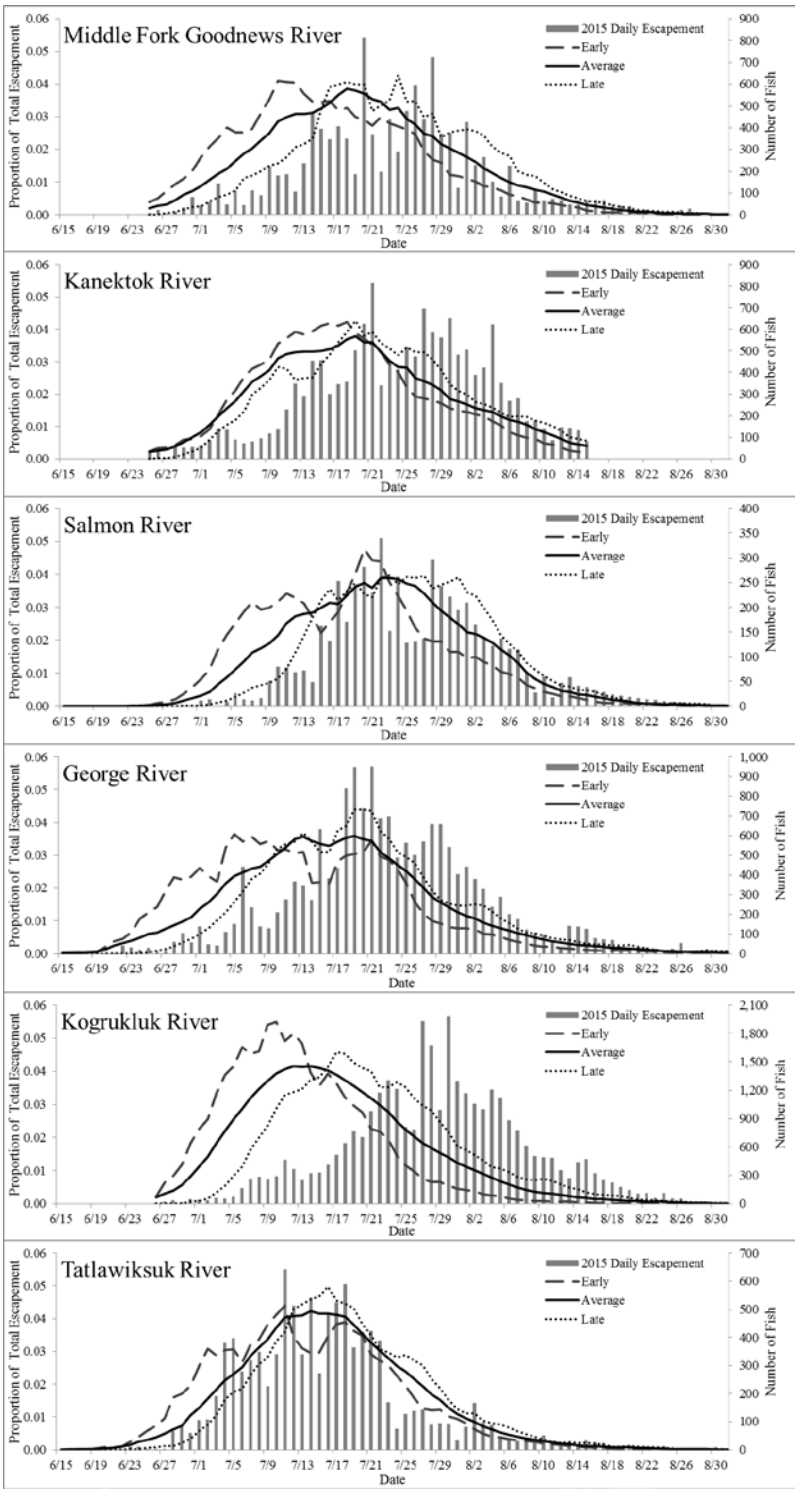

Figure 12.–Early, average, and late run timings and 2015 daily escapements of chum salmon at Kuskokwim Area weir projects.

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); readers should note differences in the number of fish among projects. Run timings shown are 5-day averages and are derived from all annual escapements available for the project.

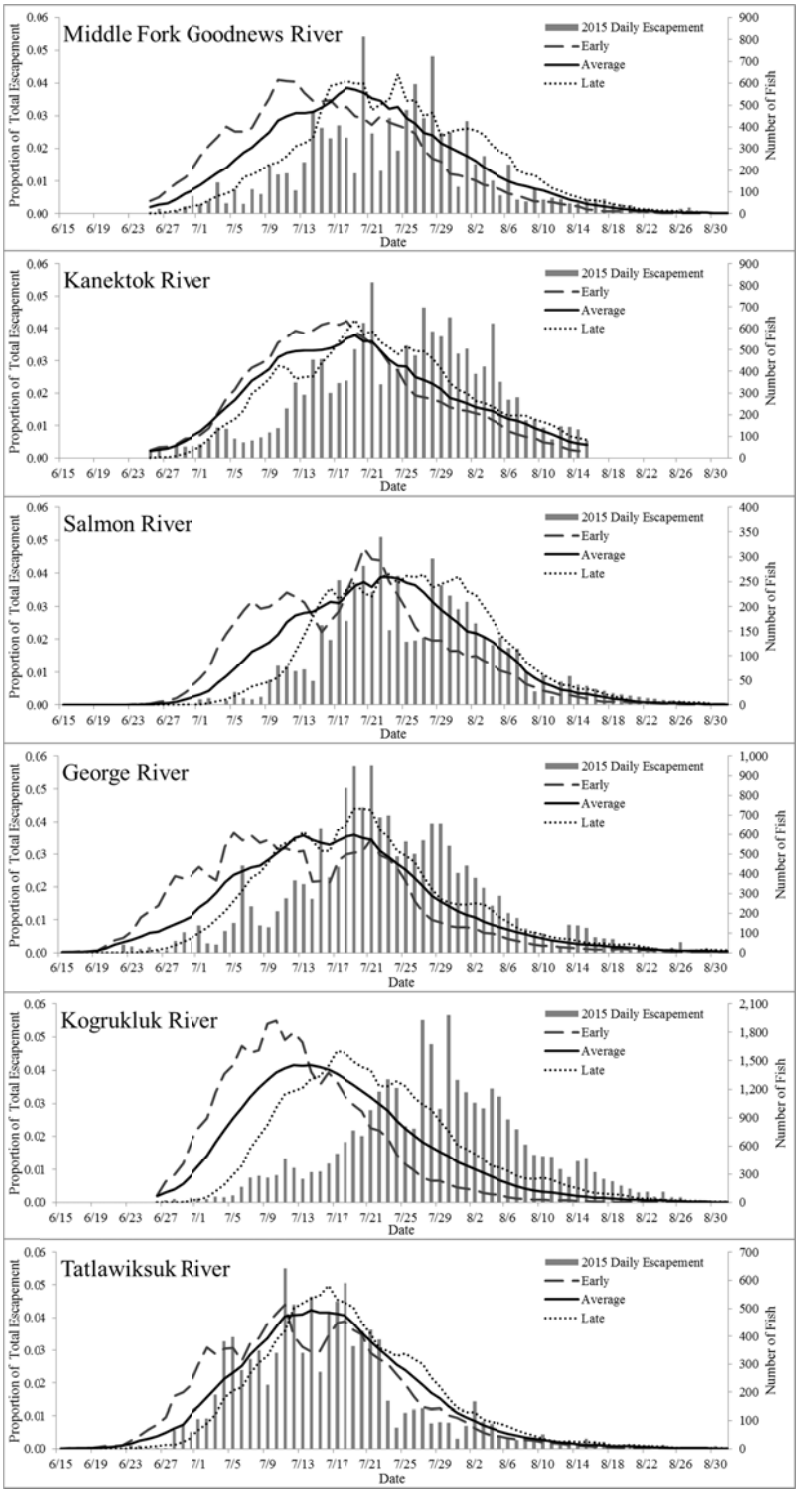

Figure 12.–Early, average, and late run timings and 2015 daily escapements of chum salmon at Kuskokwim Area weir projects.

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); readers should note differences in the number of fish among projects. Run timings shown are 5-day averages and are derived from all annual escapements available for the project.

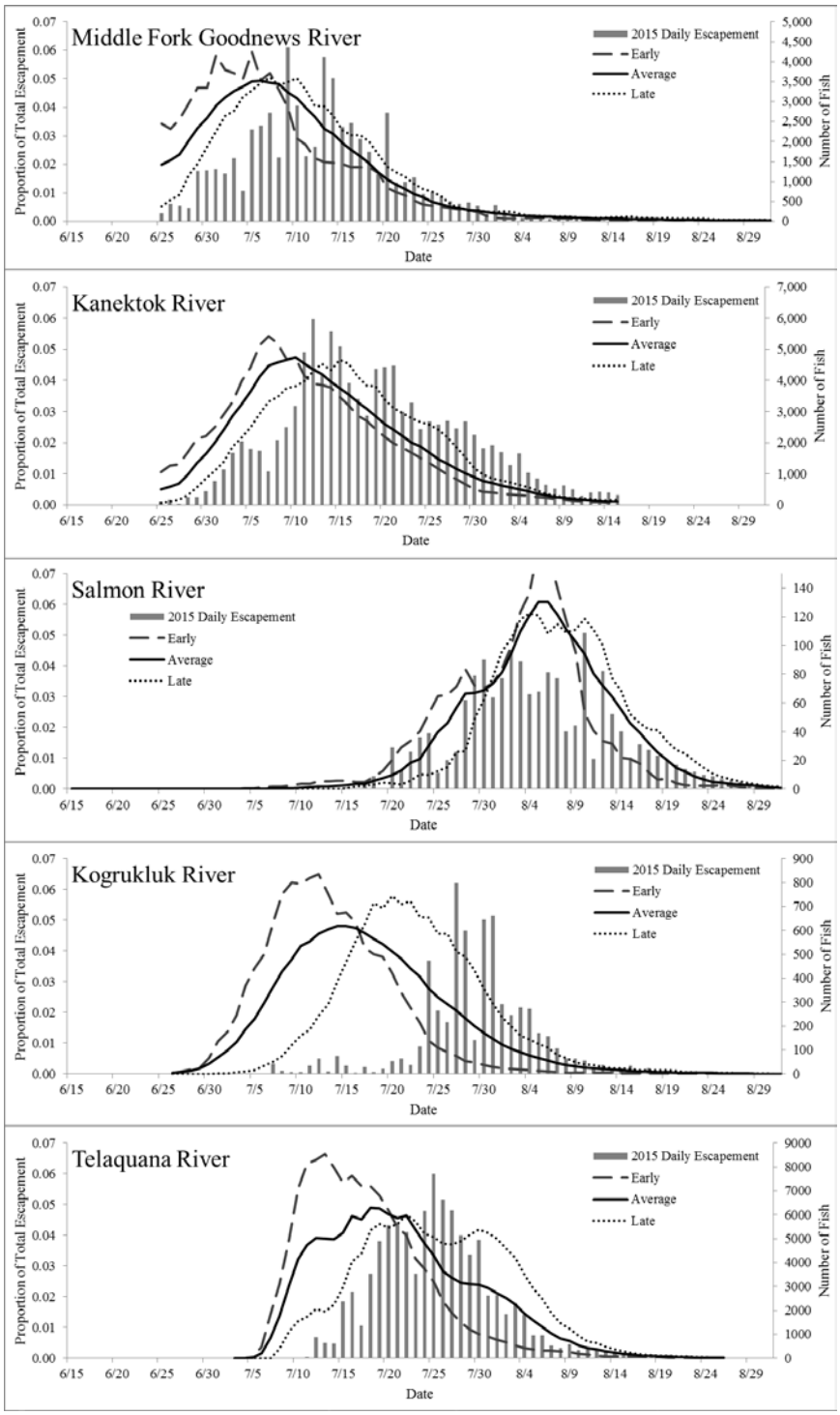

Figure 13.–Early, average, and late run timings and 2015 daily escapements of sockeye salmon at Kuskokwim Area weir projects.

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); readers should note differences in the number of fish among projects. Run timings shown are 5-day averages and are derived from all annual escapements available for the project.

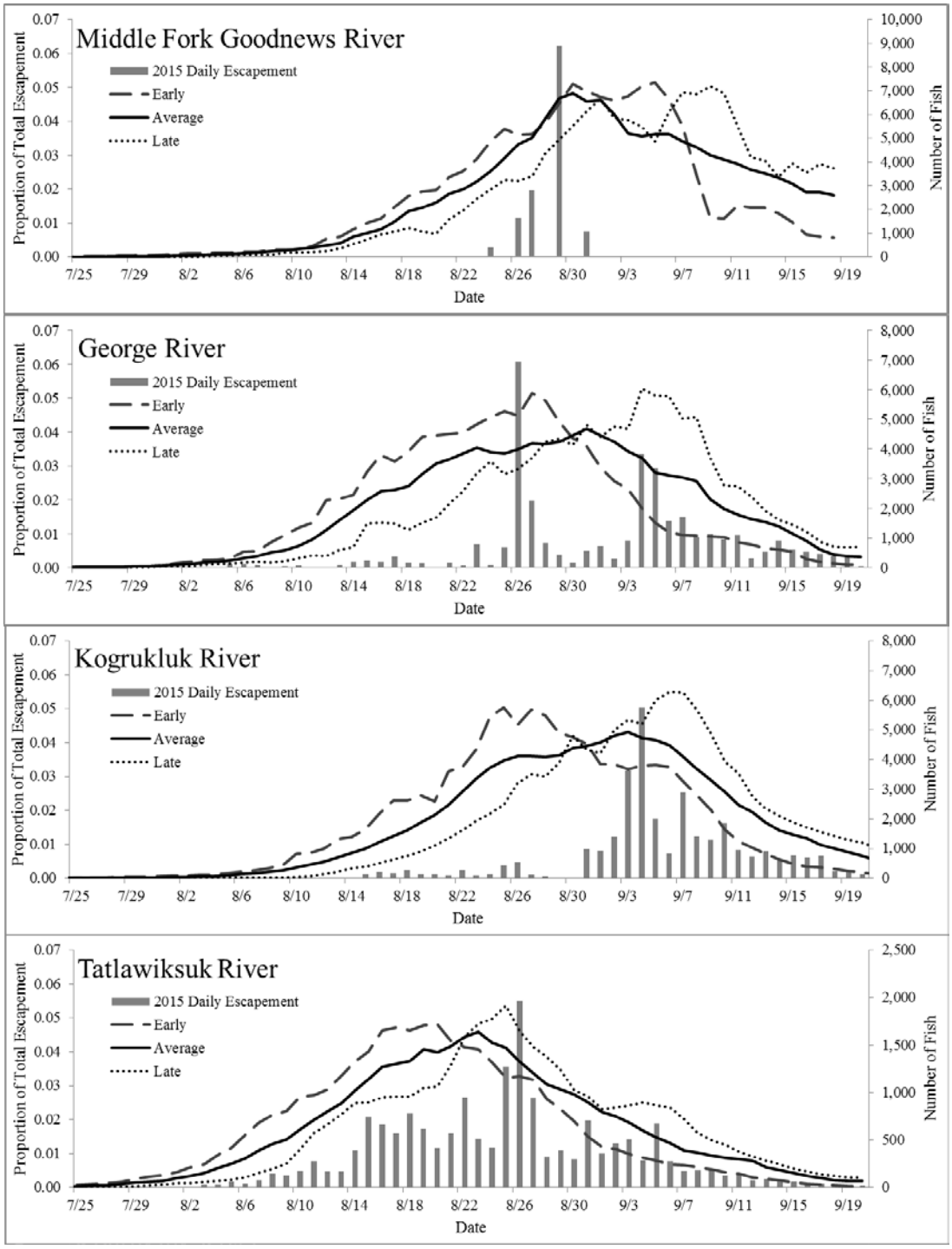

Figure 14.–Early, average, and late run timings and 2015 daily escapements of coho salmon at Kuskokwim Area weir projects.

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); readers should note differences in the number of fish among projects. Run timings shown are 5-day averages and are derived from all annual escapements available for the project.

APPENDIX A

Appendix A1.–Index areas and objectives for survey rivers in the Kuskokwim Area.

River	Index areas[a]	Description/Landmark	Index objective[b]
North Fork Goodnews R.[c]	101 (59.17.55 N, 161.15.62 W)	Approx. 1 mi. upstream of confluence w/ Goodnews Bay	Chinook: 101, 102, 103 Sockeye: 101,102,103,104
	102 (59.27.00 N, 160.47.09 W)	Confluence w/ Slate Cr.	
	103 (59.28.57 N, 160.35.13 W)	Confluence w/ Nimgun Cr.	
	104 (59.28.56 N, 160.35.16 W)	Outlet of Goodnews Lake (survey lake and river at East end of Lakes	
	STOP (59.31.69 N, 160.28.23 W)	Approx. 3 mi. upriver at East end of Goodnews Lake (Goodnews to Igmiumanik R)	
Middle Fork Goodnews R.[c]	101 (29.07.77 N, 161.28.00 W)	Confluence w/ Goodnews R.	Chinook: 101, 103, 104 Sockeye: 101,102,103,104
	102 (59.21.30 N, 160.41.11 W)	Confluence w/ North Lake Cr.	
	102 STOP (59.24.63 N, 160.35.74 W)	Outlet of North L. (Survey lake and creek at East end of lake)	
	103 (59.21.30 N, 160.41.11 W)	Confluence between North L., North Lake Cr., and M.F. Goodnews River	
	103 STOP (59.23.56 N, 160.34.25 W)	Outlet of M.F. Lake (Survey lake and creek at East end of lake)	
	104 (59.17.65 N, 160.51.15 W)	Confluence w/ Kukaktlik R.	
	104 STOP (59.20.17 N, 160.29.72 W)	Outlet of Kukatlim L. (Survey lake and all connected outlying lakes)	
Kanektok R.[c]	101 (59.44.90 N, 161.55.75 W)	Confluence w/ Kuskokwim Bay	Chinook: 101, 102, 103 Sockeye: 101, 102, 103, 104
	102 (59.42.54 N, 160.58.40 W)	Confluence w/ Nukluk Cr.	
	103 (59.52.28 N, 160.28.37 W)	Confluence w/ Kanuktik Cr.	
	104 (59.52.49 N, 160.07.35 W)	Outlet of Kagati/Pegati Lakes (survey lakes and creeks at South ends of lakes)	
	105 (59.53.50 N, 160.17.07 W)	Small chain of lakes west of Katati/Pegati L.	
	Supp. (59.44.28 N, 160.19.64 W)	Kanuktik Cr. and Kanuktik Lake	

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Appendix A1.–Page 2 of 3.

