Fishery Data Series No. 16-03

Salmon Escapement Monitoring in the Kuskokwim Area, 2014

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

by

Tracy R. Hansen

Brittany J. Blain

Davin V. Taylor

and

Zachary W. Liller

January 2016

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

Symbols and Abbreviations

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

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Zachary W. Liller

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

January 2016

This investigation was partially financed by USFWS Office of Subsistence Management (under Project Numbers 14-303, and 14-302) Fisheries Resource Monitoring Program under FWS Agreement Numbers, F14AC00102 and F14AC00109. Additional funds were provided by Coastal Villages Region Fund, Alaska Sustainable Salmon Fund, and the State of Alaska.

ADF&G Fishery Data Series was established in 1987 for the publication of Division of Sport Fish technically oriented results for a single project or group of closely related projects, and in 2004 became a joint divisional series with the Division of Commercial Fisheries. Fishery Data Series reports are intended for fishery and other technical professionals and are available through the Alaska State Library and on the Internet: http://www.adfg.alaska.gov/sf/publications/ This publication has undergone editorial and peer review.

Tracy R. Hansen,
tracy.hansen1@alaska.gov
Alaska Department of Fish and Game, Division of Commercial Fisheries,
333 Raspberry Road, Anchorage, AK 99518, USA

Brittany J. Blain,
brittany.blain@alaska.gov
Alaska Department of Fish and Game, Division of Commercial Fisheries
333 Raspberry Road, Anchorage, AK 99518, USA

Davin V. Taylor,
davin.taylor@alaska.gov
Alaska Department of Fish and Game, Division of Commercial Fisheries
333 Raspberry Road, Anchorage, AK 99518, USA

Zachary W. Liller,
zachary.liller@alaska.gov
Alaska Department of Fish and Game, Division of Commercial Fisheries
333 Raspberry Road, Anchorage, AK 99518, USA

This document should be cited as follows:
Hansen, T. R., B. J. Blain, D. V. Taylor, and Z. W. Liller. 2016. Salmon escapement monitoring in the Kuskokwim Area, 2014. Alaska Department of Fish and Game, Fishery Data Series No. 16-03, Anchorage.

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ABSTRACT

In 2014, the Alaska Department of Fish and Game, 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. Chinook salmon *O. tshawytscha* escapement indices were successfully determined for all high priority streams surveyed except the Holitna River. Aerial escapement indices were below average at most locations; however, escapement goals were achieved. In addition, Chinook salmon were successfully monitored at all ground-based weir projects. Escapements were below average at all ground-based assessment projects except the Tatlawiksuk River weir, which was above average. The drainagewide Chinook salmon and the George River Chinook salmon weir goals were met. However, the Middle Fork Goodnews and Kogrukluk River weir Chinook salmon escapement goals were not met. Sockeye salmon *O. nerka* aerial surveys were successful on the Middle Fork Goodnews and Kanektok rivers. The Kanektok River aerial escapement index was the highest on record; however, the Middle Fork Goodnews was below average. Sockeye and chum *O. keta* salmon escapement was successfully monitored at all ground based projects. Sockeye and chum salmon escapement was below average at all projects except the Kanektok River where sockeye salmon escapement was above average. The sockeye and chum salmon escapement goals were met at the Kogrukluk River weir; however, the Middle Fork Goodnews River chum salmon goal was not met. Coho salmon *O. kisutch* were successfully monitored at all ground-based monitoring projects except the Middle Fork Goodnews River weir because of early termination of the project. Coho salmon escapement was above average at all successfully operated projects, and the escapement goal was met at the Kogrukluk River. Age, sex, and length sampling was conducted at all ground based projects in 2014.

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

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 managers. 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 of abundance. The Kuskokwim Area is comprised of the Kuskokwim River and Kuskokwim Bay. 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 are monitored to provide an overview 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. 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. For the Kuskokwim River, 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 annual harvest of approximately 500,000 fish (Brazil et al. 2013). 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 (Brazil et al. 2013). Whereas 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, and Goodnews Bay and Kanektok River of Kuskokwim Bay (Brazil et al. 2013). The commercial salmon fishery occurs in 3 districts within the Kuskokwim Area (Figure 1). District 1 is located in the lower portion of the Kuskokwim River, District 4 includes areas in Kuskokwim Bay near the Kanektok river system, and District 5 includes areas near the Goodnews river system. The sport fishery is the smallest of the 3 fisheries and occurs throughout the Kuskokwim Area.

Peak aerial surveys have been conducted in the Kuskokwim Area since the late 1950s to count salmon spawning escapement; these counts are used as indices of abundance (Molyneaux and Brannian 2006). Aerial surveys flown on Kuskokwim Bay rivers target Chinook and sockeye salmon, and Kuskokwim River surveys target Chinook salmon only. These surveys have been flown on 145 Kuskokwim Area rivers and lakes in total since 1959 (Brannian et al. 2006b; AYKDBMS[1]); however, only a subset of 16 streams are considered to be a high priority by managers and surveys are attempted annually (Table 1). High priority survey rivers have been selected based on water clarity, location, salmon abundance, past survey history, and perceived local importance and interest. Lower priority rivers are surveyed when resources and conditions allow in a given year. 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).

The first ground based weir project in the Kuskokwim Area began in 1976; other weir projects were added in the 1990s and as recently as 2010 (Molyneaux and Brannian 2006; Hansen and Blain 2013). Weirs provide opportunity to estimate total annual escapement and collect age, sex, length (ASL) information from Chinook, chum, coho, and sockeye salmon. Pink salmon escapement data were also collected at the escapement projects; however the smaller body size of pink salmon allowed them to pass through the weirs undetected, making a complete count impossible. 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. In addition to Pacific salmon, many other resident fish species are commonly observed in the monitored streams. Ground based weir projects provide a more dependable and rigorous approach to escapement monitoring. However, the relatively high costs of weir projects and limitations of installing weirs in larger 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 (Table 2). Aerial survey based escapement goals are established for Chinook salmon on 2 Kuskokwim Bay rivers and 7 Kuskokwim River tributaries and for sockeye salmon on 2 Kuskokwim Bay rivers. Weir based escapement goals are established for Chinook, chum, sockeye, and coho salmon on the Middle Fork Goodnews and Kogrukluk rivers. In addition, weir based escapement goals for Chinook salmon on the George River and for Chinook and coho salmon on the Kwethluk River are in place (ADF&G 2004; Brannian et al. 2006a; Volk et al. 2009; Conitz et al. 2012; Table 2).

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

Kuskokwim River Chinook salmon is the only species with an established drainagewide escapement goal (Conitz et al. 2012). 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 (Bue et al. 2012). The model estimate is used to determine if the drainagewide escapement goal was met.

This report presents sampling activities and escapement results from all aerial surveys and ground based weir projects operated by Alaska Department of Fish and Game (ADF&G) and partner organizations in 2014. 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. Fourteen high priority Kuskokwim Area aerial survey rivers were flown including: the North Fork Goodnews, Middle Fork Goodnews, Kanektok, Eek, Kisaralik, Aniak, Salmon (Aniak drainage), Kipchuk, Holokuk, Oskawalik, Holitna, Cheeneetnuk, Gagaryah, and Salmon (Pitka Fork drainage) rivers (Table 1; Figures 2 and 3). Three low priority rivers: the Arolik, Middle Fork Eek, and Chukowan rivers were also surveyed because of close proximity to high priority rivers and the availability of resources. Aerial surveys targeted the Pacific salmon species by priority (Table 1). Weir projects were operated successfully on the Middle Fork Goodnews River in collaboration with the United States Fish and Wildlife Service (USFWS), on the Kanektok River in collaboration with Native Village of Kwinhagak, on the Salmon (Aniak drainage), George, and Tatlawiksuk rivers in collaboration with the Kuskokwim Native Association, on the Kogrukluk River, and on the Telaquana River in collaboration with the National Park Service (Table 3; Figures 2 and 3). This report does not include data from other outside agency escapement monitoring projects in the Kuskokwim Area. Supplemental to ADF&G efforts, the USFWS operated salmon weirs on the Kwethluk and Tuluksak rivers in 2014. Projects targeted the Pacific salmon species by location within standard operational target operational periods (Table 3). Data collected to determine ASL compositions will be reported in the *2014 Salmon age, sex, and length catalog for the Kuskokwim Area* (e.g., Brodersen et al. 2013).

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 2014:

   Kuskokwim Bay

   - North Fork Goodnews River: Chinook and sockeye salmon;
   - Middle Fork Goodnews River: Chinook and sockeye salmon;
   - Arolik River: Chinook and sockeye salmon;
   - Kanektok River: Chinook and sockeye salmon;

   Kuskokwim River

   - Eek River: Chinook salmon;
   - Middle Fork Eek River: Chinook salmon;

- Kisaralik River: Chinook salmon;
- Aniak River: Chinook salmon;
- Salmon River (Aniak drainage): Chinook salmon;
- Kipchuk River: Chinook salmon;
- Holokuk River: Chinook salmon;
- Oskawalik River: Chinook salmon;
- Chukowan River: Chinook salmon;
- Holitna River: Chinook salmon;
- Cheeneetnuk River: Chinook salmon;
- Gagaryah River: Chinook salmon; and
- Salmon River (Pitka Fork drainage): Chinook salmon.

2. Estimate daily and annual escapement of select Pacific salmon species at weirs operated on the following Kuskokwim Area rivers, during a standard target operational period in 2014:

   Kuskokwim Bay

   - Middle Fork Goodnews River: Chinook, chum, sockeye, and coho salmon between 25 June and 18 September;
   - Kanektok River: Chinook, chum, and sockeye salmon between 25 June and 15 August;

   Kuskokwim River

   - Salmon River (Aniak drainage): Chinook, chum, sockeye, and coho salmon between 15 June and 20 September;
   - 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 26 August; and
   - Tatlawiksuk River: Chinook, chum, and coho salmon between 15 June and 20 September.

3. Collect ASL data from adult salmon species using weir traps operated on 7 rivers throughout the Kuskokwim Area in 2014, such that minimum sample sizes meet or exceed the following:

   - Chinook salmon: 230;
   - Kuskokwim River sockeye salmon: 230;
   - 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 Management Area is divided into 2 main components: Kuskokwim Bay and the Kuskokwim River. Kuskokwim Bay includes mainland coastal streams (excluding the Kuskokwim River) and Districts 4 and 5. The Kuskokwim River includes the mainstem, all tributaries of the river, and District 1.

Escapement monitoring was conducted in selected salmon spawning tributaries draining the Kuskokwim Management Area. Specifically, escapement monitoring in 2014 was conducted on 4 rivers draining into Kuskokwim Bay and 13 tributaries representing the lower, middle, and upper portions of the Kuskokwim River drainage (Figures 2 and 3). Chinook, chum, sockeye, and coho salmon are present at all monitoring locations.

Kuskokwim Bay Assessment Locations

Goodnews River

Monitoring of the Goodnews River provides an index of escapement of salmon returning to District 5. 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 northern most 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. Because of its proximity to the confluence, the weir accounts for a majority of salmon spawning within the Middle Fork.

Arolik River

The Arolik River is located between the Goodnews and Kanektok rivers, and monitoring provides an index of salmon escapement returning to Kuskokwim Bay. The Arolik River watershed drains an area approximately 1,484 km^2 (Dorsey 2010). The Arolik River originates in the Ahklun Mountains and flows northwesterly for approximately 81 rkm. The mainstem Arolik River is formed by the East Fork Arolik River (which originates from Arolik Lake) and the

South Fork Arolik River (which originates near Tatlignagpeke Mountain). The mainstem Arolik River splits into 2 mouths: the North Mouth and the South Mouth. The South Mouth of the Arolik River is the southernmost boundary of District 4. Chinook and sockeye salmon escapement to the Arolik River was monitored by aerial surveys.

Kanektok River

Monitoring of the Kanektok River provides an index of salmon escapement returning to District 4. The Kanektok River watershed drains an area approximately 2,261 km^2 (Walsh 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 escapement were monitored using a resistance board weir. The weir was located 68 rkm upstream of the confluence with Kusokwim 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 determine the proportion of the total spawning escapement that is observed by the weir.

Lower Kuskokwim River Assessment Locations

Eek River

The Eek River is the southernmost monitored tributary of the Kuskokwim River. Originating on the northern side of Mount Oratia, which separates the headwaters of the Eek River from the Kanektok River, the river flows northwesterly for approximately 266 rkm until joining Eek Channel before reaching the Kuskokwim River (at rkm 13; Dorsey 2011). The Eek River is joined by the Middle Fork at rkm 95. Chinook salmon escapement was monitored by aerial surveys.

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 headwater tributary of the Aniak River and assessment provides 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, sockeye, and coho 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. Because of its proximity to the confluence, the weir accounts for nearly all salmon spawning within the Salmon River.

The Kipchuk River is a headwater tributary of the Aniak River and provides an index of salmon abundance to the Aniak River. The Kipchuk River originates in the Kuskokwim Mountains, several miles 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 are used to index Chinook salmon escapement to the middle portion of the Kuskokwim River drainage.

George River

The George River is the only monitored tributary that drains 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. Because of its proximity to the confluence, the weir accounts 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 are monitored throughout the mainstem of the Holitna River using aerial surveys.

The Chukowan River is as headwater tributary of the Holitna River and assessment provides an index of salmon abundance to the Holitna River. The Chukowan River is formed by Gemuk

River and Chikululnuk Creek (Brown 1983). The river flows northeasterly for 98 rkm until reaching its confluence with the Kogrukluk River to form the Holitna River. Chinook salmon escapement was monitored using aerial survey.

The Kogrukluk River is a headwater tributary of the Holitna River and assessment provides 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. Because of its proximity to the confluence, the weir accounts 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 lake-type sockeye salmon. Escapement of lake-type sockeye salmon was assessed using a weir located on the Telaquana River near the outlet of Telaquana Lake. Telaquana Lake is one of the major lakes present in the Kuskokwim River drainage that provide requisite habitat for lake-spawning sockeye salmon which is the priority species monitored at this location.

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 accounts 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 provides 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. Because of its proximity to the confluence, the weir accounts for nearly all salmon spawning within the Tatlawiksuk River.

Upper Kuskokwim River Assessment Locations

Salmon River, Pitka Fork

The Salmon River of the Pitka Fork is the northernmost monitored tributary of the Kuskokwim River. The Salmon River is located upstream of McGrath and provides an index of salmon escapement in the headwaters of the Kuskokwim River. The Salmon River originates in a piedmont area and flows northwesterly for approximately 47 rkm until reaching the Pitka Fork. The river then joins the Middle Fork Kuskokwim River before reaching the Big River, which finally flows into the Kuskokwim River (at rkm 827; Brown 1983). Chinook salmon escapement was monitored using aerial surveys.

ESCAPEMENT MONITORING

Aerial Surveys

Aerial surveys focused on a target species which was Chinook salmon in Kuskokwim River tributaries, and both Chinook and sockeye salmon in Kuskokwim Bay rivers (Table 1). On occasion, non-target species were counted opportunistically during aerial surveys; however, those counts were not representative of spawning escapement and are considered ancillary. Aerial survey counts of target and non-target species can be found in the AYKDBMS.

Aerial surveys were conducted on 13 tributaries in the Kuskokwim River drainage (11 high priority and 2 low priority) and on 4 rivers in Kuskokwim Bay (3 high priority and 1 low priority; Table 1; Figures 2 and 3). Selected rivers were segmented into several delineated stream reaches, known as index areas (Appendix A). Index area start and stop points were designated by geographic coordinates and often coincided with recognizable landmarks. A selection of index areas were identified for each river based on consistency of historical success of each index area to develop an index objective for inter-annual comparison (Appendix A). Because of the infrequency of surveying, some low priority streams may not have a defined index objective. Maps were created depicting proper index areas and index objectives and 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 to 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 each index area were summed to determine the escapement index (Tables 4 and 5). Although several index areas may exist and be flown for a river, only survey counts from index areas defined by the index objective were used to determine the final escapement index count. If the river did not have a defined index objective then no escapement index count was reported. Additionally, the escapement index was only reported if survey conditions were rated as good or fair for the entire survey.

Ground Based 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 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 and details can be found in Linderman et al. (2002). Additional details on design and materials used for construction of resistance board weirs can found in Tobin (1994) and Stewart (2002 and 2003) and for fixed picket weirs in Molyneaux at al. (1997), Baxter (1981), and Jasper and Molyneaux (2007).

Slight differences in picket spacing existed among projects. Weirs on the Goodnews, George, and Tatlawiksuk rivers had a gap of 3.33 cm between each picket, whereas Kanektok River weir had a gap of 4.3 cm. Salmon River weir had a gap of 3.5 cm, Kogrukluk River weir had a gap of 3.65 cm, and Telaquana River weir had a gap of 2.54 cm between each picket. Regardless of the spacing differences, all designs prevented most adult Pacific salmon from passing through the weirs undetected. 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 in 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 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 (Table 3).

Daily operations were conducted by small crews, varied 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 4 to 8 times per day for approximately 1 hour, 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, which was integrated into the weir, was used as the primary means of upstream fish passage. A clear plastic viewing window was placed on the stream surface to improve visual identification of fish entering the trap. Fish were only allowed to pass freely through the weir when an observer was present and opened the passage gate. Delays in fish passage occurred only at night or during ASL sampling. Following each counting shift, passage numbers were recorded in a designated logbook. Total daily and cumulative seasonal counts were reported each morning to ADF&G staff in Bethel or Anchorage. After a counting shift was completed, 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.

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. No missed escapement estimates were created for non-target 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:

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

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 among projects (Table 6). 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:

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

Prior distributions of the hyper-parameters for a_i, μ_i, and b_i were assumed to be non-informative 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) .

Markov-chain Monte Carlo methods (WinBUGS v1.4 in 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 zero based on historical information. However, if more than 40% of the entire run was missed, based on historical run timing, estimates were not created and total annual escapement counts were not determined.

Estimates generated represent the total daily escapement. On days with missed escapement, the estimated daily escapement was always reported except when it was less than the observed escapement on partial days of operation. In these scenarios, the estimate was disregarded and observed escapement was considered the minimum daily escapement estimate. The sum of daily escapement counts and missed escapement estimates that occurred within the target operational period was considered the annual escapement.

Weather and Stream Measurements

Weather and stream data were collected at all projects (Appendices B1–B7). 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 08-701, 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), 10 age-sex categories for sockeye salmon (n = 190), 8 age-sex categories for chum salmon (n = 180), and 6 age-sex categories for coho salmon (n = 168). Sample size goals were increased to account for unreadable scales or collection errors, to accommodate for variation in run timing, and to allow for investigation of inter-annual changes in ASL composition. This increase yielded a collection goal of 230 Chinook, 600 chum, and 400 coho salmon. Sockeye salmon collection goals were increased to 600 fish for Kuskokwim Bay projects and 230 fish at Kuskokwim River projects. Various ASL sampling schedules were provided for each Kuskokwim Area weir project that distributed the season sample goal in proportion to historical run timing, ensuring an even sampling distribution across the run.

ASL sample collection followed standardized procedures. Salmon were captured for sampling using the integrated trap. Following capture, crew members used safe handling techniques to place the fish into a partially submerged fish cradle that aided in data collection. 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 mideye to tail fork was measured to the nearest millimeter using a straight-edged meter stick. Sex and length data were recorded on standardized numbered data sheets that corresponded with numbers on the gum cards used for scale preservation. After sampling, each fish was released upstream of the weir. The procedure was repeated until the trap was emptied. All procedures were not biased for size or sex and were aimed 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 (2014).

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 AYK salmon database management system (Brannian et al. 2006b; AYKDBMS).

RESULTS

OPERATIONS

Aerial Surveys

Aerial surveys were flown for 14 of the 16 high priority rivers in 2014, and for 3 low priority rivers. The Kwethluk/Crooked Cr. and Tuluksak rivers, high priority streams, were not surveyed in 2014 because alternative ground based escapement projects were already in place and there

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

were funding constraints. All flights occurred between 20 July and 5 August with survey conditions rated either good and fair, except for the Middle Fork Eek River survey which was rated poor (Tables 4 and 5). All surveyed streams were only flown once.