River	Index areas[a]	Description/Landmark	Index objective[b]
Kisaralik R.	101 (60.51.43 N, 161.14.31 W)	Confluence w/ Kuskokwim R.	102, 103
	102 (60.44.52 N, 160.22.75 W)	Confluence w/ Nukluk Cr.	
	103 (60.21.11 N, 159.56.63 W)	Upper falls	
	STOP (60.20.04 N, 159.24.40 W)	Outlet of Kisaralik Lake	
Aniak R.	101 (61.34.49 N, 159.29.35 W)	Confluence w/ Kuskokwim R.	102, 103, 104
	102 (61.20.33 N, 159.13.57 W)	Confluence w/ Buckstock R.	
	103 (61.03.88 N, 159.10.93 W)	Confluence w/ Salmon R. (to West)	
	104 (60.37.44 N, 159.05.20 W)	Start of island adj. to Gemuk Mountain	
	STOP (60.29.28 N, 159.09.28 W)	Outlet of Aniak Lake	
Salmon R. (Aniak)	101 (61.03.88 N, 159.10.93 W)	Confluence w/ Aniak R.	101, 102, 103
	102 (60.57.55 N, 159.23.68 W)	Confluence w/ Dominion Cr.	
	103 (60.52.91 N, 159.31.15 W)	Confluence w/ Eagle Cr.	
	STOP (60.47.11 N, 159.32.85 W)	Confluence w/ Cripple Cr. adj. to landing strip	
Kipchuk R.	101 (61.02.66 N, 159.10.50 W)	Confluence w/ Aniak R.	101, 102, 103
	102 (60.46.67 N, 159.19.14 W)	Confluence w/ small cr. from South at beginning of Horseshoe Canyon	
	103 (60.43.44 N, 159.20.53 W)	Confluence w/ trib. from South at East bend in R.	
	STOP (60.30.83 N, 159.14.37 W)	Lake outlet at end of East Fork in upper reach	
Holokuk R.	101 (61.32.15 N, 158.35.35 W)	Confluence w/ Kuskokwim R.	101, 102, 103, 104
	102 (61.26.00 N, 158.27.07 W)	Between Ski Cr. and Gold Run Cr.	
	103 (61.21.93 N, 158.17.54 W)	Confluence w/ Chineekluk Cr.	
	104 (61.16.06 N, 158.16.86 W)	Island at confluence w/ Egozuk Cr.	
	STOP (61.12.89 N, 158.18.45 W)	Confluence w/ Boss Cr.	
	2ND STOP (61.08.62 N, 158.27.39 W)	Upper reach Tri Fork	

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Appendix A1.–Page 3 of 3.

River	Index areas[a]	Description/Landmark	Index objective[b]
Oskawalik R.	101 (61.44.30 N, 158.11.30 W)	Confluence w/ Kuskokwim R.	101, 102, 103
	102 (61.41.40 N, 157.52.47 W)	Confluence w/ 1st large South tributary	
	103 (61.38.79 N, 157.42.71 W)	Confluence w/ 1st large North tributary	
	STOP (61.32.05 N, 157.40.43 W)	Fork adjacent to Henderson Mountain	
Holitna R.	101 (61.00.95 N, 157.41.37 W)	Nogamut	102, 103
	102 (60.58.24 N, 157.40.75 W)	1 mi. above Nogamut adj. to bluff	
	103 (60.57.52 N, 157.41.59 W)	Slough/confluence w/ Kiknik Cr.	
	104 (60.51.24 N, 157.50.22 W)	Kasheglok (downstream of Chukowan/Kogrukluk R. confluence)	
	STOP (60.50.32 N, 157.50.87 W)	Kogrukluk R. weir	
Cheeneetnuk R.	101 (61.48.62 N, 156.00.64 W)	Confluence w/ Swift R.	101, 102
	102 (61.51.57 N, 155.44.49 W)	Major South tributary below 1st major hills	
	STOP (61.57.28 N, 155.18.45 W)	Confluence w/ Shoeleather Cr.	
Gagaryah R.	101 (61.37.42 N, 155.38.61 W)	Confluence w/ Swift R.	101, 102
	102 (61.39.48 N, 155.21.07 W)	Head of island adj. to 1st hills	
	STOP (61.39.30 N, 155.03.41 W)	Major fork adj. to high hills	
Salmon R. (Pitka Fork)	101 (62.53.45 N, 154.34.86 W)	Salmon R. index area 101 start	102, 103, 104
	102 (62.53.37 N, 154.30.49 W)	Salmon R. index area 102/104 start	
	102 STOP (62.55.02 N, 154.17.08 W)	Salmon R. index area 102 stop	
	103 (62.53.11 N, 154.28.93 W)	Salmon R. index area 103 start	
	103 STOP (62.51.62 N, 154.19.82 W)	Salmon R. index area 103 end	
	104 (62.52.03 N, 154.30.27 W)	Salmon R. index area 103 start	
	104 STOP (62.51.00 N, 154.19.28 W)	Salmon R. index area 104 end	
Bear Cr.	101 (62.51.08N, 154.32.94 W)	Mouth of Bear Creek	101
	STOP (62.48.24 N, 154.13.66 W)	Headwaters of Bear Cr.	

[a] Parenthesis following the index areas contain the start point in latitude and longitude (degrees.minutes.seconds). Index area stop points coincide with the following sequential index area start point unless otherwise designated. For the last index area of a stream, the stop point is designated with STOP.

[b] The index objective defines the specific index area(s) that must be to surveyed in order to produce a comparable index of escapement. Index objectives are for all focus species unless otherwise noted.

[c] Index areas may include lakes. Lakes are not surveyed for Chinook salmon even if the index area is required for the index objective.

APPENDIX B

Appendix B1.–Daily weather and stream observations at the Middle Fork Goodnews River weir, 2015.

Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C)		River stage (cm)
				Air	Water	
6/26	AM	3	0.0	12.0	12.0	41
6/27	AM	4	0.0	9.0	11.0	40
6/28	AM	2	2.3	9.0	11.0	38
6/29	AM	1	2.0	12.0	11.0	37
6/30	AM	4	1.0	14.0	12.0	36
7/1	AM	4	0.0	12.0	12.0	36
7/2	AM	5	0.0	9.0	11.0	34
7/3	AM	1	0.0	11.0	12.0	33
7/4	AM	4	0.0	11.0	12.0	33
7/5	AM	4	2.8	12.0	11.0	34
7/6	AM	4	5.3	11.0	12.0	36
7/7	AM	4	3.8	10.0	12.0	40
7/8	AM	4	2.0	11.0	12.0	39
7/9	AM	4	4.1	10.0	11.0	37
7/10	AM	3	0.0	13.0	11.0	34
7/11	AM	3	0.0	8.0	11.0	33
7/12	AM	4	0.0	13.0	11.0	31
7/13	AM	4	0.0	11.0	11.0	30
7/14	AM	4	2.3	12.0	11.0	30
7/15	AM	4	4.6	9.0	11.0	34
7/16	AM	4	16.5	10.0	11.0	39
7/17	AM	4	11.4	10.0	10.0	45
7/18	AM	4	5.8	11.0	11.0	43
7/19	AM	4	0.0	12.0	11.0	40
7/20	AM	4	0.0	11.0	11.0	38
7/21	AM	3	5.3	12.0	11.0	40
7/22	AM	3	0.0	11.0	11.0	39
7/23	AM	4	0.0	12.0	11.0	37
7/24	AM	4	3.0	11.0	11.0	37
7/25	AM	4	0.0	12.0	11.0	36
7/26	AM	3	0.0	12.0	11.0	34
7/27	AM	4	0.0	11.0	11.0	35
7/28	AM	3	0.0	11.0	11.0	34
7/29	AM	2	0.0	12.0	11.0	ND
7/30	AM	3	0.0	11.0	11.0	34
7/31	AM	2	0.0	12.0	11.0	34
8/1	AM	2	0.0	10.0	11.0	29
8/2	AM	2	0.0	12.0	11.0	28
8/3	AM	2	0.0	11.0	11.0	28

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)
8/4	AM	2	0.0	11.0	11.0	28
8/5	AM	2	0.0	12.0	11.0	28
8/6	AM	2	0.0	12.0	11.0	25
8/7	AM	2	0.0	12.0	11.0	24
8/8	AM	3	0.0	11.0	11.0	23
8/9	AM	4	7.9	12.0	11.0	25
8/10	AM	3	0.0	12.0	11.0	25
8/11	AM	3	0.0	12.0	11.0	25
8/12	AM	4	0.0	12.0	11.0	23
8/13	AM	4	0.0	12.0	12.0	23
8/14	AM	4	0.0	12.0	12.0	23
8/15	AM	4	10.7	12.0	11.0	25
8/16	AM	4	7.6	12.0	11.0	29
8/17	AM	4	6.4	12.0	11.0	30
8/18	AM	4	3.8	12.0	11.0	29
8/19	AM	3	0.0	11.0	11.0	29
8/20	AM	3	0.0	12.0	11.0	28
8/21	AM	3	0.0	11.0	11.0	26
8/22	AM	4	0.0	12.0	11.0	26
8/23	AM	4	0.0	13.0	11.0	25
8/24	AM	4	0.0	11.0	11.0	25
8/25	AM	4	0.0	12.0	11.0	24
8/26	AM	4	6.4	12.0	11.0	22
8/27	AM	4	5.1	12.0	11.0	26
8/28	AM	3	0.0	10.0	11.0	26
8/29	AM	3	31.8	12.0	10.0	33
8/30	AM	4	0.0	9.0	10.0	37
8/31	AM	4	0.0	8.0	7.0	32
Average	–	–	2.3	11	11	32

[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

Appendix B2.–Daily weather and stream observations at the Kanektok River weir, 2015.

Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C)		River stage (cm)
				Air	Water	
6/20	AM	1	0.3	9.0	10.0	24
6/20	PM	1	ND	23.0	14.0	27
6/21	AM	1	0.0	11.0	11.0	25
6/21	PM	2	ND	23.0	15.0	26
6/22	AM	4	0.0	9.0	11.0	27
6/22	PM	3	ND	20.0	13.0	27
6/23	AM	1	0.0	13.0	10.0	26
6/23	PM	2	ND	24.0	15.0	26
6/24	AM	4	0.0	15.0	12.0	24
6/24	PM	3	ND	21.0	14.0	24
6/25	AM	4	0.0	14.0	12.0	22
6/25	PM	4	ND	24.0	14.0	23
6/26	AM	4	0.0	7.0	11.0	21
6/26	PM	3	ND	15.0	12.0	22
6/27	AM	4	0.1	7.0	1.0	21
6/27	PM	4	ND	9.0	10.0	22
6/28	AM	3	3.8	6.0	8.0	21
6/28	PM	3	ND	21.0	12.0	21
6/29	AM	1	0.1	5.0	9.0	19
6/29	PM	3	ND	13.0	12.0	19
6/30	AM	4	0.2	11.0	10.0	19
6/30	PM	4	ND	21.0	12.0	19
7/1	AM	4	0.0	14.0	9.0	19
7/1	PM	3	ND	19.0	13.0	18
7/2	AM	3	0.0	13.0	10.0	18
7/2	PM	3	ND	22.0	13.0	17
7/3	AM	1	0.0	9.0	9.0	15
7/3	PM	2	ND	27.0	15.0	15
7/4	AM	4	0.0	14.0	11.0	14
7/4	PM	4	ND	13.0	12.0	14
7/5	AM	4	0.2	14.0	10.0	14
7/5	PM	4	ND	22.0	14.0	14
7/6	AM	4	0.1	14.0	8.0	13
7/6	PM	4	ND	13.0	13.0	14

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)
7/7	AM	4	0.1	11.0	10.0	14
7/7	PM	4	ND	15.0	12.0	15
7/8	AM	4	0.0	10.0	10.0	14
7/8	PM	4	ND	11.0	10.0	13
7/9	AM	4	0.1	9.0	10.0	13
7/9	PM	4	ND	13.0	10.0	13
7/10	AM	3	0.0	10.0	9.0	12
7/10	PM	3	ND	17.0	12.0	13
7/11	AM	4	0.0	8.0	10.0	11
7/11	PM	4	ND	17.0	12.0	11
7/12	AM	4	0.0	12.0	11.0	10
7/12	PM	4	ND	15.0	12.0	10
7/13	AM	4	0.0	11.0	10.0	9
7/13	PM	4	ND	15.0	13.0	10
7/14	AM	4	1.8	10.0	11.0	11
7/14	PM	4	ND	14.0	13.0	11
7/15	AM	2	1.0	9.0	10.0	11
7/15	PM	3	ND	20.0	14.0	10
7/16	AM	3	0.2	11.0	10.0	9
7/16	PM	4	ND	12.0	11.0	8
7/17	AM	4	0.8	6.0	9.0	10
7/17	PM	4	ND	9.0	10.0	15
7/18	AM	4	0.1	8.0	10.0	17
7/18	PM	4	ND	14.0	11.0	16
7/19	AM	4	0.0	9.0	10.0	13
7/19	PM	4	ND	16.0	12.0	13
7/20	AM	2	0.0	7.0	9.0	11
7/20	PM	3	ND	22.0	13.0	11
7/21	AM	4	0.0	10.0	10.0	10
7/21	PM	4	ND	12.0	12.0	10
7/22	AM	4	0.0	10.0	10.0	10
7/22	PM	4	ND	10.0	10.0	10
7/23	AM	4	0.8	6.0	10.0	14
7/23	PM	4	ND	12.0	10.0	15

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)
7/24	AM	3	0.0	11.0	10.0	12
7/24	PM	4	ND	14.0	11.0	12
7/25	AM	4	0.0	7.0	10.0	10
7/25	PM	4	ND	9.0	11.0	10
7/26	AM	3	0.3	11.0	10.0	10
7/26	PM	3	ND	15.0	11.0	10
7/27	AM	3	0.1	8.0	9.0	10
7/27	PM	3	ND	13.0	15.0	8
7/28	AM	5	0.1	8.0	10.0	10
7/28	PM	4	ND	15.0	12.0	10
7/29	AM	3	0.0	7.0	10.0	9
7/29	PM	3	ND	20.0	13.0	9
7/30	AM	4	0.0	10.0	10.0	8
7/30	PM	3	ND	17.0	13.0	9
7/31	AM	1	0.0	11.0	10.0	8
7/31	PM	2	ND	23.0	15.0	8
8/1	AM	4	0.0	8.0	10.0	7
8/1	PM	3	ND	18.0	13.0	8
8/2	AM	4	0.0	10.0	10.0	7
8/2	PM	2	ND	22.0	14.0	7
8/3	AM	1	0.0	12.0	10.0	6
8/3	PM	2	ND	27.0	16.0	6
8/4	AM	2	0.0	10.0	10.0	5
8/4	PM	2	ND	24.0	15.0	5
8/5	AM	4	0.0	9.0	11.0	4
8/5	PM	3	ND	21.0	14.0	4
8/6	AM	5	0.0	10.0	11.0	3
8/6	PM	2	ND	18.0	15.0	4
8/7	AM	5	0.0	9.0	11.0	3
8/7	PM	4	ND	16.0	14.0	3
8/8	AM	4	0.0	8.0	11.0	3
8/8	PM	4	ND	10.0	14.0	3
8/9	AM	4	0.8	9.0	11.0	4
8/9	PM	4	ND	10.0	11.0	4

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C)		River stage (cm)
				Air	Water	
8/10	AM	4	0.5	3.0	9.0	7
8/10	PM	4	ND	12.0	11.0	7
8/11	AM	4	0.0	5.0	8.0	5
8/11	PM	4	ND	11.0	9.0	5
8/12	AM	3	0.0	8.0	9.0	5
8/12	PM	4	ND	13.0	11.0	4
8/13	AM	4	0.0	7.0	10.0	3
8/13	PM	4	ND	16.0	12.0	3
8/14	AM	4	0.0	10.0	10.0	5
8/14	PM	4	ND	11.0	10.0	7
8/15	AM	4	0.5	7.0	10.0	7
8/15	PM	4	ND	13.0	12.0	8
8/16	AM	4	0.2	10.0	9.0	9
8/16	PM	4	ND	10.0	10.0	5
Average	–	–	0.2	13	11	12

[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

Appendix B3.–Daily weather and stream observations at the Salmon River (Aniak) weir, 2015.

Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
6/20	AM	1	0.0	17.0	12.0	ND	1
6/20	PM	1	0	19	14	40	1
6/21	AM	1	0.0	17.0	10.0	40	1
6/21	PM	1	0.0	23.0	13.0	40	1
6/22	AM	3	0.0	14.0	11.0	39	1
6/22	PM	1	0.0	24.0	14.0	39	1
6/23	AM	3	0.0	13.0	11.0	39	1
6/23	PM	1	0.0	23.0	14.0	38	1
6/24	AM	1	0.0	10.0	11.0	39	1
6/24	PM	1	0.0	24.0	14.0	39	1
6/25	AM	1	0.0	9.0	10.0	38	1
6/25	PM	1	0.0	23.0	13.0	37	1
6/26	AM	1	0.0	9.0	11.0	37	1
6/26	PM	3	0.0	11.0	10.0	37	1
6/27	AM	3	0.0	9.0	10.0	37	1
6/27	PM	ND	ND	ND	ND	ND	ND
6/28	AM	ND	ND	ND	ND	ND	ND
6/28	PM	ND	ND	ND	ND	ND	ND
6/29	AM	ND	ND	ND	ND	ND	ND
6/29	PM	ND	ND	ND	ND	ND	ND
6/30	AM	ND	ND	ND	ND	ND	ND
6/30	PM	4	6.5	13.0	10.0	37	1
7/1	AM	3	0.8	10.0	9.0	37	1
7/1	PM	3	0.0	15.0	11.0	36	1
7/2	AM	3	0.6	8.0	9.0	35	1
7/2	PM	3	0.0	18.0	13.0	35	1
7/3	AM	ND	ND	ND	ND	ND	ND
7/3	PM	ND	ND	ND	ND	ND	ND
7/4	AM	3	8.0	12.0	10.0	34	1
7/4	PM	4	10.0	11.0	10.0	34	1
7/5	AM	4	7.0	10.0	9.0	39	1
7/5	PM	3	0.0	19.0	12.0	38	1
7/6	AM	4	0.7	13.0	10.0	36	1
7/6	PM	3	2	16	12	36	1
7/7	AM	2	2.0	9.0	10.0	36	1
7/7	PM	3	0.7	15.0	12.0	35	1

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
7/8	AM	4	0.0	10.0	10.0	35	1
7/8	PM	3	1.5	13	12	35	1
7/9	AM	3	1.4	10.0	10.0	34	1
7/9	PM	3	0.0	15.0	12.0	34	1
7/10	AM	3	0.1	9.0	10.0	34	1
7/10	PM	3	0.0	14.0	12.0	33	1
7/11	AM	3	0.0	12.0	10.0	34	1
7/11	PM	ND	ND	ND	ND	ND	ND
7/12	AM	3	0.5	10.0	10.0	35	1
7/12	PM	3	0.5	18.0	13.0	35	1
7/13	AM	3	0.6	11.0	11.0	34	1
7/13	PM	3	0.4	17.0	13.0	34	1
7/14	AM	3	0.3	10.0	10.0	32	1
7/14	PM	2	0.0	17.0	14.0	32	1
7/15	AM	3	0.0	4.0	10.0	32	1
7/15	PM	3	0.0	17.0	13.0	31	1
7/16	AM	3	0.1	10.0	10.0	31	1
7/16	PM	4	0.6	10.0	10.0	31	1
7/17	AM	4	5.4	9.0	9.0	35	1
7/17	PM	3	0.6	12.0	10.0	37	1
7/18	AM	3	0.1	10.0	9.0	40	1
7/18	PM	3	0.0	13.0	11.0	41	1
7/19	AM	3	0.0	10.0	9.0	39	1
7/19	PM	3	0.0	12.0	10.0	38	1
7/20	AM	3	0.0	6.0	8.0	37	1
7/20	PM	2	0.0	18.0	13.0	36	1
7/21	AM	4	0.4	13.0	11.0	37	1
7/21	PM	4	0.1	13.0	12.0	36	1
7/22	AM	4	7.9	9.0	10.0	37	1
7/22	PM	4	3.9	12.0	10.0	38	1
7/23	AM	4	5.1	10.0	9.0	40	1
7/23	PM	4	0.8	11.0	10.0	39	1
7/24	AM	4	0.0	9.0	9.0	39	1
7/24	PM	3	0	15	12	39	1
7/25	AM	4	0.0	9.0	10.0	38	1
7/25	PM	ND	ND	ND	ND	ND	ND

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
7/26	AM	4	2.5	10.0	9.0	40	1
7/26	PM	3	0.0	14.0	10.0	40	1
7/27	AM	3	0.5	11.0	9.0	40	1
7/27	PM	3	0.0	17.0	12.0	40	1
7/28	AM	3	0.0	9.0	10.0	39	1
7/28	PM	3	0.0	16.0	13.0	38	1
7/29	AM	3	0.0	8.0	10.0	38	1
7/29	PM	2	0.0	19.0	12.0	38	1
7/30	AM	3	0.8	7.0	9.0	38	1
7/30	PM	3	0.0	20.0	12.0	37	1
7/31	AM	2	0.2	11.0	10.0	38	1
7/31	PM	3	0.0	20.0	13.0	38	1
8/1	AM	3	0.2	5.0	9.0	37	1
8/1	PM	2	0.0	18.0	13.0	37	1
8/2	AM	3	0.0	11.0	10.0	36	1
8/2	PM	2	0.0	18.0	13.0	36	1
8/3	AM	1	0.0	9.0	10.0	36	1
8/3	PM	1	0.0	24.0	14.0	36	1
8/4	AM	1	0.0	7.0	10.0	35	1
8/4	PM	1	0.0	22.0	14.0	35	1
8/5	AM	2	0.0	8.0	10.0	34	1
8/5	PM	1	0.0	20.0	14.0	34	1
8/6	AM	2	0.0	7.0	11.0	34	1
8/6	PM	3	0.0	18.0	14.0	33	1
8/7	AM	1	0.0	9.0	10.0	33	1
8/7	PM	3	0.0	16.0	13.0	33	1
8/8	AM	3	0.0	9.0	10.0	33	1
8/8	PM	3	0.1	14.0	11.0	33	1
8/9	AM	4	1.0	12.0	10.0	33	1
8/9	PM	4	3.0	13.0	12.0	34	1
8/10	AM	2	0.2	6.0	10.0	36	1
8/10	PM	3	0.0	10.0	11.0	39	1
8/11	AM	3	0.0	6.0	9.0	38	1
8/11	PM	4	6.0	9.0	9.0	38	1
8/12	AM	3	1.0	10.0	8.0	38	1
8/12	PM	3	0.0	14.0	12.0	39	1

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
8/13	AM	4	0.1	7.0	9.0	37	1
8/13	PM	3	0.0	14.0	13.0	37	1
8/14	AM	3	0.0	8.0	10.0	36	1
8/14	PM	4	0.0	14.0	12.0	36	1
8/15	AM	4	8.5	8.0	9.0	38	1
8/15	PM	2	0.8	15.0	11.0	41	1
Average	–	–	0.9	13	11	36	–

[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 George River weir, 2015.

Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C)		River stage (cm)	Water clarity[b]
				Air	Water		
6/12	AM	4	0.0	9.0	8.0	56	2
6/12	PM	ND	ND	ND	ND	ND	ND
6/13	AM	1	0.0	10.0	9.0	53	1
6/13	PM	1	0.0	22.0	12.0	52	1
6/14	AM	1	0.0	16.0	11.0	51	1
6/14	PM	ND	ND	ND	ND	ND	ND
6/15	AM	ND	ND	ND	ND	ND	ND
6/15	PM	ND	ND	ND	ND	ND	ND
6/16	AM	1	0.0	15.0	13.0	54	1
6/16	PM	1	0.0	22.0	10.0	53	1
6/17	AM	1	0.0	18.0	14.0	53	1
6/17	PM	1	0.0	26.0	11.0	53	1
6/18	AM	1	0.0	17.0	13.0	52	1
6/18	PM	1	0.0	23.0	14.0	51	1
6/19	AM	1	0.0	18.0	14.0	51	1
6/19	PM	4	0.0	24.0	17.0	51	1
6/20	AM	2	0.0	15.0	13.0	51	1
6/20	PM	1	0.0	25.0	16.0	50	1
6/21	AM	1	0.0	18.0	14.0	49	1
6/21	PM	2	0.0	21.0	17.0	49	1
6/22	AM	1	0.0	17.0	15.0	48	1
6/22	PM	2	0.0	20.0	18.0	48	1
6/23	AM	2	0.0	17.0	15.0	48	1
6/23	PM	3	17.5	15.0	16.0	48	1
6/24	AM	3	0.2	14.0	13.0	48	1
6/24	PM	1	0.0	23.0	17.0	48	1
6/25	AM	1	0.0	11.0	14.0	50	1
6/25	PM	1	0.0	22.0	16.0	49	1
6/26	AM	2	0.0	12.0	13.0	47	1
6/26	PM	3	0.0	14.0	13.0	46	1
6/27	AM	4	6.0	10.0	11.0	46	1
6/27	PM	3	1.8	13.0	13.0	47	1
6/28	AM	1	0.0	8.0	11.0	50	1
6/28	PM	4	1.0	14.0	14.0	52	1
6/29	AM	5	0.0	8.0	12.0	50	1
6/29	PM	3	0.5	15.0	14.0	48	1

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
6/30	AM	5	0.0	9.0	11.0	48	1
6/30	PM	3	0.0	11.0	13.0	48	1
7/1	AM	4	0.0	12.0	13.0	48	1
7/1	PM	3	0.0	15.0	12.0	51	1
7/2	AM	4	0.0	10.0	10.0	51	1
7/2	PM	4	0.0	12.0	12.0	50	1
7/3	AM	3	0.0	11.0	10.0	49	1
7/3	PM	ND	ND	ND	ND	ND	ND
7/4	AM	4	0.3	10.0	10.0	49	1
7/4	PM	4	0.1	15.0	11.0	49	1
7/5	AM	4	0.1	13.0	10.0	49	1
7/5	PM	3	0.0	23.0	14.0	48	1
7/6	AM	3	0.0	16.0	13.0	47	1
7/6	PM	3	0.1	17.0	13.0	46	1
7/7	AM	2	4.6	13.0	13.0	46	1
7/7	PM	2	0.0	17.0	14.0	46	1
7/8	AM	4	0.0	11.0	13.0	47	1
7/8	PM	3	2.8	17.0	15.0	47	1
7/9	AM	4	2.6	12.0	12.0	47	1
7/9	PM	ND	ND	ND	ND	ND	ND
7/10	AM	4	0.6	11.0	12.0	48	1
7/10	PM	4	3.0	14.0	12.0	48	1
7/11	AM	2	0.0	12.0	12.0	53	1
7/11	PM	3	1.0	18.0	14.0	54	1
7/12	AM	5	2.4	9.0	12.0	53	1
7/12	PM	3	0.0	20.0	14.0	54	1
7/13	AM	3	14.5	11.0	12.0	59	1
7/13	PM	2	0.0	19.0	14.0	57	1
7/14	AM	3	5.2	11.0	13.0	56	1
7/14	PM	ND	ND	ND	ND	ND	ND
7/15	AM	4	0.0	13.0	11.0	63	2
7/15	PM	3	0.2	16.0	14.0	63	3
7/16	AM	4	0.0	10.0	11.0	60	3
7/16	PM	4	3.0	12.0	10.0	58	3
7/17	AM	4	3.5	10.0	10.0	60	2
7/17	PM	ND	ND	ND	ND	ND	ND
7/18	AM	4	8.0	12.0	9.0	68	2
7/18	PM	3	0.0	13.0	10.0	67	2
7/19	AM	4	0.0	10.0	8.0	76	3
7/19	PM	4	0.0	14.0	9.0	75	3

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
7/20	AM	4	0.0	10.0	8.0	72	3
7/20	PM	3	0.0	17.0	10.0	70	2
7/21	AM	3	0.0	8.0	9.0	70	2
7/21	PM	4	0.0	14.0	10.0	69	2
7/22	AM	4	0.0	11.0	9.0	69	2
7/22	PM	ND	ND	ND	ND	ND	ND
7/23	AM	4	0.1	11.0	9.0	68	2
7/23	PM	4	0.5	14.0	10.0	67	1
7/24	AM	4	0.0	10.0	9.0	69	1
7/24	PM	ND	ND	ND	ND	ND	ND
7/25	AM	4	0.0	8.0	8.0	66	1
7/25	PM	4	1.8	7.0	9.0	64	1
7/26	AM	4	7.8	10.0	8.0	65	1
7/26	PM	4	0.4	9.0	9.0	64	1
7/27	AM	4	0.8	11.0	9.0	64	1
7/27	PM	2	0.0	18.0	11.0	69	1
7/28	AM	1	0.0	12.0	10.0	71	2
7/28	PM	2	0.0	17.0	11.0	73	2
7/29	AM	4	0.0	6.0	9.0	69	2
7/29	PM	3	0.0	17.0	11.0	67	2
7/30	AM	3	0.0	12.0	9.0	64	2
7/30	PM	2	0.0	14.0	11.0	62	2
7/31	AM	1	0.0	15.0	11.0	60	1
7/31	PM	2	0.0	17.0	12.0	60	1
8/1	AM	4	0.0	9.0	10.0	59	1
8/1	PM	3	0.0	14.0	12.0	59	1
8/2	AM	4	0.0	11.0	9.0	57	1
8/2	PM	ND	ND	ND	ND	ND	ND
8/3	AM	5	0.0	8.0	9.0	57	1
8/3	PM	1	0.0	22.0	14.0	55	1
8/4	AM	1	0.0	6.0	10.0	55	1
8/4	PM	1	0.0	24.0	14.0	53	1
8/5	AM	1	0.0	13.0	11.0	54	1
8/5	PM	1	0.0	23.0	14.0	52	1
8/6	AM	1	0.0	8.0	10.0	51	1
8/6	PM	1	0.0	18.0	14.0	50	1
8/7	AM	5	0.0	5.0	10.0	50	1
8/7	PM	1	0.0	14.0	12.0	50	1
8/8	AM	4	0.0	9.0	10.0	49	1
8/8	PM	ND	ND	ND	ND	ND	ND

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
8/9	AM	4	1.3	10.0	10.0	48	1
8/9	PM	4	6.5	12.0	10.0	49	1
8/10	AM	4	0.0	5.0	8.0	52	1
8/10	PM	3	0.0	10.0	9.0	56	1
8/11	AM	4	0.0	2.0	2.0	55	1
8/11	PM	3	0.0	9.0	8.0	54	1
8/12	AM	5	0.0	9.0	8.0	50	1
8/12	PM	2	0.0	11.0	8.0	50	1
8/13	AM	3	0.0	8.0	6.0	48	1
8/13	PM	2	0.0	14.0	10.0	48	1
8/14	AM	2	0.0	8.0	8.0	46	1
8/14	PM	4	0.0	12.0	9.0	46	1
8/15	AM	4	6.0	9.0	9.0	46	1
8/15	PM	3	0.3	10.0	9.0	47	1
8/16	AM	4	3.2	9.0	8.0	48	1
8/16	PM	4	3.0	12.0	9.0	50	1
8/17	AM	5	0.5	9.0	9.0	52	1
8/17	PM	4	0.0	12.0	9.0	53	1
8/18	AM	4	3.0	9.0	8.0	54	1
8/18	PM	4	0.0	10.0	9.0	54	1
8/19	AM	ND	ND	ND	ND	ND	ND
8/19	PM	4	0.0	12.0	9.0	52	1
8/20	AM	4	0.0	5.0	7.0	49	1
8/20	PM	3	0.0	8.0	8.0	50	1
8/21	AM	1	0.0	8.0	7.0	48	1
8/21	PM	3	0.0	13.0	9.0	48	1
8/22	AM	4	0.0	7.0	8.0	47	1
8/22	PM	3	0.0	9.0	8.0	47	1
8/23	AM	2	0.0	7.0	7.0	47	1
8/23	PM	ND	ND	ND	ND	ND	ND
8/24	AM	4	0.0	3.0	6.0	47	1
8/24	PM	4	0.0	11.0	8.0	47	1
8/25	AM	4	0.6	8.0	7.0	46	1
8/25	PM	4	3.0	13.0	8.0	46	1
8/26	AM	4	21.0	11.0	7.0	50	1
8/26	PM	4	0.0	10.0	8.0	56	1
8/27	AM	4	0.0	6.0	6.0	67	2
8/27	PM	3	0.2	8.0	7.0	70	3
8/28	AM	4	0.0	3.0	6.0	67	3
8/28	PM	4	0.0	6.0	6.0	65	2

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
8/29	AM	4	0.7	2.0	5.0	64	2
8/29	PM	3	0.1	5.0	5.0	64	2
8/30	AM	4	0.5	2.0	4.0	65	2
8/30	PM	4	6.2	3.0	5.0	65	2
8/31	AM	1	0.0	-2.0	3.0	66	2
8/31	PM	1	0.0	10.0	5.0	66	2
9/1	AM	5	0.0	-4.0	3.0	66	1
9/1	PM	ND	ND	ND	ND	ND	ND
9/2	AM	3	0.0	-3.0	3.0	64	1
9/2	PM	4	0.3	7.0	4.0	62	1
9/3	AM	4	0.0	6.0	4.0	61	1
9/3	PM	4	9.0	9.0	4.0	61	1
9/4	AM	4	1.0	8.0	5.0	63	1
9/4	PM	4	1.0	10.0	5.0	66	1
9/5	AM	4	0.9	5.0	5.0	69	1
9/5	PM	4	0.0	9.0	6.0	67	2
9/6	AM	4	0.0	4.0	5.0	66	2
9/6	PM	4	0.0	11.0	6.0	64	2
9/7	AM	4	0.0	3.0	5.0	62	1
9/7	PM	ND	ND	ND	ND	ND	ND
9/8	AM	4	0.0	5.0	5.0	60	1
9/8	PM	ND	ND	ND	ND	ND	ND
9/9	AM	4	0.0	4.0	5.0	60	1
9/9	PM	ND	ND	ND	ND	ND	ND
9/10	AM	4	0.5	5.0	5.0	60	1
9/10	PM	4	1.8	8.0	5.0	60	1
9/11	AM	4	1.0	4.0	5.0	60	1
9/11	PM	3	3.1	4.0	6.0	61	1
9/12	AM	4	0.0	1.0	4.0	62	1
9/12	PM	4	0.1	7.0	5.0	62	1
9/13	AM	4	2.2	7.0	4.0	62	1
9/13	PM	4	4.0	6.0	4.0	63	1
9/14	AM	4	8.4	6.0	4.0	80	3
9/14	PM	4	0.2	8.0	4.0	92	3
9/15	AM	4	2.1	3.0	4.0	100	3
9/15	PM	4	0.0	5.0	3.0	103	3
9/16	AM	5	0.3	0.0	3.0	103	3
9/16	PM	ND	ND	ND	ND	ND	ND
9/17	AM	4	0.0	0.0	2.0	103	3
9/17	PM	4	0.0	4.0	3.0	103	3