Chinook salmon

Chinook salmon escapement indices were determined for all surveyed, high priority streams except the Holitna River (Table 4). Survey counts from index areas 102, 103, and 104 were mistakenly combined on the Holitna River; therefore, the individual index area counts are unknown. Because the Holitna River index objective does not include index area 104 a comparable escapement index could not be determined (Appendix A; Table 4). For low priority streams, the escapement index was only determined for the Chukowan River. The escapement indices were not determined for the Arolik River because the index objective was undefined and for the Middle Fork Eek River because the survey condition was rated poor (Table 4).

Sockeye salmon

Sockeye salmon escapement indices were determined for the Middle Fork Goodnews and Kanektok rivers (Table 5). The sockeye salmon escapement index for the North Fork Goodnews River was not determined because the survey was not completed in reach 104. The escapement index was not determined for the Arolik River because the index objective was undefined.

Weirs

Middle Fork Goodnews River Weir

The Middle Fork Goodnews River weir operated from 25 June through 31 August 2014. During this period, the weir had no inoperable periods in 2014 (Tables 7–10). The Middle Fork Goodnews River weir operations ended 18 days early because of reductions in funding. Early termination resulted in insufficient data for estimating total coho salmon escapement (Figure 4) and ASL composition. Weather and stream observations were recorded between 23 June and 1 September (Appendix B1). Water temperature at the weir averaged 11°C (range: 7°C–13°C). Air temperature averaged 11°C (range: 1°C–20°C). A total of 147.6 mm of precipitation was recorded throughout the season. River stage averaged 17 cm (range: 5 cm–27 cm) and was below average depth throughout the season (Figure 5).

Kanektok River Weir

The Kanektok River weir operated from 26 June through 15 August 2014. The weir had no inoperable periods in 2014 (Tables 7–10). Weather and stream observations were recorded between 23 June and 18 August (Appendix B2). Water temperature at the weir averaged 11°C (range: 8°C–15°C). Air temperature averaged 16°C (range: 4°C–27°C). A total of 235.8 mm of precipitation was recorded throughout the season. River stage averaged 18 cm (range: 7 cm–35 cm) and was below average depth throughout majority of the season (Figure 6).

Salmon River Weir

The Salmon River weir operated from 26 June through 20 September 2014. Installation of this weir was delayed by 11 days because of logistical constraints. In addition, the weir was inoperable for 3 full days and 12 partial days (Tables 7–10). Weather and stream observations were recorded between 26 June and 19 September (Appendix B3). Water temperature at the weir averaged 9.9°C (range: 5°C–14°C). Air temperature averaged 12.9°C (range: -1°C–25°C). A total of 105.2 mm of precipitation was recorded throughout the season. River stage averaged 61

cm (range: 39 cm–61 cm). River stage was below average depth in July and above average throughout August and September (Figure 7).

George River Weir

The George River weir operated from 16 June through 20 September 2014. The weir was installed 1 day late and in addition, there were 8 partial days because of high water and holes in the weir (Tables 7–10). Weather and stream observations were recorded between 8 June and 20 September (Appendix B4). Water temperature at the weir averaged 10.6°C (range: 5.5°C–15°C). Air temperature averaged 12.3°C (range: -3°C–24.5°C). A total of 231.2 mm of precipitation was recorded throughout the season. River stage averaged 56.4 cm (range: 45 cm–90 cm). River stage was above average depth in June, near average in July, and below average throughout August and September (Figure 8).

Kogrukluk River Weir

The Kogrukluk River weir operated from 26 June through 14 September 2014. During this period, the weir was inoperable for 10 days in August because of high water and 2 partial days because of high water and holes in the weir (Tables 7–10). The Kogrukluk River weir ended 11 days early because high water washed out the weir. Weather and stream observations were recorded between 18 June and 23 September (Appendix B5). Water temperature at the weir averaged 9.4°C (range: 4°C–14.5°C). Air temperature averaged 14°C (range: -2°C–28°C). A total of 175.8 mm of precipitation was recorded throughout the season. River stage averaged 301 cm (range: 273 cm–351 cm). River stage was near average depth in July and above average throughout August and September (Figure 9).

Telaquana River Weir

The Telaquana River weir operated from 3 July through 10 August 2014. The weir operated successfully throughout the operational period (Table 9). The Telaquana River weir was removed earlier than previous years because the majority of sockeye salmon escapement (approximately 98%) had passed the weir. Estimates were made for 11 August through 26 August to account for missed passage. Weather and stream observations were recorded between 2 July and 10 August (Appendix B6). Water temperature at the weir averaged 14.1°C (range: 10°C–17°C). Air temperature averaged 14°C (range: 6°C–23°C). A total of 78.2 mm of precipitation was recorded throughout the season. River stage averaged 65 cm (range: 59 cm–71 cm). River stage was above average depth in July and below average in August (Figure 10).

Tatlawiksuk River Weir

The Tatlawiksuk River weir operated from 15 June through 16 September 2014. During this period, the weir was inoperable for 3 full days because of high water and 4 partial days because of high water and holes in the weir (Tables 7–10). Tatlawiksuk River weir was removed 4 days early because of logistical constraints that required early disassembly of the weir and breakdown of camp. Estimates were made for all missed days of passage. Weather and stream observations were recorded between 13 June and 19 September (Appendix B7). Water temperature at the weir averaged 11°C (range: 6°C–15°C). Air temperature averaged 13.3°C (range: -2°C–30°C). A total of 312 mm of precipitation was recorded throughout the season. River stage averaged 49.3 cm (range: 30 cm–125 cm). River stage was above average depth in July and generally below average beginning mid-July through the remainder of the season (Figure 11).

ESCAPEMENT COUNTS

Chinook salmon

Aerial Survey

For all successfully surveyed tributaries in the Kuskokwim River, escapement was within the range of the historical observations, and all escapement goals were met or exceeded (Tables 4 and 11). Chinook salmon aerial escapement indices were below average at most locations, with the exception of the Aniak, Kipchuk, and Salmon (Pitka Fork drainage) rivers (Table 11). Chinook salmon aerial escapements for the Kisaralik, Salmon (Aniak drainage), Cheeneetnuk, and Gagaryah rivers fell within their established sustainable escapement goal (SEG) ranges and the Aniak and Salmon (Pitka Fork drainage) rivers exceeded the upper bounds of their established SEG ranges (Table 4). It is unknown if the Holitna River SEG was met; however, the total observed count (including observations outside the index reach) exceeded the lower bound of the escapement goal. With the exception of the Eek River, aerial survey indices were larger than the previous year in which the survey was successfully flown.

Tributaries surveyed in Kuskokwim Bay were also within the range of the historical observations, but the escapement goal on the North Fork Goodnews River River was not achieved (Tables 4 and 11). Survey indices at the North Fork and Middle Fork of the Goodnews River were larger than what was observed in 2012, which was the last time they were successfully flown. Survey index at the Kanektok River was lower than the prior year.

Weirs

Annual escapements were successfully estimated for Chinook salmon at the Middle Fork Goodnews (750 fish), Kanektok (3,594 fish), Salmon (1,757 fish), George (2,993 fish), Kogrukluk (3,732 fish), and Tatlawiksuk (1,904 fish) river weirs (Table 7). No missed escapement was estimated to have passed the Middle Fork Goodnews River weir and the observed escapement was assumed to be without error (Table 7). Only minimal estimation was required for other weir locations and 95% confidence intervals around each point estimate were small.

Chinook salmon escapement was larger than the previous year at all ground based projects except the Middle Fork Goodnews River weir which was the second lowest on record. Although there was a general increase in Chinook salmon escapement, total passage was below average at all weir assessment projects except Tatlawiksuk River weir (Table 12). The SEG on the George River was met; however, the Middle Fork Goodnews River BEG and the Kogrukluk River SEG were not met.

Chinook salmon run timing past weirs was early to average at all locations (Figure 12). Chinook salmon run timing past the Salmon River weir was the earliest on record; however, this was only the sixth non-consecutive year of operation at this site. All other run timings were within the historical ranges observed at each project.

Chum salmon

Annual escapements were successfully estimated for chum salmon at the Middle Fork Goodnews (11,518 fish), Kanektok (18,602 fish), Salmon (2,890 fish), George (17,148 fish), Kogrukluk (30,763 fish), and Tatlawiksuk (12,455 fish) river weirs (Table 8). No missed escapement was estimated to have passed the Middle Fork Goodnews River weir and the observed escapement is

assumed to be without error (Table 8). Only minimal estimation was required for other weir locations and 95% confidence intervals around each point estimate were small.

Chum salmon escapement was below average at all weir projects (Table 13). Escapement was the lowest on record for the Salmon River (Aniak) and Kanektok rivers, the second lowest for the Middle Fork Goodnews River, and the third lowest for the Tatlawiksuk River. Escapement to the George and Kogrukluk rivers were well within the range of historical escapements observed at those locations. The chum salmon SEG on the Middle Fork Goodnews River was not met; however, the Kogrukluk River chum salmon SEG was met. No general pattern of chum salmon run timing existed among projects, as run timings varied among early, average, and late, but all were within the historical ranges observed at the projects (Figure 13).

Sockeye salmon

Aerial Survey

The sockeye salmon aerial escapement index for the Kanektok River was the highest on record and the indices for the Goodnews River suggest an adequate level of escapement. The upper bound of the SEG on the Kanektok River was exceeded by over 100,000 fish (Table 5). The sockeye salmon escapement index for the North Fork Goodnews River was not determined because the survey was not completed in reach 104. However, the observed escapement of sockeye salmon throughout reaches 101, 102, and 103 exceeded the lower bound of the escapement goal (Table 5). The escapement index for the Middle Fork Goodnews River was below average, but within the historical range (Table 14). The escapement index was not determined for the Arolik River because the index objective was undefined.

Weirs

Annual escapements were successfully estimated for sockeye salmon at the Middle Fork Goodnews (41,473 fish), Kanektok (259,406 fish), Salmon (894 fish), Kogrukluk (6,413 fish), and Telaquana (24,293 fish) river weirs (Table 9). No missed escapement was estimated to have passed the Middle Fork Goodnews River weir and the observed escapement was assumed to be without error (Table 9). Only minimal estimation was required for other weir locations and 95% confidence intervals around each point estimate were small.

Sockeye salmon ground based escapement was below average at all projects except at the Kanektok River weir (Table 15). Escapement past the Telaquana River weir into Telaquana Lake was the second lowest on record, and escapement past the Salmon (Aniak) River weir was the lowest on record. The escapement to the Kogrukluk River weir was below average but well within the range of historical observations, and the SEG was achieved. Escapement past the Middle Fork Goodnews River weir was below average, but larger than the prior year, and the upper bound of the BEG was exceeded. Passage at the Kanektok River weir was above average and the fourth largest on record.

Sockeye salmon run timing varied among projects. Kuskokwim Bay projects exhibited early run timings. In the Kuskokwim River, sockeye salmon run timing was early at Salmon River weir, later than average at Kogrukluk River weir, and average at Telaquana River weir (Figure 14). All run timings were within the historical ranges observed except Salmon River weir, which was the earliest on record at the project.

Coho salmon

Annual escapements were successfully estimated for coho salmon at the Salmon (8,254 fish), George (35,771 fish), Kogrukluk (52,975 fish), and Tatlawiksuk (19,814 fish) river weirs (Table 10). No missed escapement was estimated to have passed the George River weir during inoperable periods, and the observed escapement is assumed to be without error. A total of 5,294 coho salmon were counted past the Middle Fork Goodnews River weir (Table 10). Because more than 40% of the coho salmon run into the Middle Fork Goodnews River was missed due to early termination of the weir (Figure 4), total annual escapement was not determined and the season is considered incomplete. Only minimal estimation was required for other weir locations and 95% confidence intervals around each point estimate were small.

Coho salmon escapement was above average at all weir projects (Table 16), and escapement at the George and Tatlawiksuk rivers was the highest on record at each project. The upper bound of the Kogrukluk River coho salmon SEG was exceeded. Coho salmon run timing varied between early and average for all projects but all were within the historical ranges observed at the projects (Figure 4). It is unknown if the coho salmon SEG on the Middle Fork Goodnews River was achieved because annual escapement was not determined.

Non-target species

Non-target species were observed at all weir projects. In 2014, pink salmon, Arctic grayling *Thymallus arcticus*, and whitefish *Coregonus* spp. were observed at all Kuskokwim Area projects. Coho salmon was observed at the Kanektok River weir and sockeye salmon were observed at the George and Tatlawiksuk river weirs. Chinook and chum salmon were observed at the Telaquana River weir. In addition, longnose suckers *Catostomus catostomus*, Dolly Varden *Salvelinus malma*, and rainbow trout *O. mykiss* were observed at multiple projects, and the Telaquana River weir was the only project to observe northern pike *Esox lucius* and lake trout *Salvelinus namaycush* (Appendices C1–C7).

Age, Sex, and Length Collection

Chinook Salmon

ASL samples were collected from Chinook salmon at the Middle Fork Goodnews (108 fish), Kanektok (265 fish), Salmon (143 fish), George (231 fish), Kogrukluk (230 fish), and Tatlawiksuk (187 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, George, and Kogrukluk river weirs (Table 17).

Chum Salmon

ASL samples were collected from chum salmon at the Middle Fork Goodnews (494 fish), Kanektok (631 fish), Salmon (273 fish), George (604 fish), Kogrukluk (616 fish), and Tatlawiksuk (611 fish) river weirs. At each project samples were collected on a daily or weekly basis spanning approximately the central 90% of the run. The chum salmon sample size goal was achieved at all projects except the Middle Fork Goodnews and Salmon river weirs (Table 17).

Sockeye Salmon

ASL samples were collected from the Middle Fork Goodnews (605 fish), Kanektok (722 fish), Salmon (68 fish), Kogrukluk (235 fish), and Telaquana (279 fish) river weirs. At each project

samples were collected on a near daily basis spanning approximately the central 90% of the run. The sockeye salmon sample size goal was achieved at all projects except the Salmon River weir (Table 17).

Coho Salmon

ASL samples were collected from coho salmon at the Salmon (406 fish), George (422 fish), Kogrukluk (327 fish), and Tatlawiksuk (401 fish) river weirs. At each project samples were collected on a daily or weekly basis spanning approximately the central 90% of the run. The Middle Fork Goodnews River weir typically collects ASL samples for coho salmon; however no sample collection was attempted because of early termination of the project. The coho salmon sample size goal was achieved at all projects except the Kogrukluk River weir (Table 17).

DISCUSSION

In 2014, all historical aerial survey and weir escapement data were re-evaluated using the methods presented in this report. Minor inconsistencies were detected in how aerial survey data were summarized in prior years. Those inconsistencies were resolved, and revised index counts were generated for many rivers. Similarly, a variety of methods have been used in prior years to estimate missed passage at weirs. Missed passage for all prior years was estimated using Bayesian methods, and revised estimates were generated for all projects and species. The revised historical estimates presented in this report supersede data presented in all prior publications.

It is important that readers understand the limitations of escapement data before using the 2014 results to describe spatial and temporal patterns of salmon spawning abundance. Aerial survey indices and weir counts are not directly comparable. Air surveys provide only an index of spawning abundance to a broader geographic area and weir counts are used to estimate the total number of salmon that escaped past a specific location. Furthermore, aerial survey indices are not directly comparable among monitoring locations within the same year because of 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, it is appropriate to compare weir counts among the various monitoring locations within the same year, provided that adequate data was collected to estimate total annual escapement.

Escapement monitoring efforts throughout the Kuskokwim Area were successful in 2014. 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. The escapement data collected in 2014 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. A few exceptions should be noted. The Holitna River Chinook salmon aerial survey is not comparable to prior years because fish observed outside the standard index area were included in the count and cannot be parsed out. The Middle Fork of the Eek River aerial survey count was given a poor rating and should not be used. The North Fork Goodnews River sockeye salmon aerial survey should be considered a minimum count because not all of the standard index reaches were flown. That minimum count should not be used for future escapement goal evaluations. Survey areas have not been standardized for the Arolik River and counts from 2014 may not be consistent with past years.

CHINOOK SALMON

Escapement of Chinook salmon throughout much of the Kuskokwim River drainage in 2014 was improved compared to recent years. Since 2010, escapements have been persistently low at most monitoring locations, and 2013 was the lowest escapement on record at all Kuskokwim River weir locations and several aerial survey locations. In 2013, no weir-based escapement goals were achieved and only 1 aerial survey goal was achieved. Of the 13 locations that were monitored in both 2013 and 2014, escapement increased at all but 1 location. Escapement counts in 2014 were on average 3.4 times larger than what was observed in 2013 (range: 1.1–5.2). Only the Eek River aerial survey was lower in 2014 compared to 2013. Below average escapement was observed at a majority of monitored locations in 2014. However, above average escapement was observed throughout much of the Aniak River drainage (i.e., Aniak and Kipchuck rivers), Tatlawiksuk River, and Salmon Pitka Fork (headwaters). Only 1 of 3 weir-based goals was achieved in 2014, but all aerial survey goals that were assessed were either achieved or exceeded.

The drainagewide escapement of Kuskokwim River Chinook salmon was estimated to be 123,987 (95% CI: 100,836–182,750). The drainagewide escapement was below the historical (1976–2013) average of 147,727 (range: 47,315–287,178), but exceeded the upper bound of the escapement goal range (Hamazaki and Liller 2015). The upper bound of the drainagewide escapement goal for Kuskokwim River Chinook salmon (65,000–120,000) was exceeded in 2014. All of the weir and high priority aerial survey data were used to estimate drainagewide escapement except the Salmon River weir, Eek River aerial survey, and Holitna River aerial survey. Data from the Salmon River weir and Eek River aerial survey were not included in the 2014 run reconstruction because they were not part of the original model design (Bue et al. 2012). The Holitna aerial survey was not included because the survey included counts obtained from outside the standard survey reach and was not comparable to prior years.

Similar to the Kuskokwim River, Chinook salmon escapement throughout Kuskokwim Bay have been persistently low in recent years. Overall, Chinook salmon escapement did not improve in 2014 relative to prior years. However, escapement to the Kanektok River was similar to what was observed in 2013.

Persistently low Chinook salmon escapement throughout much of the Kuskokwim Management Area is a concern. Specific actions were taken in 2014 to reduce harvest in the Kuskokwim River and Bay to allow for achievement of escapement goals (A. Poetter, Kuskokwim Area Management Biologist, ADF&G, Anchorage; personal communication). In 2014, ADF&G committed funds for a new weir on the Salmon River (Pitka Fork) to index Chinook salmon escapement in the headwaters of the Kuskokwim drainage, upriver from McGrath. Funding for that weir was provided through the Chinook Salmon Research Initiative for 2 years, and operations will begin in 2015.

CHUM SALMON

Notwithstanding the low chum salmon escapements observed throughout the Kuskokwim Area in 2014, there is no concern for the sustainability of chum salmon in the Kuskokwim Area at this time. Kuskokwim River chum salmon have experienced periods of low abundance and escapement in the past. Following a period of poor runs beginning in 1997, the Alaska Board of Fisheries designated Kuskokwim River chum salmon a stock of concern in 2001 (Brazil et al. 2013). The stock of concern designation was discontinued in 2007, following consecutive years

of at or above average run sizes beginning in 2002 (Brazil et al. 2013) and record high escapements in 2005 and 2006. The chum salmon escapements to the George, Tatlawiksuk, and Kogrukluk Rivers in 2014 were larger than the escapements observed during the years leading to the 2001 stock of concern designation. Escapements have been near or above average in at least 2 of the last 5 years (2009–2013) at all escapement locations except Salmon River (Aniak), which has only operated for 6 non-consecutive years (Table 13). The chum salmon escapement goal on the Kogrukluk River was achieved in 2014, 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 2014, but it has been achieved in all prior years except 2012.