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
9/18	AM	3	0.0	2.0	2.0	103	3
9/18	PM	3	0.0	4.0	3.0	100	3
9/19	AM	1	0.0	-4.0	1.0	98	3
9/19	PM	3	0.0	0.0	2.0	92	3
9/20	AM	1	0.0	-7.0	1.0	90	3
9/20	PM	3	0.0	3.0	1.0	87	3
9/21	AM	4	0.0	-2.0	1.0	86	3
Average	–	–	1.0	11	9	59	–

[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 Kogrukluk River weir, 2015.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
6/18	PM	1	0	32.0	13.0	294	1
6/19	AM	1	0.0	12.0	11.0	292	1
6/19	PM	2	0.0	31.0	14.0	290	1
6/20	AM	1	0.0	17.0	12.0	288	1
6/20	PM	1	0.0	28.0	14.0	287	1
6/21	AM	1	0.0	14.0	11.0	286	1
6/21	PM	2	0.0	29.0	14.0	288	1
6/22	AM	1	0.0	14.0	11.0	287	1
6/22	PM	1	0.0	27.0	14.0	287	1
6/23	AM	2	0.0	9.0	10.0	286	1
6/23	PM	2	0.0	28.0	13.0	285	1
6/24	AM	2	2.8	11.0	11.0	285	1
6/24	PM	2	0.0	27.0	14.0	284	1
6/25	AM	2	0.0	10.0	9.0	283	1
6/25	PM	2	0.0	25.0	12.0	282	1
6/26	AM	3	0.0	15.0	8.0	281	1
6/26	PM	4	0.0	14.0	10.0	280	1
6/27	AM	4	4.2	10.0	8.0	284	1
6/27	PM	3	2.2	19.0	10.0	291	1
6/28	AM	4	0.8	12.0	9.0	300	2
6/28	PM	3	1.0	19.0	11.0	300	2
6/29	AM	1	1.6	7.0	8.0	295	1
6/29	PM	2	0.0	21.0	11.0	294	1
6/30	AM	2	0.0	9.0	9.0	292	1
6/30	PM	2	0.0	18.0	11.0	292	1
7/1	AM	4	0.0	11.0	9.0	290	1
7/1	PM	3	0.0	19.0	12.0	290	1
7/2	AM	3	0.0	9.0	9.0	286	1
7/2	PM	3	0.0	19.0	12.0	285	1
7/3	AM	2	0.0	8.0	9.0	283	1
7/3	PM	2	0.0	18.0	11.0	282	1
7/4	AM	4	0.0	11.0	9.0	280	1
7/4	PM	4	0.0	14.0	10.0	280	1
7/5	AM	3	0.0	12.0	9.0	282	1
7/5	PM	3	0.0	23.0	12.0	284	1

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
7/6	AM	4	0.0	13.0	9.0	284	1
7/6	PM	4	0.0	17.0	11.0	284	1
7/7	AM	3	0.0	10.0	8.0	290	2
7/7	PM	3	0.0	17.0	12.0	300	2
7/8	AM	3	0.0	12.0	9.0	300	2
7/8	PM	3	0.0	19.0	12.0	298	2
7/9	AM	2	0.0	12.0	8.0	293	1
7/9	PM	3	0.0	19.0	11.0	291	1
7/10	AM	1	0.0	10.0	8.0	289	1
7/10	PM	3	0.0	18.0	11.0	288	1
7/11	AM	3	0.0	14.0	9.0	286	1
7/11	PM	2	0.0	24.0	12.0	284	1
7/12	AM	2	0.0	11.0	8.0	284	1
7/12	PM	2	0.0	18.0	12.0	284	1
7/13	AM	3	0.8	11.0	9.0	283	1
7/13	PM	3	0.0	19.0	12.0	282	1
7/14	AM	2	0.0	10.0	8.0	281	1
7/14	PM	3	0.0	20.0	12.0	282	1
7/15	AM	2	0.0	8.0	8.0	281	1
7/15	PM	2	0.5	18.0	12.0	280	1
7/16	AM	4	1.6	10.0	8.0	278	1
7/16	PM	4	12.2	13.0	10.0	279	1
7/17	AM	4	4.5	11.0	8.0	294	2
7/17	PM	4	5.2	16.0	9.0	326	3
7/18	AM	3	0.0	10.0	8.0	319	3
7/18	PM	2	0.0	19.0	12.0	318	3
7/19	AM	3	0.0	11.0	8.0	302	2
7/19	PM	3	0.0	18.0	12.0	300	2
7/20	AM	4	0.0	11.0	8.0	298	2
7/20	PM	2	0.0	20.0	13.0	296	2
7/21	AM	4	0.0	13.0	9.0	294	1
7/21	PM	4	0.0	17.0	12.0	293	1
7/22	AM	3	0.0	12.0	8.0	292	1
7/22	PM	4	2.0	14.0	11.0	291	1

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
7/23	AM	3	1.6	13.0	8.0	291	1
7/23	PM	2	0.0	17.0	11.0	294	1
7/24	AM	1	0.0	7.0	7.0	294	1
7/24	PM	4	0.0	19.0	11.0	291	1
7/25	AM	3	0.0	11.0	7.0	290	1
7/25	PM	4	0.0	14.0	9.0	287	1
7/26	AM	3	2.0	12.0	7.0	287	1
7/26	PM	4	0.0	17.0	10.0	286	1
7/27	AM	4	0.0	12.0	8.0	286	1
7/27	PM	2	0.0	22.0	12.0	285	1
7/28	AM	1	0.0	9.0	8.0	280	1
7/28	PM	2	0.0	18.0	10.0	279	1
7/29	AM	3	0.0	9.0	8.0	278	1
7/29	PM	1	0.0	24.0	12.0	278	1
7/30	AM	1	0.0	8.0	7.0	276	1
7/30	PM	2	0.0	26.0	13.0	276	1
7/31	AM	3	0.0	12.0	8.0	275	1
7/31	PM	2	0.0	25.0	13.0	274	1
8/1	AM	1	0.0	8.0	7.0	274	1
8/1	PM	1	0.0	26.0	13.0	271	1
8/2	AM	3	0.0	9.0	8.0	271	1
8/2	PM	3	0.0	22.0	12.0	270	1
8/3	AM	1	0.0	11.0	9.0	273	1
8/3	PM	1	0.0	27.0	13.0	271	1
8/4	AM	1	0.0	10.0	8.0	271	1
8/4	PM	1	0.0	27.0	13.0	269	1
8/5	AM	1	0.0	10.0	7.0	270	1
8/5	PM	ND	ND	ND	ND	ND	ND
8/6	AM	2	0.0	12.0	11.0	268	1
8/6	PM	2	0.0	25.0	15.0	267	1
8/7	AM	2	0.0	10.0	12.0	267	1
8/7	PM	2	0.0	24.0	14.0	265	1
8/8	AM	4	0.0	12.0	12.0	266	1
8/8	PM	4	0.0	15.0	12.0	264	1

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
8/9	AM	4	0.5	14.0	11.0	265	1
8/9	PM	3	3.8	17.0	13.0	264	1
8/10	AM	3	0.0	8.0	10.0	267	1
8/10	PM	3	0.0	13.0	11.0	264	1
8/11	AM	3	0.0	8.0	9.0	265	1
8/11	PM	4	0.5	11.0	10.0	263	1
8/12	AM	4	0.0	10.0	9.0	265	1
8/12	PM	4	0.0	18.0	10.0	263	1
8/13	AM	4	0.0	10.0	9.0	264	1
8/13	PM	ND	ND	ND	ND	ND	ND
8/14	AM	4	3.2	11.0	8.0	264	1
8/14	PM	4	0.0	16.0	10.0	264	1
8/15	AM	4	4.9	10.0	9.0	266	1
8/15	PM	4	1.0	12.0	9.0	265	1
8/16	AM	4	4.2	10.0	8.0	272	1
8/16	PM	4	0.0	11.0	9.0	269	1
8/17	AM	4	2.0	10.0	8.0	275	1
8/17	PM	3	0.0	16.0	9.0	271	1
8/18	AM	2	1.0	11.0	8.0	271	1
8/18	PM	2	0.0	18.0	10.0	267	1
8/19	AM	2	0.0	10.0	7.0	267	1
8/19	PM	4	0.0	15.0	11.0	267	1
8/20	AM	3	0.0	5.0	7.0	264	1
8/20	PM	3	0.0	16.0	9.0	261	1
8/21	AM	1	0.0	7.0	8.0	262	1
8/21	PM	3	0.0	16.0	9.0	260	1
8/22	AM	2	0.0	9.0	7.0	261	1
8/22	PM	3	0.0	13.0	9.0	258	1
8/23	AM	4	0.0	10.0	7.0	259	1
8/23	PM	3	0.0	14.0	10.0	259	1
8/24	AM	4	0.0	11.0	7.0	261	1
8/24	PM	4	0.0	20.0	10.0	258	1
8/25	AM	2	0.0	10.0	7.0	258	1
8/25	PM	4	0.0	14.0	9.0	258	1

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
8/26	AM	4	3.2	11.0	8.0	257	1
8/26	PM	4	0.0	14.0	9.0	257	1
8/27	AM	3	0.0	9.0	7.0	257	1
8/27	PM	2	0.0	14.0	9.0	257	1
8/28	AM	4	0.0	4.0	7.0	257	1
8/28	PM	3	0.0	11.0	9.0	254	1
8/29	AM	4	1.0	5.0	7.0	255	1
8/29	PM	2	0.0	11.0	8.0	255	1
8/30	AM	3	0.0	4.0	6.0	257	1
8/30	PM	3	0.0	10.0	7.0	257	1
8/31	AM	1	0.0	0.0	6.0	257	1
8/31	PM	1	0.0	11.0	7.0	254	1
9/1	AM	1	0.0	-1.0	6.0	254	1
9/1	PM	1	0.0	17.0	9.0	252	1
9/2	AM	4	0.0	4.0	7.0	252	1
9/2	PM	4	0.0	13.0	8.0	252	1
9/3	AM	4	6.0	10.0	7.0	256	1
9/3	PM	4	10.2	12.0	8.0	262	1
9/4	AM	3	8.0	11.0	8.0	267	1
9/4	PM	4	0.0	12.0	8.0	272	1
9/5	AM	4	0.3	9.0	8.0	274	1
9/5	PM	4	0.0	12.0	8.0	272	1
9/6	AM	4	0.5	12.0	8.0	267	1
9/6	PM	3	0.0	14.0	9.0	265	1
9/7	AM	4	8.0	10.0	9.0	269	1
9/7	PM	3	0.0	16.0	9.0	270	1
9/8	AM	4	0.2	8.0	8.0	268	1
9/8	PM	4	4.2	13.0	9.0	269	1
9/9	AM	4	0.5	9.0	8.0	269	1
9/9	PM	4	0.6	13.0	8.0	269	1
9/10	AM	4	12.2	9.0	8.0	273	1
9/10	PM	3	1.2	11.0	8.0	277	1
9/11	AM	3	0.0	9.0	9.0	292	2
9/11	PM	3	0.0	9.0	9.0	296	3

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
9/12	AM	1	0.0	3.0	7.0	284	2
9/12	PM	3	0.0	11.0	9.0	284	2
9/13	AM	3	0.0	8.0	8.0	278	1
9/13	PM	4	1.2	10.0	8.0	277	1
9/14	AM	3	0.0	8.0	7.0	275	1
9/14	PM	4	1.8	11.0	7.0	273	1
9/15	AM	4	0.5	9.0	7.0	273	1
9/15	PM	4	0.0	7.0	7.0	273	1
9/16	AM	4	0.0	3.0	6.0	273	1
9/16	PM	4	0.0	7.0	7.0	273	1
9/17	AM	4	3.2	1.0	7.0	273	1
9/17	PM	4	0.0	5.0	6.0	272	1
9/18	AM	3	0.0	4.0	6.0	272	1
9/18	PM	3	0.0	8.0	7.0	272	1
9/19	AM	1	0.0	-1.0	6.0	272	1
9/19	PM	ND	ND	ND	ND	ND	ND
9/20	AM	2	0.0	0.0	5.0	270	1
9/20	PM	2	0.0	8.0	7.0	270	1
9/21	AM	4	0.0	0.0	5.0	269	1
9/21	PM	4	0.0	4.0	5.0	268	1
9/22	AM	4	0.0	3.0	5.0	268	1
Average	–	–	0.7	13	9	277	–

[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 Telaquana River weir, 2015.

Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C)		River stage (cm)[b]	Water clarity[c]
				Air	Water		
7/12	PM	3	0.0	15.0	14.0	ND	1
7/13	AM	2	0.0	16	13.5	ND	1
7/13	PM	3	0.0	14.0	13.0	ND	1
7/14	AM	ND	ND	ND	ND	ND	ND
7/14	PM	2	0.3	14.0	13.0	ND	1
7/15	AM	1	0.0	14.0	15.0	ND	1
7/15	PM	1	0.0	14.0	13.0	ND	1
7/16	AM	2	0.0	13.0	14.0	ND	1
7/16	PM	4	0.5	12.0	12.0	ND	1
7/17	AM	4	6.6	9.0	ND	ND	1
7/17	PM	4	1.5	11.0	12.0	ND	1
7/18	AM	4	7.4	9.0	14.0	ND	1
7/18	PM	4	2.8	10.0	13.0	ND	1
7/19	AM	4	0.8	10.0	11.0	ND	1
7/19	PM	2	0.0	16.0	12.0	ND	1
7/20	AM	2	0.0	12.0	10.0	ND	1
7/20	PM	1	0.0	20.0	14.0	ND	1
7/21	AM	2	0.0	9.0	13.0	ND	1
7/21	PM	4	0.3	13.0	13.0	ND	1
7/22	AM	4	0.0	9.0	13.0	ND	1
7/22	PM	4	6.6	9.5	12.0	ND	1
7/23	AM	4	1.5	11.0	12.0	ND	1
7/23	PM	4	1.3	13.0	11.0	ND	1
7/24	AM	4	0.0	9.0	11.0	ND	1
7/24	PM	ND	ND	ND	ND	ND	ND
7/25	AM	3	0.0	9.0	12.0	ND	1
7/25	PM	4	6.4	11.0	11.0	ND	1
7/26	AM	4	10.4	9.0	11.0	ND	1
7/26	PM	3	1.0	15.0	13.0	ND	1
7/27	AM	4	1.0	11.0	11.0	ND	1
7/27	PM	3	0.0	13.0	12.0	ND	1
7/28	AM	3	1.8	11.0	11.0	ND	1
7/28	PM	2	0.0	12.0	13.0	ND	1
7/29	AM	2	0.0	14.0	12.0	ND	1
7/29	PM	ND	ND	ND	ND	ND	ND

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
7/30	AM	2	0.0	15.0	13.0	ND	1
7/30	PM	2	0.0	19.0	15.0	ND	1
7/31	AM	1	0.0	18.0	13.0	ND	1
7/31	PM	1	0.0	21.0	15.0	ND	1
8/1	AM	1	0.0	21.0	12.0	ND	1
8/1	PM	1	0.0	21.0	15.0	ND	1
8/2	AM	1	0.0	10.0	11.0	ND	1
8/2	PM	1	0.0	21.0	15.0	ND	1
8/3	AM	1	0.0	18.0	14.0	ND	1
8/3	PM	1	0.0	24.0	16.0	ND	1
8/4	AM	1	0.0	16.0	14.0	ND	1
8/4	PM	1	0.0	25.0	18.0	ND	1
8/5	AM	1	0.0	14.0	16.0	ND	1
8/5	PM	1	0.0	24.0	17.0	ND	1
8/6	AM	2	0.0	15.0	16.0	ND	1
8/6	PM	1	0.0	21.0	15.0	ND	1
8/7	AM	1	0.0	14.0	12.0	ND	1
8/7	PM	1	0.0	23.0	14.0	ND	1
8/8	AM	1	0.0	10.0	11.0	ND	1
8/8	PM	3	0.0	15.0	13.0	ND	1
8/9	AM	4	6.1	11.0	14.0	ND	2
8/9	PM	4	1.0	12.0	14.0	ND	2
8/10	AM	3	13.0	8.0	11.0	ND	2
8/10	PM	3	0.0	12.0	11.0	ND	2
8/11	AM	1	0.0	5.0	9.0	ND	2
8/11	PM	2	0.0	15.0	12.0	ND	2
8/12	AM	2	0.0	6.0	11.0	ND	2
8/12	PM	2	0.0	14.0	12.0	ND	2
Average	–	–	1.2	14	13	–	–

[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 B7.–Daily weather and stream observations at the Tatlawiksuk River weir, 2015.

Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C)		River stage (cm)	Water clarity[b]
				Air	Water		
6/10	PM	3	11.0	11.0	9.0	ND	2
6/11	AM	3	0.0	8.0	8.0	ND	2
6/11	PM	3	0.0	10.0	9.0	ND	2
6/12	AM	3	2.0	10.0	8.0	40	2
6/12	PM	3	0.0	18.0	10.0	40	2
6/13	AM	2	0.0	10.0	9.0	40	2
6/14	PM	3	0.0	27.0	11.0	40	2
6/14	AM	1	0.0	15.0	10.0	37	2
6/14	PM	1	0.0	30.0	14.0	37	2
6/15	AM	1	0.0	20.0	13.0	34	2
6/15	PM	1	0.0	27.0	17.0	32	2
6/16	AM	1	0.0	15.0	14.0	31	2
6/16	PM	1	0.0	25.0	13.0	30	2
6/17	AM	1	0.0	16.0	15.0	28	2
6/17	PM	1	0.0	28.0	17.0	28	2
6/18	AM	1	0.0	15.0	15.0	26	2
6/18	PM	1	0.0	30.0	18.0	26	2
6/19	AM	1	0.0	18.0	15.0	24	2
6/19	PM	4	0.0	23.0	17.0	24	2
6/20	AM	1	0.0	14.0	15.0	24	2
6/20	PM	2	0.0	30.0	17.0	24	2
6/21	AM	2	0.0	15.0	12.0	23	2
6/21	PM	2	0.0	27.0	18.0	22	2
6/22	AM	2	15.0	15.0	15.0	22	2
6/22	PM	2	0.0	27.0	17.0	23	2
6/23	AM	2	0.0	14.0	15.0	24	2
6/23	PM	2	0.0	16.0	16.0	26	2
6/24	AM	3	0.0	11.0	14.0	23	2
6/24	PM	3	0.0	25.0	16.0	25	2
6/25	AM	4	0.0	12.0	14.0	22	2
6/25	PM	4	0.0	29.0	16.0	23	2
6/26	AM	4	0.0	14.0	14.0	21	2
6/26	PM	4	2.4	12.0	13.0	22	2

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
6/27	AM	4	14.0	11.0	12.0	21	2
6/27	PM	3	0.9	16.0	14.0	22	2
6/28	AM	1	4.5	9.0	12.0	23	2
6/28	PM	3	0.0	27.0	16.0	25	2
6/29	AM	5	2.0	9.0	13.0	28	2
6/29	PM	3	0.0	27.0	16.0	29	2
6/30	AM	3	0.1	14.0	14.0	28	2
6/30	PM	3	0.0	21.0	17.0	28	2
7/1	AM	3	5.0	11.0	14.0	28	2
7/1	PM	4	0.0	17.0	14.0	27	2
7/2	AM	3	0.0	9.0	11.0	25	2
7/2	PM	3	0.0	23.0	14.0	29	2
7/3	AM	3	0.0	13.0	11.0	27	2
7/3	PM	3	0.0	23.0	14.0	27	2
7/4	AM	3	0.0	14.0	12.0	24	2
7/4	PM	4	0.0	17.0	14.0	25	2
7/5	AM	3	0.0	14.0	13.0	24	2
7/5	PM	3	0.0	24.0	16.0	23	2
7/6	AM	3	0.0	18.0	14.0	22	2
7/6	PM	4	0.2	19.0	15.0	22	2
7/7	AM	3	7.0	13.0	14.0	21	2
7/7	PM	2	0.0	24.0	15.0	21	2
7/8	AM	3	0.0	10.0	14.0	21	2
7/8	PM	3	0.0	20.0	16.0	24	2
7/9	AM	4	0.0	14.0	13.0	23	2
7/9	PM	4	3.0	16.0	14.0	24	2
7/10	AM	4	0.0	14.0	13.0	23	2
7/10	PM	3	1.8	ND	15.0	25	2
7/11	AM	5	0.0	14.0	16.0	25	2
7/11	PM	4	0.0	19.0	15.0	26	2
7/12	AM	3	7.0	14.0	13.0	28	2
7/12	PM	3	1.6	15.0	14.0	28	2
7/13	AM	3	3.6	14.0	13.0	29	2
7/13	PM	3	0.0	24.0	16.0	30	2

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
7/14	AM	2	4.0	12.0	13.0	30	2
7/14	PM	3	0.0	22.0	14.0	32	2
7/15	AM	4	0.0	16.0	14.0	32	2
7/15	PM	2	0.7	21.0	14.0	35	2
7/16	AM	4	0.0	10.0	12.0	32	2
7/16	PM	4	0.0	16.0	11.0	31	2
7/17	AM	4	8.0	11.0	10.0	32	2
7/17	PM	4	6.0	12.0	11.0	34	2
7/18	AM	2	6.0	10.0	10.0	37	2
7/18	PM	3	0.3	18.0	12.0	45	3
7/19	AM	2	0.0	10.0	10.0	63	3
7/19	PM	4	0.0	15.0	11.0	86	3
7/20	AM	3	0.0	10.0	10.0	90	3
7/20	PM	2	0.0	19.0	12.0	84	3
7/21	AM	3	0.0	8.0	10.0	74	3
7/21	PM	4	0.0	18.0	12.0	71	3
7/22	AM	4	0.0	13.0	12.0	64	3
7/22	PM	3	0.0	19.0	12.0	63	3
7/23	AM	3	8.0	13.0	11.0	62	3
7/23	PM	4	0.0	16.0	12.0	66	3
7/24	AM	4	0.0	11.0	10.0	83	3
7/24	PM	3	0.0	19.0	11.0	90	3
7/25	AM	4	0.0	12.0	10.0	80	3
7/25	PM	4	1.0	14.0	11.0	76	3
7/26	AM	4	5.0	12.0	10.0	70	3
7/26	PM	3	0.5	20.0	13.0	70	3
7/27	AM	3	0.0	14.0	10.0	66	3
7/27	PM	4	6.0	14.0	12.0	69	3
7/28	AM	3	6.0	12.0	10.0	71	3
7/28	PM	2	0.1	17.0	13.0	75	3
7/29	AM	3	0.0	13.0	11.0	78	3
7/29	PM	3	0.0	26.0	14.0	78	3
7/30	AM	3	0.0	13.0	11.0	76	3
7/30	PM	2	0.0	23.0	15.0	74	3

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
7/31	AM	3	0.0	14.0	13.0	70	3
7/31	PM	2	0.0	25.0	15.0	68	3
8/1	AM	2	0.0	9.0	13.0	66	3
8/1	PM	3	0.0	16.0	15.0	63	3
8/2	AM	4	0.0	13.0	13.0	62	3
8/2	PM	2	0.0	21.0	15.0	57	3
8/3	AM	1	0.0	5.0	11.0	55	3
8/3	PM	1	0.0	23.0	15.0	50	3
8/4	AM	1	0.0	10.0	14.0	49	3
8/4	PM	2	0.0	23.0	17.0	48	3
8/5	AM	3	0.0	12.0	12.0	45	3
8/5	PM	3	0.0	23.0	17.0	45	3
8/6	AM	1	0.0	7.0	13.0	42	2
8/6	PM	1	0.0	21.0	18.0	42	2
8/7	AM	2	0.0	9.0	12.0	42	2
8/7	PM	2	0.0	19.0	12.0	40	2
8/8	AM	4	0.0	13.0	13.0	39	2
8/8	PM	4	0.3	14.0	14.0	38	2
8/9	AM	4	9.0	13.0	10.0	39	2
8/9	PM	4	15.0	9.0	10.0	41	2
8/10	AM	3	2.2	3.0	10.0	43	2
8/10	PM	4	0.0	12.0	12.0	49	2
8/11	AM	3	0.0	6.0	10.0	51	2
8/11	PM	4	0.0	11.0	12.0	49	3
8/12	AM	4	0.1	10.0	10.0	45	3
8/12	PM	4	0.0	14.0	11.0	46	3
8/13	AM	4	0.1	10.0	9.0	43	3
8/13	PM	2	0.0	11.0	13.0	44	3
8/14	AM	4	0.0	10.0	9.0	41	2
8/14	PM	4	0.5	13.0	12.0	41	2
8/15	AM	4	8.0	10.0	10.0	40	2
8/15	PM	4	2.0	14.0	11.0	40	3
8/16	AM	4	4.0	10.0	11.0	41	2
8/16	PM	4	0.0	15.0	12.0	44	3

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
8/17	AM	4	3.0	11.0	10.0	45	3
8/17	PM	4	0.5	14.0	13.0	48	3
8/18	AM	3	2.0	11.0	10.0	49	3
8/18	PM	4	0.2	11.0	11.0	50	3
8/19	AM	4	0.0	9.0	9.0	49	3
8/19	PM	3	0.0	17.0	11.0	49	3
8/20	AM	3	0.0	8.0	10.0	47	3
8/20	PM	2	0.0	17.0	10.0	47	3
8/21	AM	3	0.0	9.0	10.0	44	3
8/21	PM	2	0.2	16.0	11.0	44	3
8/22	AM	4	0.0	9.0	10.0	41	3
8/22	PM	3	0.0	13.0	11.0	42	3
8/23	AM	3	0.0	9.0	9.0	40	3
8/23	PM	2	0.0	20.0	10.0	40	2
8/24	AM	3	0.0	-1.0	9.0	38	2
8/24	PM	4	0.0	15.0	11.0	38	2
8/25	AM	4	2.2	10.0	10.0	35	2
8/25	PM	4	0.2	16.0	10.0	37	2
8/26	AM	4	20.5	10.0	9.0	40	2
8/26	PM	3	3.2	14.0	11.0	45	2
8/27	AM	4	0.5	9.0	10.0	60	3
8/27	PM	2	0.3	13.0	10.0	76	3
8/28	AM	4	0.0	6.0	9.0	80	3
8/28	PM	3	0.0	10.0	9.0	77	3
8/29	AM	4	0.3	5.0	8.0	72	3
8/29	PM	2	1.0	13.0	9.0	70	3
8/30	AM	4	0.0	4.0	8.0	70	3
8/30	PM	3	1.2	5.0	8.0	71	3
8/31	AM	2	0.0	0.0	6.0	68	3
8/31	PM	1	0.0	14.0	8.0	68	2
9/1	AM	1	0.0	-5.0	6.0	66	3
9/1	PM	1	0.0	21.0	8.0	64	2
9/2	AM	4	0.0	-3.0	7.0	57	3
9/2	PM	4	0.0	12.0	8.0	56	2

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River stage (cm)	Water clarity[b]
9/3	AM	4	2.2	8.0	8.0	52	3
9/3	PM	4	8.3	12.0	8.0	54	3
9/4	AM	4	7.0	10.0	9.0	53	3
9/4	PM	4	3.0	11.0	9.0	61	3
9/5	AM	4	0.0	10.0	9.0	66	3
9/5	PM	4	0.0	11.0	9.0	73	3
9/6	AM	4	0.0	10.0	9.0	72	3
9/6	PM	3	0.0	18.0	10.0	72	3
9/7	AM	5	0.0	1.0	9.0	66	3
9/7	PM	3	0.0	16.0	10.0	66	3
9/8	AM	3	0.2	9.0	9.0	63	3
9/8	PM	3	0.3	14.0	10.0	63	3
9/9	AM	4	2.6	9.0	8.0	60	3
9/9	PM	3	0.0	10.0	9.0	62	3
9/10	AM	3	0.4	9.0	9.0	64	3
9/10	PM	3	3.2	11.0	9.0	68	3
9/11	AM	4	0.1	8.0	8.0	63	3
9/11	PM	4	0.0	6.0	8.0	64	3
9/12	AM	4	0.0	3.0	6.0	60	3
9/12	PM	4	0.0	8.0	6.0	62	3
9/13	AM	4	4.2	6.0	7.0	62	3
9/13	PM	4	16.0	6.0	7.0	64	3
9/14	AM	4	14.0	8.0	7.0	70	3
9/14	PM	4	1.2	10.0	7.0	96	3
9/15	AM	4	0.0	5.0	7.0	100[c]	3
Average	–	–	1.4	14	12	46	–

[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

[c] The river stage exceeded the staff gauge; the reading represents the minimum river stage at that observation.

Appendix B8.–Daily weather and stream observations at the Salmon River (Pitka Fork) weir, 2015.

Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C)		River stage (cm)	Water clarity[b]
				Air	Water		
6/4	AM	3	ND	ND	ND	28	ND
6/4	PM	4	ND	ND	ND	27	ND
6/5	AM	4	ND	ND	ND	26	ND
6/5	PM	3	0.0	ND	ND	27	ND
6/6	AM	3	0.0	ND	ND	27	ND
6/6	PM	3	0.0	ND	ND	27	ND
6/7	AM	3	0.0	ND	ND	26	ND
6/7	PM	3	4.0	ND	ND	25	ND
6/8	AM	4	0.0	ND	ND	26	ND
6/8	PM	4	0.0	ND	ND	26	ND
6/9	AM	2	8.0	ND	ND	31	ND
6/9	PM	4	0.0	ND	ND	28	ND
6/10	AM	3	0.0	ND	ND	26	ND
6/10	PM	4	ND	ND	ND	26	ND
6/11	AM	2	ND	ND	ND	29	ND
6/11	PM	1	ND	ND	ND	29	ND
6/12	AM	1	ND	ND	ND	28	ND
6/12	PM	1	ND	ND	ND	28	ND
6/13	AM	1	ND	ND	ND	26	ND
6/14	PM	1	ND	ND	ND	26	ND
6/14	AM	1	ND	ND	ND	26	ND
6/14	PM	1	ND	ND	ND	26	ND
6/15	AM	1	ND	ND	ND	26	ND
6/15	PM	1	ND	ND	ND	27	ND
6/16	AM	1	ND	ND	ND	27	ND
6/16	PM	1	ND	ND	ND	27	ND
6/17	AM	1	ND	ND	ND	28	ND
6/17	PM	1	ND	ND	ND	28	ND
6/18	AM	1	ND	ND	ND	26	ND
6/18	PM	1	ND	ND	ND	27	ND
6/19	AM	1	ND	ND	ND	28	ND
6/19	PM	4	ND	ND	ND	27	ND

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Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C)		River stage (cm)	Water clarity[b]
				Air	Water		
6/20	AM	1	ND	ND	ND	29	ND
6/20	PM	1	ND	ND	ND	29	ND
6/21	AM	1	ND	ND	ND	30	ND
6/21	PM	3	ND	ND	ND	30	ND
6/22	AM	2	ND	ND	ND	30	ND
6/22	PM	2	ND	16.0	ND	30	ND
6/23	AM	1	ND	24.0	ND	31	ND
6/23	PM	3	ND	ND	ND	30	ND
6/24	AM	ND	ND	ND	ND	ND	ND
6/24	PM	ND	ND	ND	ND	ND	ND
6/25	AM	ND	ND	ND	ND	ND	ND
6/25	PM	ND	ND	ND	ND	ND	ND
6/26	AM	4	0.0	15.0	12.0	35	1
6/26	PM	4	0.0	17.0	12.0	38	1
6/27	AM	3	4.0	13.0	10.0	38	1
6/27	PM	3	0.0	19.0	15.0	40	1
6/28	AM	2	0.0	13.0	11.0	38	1
6/28	PM	2	0.0	21.0	15.0	37	1
6/29	AM	1	0.0	15.0	12.0	37	1
6/29	PM	3	0.0	23.0	15.0	37	1
6/30	AM	4	0.0	13.0	12.0	37	1
6/30	PM	4	5.6	17.0	12.0	38	1
7/1	AM	4	0.0	13.0	11.0	39	1
7/1	PM	ND	ND	ND	ND	ND	ND
7/2	AM	3	0.0	11.0	10.0	40	1
7/2	PM	3	0.0	16.0	14.0	40	1
7/3	AM	4	0.0	10.0	11.0	40	ND
7/3	PM	4	0.0	17.0	12.0	40	ND
7/4	AM	3	1.0	19.0	12.0	40	ND
7/4	PM	4	0.0	17.0	13.0	39	ND
7/5	AM	3	0.0	12.0	12.0	40	ND
7/5	PM	4	0.0	17.0	14.0	40	1
7/6	AM	3	0.0	12.0	11.0	39	ND
7/6	PM	4	1.0	16.0	13.0	40	ND

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Appendix B8.–Page 3 of 5.

Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C)		River stage (cm)	Water clarity[b]
				Air	Water		
7/7	AM	3	5.0	14.0	12.0	39	ND
7/7	PM	2	0.0	17.0	12.0	39	ND
7/8	AM	3	0.0	15.0	11.0	39	ND
7/8	PM	4	0.0	11.0	13.0	40	ND
7/9	AM	3	0.0	15.0	12.0	39	ND
7/9	PM	2	0.0	12.0	12.0	39	ND
7/10	AM	4	0.0	13.0	13.0	43	ND
7/10	PM	2	ND	14.0	14.0	45	ND
7/11	AM	3	0.0	14.0	14.0	45	ND
7/11	PM	3	0.0	13.0	14.0	47	ND
7/12	AM	3	1.5	14.0	14.0	47	ND
7/12	PM	2	0.0	11.0	15.0	47	ND
7/13	AM	2	0.0	14.0	13.0	47	ND
7/13	PM	3	0.0	23.0	17.0	48	ND
7/14	AM	2	0.0	14.0	12.0	48	ND
7/14	PM	ND	ND	ND	ND	ND	ND
7/15	AM	ND	ND	ND	ND	ND	ND
7/15	PM	2	28.0	18.0	14.0	71	ND
7/16	AM	3	0.0	14.0	12.0	65	2
7/16	PM	ND	ND	ND	ND	ND	ND
7/17	AM	ND	ND	ND	ND	ND	ND
7/17	PM	4	11.0	11.0	10.0	64	2
7/18	AM	ND	ND	ND	ND	ND	ND
7/18	PM	ND	ND	ND	ND	ND	ND
7/19	AM	ND	ND	ND	ND	ND	ND
7/19	PM	ND	ND	ND	ND	ND	ND
7/20	AM	2	0.0	14.0	11.0	63	1
7/20	PM	ND	ND	ND	ND	ND	ND
7/21	AM	3	0.5	10.0	11.0	64	1
7/21	PM	4	0.0	19.0	13.0	63	1
7/22	AM	4	0.0	13.0	12.0	62	1
7/22	PM	2	0.0	21.0	13.0	62	1
7/23	AM	4	0.0	16.0	12.0	62	1
7/23	PM	3	0.0	21.0	14.0	62	1

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Appendix B8.–Page 4 of 5.

Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C)		River stage (cm)	Water clarity[b]
				Air	Water		
7/24	AM	3	11.5	11.0	12.0	67	2
7/24	PM	ND	ND	ND	ND	ND	ND
7/25	AM	2	0.0	16.0	12.0	66	1
7/25	PM	ND	ND	ND	ND	ND	ND
7/26	AM	4	9.0	14.0	11.0	70	1
7/26	PM	ND	ND	ND	ND	ND	ND
7/27	AM	3	0.0	15.0	11.0	72	1
7/27	PM	ND	ND	ND	ND	ND	ND
7/28	AM	2	0.0	17.0	11.0	71	ND
7/28	PM	ND	ND	ND	ND	ND	ND
7/29	AM	2	0.0	17.0	11.0	70	ND
7/29	PM	ND	ND	ND	ND	ND	ND
7/30	AM	ND	ND	ND	ND	ND	ND
7/30	PM	ND	ND	ND	ND	ND	ND
7/31	AM	ND	ND	ND	ND	ND	ND
7/31	PM	ND	ND	ND	ND	ND	ND
8/1	AM	ND	ND	ND	ND	ND	ND
8/1	PM	ND	ND	ND	ND	ND	ND
8/2	AM	2	0.0	13.0	14.0	68	1
8/2	PM	ND	ND	ND	ND	ND	ND
8/3	AM	1	0.0	18.0	12.0	ND	ND
8/3	PM	1	0.0	ND	ND	ND	ND
8/4	AM	1	0.0	21.0	13.0	67	1
8/4	PM	1	0.0	26.0	18.0	72	1
8/5	AM	2	0.0	23.0	15.0	72	1
8/5	PM	ND	ND	ND	ND	ND	ND
8/6	AM	2	0.0	18.0	15.0	72	1
8/6	PM	ND	ND	ND	ND	ND	ND
8/7	AM	ND	ND	15.0	13.0	71	1
8/7	PM	ND	ND	ND	ND	ND	ND
8/8	AM	ND	ND	ND	ND	ND	ND
8/8	PM	ND	ND	ND	ND	ND	ND
8/9	AM	4	0.0	17.0	13.0	79	ND
8/9	PM	ND	ND	ND	ND	ND	ND

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Appendix B8.–Page 5 of 5.

Date	Time	Sky conditions[a]	Precipitation (mm)	Temperature (°C)		River stage (cm)	Water clarity[b]
				Air	Water		
8/10	AM	2	22.0	13.0	10.0	83	1
8/10	PM	ND	ND	ND	ND	ND	ND
8/11	AM	2	1.5	14.0	10.0	78	ND
8/11	PM	ND	ND	ND	ND	ND	ND
8/12	AM	4	0.0	13.0	10.0	76	ND
8/12	PM	4	ND	13.0	11.0	76	ND
8/13	AM	3	0.0	11.0	10.0	76	ND
8/13	PM	ND	ND	ND	ND	ND	ND
8/14	AM	2	0.0	13.0	10.0	76	ND
8/14	PM	ND	ND	ND	ND	ND	ND
8/15	AM	4	ND	13.0	11.0	77	ND
8/15	PM	ND	ND	ND	ND	ND	ND
8/16	AM	3	ND	12.0	9.0	77	ND
Average	–	–	1.5	15	12	44	–

[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

Appendix C1.–Daily observed passage of nontarget species at Middle Fork Goodnews River weir, 2015.

Date	Pink Salmon	Dolly Varden	Rainbow Trout	Whitefish
6/25	0	1	1	8
6/26	0	8	0	9
6/27	0	6	0	1
6/28	0	7	0	6
6/29	0	21	2	7
6/30	0	25	0	3
7/1	0	21	0	5
7/2	0	22	0	9
7/3	0	98	0	15
7/4	9	74	0	13
7/5	14	278	1	2
7/6	3	158	0	0
7/7	14	476	0	2
7/8	0	601	0	2
7/9	21	809	4	3
7/10	18	511	0	3
7/11	42	293	0	0
7/12	46	241	0	1
7/13	31	360	1	9
7/14	97	210	0	3
7/15	61	96	0	0
7/16	81	159	0	1
7/17	22	29	0	0
7/18	53	123	0	0
7/19	5	33	0	0
7/20	48	273	1	2
7/21	74	100	0	0
7/22	21	42	0	0
7/23	44	78	1	1
7/24	23	83	0	0
7/25	24	75	0	2
7/26	40	46	0	1
7/27	30	23	0	0
7/28	28	30	2	2
7/29	25	29	1	1
7/30	28	20	0	0
7/31	8	6	0	0
8/1	32	33	0	5
8/2	24	19	1	1
8/3	14	23	0	2
8/4	7	4	0	1
8/5	5	5	0	1
8/6	6	6	0	1
8/7	5	2	0	0

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Appendix C2.–Page 2 of 2.

Date	Pink Salmon	Dolly Varden	Rainbow Trout	Whitefish
8/8	1	0	0	0
8/9	8	2	0	0
8/10	2	2	0	2
8/11	0	2	0	0
8/12	3	0	0	0
8/13	2	0	0	0
8/14	3	2	0	0
8/15	0	0	0	0
8/16	3	0	0	0
8/17	6	0	0	0
8/18	4	0	0	0
8/19	0	0	0	0
8/20	2	0	0	2
8/21	2	1	0	0
8/22	5	0	0	0
8/23	5	0	0	0
8/24	24	0	0	0
8/25	6	1	0	0
8/26	29	1	0	2
8/27	23	4	0	2
8/28	0	0	0	0
8/29	18	1	0	0
8/30	1	1	0	0
8/31	9	1	0	1
Total	1,159	5,575	15	131

Appendix C2.–Daily observed passage of nontarget species at Kanektok River weir, 2015.

Date	Coho Salmon	Pink Salmon	Dolly Varden	Arctic Grayling	Rainbow Trout	Whitefish
6/22	0	0	0	0	0	0
6/23	0	0	0	1	0	4
6/24	0	0	1	2	0	4
6/25	0	0	4	1	1	2
6/26	0	0	0	3	5	0
6/27	0	0	0	7	6	0
6/28	0	0	0	7	0	0
6/29	0	0	3	3	0	3
6/30	0	0	4	0	0	7
7/1	0	1	6	0	1	3
7/2	0	1	6	1	5	3
7/3	0	11	39	3	4	9
7/4	0	11	65	0	1	5
7/5	0	11	36	0	2	1
7/6	0	12	76	0	3	0
7/7	0	6	89	0	4	3
7/8	0	14	410	0	4	0
7/9	0	22	507	0	2	4
7/10	0	16	1,530	1	0	1
7/11	0	26	3,261	0	2	3
7/12	0	32	5,216	0	1	3
7/13	0	41	3,009	0	5	1
7/14	0	57	3,626	0	0	5
7/15	0	83	2,826	0	6	3
7/16	0	38	989	0	1	0
7/17	0	83	1,144	0	2	0
7/18	0	36	868	0	0	5
7/19	0	79	1,425	0	6	1
7/20	4	69	1,592	0	1	1
7/21	2	97	1,014	0	0	0
7/22	10	27	358	0	4	0
7/23	10	35	462	0	3	0
7/24	16	46	533	0	3	3
7/25	9	27	469	0	2	2
7/26	23	22	777	0	4	0
7/27	8	19	602	0	7	1
7/28	44	18	751	0	2	0
7/29	45	21	545	0	0	0
7/30	54	17	503	0	0	4
7/31	55	11	599	0	1	0
8/1	85	12	563	0	4	0
8/2	72	5	346	0	3	0
8/3	81	13	346	0	0	1
8/4	291	20	341	0	2	3
8/5	129	6	214	0	3	0
8/6	144	3	117	0	1	0
8/7	122	0	47	0	0	0
8/8	48	1	11	1	0	0

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Appendix C2.–Page 2 of 2.

Date	Coho Salmon	Pink Salmon	Dolly Varden	Arctic Grayling	Rainbow Trout	Whitefish
8/9	157	2	17	0	0	0
8/10	207	1	16	0	0	0
8/11	27	0	5	0	1	0
8/12	101	0	15	0	0	0
8/13	97	3	21	0	1	0
8/14	277	3	33	1	0	0
8/15	375	0	19	0	2	0
Total	2,493	1,058	35,456	31	105	85

Appendix C3.–Daily observed passage of nontarget species at Salmon River (Aniak) weir, 2015.

Date	Pink Salmon	Coho Salmon	Longnose Sucker	Dolly Varden	Arctic Grayling	Rainbow Trout	Whitefish
6/20	0		0	0	1	0	0
6/21	0		86	0	0	0	0
6/22	0		16	0	2	2	0
6/23	0		9	0	0	0	2
6/24	0		29	0	0	0	1
6/25	0	0	72	2	1	0	0
6/26	0	0	3	1	0	0	1
6/27 [a]	0	0	11	0	1	0	0
6/28 [b]	ND	ND	ND	ND	ND	ND	ND
6/29 [b]	ND	ND	ND	ND	ND	ND	ND
6/30	0	0	0	0	0	0	0
7/1	0	0	0	1	0	0	1
7/2	0	0	3	0	0	0	0
7/3	0	0	0	0	0	0	0
7/4	0	0	0	0	0	0	0
7/5	0	0	13	0	0	0	0
7/6	0	0	3	0	0	0	0
7/7	0	0	2	0	0	0	2
7/8	0	0	0	1	1	0	0
7/9	0	0	0	1	0	0	0
7/10	0	0	0	3	0	0	0
7/11	0	0	5	22	0	0	0
7/12	1	0	3	16	1	1	0
7/13	0	0	0	14	0	0	0
7/14	0	0	0	4	0	0	0
7/15	5	0	0	18	0	2	0
7/16	0	0	0	9	0	4	1
7/17	2	0	0	11	0	4	0
7/18	2	0	17	15	2	4	0
7/19	7	0	0	5	3	2	0
7/20 [a]	19	0	4	23	0	0	0
7/21 [a]	12	0	2	27	0	0	0
7/22	11	0	0	34	0	0	0
7/23	10	0	0	8	0	0	0
7/24	12	0	0	10	0	0	0
7/25	1	0	0	1	0	0	0
7/26	3	1	0	16	0	0	0
7/27	10	2	0	4	0	0	0
7/28	10	2	7	17	0	0	0
7/29	4	3	0	11	0	0	0
7/30	1	3	0	6	0	0	1
7/31	1	4	0	2	0	0	0
8/1	4	8	0	10	0	0	0
8/2	1	4	0	29	0	0	0
8/3	1	11	0	18	0	0	0
8/4	1	13	0	12	0	0	0
8/5	3	11	0	20	0	0	0
8/6	0	21	0	12	0	0	0
8/7	0	17	0	9	0	1	0

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Date	Pink Salmon	Coho Salmon	Longnose Sucker	Dolly Varden	Arctic Grayling	Rainbow Trout	Whitefish
8/8	0	2	0	8	0	1	0
8/9	3	11	0	7	0	0	0
8/10	2	13	0	10	0	0	0
8/11	0	0	0	0	0	0	0
8/12	0	29	0	15	0	0	0
8/13	0	28	1	22	0	0	0
8/14 [a]	0	21	0	8	0	1	0
8/15	0	63	2	29	1	0	0
Total	126	267	288	491	13	22	9

[a] Partial day count.

[b] The weir was not operational.

Appendix C4.–Daily observed passage of nontarget species at George River weir, 2015.

Date		Sockeye Salmon	Pink Salmon	Longnose Sucker	Dolly Varden	Arctic Grayling	Whitefish	Northern Pike
6/15	[a]	0	0	407	0	0	0	0
6/16		0	0	1,956	0	0	0	0
6/17		0	0	1,149	0	0	0	0
6/18		0	0	273	0	0	0	0
6/19		0	0	469	0	24	1	0
6/20		0	0	212	0	11	0	0
6/21		0	0	353	0	30	0	0
6/22		0	0	235	0	50	0	0
6/23		0	0	189	0	5	2	0
6/24		0	0	214	0	8	8	0
6/25		0	0	197	0	21	3	1
6/26	[a]	0	0	133	0	5	0	0
6/27		0	0	184	0	1	0	0
6/28		0	0	278	0	2	2	0
6/29		0	0	262	0	2	1	0
6/30		0	0	152	0	0	0	0
7/1		0	0	119	0	2	1	0
7/2		0	0	59	0	0	1	0
7/3		0	0	131	0	2	1	0
7/4		0	0	100	0	2	0	0
7/5		0	0	72	0	6	0	0
7/6		0	6	143	1	5	7	0
7/7		3	12	211	0	5	1	0
7/8		0	8	255	0	1	4	0
7/9		0	4	264	0	1	2	0
7/10		0	2	123	0	5	0	0
7/11		0	6	282	0	12	1	0
7/12		0	4	281	0	19	0	0
7/13		2	10	340	0	7	2	0
7/14		0	14	147	0	2	2	0
7/15		0	23	144	0	16	2	0
7/16		0	5	29	1	10	0	0
7/17		0	6	12	0	2	0	0
7/18		1	9	34	0	1	2	0
7/19		0	4	20	0	1	0	0
7/20		0	12	12	0	3	0	0
7/21		1	16	9	0	0	0	0
7/22		0	9	3	0	1	0	1
7/23		0	12	1	0	0	0	0
7/24		0	8	2	0	6	0	0
7/25		0	19	2	0	2	0	0
7/26		4	40	0	0	4	0	0
7/27		1	52	2	0	6	0	0

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Date	Sockeye Salmon	Pink Salmon	Longnose Sucker	Dolly Varden	Arctic Grayling	Whitefish	Northern Pike
7/28	2	67	4	0	2	0	0
7/29	0	38	12	0	3	0	0
7/30	3	50	7	0	4	0	0
7/31	6	31	7	1	3	0	0
8/1	5	19	19	0	3	0	0
8/2	0	14	6	0	3	0	0
8/3 [a]	0	8	1	0	4	0	0
8/4	1	10	7	0	1	1	0
8/5	5	11	3	0	0	1	0
8/6	3	12	8	0	5	0	0
8/7	5	10	4	0	4	0	0
8/8	1	4	10	0	1	2	0
8/9	4	7	4	0	1	0	0
8/10	7	5	3	0	0	1	0
8/11	1	2	2	0	2	1	0
8/12	0	3	2	0	1	2	0
8/13	5	27	3	0	3	3	0
8/14	0	20	3	0	1	4	0
8/15	2	9	0	0	0	2	0
8/16	3	9	1	0	1	3	0
8/17	3	6	3	0	4	3	0
8/18	3	4	2	0	3	3	0
8/19	0	0	0	0	1	1	0
8/20	0	1	2	0	0	0	0
8/21	2	4	2	0	0	1	0
8/22	4	0	1	0	1	1	0
8/23	7	6	0	0	0	0	0
8/24	1	1	0	0	0	0	0
8/25	4	1	0	0	4	0	0
8/26	13	6	0	0	1	2	0
8/27	5	5	1	0	2	1	0
8/28	3	1	0	0	0	0	0
8/29	1	0	0	1	0	0	0
8/30	4	0	0	0	0	0	0
8/31	2	1	0	0	2	0	0
9/1	2	8	0	0	0	0	0
9/2	3	6	0	0	1	3	0
9/3	1	2	1	1	0	0	0
9/4	6	3	2	0	1	1	0
9/5	7	3	0	0	0	4	0
9/6	2	0	0	0	1	0	0
9/7	2	2	0	1	0	0	0
9/8	3	0	0	0	0	3	0
9/9	5	0	1	0	0	7	0

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Date		Sockeye Salmon	Pink Salmon	Longnose Sucker	Dolly Varden	Arctic Grayling	Whitefish	Northern Pike
9/10		2	1	1	0	1	5	0
9/11		4	3	0	0	1	0	0
9/12		1	1	1	0	0	1	0
9/13		4	1	1	0	0	7	0
9/14	[a]	0	0	0	0	0	0	0
9/15	[b]	ND	ND	ND	ND	ND	ND	ND
9/16	[b]	ND	ND	ND	ND	ND	ND	ND
9/17	[b]	ND	ND	ND	ND	ND	ND	ND
9/18	[b]	ND	ND	ND	ND	ND	ND	ND
9/19	[a]	0	0	0	0	0	0	0
9/20		0	0	0	0	0	0	0
Total		159	703	9,584	6	345	106	2

[a] Partial day count.

[b] The weir was not operational.

Appendix C5.–Daily observed passage of nontarget species at Kogrukluk River weir, 2015.