SOCKEYE SALMON

Long-term monitoring of Kuskokwim River sockeye salmon escapement is limited. Although escapement monitoring projects have been operated throughout the Kuskokwim River for many years, the locations are primarily a function of Chinook and chum salmon abundance. For example, the weir located on the Salmon (Aniak) River was first operated in 2006 specifically to monitor Chinook salmon (Schaberg et al. 2012), and the relatively large escapement of sockeye salmon in that year was not expected. The George River weir averages less than 150 sockeye salmon each year, and the Tatlawiksuk River weir averages about 20. Only the Kogrukluk River weir has a history of counting large numbers of sockeye salmon, and escapement has ranged between 1,732 and 61,382 since 1976.

Most salmon monitoring locations in the Kuskokwim River, including the Kogrukluk River, do not have access to lake rearing habitat which is commonly associated with large sockeye salmon runs. Prior to 2006, the sockeye salmon escapement to the Kogrukluk River was considered incidental, and it was assumed that sockeye salmon returning to the Stony River and its associated lakes made up the majority of the annual return. Radiotelemetry studies conducted in 2006 and 2007 demonstrated the importance of both lake and river spawning life-history strategies for Kuskokwim River sockeye salmon (Gilk et al. 2011). Specifically, the Holitna River drainage (including the Kogrukluk River) was recognized as important spawning and rearing habitat for Kuskokwim River sockeye salmon. Existing data suggests a high degree of genetic diversity among Kuskokwim River sockeye salmon, specifically between lake and river spawners (Dann et al. 2009). In order to ensure adequate monitoring of both life history strategies, the Telaquana River weir was installed in 2010, specifically to monitor lake-type sockeye salmon returning the Stony River.

The ability to operate both the Kogrukluk and Telaquana river weirs has greatly improved sockeye salmon assessment throughout the Kuskokwim River. Tagging studies indicate that the Kogrukluk River makes up approximately 23% of the total escapement to the Holitna River drainage, which is the largest single source of river-type sockeye salmon (Gilk et al. 2011). Preliminary results from genetic collections indicate that Telaquana Lake sockeye salmon comprised approximately 25% of the total run during the 4 years (2010, 2012–2014) when estimates were available (data on file with ADF&G Kuskokwim Research Group; Anchorage).

As of 2014, we have 4 years of paired escapement observations from both lake-spawning (Telaquana) and river-spawning (Kogrukluk) sockeye salmon returning to the Kuskokwim River. The relative abundance between the 2 monitoring sites has remained consistent, and on average, four times more (range: 3.6–4.4) sockeye salmon are counted at the Telaquana River weir

compared to the Kogrukluk River weir. Since 2010, escapement has declined at both locations. However, in each of those years the escapement to the Kogrukluk River has exceeded the lower bound of the SEG. Additional monitoring is needed to understand the escapement to Telaquana Lake. In 2014, ADF&G committed to funding the Telaquana River weir for the foreseeable future.

COHO SALMON

Overall, coho salmon escapement throughout the Kuskokwim River was one of the largest on record. The 2014 escapement estimates from those weirs will be incorporated into a drainagewide run reconstruction model to estimate total coho salmon run size and escapement (Schaberg and Liller 2015). At this time, the run reconstruction has not been updated for 2014. However, tributary escapements are similar to what was observed in 2003 and 2004, which were record high escapements.

Efforts to monitor coho salmon at the Middle Fork Goodnews River weir were incomplete in 2014, and it is not possible to determine if the SEG was achieved. Historically, the Middle Fork Goodnews River weir operated until September 20, and majority of the coho salmon escapement was monitored. Since 2012, annual weir operations have ended early, on August 31, largely because of inadequate funding. August 31, is consistent with the historical 50% passage date for coho salmon. The abbreviated operational period has made it difficult to determine if the established coho salmon SEG (>12,000) was achieved. The SEG has only been achieved by August 31 in 46% of all years (n = 13) when the goal was eventually met. At the time the weir ended in 2014 the SEG has not been achieved and escapement counts were the second lowest on record.

Coho salmon do return in large numbers to the Kanektok River in Kuskokwim Bay, but the annual escapement has not been assessed since 2007. Between 2001 and 2007, coho salmon escapement averaged 40,342 (range: 13,678–87,785). Recurring challenges, associated with high water conditions during majority of the coho salmon escapement, led to the decision to end weir operations on August 15. As a result, only about 10% of the coho salmon escapement to the Kanektok River is observed, incidental to monitoring the end of the Chinook, chum, and sockeye salmon escapements to the Kanektok River.

ACKNOWLEDGEMENTS

The many Kuskokwim Area escapement monitoring projects are only successful because of the hard work and diligence of all the individuals that have contributed to the development and operations of each project.

The U.S. Fish and Wildlife Service, Office of Subsistence Management, provided $208,409 in funding support under agreement number F14AC00102 for George River Salmon Weir (Project No. 14-303) and $210,879 in funding support under agreement number F14AC00109 for Tatlawiksuk River Salmon Weir (Project No. 14-302), through the Fisheries Resource Monitoring Program. The Coastal Villages Regional Fund provided funding in support of the Kanektok and Middle Fork Goodnews river weirs. This funding allowed for the full operation of the Kanektok River weir and extended the Middle Fork Goodnews River weir operations until the end of August. Additional funds were also provided by the Alaska Sustainable Salmon Fund and the State of Alaska.

We would like to thank all of our collaborators: United States Fish and Wildlife Service, Native Village of Kwinhagak, Kuskokwim Native Association, and the National Park Service. Administrative and logistical support was provided by Kevin Schaberg, Toshihide Hamazaki, Aaron Poetter, Aaron Tiernan, Jackie Cleveland, Mark Lisac, Rebecca Frye, Dan Gillikin, Dan Young, Colton Lipka, Janet Bavilla, Amy Brodersen, Katie Froning, and Ashley Fitzsimmons. Thank you to project crew leaders: Justin Cross, Rob Stewart, Glen Lindsey, Dakota Phillips, Katie Hayden, Mike Oexner, and Harrison DeSanto. A special thanks to all the crew technicians: Thaddius Foster, Mike Stracco, Isaac Jackson, Kyle Church, Tim Bebe, Tom Ardnt, Karl Jones, Joe Roberts, Alex Nicori, Allison Simeon, Curtis Robinette, Caroline Kvamme, and Charles Grammer. An additional thanks goes out to the college interns and all others who provided additional help at the projects: Brad Gusty, Amanda Hoeldt, Ben Hoeldt, Megan Leary, Cameron Lingnau, and Jessica Jordan.

This report was submitted as the technical project report to U.S. Fish and Wildlife Service, Office of Subsistence Management (OSM), Subsistence Fisheries Resource Monitoring Program for project numbers 14-303 and 14-304. OSM review was provided by Donald Rivard. Jan Conitz provided regional review and Toshihide Hamazaki provided biometric review for ADF&G.

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TABLES AND FIGURES

Table 1.–Priority ranking and species targeted at Kuskokwim Area aerial survey rivers, 2014.

River	Priority level	Species targeted
Kuskokwim Bay rivers		
North Fork Goodnews R.	High	Chinook and sockeye salmon
Middle Fork Goodnews R.	High	Chinook and sockeye salmon
Arolik R.	Low	Chinook and sockeye salmon
Kanektok R.	High	Chinook and sockeye salmon
Kuskokwim River tributaries		
Eek R.	High	Chinook salmon
Middle Fork Eek R.	Low	Chinook salmon
Kwethluk R.	High	Chinook salmon
Kisaralik R.	High	Chinook salmon
Tuluksak R.	High	Chinook salmon
Aniak R.	High	Chinook salmon
Salmon R. (Aniak)	High	Chinook salmon
Kipchuk R.	High	Chinook salmon
Holokuk R.	High	Chinook salmon
Oskawalik R.	High	Chinook salmon
Holitna R.	High	Chinook salmon
Chukowan R.	Low	Chinook salmon
Cheeneetnuk R.	High	Chinook salmon
Gagaryah R.	High	Chinook salmon
Salmon R. (Pitka Fork)	High	Chinook salmon

Note: Many low priority streams exist in the Kuskokwim Area. Low priority streams included in this table only represent those with a survey attempted in 2014.

Table 2.–Kuskokwim Area escapement monitoring projects and escapement goals, 2014.

River	Monitoring method	Species escapement goal type and range (if established)			
		Chinook	Chum	Sockeye	Coho
Kuskokwim Bay Rivers					
North Fork Goodnews River	aerial survey	SEG: 640–3,300	–	SEG: 5,500–19,500	–
Middle Fork Goodnews River	aerial survey	–	–	–	–
Middle Fork Goodnews River	weir	BEG: 1,500–2,900	SEG: >12,000	BEG: 18,000–40,000	SEG: >12,000
Arolik River	aerial survey	–	–	–	–
Kanektok River	aerial survey	SEG: 3,500–8,500	–	SEG: 14,000–34,000	–
Kanektok River	weir	–	–	–	–
Kuskokwim River and Tributaries					
Eek River	aerial survey	–	–	–	–
Middle Fork Eek River	aerial survey	–	–	–	–
Kwethluk River	weir[a]	SEG: 4,100–7,500	–	–	SEG: >19,000
Kisaralik River	aerial survey	SEG: 400–1,200	–	–	–
Tuluksak River	weir[a]	–	–	–	–
Aniak River	aerial survey	SEG: 1,200–2,300	–	–	–
Salmon River (Aniak)	aerial survey	SEG: 330–1,200	–	–	–
Salmon River (Aniak)	weir	–	–	–	–
Kipchuk River	aerial survey	–	–	–	–
Holokuk River	aerial survey	–	–	–	–
Oskawalik River	aerial survey	–	–	–	–
George River	weir	SEG: 1,800–3,300	–	–	–
Holitna River	aerial survey	SEG: 970–2,100	–	–	–
Chukowan River	aerial survey	–	–	–	–
Kogrukluk River	weir	SEG: 4,800–8,800	SEG: 15,000–49,000	SEG: 4,400–17,000	SEG: 13,000–28,000
Telaquana River	weir	–	–	–	–
Cheeneetnuk River	aerial survey	SEG: 340–1,300	–	–	–
Gagaryah River	aerial survey	SEG: 300–830	–	–	–
Tatlawiksuk River	weir	–	–	–	–
Salmon River (Pitka Fork)	aerial survey	SEG: 470–1,600	–	–	–
Kuskokwim River (entire drainage)	Run reconstruction[b]	SEG: 65,000–120,000	–	–	–

Note: Sustainable escapement goal is abbreviated SEG. Biological escapement goal is abbreviated BEG.