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

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Date	Pink Salmon	Dolly Varden	Arctic Grayling	Whitefish	Northern Pike
8/2	1	0	0	1	0
8/3	0	4	0	0	0
8/4	1	1	0	0	0
8/5	0	1	0	0	0
8/6	0	1	0	0	0
8/7	0	2	1	1	0
8/8	0	2	0	2	0
8/9	0	3	0	1	0
8/10	0	3	0	0	0
8/11	0	8	0	0	0
8/12	0	5	0	2	0
8/13	0	2	0	0	0
8/14	0	8	0	1	0
8/15	2	8	0	1	0
8/16	1	17	0	0	0
8/17	0	24	0	0	0
8/18	1	20	0	2	0
8/19	0	12	0	0	0
8/20	1	13	0	0	0
8/21	0	8	0	0	0
8/22	0	10	0	1	0
8/23	0	17	0	0	0
8/24	1	11	0	2	0
8/25	0	19	0	1	0
8/26	0	23	0	2	0
8/27	0	7	0	0	0
8/28	0	4	0	0	0
8/29	1	1	0	1	0
8/30	0	0	1	0	0
8/31	0	32	0	0	0
9/1	0	18	0	0	0
9/2	1	8	0	3	0
9/3	0	12	0	4	1
9/4	0	8	0	5	0
9/5	0	14	0	4	0
9/6	0	0	0	0	0
9/7	0	8	0	5	0
9/8	0	8	0	1	0
9/9	0	0	0	2	0
9/10	0	7	0	11	0
9/11	0	1	0	0	0

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Date	Pink Salmon	Dolly Varden	Arctic Grayling	Whitefish	Northern Pike
9/12	0	9	0	0	0
9/13	1	0	0	12	0
9/14	0	2	0	6	0
9/15	0	4	0	4	0
9/16	0	3	0	7	0
9/17	0	3	0	8	0
9/18	0	0	0	2	0
9/19	0	0	0	6	0
9/20	0	1	0	7	0
9/21	0	0	0	0	0
9/22	0	0	0	4	0
Total	88	381	2	117	1

[a] Partial day count.

[b] Counts occurred outside of the project's target operational period.

[c] The weir was not operational.

Appendix C6.–Daily observed passage of nontarget species at Telaquana River weir, 2015.

Date		Chinook Salmon	Chum Salmon	Pink Salmon	Longnose Sucker	Arctic Grayling	Whitefish	Lake Trout
7/11	[a]	0	0	0	0	0	0	0
7/12		0	0	0	30	0	0	0
7/13		0	0	0	2	0	0	0
7/14	[a]	0	0	0	0	0	0	0
7/15		2	0	0	5	2	0	0
7/16		2	0	0	15	0	0	0
7/17		0	0	0	2	0	0	0
7/18		1	0	1	0	0	0	1
7/19	[a]	2	2	0	0	0	0	0
7/20		3	0	1	16	0	0	0
7/21	[a]	4	2	0	7	2	1	0
7/22		2	3	0	5	2	0	0
7/23		1	3	0	1	1	0	0
7/24		2	4	0	0	0	0	0
7/25		4	5	0	5	1	0	0
7/26		6	9	0	8	2	0	0
7/27		10	14	0	6	3	0	0
7/28		4	4	0	0	11	0	0
7/29	[a]	1	7	1	2	2	0	0
7/30		2	4	1	7	7	0	0
7/31		2	8	0	1	0	0	0
8/1		1	2	0	1	0	0	0
8/2		2	5	0	1	0	0	0
8/3		12	1	0	0	0	0	0
8/4		14	3	0	1	0	0	0
8/5		8	0	0	0	1	0	0
8/6		5	3	0	0	0	0	0
8/7		3	6	0	0	0	0	0
8/8		2	2	0	0	0	0	0
8/9		1	4	0	0	0	0	0
8/10		4	0	0	0	0	0	0
8/11		1	1	0	0	0	0	0
Total		101	92	4	115	34	1	1

[a] Partial day count.

Appendix C7.–Daily observed passage of nontarget species at Tatlawiksuk River weir, 2015.

Date		Longnose Sucker	Arctic Grayling	Whitefish	Northern Pike	Sheefish
6/13	[ab]	0	0	0	0	0
6/14	[a]	11	0	0	0	0
6/15		43	0	3	0	0
6/16		99	0	12	0	0
6/17		7	1	4	0	0
6/18		52	0	0	0	0
6/19		40	0	0	0	0
6/20		39	0	0	0	0
6/21		24	0	0	0	0
6/22		28	0	0	0	0
6/23		41	0	2	0	0
6/24		36	0	0	0	0
6/25		47	0	0	0	0
6/26		22	0	0	0	0
6/27		5	0	0	0	0
6/28		30	0	0	0	0
6/29		36	0	1	0	0
6/30		27	0	0	0	0
7/1		13	0	0	0	0
7/2		7	0	0	0	0
7/3		2	0	1	0	0
7/4		9	0	0	0	0
7/5		5	0	0	0	0
7/6		7	1	0	0	0
7/7		4	0	0	0	0
7/8		15	2	3	0	0
7/9		3	0	0	0	0
7/10		5	0	0	0	0
7/11		8	1	0	0	0
7/12		4	0	0	0	0
7/13		5	2	0	0	0
7/14		7	0	5	0	0
7/15		4	0	3	0	0
7/16		1	0	2	0	0
7/17		9	0	0	0	0
7/18		16	0	0	0	0
7/19	[c]	ND	ND	ND	ND	ND
7/20		0	0	0	0	0
7/21		4	0	0	0	0
7/22		4	0	0	0	0
7/23		1	0	0	0	0
7/24		1	0	0	0	0
7/25		4	0	0	0	0
7/26		0	0	0	0	0

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Date	Longnose Sucker	Arctic Grayling	Whitefish	Northern Pike	Sheefish
7/27	2	0	0	0	0
7/28	6	0	0	0	0
7/29	1	0	0	0	0
7/30	3	0	0	0	0
7/31	1	0	0	0	0
8/1	0	0	0	0	0
8/2	0	0	0	0	0
8/3	0	0	0	0	0
8/4	1	0	0	0	0
8/5	0	0	0	0	0
8/6	0	0	0	0	0
8/7	0	0	0	0	0
8/8	0	0	0	0	0
8/9	2	0	0	0	0
8/10	0	0	0	0	0
8/11	2	0	0	0	0
8/12	2	0	0	0	0
8/13	7	0	0	0	0
8/14	0	0	0	0	0
8/15	6	0	0	0	0
8/16	0	0	0	0	0
8/17	2	0	0	0	0
8/18	0	0	0	0	0
8/19	0	0	0	0	0
8/20	1	0	2	0	0
8/21	0	0	0	0	0
8/22	0	0	1	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	2	1	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	1	0
9/1	0	0	0	1	0
9/2	0	0	0	0	0
9/3	0	0	0	1	0
9/4	0	0	0	1	0
9/5	0	0	0	3	1
9/6	0	0	1	0	1
9/7	0	0	1	0	0
9/8	0	0	0	0	0

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Date		Longnose Sucker	Arctic Grayling	Whitefish	Northern Pike	Sheefish
9/9		0	0	0	0	0
9/10		0	0	0	0	0
9/11		0	0	0	0	0
9/12	[b]	0	0	0	0	0
Total		761	7	43	8	2

[a] Counts occurred outside of the project's target operational period.

[b] Partial day count.

[c] The weir was not operational.

Appendix C8.–Daily observed passage of nontarget species at Salmon River (Pitka Fork) weir, 2015.

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

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Date	Chum Salmon	Longnose Sucker	Arctic Grayling
7/14	1	0	0
7/15	2	0	0
7/16	0	2	1
7/17	1	0	0
7/18	1	0	0
7/19	0	0	0
7/20	3	0	0
7/21	5	1	0
7/22	3	0	0
7/23	2	0	0
7/24	6	0	0
7/25	1	0	0
7/26	0	0	0
7/27	2	0	0
7/28	2	0	0
7/29	8	0	0
7/30	3	0	0
7/31	2	0	0
8/1	4	0	0
8/2	0	0	0
8/3	0	0	0
8/4	1	0	0
8/5	0	0	0
8/6	1	0	0
8/7	1	0	0
8/8	0	0	0
8/9	1	0	0
8/10	1	0	0
8/11	0	0	0
8/12	0	0	0
8/13	0	0	0
8/14	1	0	0
8/15	0	0	0
Total	54	38	4

[a] The weir was not operational.

[b] Partial day count.

APPENDIX D

Appendix D1.–Daily and annual observed Chinook salmon counts at Kuskokwim Area weir projects, 2015.

	Kuskokwim Bay		Kuskokwim River				
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	George	Kogrukluk	Tatlawiksuk	Salmon River (Pitka Fork)
6/1	[a]	[a]	[a]	[a]	[a]	[a]	[b]
6/2	[a]	[a]	[a]	[a]	[a]	[a]	[b]
6/3	[a]	[a]	[a]	[a]	[a]	[a]	0
6/4	[a]	[a]	[a]	[a]	[a]	[a]	0
6/5	[a]	[a]	[a]	[a]	[a]	[a]	0
6/6	[a]	[a]	[a]	[a]	[a]	[a]	0
6/7	[a]	[a]	[a]	[a]	[a]	[a]	0
6/8	[a]	[a]	[a]	[a]	[a]	[a]	0
6/9	[a]	[a]	[a]	[a]	[a]	[a]	0 [c]
6/10	[a]	[a]	[a]	[a]	[a]	[a]	[b]
6/11	[a]	[a]	[a]	[a]	[a]	[a]	[b]
6/12	[a]	[a]	[a]	[a]	[a]	[a]	[b]
6/13	[a]	[a]	[a]	[a]	[a]	0 [ac]	0 [c]
6/14	[a]	[a]	[a]	[a]	[a]	0 [a]	0
6/15	[a]	[a]	[b]	0 [c]	[a]	0	0
6/16	[a]	[a]	[b]	3	[a]	0	0
6/17	[a]	[a]	[b]	0	[a]	0	0
6/18	[a]	[a]	[b]	0	[a]	0	0
6/19	[a]	[a]	[b]	10	[a]	0	0
6/20	[a]	[a]	0	0	[a]	0	0
6/21	[a]	[a]	1	7	[a]	1	0
6/22	[a]	0 [ac]	1	32	1 [ac]	1	0
6/23	[a]	1 [a]	0	96	6 [a]	4	0
6/24	[a]	2 [a]	0	49	7 [a]	1	0
6/25	3 [c]	1	0	20	4 [a]	1	0
6/26	12	2	0	4 [c]	2	0	0
6/27	3	0	0 [c]	2	8	0	19
6/28	0	8	[b]	32	20	29	1
6/29	12	3	[b]	36	8	20	81
6/30	32	18	0 [c]	33	50	35	111
7/1	12	71	5	74	35	39	35
7/2	23	56	0	27	46	24	164
7/3	83	148	0	17	51	53	102
7/4	10	213	35	79	49	261	116

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Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	George	Kogrukluk	Tatlawiksuk	Salmon River (Pitka Fork)
7/5	36	149	47	157	105	171	15
7/6	39 [c]	124	44	282	164	116	533
7/7	16	38	5	259	577	367	248
7/8	13	85	43	90	150	196	68
7/9	43	58	6	32	115	36	87
7/10	40	153	6	83	217	47	113
7/11	28	247	104	119	320	189	252 [c]
7/12	11	243	78	50	657	55	624
7/13	88	325	83	84	180	71	49 [c]
7/14	134	448	106	68	421	93	240
7/15	66	362	165	63	238	32	905
7/16	52	229	16	17	251	44	147
7/17	5 [c]	317	76	20	378 [c]	28	112
7/18	57	302	180	27	[b]	31	271
7/19	13	327	82	22	17 [c]	[b]	68
7/20	76	390	140 [c]	50	215	15	221
7/21	62	449	18 [c]	32	171	20	331
7/22	12	369	162	29	122	27	398
7/23	9 [c]	543	84	21	217	6	295
7/24	53	318	106	23	419	8	243
7/25	38	488	52	17	195	10	112
7/26	62	428	55	18	256	5	100
7/27	24	474	62	29	260	10	82
7/28	61	461	76	31	238	7	55
7/29	18	269	49	27	105	3	148
7/30	18	235	64	16	195	6	26
7/31	3	164	51	17	213	1	67
8/1	59	286	57	11	98	2	100
8/2	14	211	20	11	110	3	39
8/3	7	134	26	4 [c]	65	0	20
8/4	5	191	14	4	103	0	30
8/5	2	183	18	5	60	4	22

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	Kuskokwim Bay		Kuskokwim River				
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	George	Kogrukluk	Tatlawiksuk	Salmon River (Pitka Fork)
8/6	4	136	19	5	49	1	16
8/7	2	93	15	4	39	2	14
8/8	0	68	7	1	51	1	5
8/9	8	153	17	0	40	0	14
8/10	6	75	39	3	39	1	9
8/11	1	55	1	4	21	5	5
8/12	0	76	22	0	25	4	6
8/13	0	78	18	6	15	2	5
8/14	1	103	6 [c]	4	20	0	2
8/15	2 [c]	59	11	4	24	4	10
8/16	1 [c]	[a]	[b]	2	12	1	[a]
8/17	6	[a]	[b]	3	9	0	[a]
8/18	3 [c]	[a]	[b]	0	9	0	[a]
8/19	0 [c]	[a]	[b]	0	15	0	[a]
8/20	1 [c]	[a]	[b]	0	5	0	[a]
8/21	0	[a]	[b]	1	6	1	[a]
8/22	1	[a]	[b]	0	4	0	[a]
8/23	0	[a]	[b]	0	1	0	[a]
8/24	3	[a]	[b]	0	1	1	[a]
8/25	0	[a]	[b]	1	4	0	[a]
8/26	0	[a]	[b]	0	2	0	[a]
8/27	3	[a]	[b]	1	0	0	[a]
8/28	0	[a]	[b]	0	0	0	[a]
8/29	1	[a]	[b]	0	1	0	[a]
8/30	0	[a]	[b]	0	0	0	[a]
8/31	1	[a]	[b]	1	2	0	[a]
9/1	[b]	[a]	[b]	1	1	0	[a]
9/2	[b]	[a]	[b]	0	1	0	[a]
9/3	[b]	[a]	[b]	1	1	1	[a]
9/4	[b]	[a]	[b]	1	2	0	[a]
9/5	[b]	[a]	[b]	0	1	0	[a]
9/6	[b]	[a]	[b]	0	0	0	[a]

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	Kuskokwim Bay		Kuskokwim River				
Date	Middle Fork Goodnews	Kanektok	Salmon (Aniak)	George	Kogrukluk	Tatlawiksuk	Salmon River (Pitka Fork)
9/7	[b]	[a]	[b]	0	0	0	[a]
9/8	[b]	[a]	[b]	0	0	0	[a]
9/9	[b]	[a]	[b]	0	0	0	[a]
9/10	[b]	[a]	[b]	0	2	0	[a]
9/11	[b]	[a]	[b]	0	0	0	[a]
9/12	[b]	[a]	[b]	0	0	0 [c]	[a]
9/13	[b]	[a]	[b]	0	0	[b]	[a]
9/14	[b]	[a]	[b]	0 [c]	0	[b]	[a]
9/15	[b]	[a]	[b]	[b]	0	[b]	[a]
9/16	[b]	[a]	[b]	[b]	0	[b]	[a]
9/17	[b]	[a]	[b]	[b]	1	[b]	[a]
9/18	[b]	[a]	[b]	[b]	0	[b]	[a]
9/19	[a]	[a]	[b]	0 [c]	0	[b]	[a]
9/20	[a]	[a]	[b]	0	0	[b]	[a]
9/21	[a]	[a]	[a]	[a]	0	[a]	[a]
9/22	[a]	[a]	[a]	[a]	0	[a]	[a]
9/23	[a]	[a]	[a]	[a]	[b]	[a]	[a]
9/24	[a]	[a]	[a]	[a]	[b]	[a]	[a]
9/25	[a]	[a]	[a]	[a]	[b]	[a]	[a]
Observed Esc	1,398	10,419	2,292	2,282	7,522	2,096	6,736

Note: This table documents raw counts from field forms. This table does not contain estimates for any missed escapement that may have occurred during inoperable periods. These counts may not constitute daily escapement, and the sum of these counts may not constitute annual escapement.

[a] The date is outside of the project's target operational period.

[b] The weir was not operational.

[c] Partial day count.

Appendix D2.–Daily and annual observed chum salmon counts at Kuskokwim Area weir projects, 2015.