[a] The weir on this tributary is operated by the U.S. Fish and Wildlife Service.

[b] Run reconstruction is conducted postseason and uses a model to estimate total return from harvest and escapement monitoring projects.

Table 3.–Target operational periods, actual operational periods, and species targeted at Kuskokwim Area weir projects, 2014.

Project	Target operational period	Actual operational period	Species targeted
Kuskokwim Bay rivers			
Middle Fork Goodnews River weir	25 June–18 September	25 June–31 August	Chinook, chum, sockeye, and coho salmon
Kanektok River weir	25 June–15 August	27 June–15 August	Chinook, chum, and sockeye salmon
Kuskokwim River tributaries			
Salmon River weir	15 June–20 September	26 June–20 September	Chinook, chum, sockeye, and coho salmon
George River weir	15 June–20 September	16 June–20 September	Chinook, chum, and coho salmon
Kogrukluk River weir	26 June–25 September	20 June–14 September	Chinook, chum, sockeye, and coho salmon
Telaquana River weir	3 July–26 August	2 July–10 August	Sockeye salmon
Tatlawiksuk River weir	15 June–20 September	13 June–16 September	Chinook, chum, and coho salmon

Note: The actual operational period was the start and end date of project operations.

Table 4.–Chinook salmon aerial survey escapement indices in the Kuskokwim Area, 2014.

River	Priority level	Survey date	Overall survey rating	Index objective	Index area survey counts						Escapement index	Escapement goal range
					101	102	103	104	105	Supplemental		
Kuskowkim Bay Rivers												
North Fork Goodnews R.	High	26 July	Good (1)	101,102,103	29	469	132	–	[a]	[a]	630	640–3,300
Middle Fork Goodnews R.	High	26 July	Good (1)	101, 103, 104	542	0	6	64	[a]	[a]	612	[b]
Arolik R.	Low	30 July	Good (1)	[c]	241	230	42	[a]	[a]	[a]	[d]	[b]
Kanektok R.	High	29 July	Fair (2)	101, 102, 103	904	936 [e]		0	0	31	1,840	3,500–8,500
Kuskokwim River Tributaries												
Eek R.	High	5 August	Fair (2)	102, 103, 104	–	78	56	55	[a]	[a]	189	[b]
Middle Fork Eek R.	Low	5 August	Poor (3)	101	17	[a]	[a]	[a]	[a]	[a]	[d]	[b]
Kisaralik R.	High	27 July	Good (1)	102, 103	239	553	69	[a]	[a]	[a]	622	400–1,200
Aniak R.	High	28 July	Good (1)	102, 103, 104	–	1,938	1,169	94	[a]	[a]	3,201	1,200–2,300
Salmon R. (Aniak)	High	25 July	Fair (2)	101, 102, 103	62	134	301	[a]	[a]	[a]	497	330–1,200
Kipchuk R.	High	25 July	Good (1)	101, 102, 103	643	440	137	[a]	[a]	[a]	1,220	[b]
Holokuk R.	High	26 July	Fair (2)	101, 102	2	6	33	39	[a]	[a]	8	[b]
Oskawalik R.	High	27 July	Fair (2)	101, 102, 103	41	113	46	[a]	[a]	[a]	200	[b]
Holitna R.	High	27 July	Good (1)	102, 103	289	1,496 [f]			[a]	[a]	[d]	970–2,100
Chukowan R.	Low	27 July	Good (1)	101, 102	1,004	281	16	[a]	[a]	[a]	1,285	[b]
Cheeneetnuk R.	High	20 July	Good (1)	101, 102	123	217	[a]	[a]	[a]	[a]	340	340–1,300
Gagaryah R.	High	21 July	Fair (2)	101, 102	287	72	[a]	[a]	[a]	[a]	359	300–830
Salmon R. (Pitka Fork)	High	20 July	Good (1)	102, 103, 104	–	306	157	1,402	[a]	[a]	1,865	470–1,600

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 index were 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.

[c] No defined index objective established.

[d] Escapement index not reported because of inadequate survey rating, index objective not achieved, or unestablished index objective.

[e] Counts from index areas 102 and 103 were combined.

[f] Counts from index areas 102, 103, and 104 were combined. Index objective could not be determined.

Table 5.–Sockeye salmon aerial survey escapement indices in the Kuskokwim Area, 2014.

River	Priority level	Survey date	Overall survey rating	Index objective	Index area survey counts						Escapement index	Escapement goal range
					101	102	103	104	105	Supplemental		
Kuskowkim Bay Rivers												
North Fork Goodnews R.	High	26 July	Good (1)	101, 102, 103, 104	1,140	3,320	4,420	–	[a]	[a]	[b]	5,500–19,500
Middle Fork Goodnews R.	High	26 July	Good (1)	101, 102, 103, 104	11,220	0	22	1,020	[a]	[a]	12,262	[c]
Arolik R.	Low	30 July	Good (1)	[d]	6,600	3,100	2,100	[a]	[a]	[a]	[b]	[c]
Kanektok R.	High	29 July	Fair (2)	101, 102, 103, 104	26,700	35,300[e]		74,400	0	12,400	136,400	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 index were 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] Escapement index not reported because the index objective was not achieved or an unestablished index objective.

[c] No escapement goal was established.

[d] No defined index objective was established.

[e] Counts from index areas 102 and 103 were combined.

Table 6.–Starting passage dates and passage years used in the hierarchical Bayesian estimation technique to estimate missed escapement at Kuskokwim Area weir projects, 2014.

Project	Starting passage date	Weir passage years
Kanektok River weir	15 June[a]	2001–2014
Salmon River weir	15 June	2006–2009, 2012–2014
George River weir	15 June	1996–2014
Kogrukluk River weir	26 June	1976–2014[b]
Telaquana River weir	2 July	2010–2014
Tatlawiksuk River weir	15 June	1998–2014

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 1981–2013.

Table 7.–Chinook salmon escapement indices of high priority aerial survey rivers, Kuskokwim Area, 2000–2014.

	Kuskokwim Bay			Kuskokwim River										
Year	North Fork Goodnews	Middle Fork Goodnews	Kanektok	Eek	Kisaralik	Aniak	Salmon (Aniak)	Kipchuk	Holokuk	Oskawalik	Holitna	Cheeneetnuk	Gagaryah	Salmon (Pitka Fork)
2000	–	–	–	–	–	714	238	182	–	–	301	–	–	362
2001	–	–	–	–	–	–	598	–	52	–	4,156	–	143	1,033
2002	1,470	1,195	–	–	1,727	–	1,236	1,615	513	295	733	730	–	–
2003	3,935	2,131	6,206	1,525	654	3,514	1,242	1,493	1,096	844	–	810	1,093	–
2004	7,482	2,617	28,375	4,653	5,157	5,362	2,177	1,868	539	293	4,051	918	670	1,138
2005	–	–	12,780	–	2,206	–	4,097	1,679	510	582	1,760	–	–	1,801
2006	–	–	–	–	4,734	5,639	–	1,618	705	386	1,866	1,015	531	862
2007	–	–	–	–	692	3,984	1,458	2,147	–	–	–	–	1,035	943
2008	2,155	2,190	–	–	1,074	3,222	589	1,061	418	213	–	290	177	1,033
2009	–	–	–	–	–	–	–	–	565	379	–	323	303	632
2010	–	–	1,208	–	235	–	–	–	229	–	–	–	62	135
2011	853	–	–	263		–	79	116	61	26	–	249	96	767
2012	378	355	–	–	588	–	49	193	36	51	–	229	178	670
2013	–	–	2,277	240	599	754	154	261	–	38	532	138	74	469
2014	630	612	1,840	189	622	3,201	497	1,220	80	200	–	340	359	1,865
Average	1,994	1,471	8,760	1,437	1,213	2,746	802	1,019	413	310	1,723	745	493	924

Note: Average is derived from all aerial survey escapement indices on record for each river, except 2014 and may include indices prior to 2000. For additional aerial survey data refer to the AYK salmon database management system:
(http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx). Dashes (–) indicate the escapement index was not estimated.

Table 8.–Daily and annual estimated escapement of Chinook salmon at Kuskokwim Area weir projects, 2014.

	Kuskokwim Bay		Kuskokwim River			
Date	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Tatlawiksuk River
6/15	[a]	[a]	0 [b]	0 [b]	[a]	2
6/16	[a]	[a]	0 [b]	0	[a]	0
6/17	[a]	[a]	0 [b]	0	[a]	0
6/18	[a]	[a]	0 [b]	0	[a]	0
6/19	[a]	[a]	0 [b]	0	[a]	2
6/20	[a]	[a]	0 [b]	0 [c]	[a]	3
6/21	[a]	[a]	0 [b]	1	[a]	5
6/22	[a]	[a]	0 [b]	0	[a]	12
6/23	[a]	[a]	1 [b]	0	[a]	1 [d]
6/24	[a]	[a]	2 [b]	3	[a]	0 [b]
6/25	6	0 [b]	4 [b]	11	[a]	1 [b]
6/26	7	0 [b]	7 [c]	3	2	4 [b]
6/27	5	6	11 [c]	1	33	99 [d]
6/28	18	27	32	12 [c]	43	37
6/29	20	16	7	15	16	21
6/30	2	8	19	1	16	2
7/1	11	7	21	11	31	6
7/2	4	7	77	154 [c]	63	280
7/3	9	17	55 [c]	203 [c]	134	29
7/4	9	8	52	278	52	723
7/5	30	27	96	597	54	33
7/6	20	55	109	34	42	29
7/7	15	35	45	244	98	132
7/8	52	156	77	150	254	183
7/9	11	73	71	237	122	19
7/10	13	72	93	239	160	54
7/11	111	113	27	61	355	27
7/12	18	234	61	48	208	12
7/13	19	100	158	89	100	12
7/14	16	142	56	59	271	16
7/15	43	120	51	105	127	35
7/16	10	200	70	178	132	8

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	Kuskokwim Bay		Kuskokwim River			
Date	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Tatlawiksuk River
7/17	93	155	20	42	243	20
7/18	18	159	17	6	76	2 [c]
7/19	1	86	20	5	68	3
7/20	22	220	55	5	123	41
7/21	10	131	57 [d]	34 [d]	223	3
7/22	30	154	37	23	60	6
7/23	13	142	52	15 [d]	95	6
7/24	19	148	33	12	65	0
7/25	4	95	48	13	57	4
7/26	16	93	24 [d]	13	85	3
7/27	1	135	25	31	74	3 [d]
7/28	7	91	27	8	58	3
7/29	3	45	36	7	8	5
7/30	1	103	21	5	39	4
7/31	4	65	14	3	10	5
8/1	10	46	12 [c]	7	26	1
8/2	6	36	4	3 [d]	12	1
8/3	1	52	4	4	20	1
8/4	9	40	9	0	10	0
8/5	0	51	8	3	9	1
8/6	5	36	7 [b]	0	9	1
8/7	0	22	6 [b]	2	3	2
8/8	3	20	5 [b]	1	3	1
8/9	0	10	4 [c]	2	6	0
8/10	4	8	4	0	5	0
8/11	2	6	0	0 [c]	4	0
8/12	6	7	1	0	0	0
8/13	1	3	2	0	0	0
8/14	5	3	0	0	0	0
8/15	0	9	0	4	3	0
8/16	3	[a]	0	1	4	0
8/17	1	[a]	0	0	3 [b]	0

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

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Date	Kuskokwim Bay		Kuskokwim River			
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Tatlawiksuk River
9/19	[a]	[a]	0	0	0 [e]	0 [e]
9/20	[a]	[a]	0	0	0 [e]	0 [e]
9/21	[a]	[a]	[a]	[a]	0 [e]	[a]
9/22	[a]	[a]	[a]	[a]	0 [e]	[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	750	3,594	1,757	2,993	3,732	1,904
95% CI	–	3,594–3,595	1,717–1,814	2,878–3,127	3,718–3,769	1,900–1,960

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; missed passage was estimated using the Bayesian method.

[d] Partial day count; Bayesian estimate rejected because observed passage was larger than estimate.

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

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

Table 9.–Daily and annual estimated escapement of chum salmon at Kuskokwim Area weir projects, 2014.

	Kuskokwim Bay		Kuskokwim River			
Date	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Tatlawiksuk River
6/15	[a]	[a]	0 [b]	0 [b]	[a]	3
6/16	[a]	[a]	0 [b]	0	[a]	0
6/17	[a]	[a]	0 [b]	0	[a]	1
6/18	[a]	[a]	0 [b]	0	[a]	9
6/19	[a]	[a]	0 [b]	1	[a]	8
6/20	[a]	[a]	0 [b]	0 [c]	[a]	5
6/21	[a]	[a]	0 [b]	0	[a]	13
6/22	[a]	[a]	0 [b]	1	[a]	13
6/23	[a]	[a]	0 [b]	2	[a]	5 [d]
6/24	[a]	[a]	1 [b]	7	[a]	0 [b]
6/25	21	4 [b]	1 [b]	56	[a]	1 [b]
6/26	42	12 [b]	3 [c]	29	34	4 [b]
6/27	37	89	5 [c]	32	47	46 [d]
6/28	165	80	15	34 [c]	58	46
6/29	168	99	2	20	66	24
6/30	96	77	24	22	111	1
7/1	189	140	46	147	131	48
7/2	158	198	40	182 [c]	233	401
7/3	158	275	33 [c]	240 [c]	173	140
7/4	236	302	29	530	144	467
7/5	393	559	96	365	309	221
7/6	525	757	67	144	314	143
7/7	104	297	71	401	349	453
7/8	43	485	93	491	695	536
7/9	53	519	95	632	680	384
7/10	290	647	61	556	929	570
7/11	761	739	98	699	1,137	538
7/12	419	651	118	925	944	585
7/13	330	466	138	960	719	539
7/14	172	746	56	819	1,279	631
7/15	703	720	32	689	994	717
7/16	372	924	19	1,006	1,469	504

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	Kuskokwim Bay		Kuskokwim River			
Date	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Tatlawiksuk River
7/17	925	811	22	619	1,437	191
7/18	351	713	13	303	1,143	500 [c]
7/19	64	337	12	335	1,400	498
7/20	565	357	18	339	1,049	653
7/21	593	738	85 [c]	550 [c]	1,203	462
7/22	495	626	235	569	1,354	623
7/23	226	564	113	480 [c]	1,769	494
7/24	347	368	142	540	1,000	345
7/25	18	392	137	501	1,075	204
7/26	219	492	71 [c]	338	1,072	106
7/27	153	481	107	470	897	221 [d]
7/28	246	400	115	320	718	73
7/29	156	233	83	205	332	146
7/30	397	325	59	392	564	64
7/31	224	419	29	222	430	85
8/1	101	227	52 [c]	145	689	36
8/2	47	203	51	189 [c]	389	39
8/3	132	196	19	152	423	85
8/4	169	267	58	170	440	75
8/5	60	285	53	154	250	77
8/6	67	274	38 [b]	151	186	56
8/7	37	219	35 [b]	117	206	42
8/8	127	160	33 [b]	135	179	72
8/9	41	110	31 [c]	116	215	59
8/10	75	136	8	108	145	38
8/11	50	122	13	98 [d]	120	31
8/12	70	100	15	68	154	29
8/13	20	60	14	28	208	15
8/14	23	121	18	19	68	6
8/15	17	80	16	51	66	13
8/16	21	[a]	0	34	73	5
8/17	20	[a]	21	20	96 [b]	10

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Table 9.–Page 3 of 4.

	Kuskokwim Bay		Kuskokwim River			
Date	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Tatlawiksuk River
8/18	4	[a]	8	55	86 [b]	8
8/19	4	[a]	2	12	77 [b]	3
8/20	4	[a]	2	19	69 [b]	3
8/21	4	[a]	2	7	61 [b]	0
8/22	0	[a]	1	11	55 [b]	4
8/23	5	[a]	0	7	49 [b]	6
8/24	1	[a]	3	11	44 [b]	9
8/25	2	[a]	0	7	39 [b]	2
8/26	0	[a]	5	6	35 [b]	2
8/27	0	[a]	7 [c]	6	31 [c]	0
8/28	0	[a]	0	12	8	1
8/29	1	[a]	0	3	3	0
8/30	0	[a]	0	0	3	1
8/31	2	[a]	0	2	1	0
9/1	0 [e]	[a]	0	1	7	0
9/2	0 [e]	[a]	0 [f]	10	5	2
9/3	0 [e]	[a]	0 [f]	10	3	1
9/4	0 [e]	[a]	0 [f]	5	3	0
9/5	0 [e]	[a]	0	3	5	0
9/6	0 [e]	[a]	0	3	3	1
9/7	0 [e]	[a]	1	0	3	0
9/8	0 [e]	[a]	0 [f]	0	1	1
9/9	0 [e]	[a]	0	6	1	1
9/10	0 [e]	[a]	0	5	2	0
9/11	0 [e]	[a]	0	4	3	0
9/12	0 [e]	[a]	0	3	1	0
9/13	0 [e]	[a]	0	1	0	0
9/14	0 [e]	[a]	0	0	0 [f]	0
9/15	0 [e]	[a]	0	0	0 [e]	1
9/16	0 [e]	[a]	0	4	0 [e]	0
9/17	0 [e]	[a]	0	3	0 [e]	0 [e]
9/18	0 [e]	[a]	0	1	0 [e]	0 [e]

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Table 9.–Page 4 of 4.

Date	Kuskokwim Bay		Kuskokwim River			
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Tatlawiksuk River
9/19	[a]	[a]	0	1	0 [e]	0 [e]
9/20	[a]	[a]	0	2	0 [e]	0 [e]
9/21	[a]	[a]	[a]	[a]	0 [e]	[a]
9/22	[a]	[a]	[a]	[a]	0 [e]	[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	11,518	18,602	2,890	17,148	30,763	12,455
95% CI	–	18,591–18,624	2,806–2,979	16,690–17,338	30,592–30,954	12,382–12,525

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; missed passage was estimated using the Bayesian method.

[d] Partial day count; Bayesian estimate rejected because observed passage was larger than estimate.

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

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

Table 10.–Daily and annual estimated escapement of sockeye salmon at Kuskokwim Area weir projects, 2014.