	Kuskokwim Bay		Kuskokwim River			
Date	Middle Fork Goodnews R	Kanektok River	Salmon River (Aniak)	George River	Kogrukluk River	Tatlawiksuk River
6/1	[a]	[a]	[a]	[a]	[a]	[a]
6/2	[a]	[a]	[a]	[a]	[a]	[a]
6/3	[a]	[a]	[a]	[a]	[a]	[a]
6/4	[a]	[a]	[a]	[a]	[a]	[a]
6/5	[a]	[a]	[a]	[a]	[a]	[a]
6/6	[a]	[a]	[a]	[a]	[a]	[a]
6/7	[a]	[a]	[a]	[a]	[a]	[a]
6/8	[a]	[a]	[a]	[a]	[a]	[a]
6/9	[a]	[a]	[a]	[a]	[a]	[a]
6/10	[a]	[a]	[a]	[a]	[a]	[a]
6/11	[a]	[a]	[a]	[a]	[a]	[a]
6/12	[a]	[a]	[a]	[a]	[a]	[a]
6/13	[a]	[a]	[a]	[a]	[a]	0 [ac]
6/14	[a]	[a]	[a]	[a]	[a]	0 [a]
6/15	[a]	[a]	[b]	1 [c]	[a]	0
6/16	[a]	[a]	[b]	11	[a]	0
6/17	[a]	[a]	[b]	3	[a]	0
6/18	[a]	[a]	[b]	6	[a]	1
6/19	[a]	[a]	[b]	8	[a]	0
6/20	[a]	[a]	0	2	[a]	1
6/21	[a]	[a]	0	4	[a]	0
6/22	[a]	0 [ac]	0	42	6 [ac]	1
6/23	[a]	8 [a]	2	32	1 [a]	11
6/24	[a]	9 [a]	3	18	27 [a]	12
6/25	9 [c]	26	4	27	19 [a]	2
6/26	23	37	0	14 [c]	12	2
6/27	5	4	0 [c]	12	21	1
6/28	14	55	[b]	60	38	66
6/29	35	51	[b]	104	13	88
6/30	82	56	1 [c]	58	47	59
7/1	42	64	11	138	40	106
7/2	58	86	14	48	34	108
7/3	145	140	0	42	59	192
7/4	48	134	8	110	56	382

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Appendix D2.–Page 2 of 4.

Date	Kuskokwim Bay		Kuskokwim River			
	Middle Fork Goodnews R	Kanektok River	Salmon River (Aniak)	George River	Kogrukluk River	Tatlawiksuk River
7/5	113	88	26	149	76	398
7/6	27 [c]	73	13	441	165	279
7/7	114	81	11	235	260	318
7/8	90	95	16	137	282	349
7/9	224	119	51	128	265	225
7/10	182	139	80	211	291	341
7/11	185	228	78	276	463	642
7/12	108	348	69	367	370	513
7/13	238	292	72	347	247	339
7/14	466	455	49	272	324	542
7/15	395	458	162	632	330	273
7/16	347	301	132	381	411	489
7/17	122 [c]	345	253	437	337 [c]	525
7/18	351	356	170	838	[b]	590
7/19	186	502	243	949	54 [c]	[b]
7/20	813	625	282 [c]	739	705	419
7/21	371	813	201 [c]	952	977	423
7/22	199	339	340	688	1,172	389
7/23	220 [c]	437	152	698	1,307	168
7/24	290	413	262	490	1,216	74
7/25	479	520	128	563	811	128
7/26	596	475	131	502	786	139
7/27	440	696	137	571	1,927	142
7/28	723	585	296	657	1,674	90
7/29	372	561	243	659	992	94
7/30	375	651	222	541	1,983	92
7/31	123	483	194	403	1,300	36
8/1	427	504	209	443	1,169	82
8/2	229	387	166	379	1,056	167
8/3	266	423	138	136 [c]	996	97
8/4	153	622	122	238	1,205	87
8/5	86	352	137	287	1,119	49

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Appendix D2.–Page 3 of 4.

Date	Kuskokwim Bay		Kuskokwim River			
	Middle Fork Goodnews R	Kanektok River	Salmon River (Aniak)	George River	Kogrukluk River	Tatlawiksuk River
8/6	226	270	116	201	879	37
8/7	65	280	114	176	778	32
8/8	57	175	68	123	614	40
8/9	114	178	27	107	507	40
8/10	66	141	60	98	494	50
8/11	74	85	17	57	486	25
8/12	68	146	47	30	357	24
8/13	48	142	58	141	267	27
8/14	48	131	34 [c]	137	439	19
8/15	27 [c]	81	39	124	474	35
8/16	67 [c]	[a]	[b]	80	319	27
8/17	67	[a]	[b]	73	247	25
8/18	40 [c]	[a]	[b]	68	223	14
8/19	14 [c]	[a]	[b]	35	176	4
8/20	9 [c]	[a]	[b]	20	148	8
8/21	14	[a]	[b]	32	108	7
8/22	22	[a]	[b]	33	114	10
8/23	14	[a]	[b]	24	64	7
8/24	4	[a]	[b]	16	116	13
8/25	4	[a]	[b]	24	55	7
8/26	22	[a]	[b]	54	53	3
8/27	28	[a]	[b]	14	25	1
8/28	5	[a]	[b]	16	14	2
8/29	4	[a]	[b]	21	10	1
8/30	3	[a]	[b]	18	10	10
8/31	4	[a]	[b]	13	17	1
9/1	[b]	[a]	[b]	11	11	1
9/2	[b]	[a]	[b]	21	11	5
9/3	[b]	[a]	[b]	11	9	0
9/4	[b]	[a]	[b]	12	18	2
9/5	[b]	[a]	[b]	19	14	0
9/6	[b]	[a]	[b]	17	1	0

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Appendix D2.–Page 4 of 4.

Date	Kuskokwim Bay		Kuskokwim River			
	Middle Fork Goodnews R	Kanektok River	Salmon River (Aniak)	George River	Kogrukluk River	Tatlawiksuk River
9/7	[b]	[a]	[b]	5	6	1
9/8	[b]	[a]	[b]	7	3	1
9/9	[b]	[a]	[b]	5	3	1
9/10	[b]	[a]	[b]	11	8	1
9/11	[b]	[a]	[b]	5	0	2
9/12	[b]	[a]	[b]	3	1	0 [c]
9/13	[b]	[a]	[b]	5	0	[b]
9/14	[b]	[a]	[b]	6 [c]	1	[b]
9/15	[b]	[a]	[b]	[b]	2	[b]
9/16	[b]	[a]	[b]	[b]	0	[b]
9/17	[b]	[a]	[b]	[b]	0	[b]
9/18	[b]	[a]	[b]	[b]	1	[b]
9/19	[a]	[a]	[b]	0 [c]	0	[b]
9/20	[a]	[a]	[b]	0	0	[b]
9/21	[a]	[a]	[a]	[a]	0	[a]
9/22	[a]	[a]	[a]	[a]	0	[a]
9/23	[a]	[a]	[a]	[a]	[b]	[a]
9/24	[a]	[a]	[a]	[a]	[b]	[a]
9/25	[a]	[a]	[a]	[a]	[b]	[a]
Observed Esc	10,885	15,065	5,408	17,359	31,726	10,014

Note: This table documents raw counts from field forms. This table does not contain estimates for any missed escapement that may have occurred during inoperable periods. These counts may not constitute daily escapement, and the sum of these counts may not constitute annual escapement.

[a] The date is outside of the project's target operational period.

[b] The weir was not operational.

[c] Partial day count.

Appendix D3.–Daily and annual observed coho salmon counts at Kuskokwim Area weir projects, 2015.

	Kuskokwim Bay	Kuskokwim River		
Date	Middle Fork Goodnews R	George River	Kogrukluk River	Tatlawiksuk River
6/1	a	a	a	a
6/2	a	a	a	a
6/3	a	a	a	a
6/4	a	a	a	a
6/5	a	a	a	a
6/6	a	a	a	a
6/7	a	a	a	a
6/8	a	a	a	a
6/9	a	a	a	a
6/10	a	a	a	a
6/11	a	a	a	a
6/12	a	a	a	a
6/13	a	a	a	0 ac
6/14	a	a	a	0 a
6/15	a	0 c	a	0
6/16	a	0	a	0
6/17	a	0	a	0
6/18	a	0	a	0
6/19	a	0	a	0
6/20	a	0	a	0
6/21	a	0	a	0
6/22	a	0	0 ac	0
6/23	a	0	0 a	0
6/24	a	0	0 a	0
6/25	0 c	0	0 a	0
6/26	0	0 c	0	0
6/27	0	0	0	0
6/28	0	0	0	0
6/29	0	0	0	0
6/30	0	0	0	0
7/1	0	0	0	0
7/2	0	0	0	0
7/3	0	0	0	0
7/4	0	0	0	0

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	Kuskokwim Bay	Kuskokwim River		
Date	Middle Fork Goodnews R	George River	Kogrukluk River	Tatlawiksuk River
7/5	0	0	0	0
7/6	0 [c]	0	0	0
7/7	0	0	0	0
7/8	0	0	0	0
7/9	0	0	0	0
7/10	0	0	0	0
7/11	0	0	0	0
7/12	0	0	0	0
7/13	0	0	0	0
7/14	0	0	0	0
7/15	0	0	0	0
7/16	0	0	0	0
7/17	0 [c]	0	0 [c]	0
7/18	0	0	[b]	0
7/19	0	0	0 [c]	[b]
7/20	0	0	0	0
7/21	0	0	0	0
7/22	0	0	0	0
7/23	0 [c]	0	0	2
7/24	0	0	0	4
7/25	0	3	0	2
7/26	0	0	2	0
7/27	0	5	3	2
7/28	0	17	1	3
7/29	0	12	2	3
7/30	0	24	3	4
7/31	2	6	4	1
8/1	14	16	9	4
8/2	6	17	8	10
8/3	6	5 [c]	6	28
8/4	8	32	24	28
8/5	7	108	21	61

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	Kuskokwim Bay		Kuskokwim River		
Date	Middle Fork Goodnews R		George River	Kogrukluk River	Tatlawiksuk River
8/6	0		107	18	39
8/7	4		94	11	75
8/8	3		29	10	144
8/9	20		45	19	131
8/10	2		70	22	175
8/11	4		9	8	277
8/12	0		5	14	169
8/13	3		100	22	167
8/14	3		184	25	391
8/15	8	[c]	253	144	740
8/16	6	[c]	203	215	665
8/17	14		374	165	576
8/18	21	[c]	159	265	784
8/19	5	[c]	141	150	623
8/20	2	[c]	16	133	414
8/21	0		164	82	576
8/22	30		67	262	947
8/23	14		775	92	510
8/24	380		105	137	422
8/25	26		677	426	1,272
8/26	1,646		6,941	528	1,971
8/27	2,812		2,246	112	943
8/28	33		841	75	324
8/29	8,901		445	20	387
8/30	28		174	30	298
8/31	1,076		553	977	703
9/1		[b]	734	923	361
9/2		[b]	294	1,394	464
9/3		[b]	892	3,630	508
9/4		[b]	3,829	5,764	282
9/5		[b]	3,368	2,017	674
9/6		[b]	1,576	835	273

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	Kuskokwim Bay	Kuskokwim River		
Date	Middle Fork Goodnews R	George River	Kogrukluk River	Tatlawiksuk River
9/7	[b]	1,718	2,878	178
9/8	[b]	1,038	1,419	181
9/9	[b]	1,126	1,300	182
9/10	[b]	952	1,853	130
9/11	[b]	1,089	958	133
9/12	[b]	319	740	78 [c]
9/13	[b]	543	908	[b]
9/14	[b]	892 [c]	640	[b]
9/15	[b]	[b]	786	[b]
9/16	[b]	[b]	707	[b]
9/17	[b]	[b]	764	[b]
9/18	[b]	[b]	252	[b]
9/19	[a]	11 [c]	226	[b]
9/20	[a]	55	145	[b]
9/21	[a]	[a]	116	[a]
9/22	[a]	[a]	157	[a]
9/23	[a]	[a]	[b]	[a]
9/24	[a]	[a]	[b]	[a]
9/25	[a]	[a]	[b]	[a]
Observed Esc	15,084	33,458	32,457	17,319

Note: This table documents raw counts from field forms. This table does not contain estimates for any missed escapement that may have occurred during inoperable periods. These counts may not constitute daily escapement, and the sum of these counts may not constitute annual escapement.

[a] The date is outside of the project's target operational period.

[b] The weir was not operational.

[c] Partial day count.

Appendix D4.–Daily and annual observed sockeye salmon counts at Kuskokwim Area weir projects, 2015.

	Kuskokwim Bay		Kuskokwim River		
Date	Middle Fork Goodnews R	Kanektok River	Salmon River (Aniak)	Kogrukluk River	Telaquana River
6/1	a	a	a	a	a
6/2	a	a	a	a	a
6/3	a	a	a	a	a
6/4	a	a	a	a	a
6/5	a	a	a	a	a
6/6	a	a	a	a	a
6/7	a	a	a	a	a
6/8	a	a	a	a	a
6/9	a	a	a	a	a
6/10	a	a	a	a	a
6/11	a	a	a	a	a
6/12	a	a	a	a	a
6/13	a	a	a	a	a
6/14	a	a	a	a	a
6/15	a	a	b	a	a
6/16	a	a	b	a	a
6/17	a	a	b	a	a
6/18	a	a	b	a	a
6/19	a	a	b	a	a
6/20	a	a	0	a	a
6/21	a	a	0	a	a
6/22	a	18 ac	0	0 ac	a
6/23	a	57 a	0	0 a	a
6/24	a	92 a	0	0 a	a
6/25	203 c	110	0	0 a	a
6/26	436	167	0	0	a
6/27	397	10	0 c	0	a
6/28	338	244	b	0	a
6/29	1,257	242	b	0	a
6/30	1,276	437	0 c	1	a
7/1	1,308	767	0	0	a
7/2	1,197	1,137	0	0	a
7/3	1,586	1,670	0	3	b
7/4	768	2,034	0	0	b

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Date	Kuskokwim Bay		Kuskokwim River			
	Middle Fork Goodnews R	Kanektok River	Salmon River (Aniak)	Kogrukluk River	Telaquana River	
7/5	2,306	1,790	0	1		[b]
7/6	880 [c]	1,730	0	3		[b]
7/7	2,714	1,082	0	42		[b]
7/8	1,602	2,079	0	14		[b]
7/9	4,361	2,489	0	7		[b]
7/10	2,900	3,183	1	7		[b]
7/11	1,623	4,904	0	34	0	[c]
7/12	1,866	5,970	1	64	872	
7/13	4,109	4,206	0	10	638	
7/14	3,588	5,574	0	74	603	[c]
7/15	2,368	5,094	1	35	2,374	
7/16	2,458	3,919	0	6	2,793	
7/17	703 [c]	3,402	4	28 [c]	1,376	
7/18	1,748	2,876	9	[b]	3,521	
7/19	1,176	4,364	0	2 [c]	4,904	[c]
7/20	2,719	4,437	29 [c]	54	5,560	
7/21	973	4,469	5 [c]	63	3,033	[c]
7/22	988	2,985	26	38	5,275	
7/23	684 [c]	3,280	36	114	3,522	
7/24	679	2,430	39	474	6,165	
7/25	731	2,678	11	265	7,711	
7/26	619	2,581	20	217	6,631	
7/27	500	2,706	26	797	6,195	
7/28	439	2,464	62	601	5,128	
7/29	469	2,679	79	141	4,330	[c]
7/30	399	2,248	90	645	4,946	
7/31	184	1,822	64	662	2,622	
8/1	417	1,923	77	293	2,654	
8/2	212	1,683	97	247	1,834	
8/3	144	1,280	89	279	2,304	
8/4	86	1,653	66	274	1,806	
8/5	76	1,024	68	170	954	

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Appendix D4.–Page 3 of 4.

	Kuskokwim Bay		Kuskokwim River		
Date	Middle Fork Goodnews R	Kanektok River	Salmon River (Aniak)	Kogrukluk River	Telaquana River
8/6	93	845	81	159	972
8/7	56	650	77	107	521
8/8	47	516	40	63	437
8/9	127	612	44	65	592
8/10	82	507	109	56	352
8/11	45	288	21	28	365
8/12	46	399	82	37	b
8/13	26	408	52	17	b
8/14	67	390	21 c	24	b
8/15	18 c	314	22	34	b
8/16	77 c	a	b	16	b
8/17	72	a	b	24	b
8/18	40 c	a	b	9	b
8/19	24 c	a	b	12	b
8/20	26 c	a	b	10	b
8/21	20	a	b	5	b
8/22	17	a	b	5	b
8/23	23	a	b	2	b
8/24	22	a	b	9	b
8/25	7	a	b	4	b
8/26	10	a	b	6	b
8/27	27	a	b	1	a
8/28	6	a	b	0	a
8/29	4	a	b	0	a
8/30	7	a	b	0	a
8/31	7	a	b	4	a
9/1	b	a	b	1	a
9/2	b	a	b	1	a
9/3	b	a	b	4	a
9/4	b	a	b	5	a
9/5	b	a	b	1	a
9/6	b	a	b	0	a

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	Kuskokwim Bay		Kuskokwim River		
Date	Middle Fork Goodnews R	Kanektok River	Salmon River (Aniak)	Kogrukluk River	Telaquana River
9/7	[b]	[a]	[b]	1	[a]
9/8	[b]	[a]	[b]	0	[a]
9/9	[b]	[a]	[b]	0	[a]
9/10	[b]	[a]	[b]	5	[a]
9/11	[b]	[a]	[b]	0	[a]
9/12	[b]	[a]	[b]	0	[a]
9/13	[b]	[a]	[b]	0	[a]
9/14	[b]	[a]	[b]	0	[a]
9/15	[b]	[a]	[b]	2	[a]
9/16	[b]	[a]	[b]	0	[a]
9/17	[b]	[a]	[b]	1	[a]
9/18	[b]	[a]	[b]	2	[a]
9/19	[a]	[a]	[b]	0	[a]
9/20	[a]	[a]	[b]	0	[a]
9/21	[a]	[a]	[a]	0	[a]
9/22	[a]	[a]	[a]	0	[a]
9/23	[a]	[a]	[a]	[b]	[a]
9/24	[a]	[a]	[a]	[b]	[a]
9/25	[a]	[a]	[a]	[b]	[a]
Observed Esc	54,483	106,918	1,449	6,385	90,990

Note: This table documents raw counts from field forms. This table does not contain estimates for any missed escapement that may have occurred during inoperable periods. These counts may not constitute daily escapement, and the sum of these counts may not constitute annual escapement.

[a] The date is outside of the project's target operational period.

[b] The weir was not operational.

[c] Partial day count.