	Kuskokwim Bay		Kuskokwim River		
Date	Middle Fork Goodnews R	Kanektok River	Salmon River	Kogrukluk River	Telaquana River
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 [b]	[a]	[a]
6/21	[a]	[a]	0 [b]	[a]	[a]
6/22	[a]	[a]	0 [b]	[a]	[a]
6/23	[a]	[a]	0 [b]	[a]	[a]
6/24	[a]	[a]	0 [b]	[a]	[a]
6/25	1,824	881 [b]	0 [b]	[a]	[a]
6/26	2,052	1,556 [b]	0 [c]	0	[a]
6/27	1,844	3,584	0 [c]	0	[a]
6/28	2,200	3,470	0	0	[a]
6/29	2,343	4,099	0	0	[a]
6/30	1,915	5,433	0	4	[a]
7/1	2,933	7,219	0	0	[a]
7/2	2,022	7,955	0	6	[a]
7/3	2,272	11,753	0 [c]	8	0
7/4	1,964	8,712	0	7	0
7/5	2,667	11,730	0	15	0
7/6	2,307	18,070	0	1	1
7/7	1,496	12,440	0	19	1
7/8	1,259	19,173	2	37	16
7/9	1,401	12,946	1	59	13
7/10	1,422	7,548	0	56	991
7/11	1,224	9,661	0	140	751
7/12	1,035	11,040	4	87	783
7/13	827	9,822	2	36	589
7/14	607	8,744	5	129	1,044
7/15	1,286	6,613	0	117	949
7/16	485	9,481	3	184	1,270

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	Kuskokwim Bay		Kuskokwim River		
Date	Middle Fork Goodnews R	Kanektok River	Salmon River	Kogrukluk River	Telaquana River
7/17	882	8,337	1	236	1,702
7/18	327	5,783	0	136	1,496
7/19	73	3,791	0	126	475
7/20	576	4,507	2	284	1,510 [c]
7/21	222	5,737	17 [d]	603	1,982
7/22	327	4,042	18	186	1,933
7/23	179	4,040	20	460	2,023
7/24	234	3,306	14	380	1,286
7/25	68	3,079	23	626	1,046
7/26	128	3,008	40 [d]	435	796
7/27	103	2,706	43	403	526
7/28	100	2,560	21	258	562
7/29	55	1,470	58	109	646
7/30	108	1,980	94	248	307
7/31	44	1,765	24	135	339
8/1	43	1,002	54 [c]	192	90
8/2	27	1,440	23	93	187
8/3	26	1,741	30	139	116
8/4	40	1,165	105	123	104
8/5	31	1,127	45	45	67
8/6	57	806	42 [b]	41	69
8/7	24	534	37 [b]	30	108
8/8	60	610	33 [b]	32	35
8/9	41	495	31 [d]	34	39
8/10	51	559	15	26	39
8/11	38	394	21	14	69 [b]
8/12	101	341	8	10	58 [b]
8/13	12	279	10	21	49 [b]
8/14	18	413	16	8	41 [b]
8/15	21	459	11	4	34 [b]
8/16	23	[a]	0	9	28 [b]
8/17	11	[a]	8	2 [b]	24 [b]

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

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Table 10.–Page 4 of 4.

	Kuskokwim Bay		Kuskokwim River		
Date	Middle Fork Goodnews R	Kanektok River	Salmon River	Kogrukluk River	Telaquana River
9/19	[a]	[a]	0	0 [f]	[a]
9/20	[a]	[a]	0	0 [f]	[a]
9/21	[a]	[a]	[a]	0 [f]	[a]
9/22	[a]	[a]	[a]	0 [f]	[a]
9/23	[a]	[a]	[a]	0 [f]	[a]
9/24	[a]	[a]	[a]	0 [f]	[a]
9/25	[a]	[a]	[a]	0 [f]	[a]
Annual Esc	41,473	259,406	894	6,413	24,293
95% CI	–	259,325–259,489	865–924	6,408–6,442	24,176–24,440

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; missed passage was estimated using the Bayesian method.

[d] Partial day count; Bayesian estimate rejected because observed passage was larger than estimate.

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

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

Table 11.–Daily and annual estimated escapement of coho salmon at Kuskokwim Area weir projects, 2014.

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

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Table 11.–Page 2 of 4.

Date	Kuskokwim Bay	Kuskokwim River			
	Middle Fork Goodnews R	Salmon River	George River	Kogrukluk River	Tatlawiksuk River
7/17	0	0	0	0	0
7/18	0	0	0	0	0 [c]
7/19	0	0	0	0	0
7/20	0	0	0	0	0
7/21	0	0 [c]	0 [c]	0	1
7/22	0	0	0	0	3
7/23	0	0	0 [c]	0	3
7/24	0	1	0	0	2
7/25	0	3	0	0	2
7/26	0	3 [d]	0	0	3
7/27	0	0	0	2	12 [d]
7/28	0	1	0	0	0
7/29	2	2	0	1	18
7/30	4	8	16	6	7
7/31	10	1	8	3	20
8/1	8	5 [d]	9	4	24
8/2	7	9	7 [d]	12	29
8/3	15	8	47	33	54
8/4	16	20	48	47	69
8/5	9	20	57	17	133
8/6	71	5 [b]	126	79	129
8/7	38	7 [b]	164	47	115
8/8	117	10 [b]	92	60	262
8/9	32	54 [d]	254	155	345
8/10	44	36	389	234	453
8/11	66	75	252 [d]	248	413
8/12	201	52	454	76	814
8/13	75	35	94	390	1,013
8/14	312	152	62	607	711
8/15	139	223	635	497	1,131
8/16	312	0	360	603	883
8/17	252	167	119	636 [b]	1,323

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	Kuskokwim Bay	Kuskokwim River			
Date	Middle Fork Goodnews R	Salmon River	George River	Kogrukluk River	Tatlawiksuk River
8/18	165	218	2,459	763 [b]	958
8/19	186	41	1,684	898 [b]	857
8/20	88	31	804	1,039 [b]	1,088
8/21	152	188	1,162	1,184 [b]	953
8/22	88	281	663	1,329 [b]	1,137
8/23	217	83	859	1,467 [b]	1,161
8/24	604	399	1,967	1,598 [b]	902
8/25	221	474	4,377	1,719 [b]	1,097
8/26	1,031	199	3,770	1,825 [b]	806
8/27	181	301 [c]	1,198	1,915 [c]	404
8/28	86	404	824	2,372	268
8/29	380	221	1,643	1,806	134
8/30	105	92	164	1,421	171
8/31	60	67	444	1,164	145
9/1	[e]	223	575	1,379	174
9/2	[e]	865 [d]	2,363	2,484	266
9/3	[e]	312 [c]	1,454	3,326	251
9/4	[e]	302 [c]	307	2,010	86
9/5	[e]	363	47	2,807	100
9/6	[e]	326	444	2,568	110
9/7	[e]	238	33	1,589	115
9/8	[e]	246 [c]	53	978	87
9/9	[e]	270	2,463	1,304	80
9/10	[e]	253	1,309	1,396	105
9/11	[e]	222	357	954	81
9/12	[e]	167	242	769	75
9/13	[e]	58	295	754	80
9/14	[e]	203	206	942 [c]	32
9/15	[e]	105	75	849 [b]	52
9/16	[e]	50	89	760 [b]	62
9/17	[e]	60	88	678 [b]	2 [b]
9/18	[e]	72	100	601 [b]	1 [b]

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	Kuskokwim Bay	Kuskokwim River			
Date	Middle Fork Goodnews R	Salmon River	George River	Kogrukluk River	Tatlawiksuk River
9/19	[a]	12	25	531 [b]	1 [b]
9/20	[a]	11	35	467 [b]	1 [b]
9/21	[a]	[a]	[a]	408 [b]	[a]
9/22	[a]	[a]	[a]	356 [b]	[a]
9/23	[a]	[a]	[a]	309 [b]	[a]
9/24	[a]	[a]	[a]	268 [b]	[a]
9/25	[a]	[a]	[a]	231 [b]	[a]
Annual Esc	–	8,254	35,771	52,975	19,814
95% CI	–	8,086–8,448		51,050–54,555	19,811–19,819

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

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

[d] Partial day count; Bayesian estimate rejected because to observed passage was larger than estimate.

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

Table 12.–Annual escapement of Chinook salmon past Kuskokwim Area weir projects, 2000–2014.

Year	Kuskokwim Bay		Kuskokwim River			
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Tatlawiksuk River
2000	2,670	[a]	[a]	2,959	3,242	807
2001	5,351	[b]	[a]	3,277	7,475	1,978
2002	3,025	5,304	[a]	2,443	10,025	2,237
2003	2,248	8,211	[a]	[b]	12,008	[b]
2004	4,438	19,569	[a]	5,488	19,819	2,833
2005	4,781	14,177	[a]	3,845	21,819	2,864
2006	4,572	[a]	7,075	4,355	20,205	1,700
2007	3,914	13,965	6,255	4,011	[b]	2,032
2008	2,223	[b]	2,376	2,563	9,750	1,075
2009	1,669	7,065	1,656	3,663	9,528	1,071
2010	2,176	6,537	[a]	1,498	5,812	546
2011	2,045	5,170	[a]	1,547	6,731	992
2012	524	1,561	[b]	2,201	[b]	1,116
2013	1,187	3,569	625	1,292	1,819	495
2014	750	3,594	1,757	2,993	3,732	1,904
Average	2,926	8,513	3,597	3,648	10,551	1,516

Note: Average is derived from all annual escapements on record at each project except 2014, and may include escapements prior to 2000. Escapement data for all projects entirety are archived in the AYK 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 13.–Annual escapement of chum salmon past Kuskokwim Area weir projects, 2000–2014.

	Kuskokwim Bay		Kuskokwim River			
Year	Middle Fork Goodnews R	Kanektok River	Salmon 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
Average	27,071	56,319	18,948	24,055	47,780	36,513

Note: Average is derived from all annual escapements on record at each project except 2014, and may include escapements prior to 2000. Escapement data for all projects entirety are archived in the AYK 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.–Sockeye salmon escapement indices of high priority aerial survey rivers, Kuskokwim Area, 2000–2014.

Year	North Fork Goodnews R	Middle Fork Goodnews R	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
Average	22,765	17,943	41,424

Note: Average is derived from all aerial survey escapement indices on record for each river except 2014, and may include indices prior to 2000. For additional aerial survey data refer to the AYK salmon database management system. (http://www.adfg.alaska.gov/CommFishR3/WebSite/AYKDBMSWebsite/Default.aspx). Dashes (–) indicate the escapement index was not estimated.

Table 15.–Annual escapement of sockeye salmon past Kuskokwim Area weir projects, 2000–2014.

Year	Kuskokwim Bay		Kuskokwim River		
	Middle Fork Goodnews R	Kanektok River	Salmon 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
Average	45,666	170,869	2,285	12,854	39,522

Note: Average is derived from all annual escapements on record at each project except 2014, and may include escapements prior to 2000. Escapement data for all projects entirety are archived in the AYK 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 16.–Annual escapement of coho salmon past Kuskokwim Area weir projects, 2000–2014.

Year	Kuskokwim Bay	Kuskokwim River			
	Middle Fork Goodnews R	Salmon River	George River	Kogrukluk River	Tatlawiksuk River
2000	[a]	[b]	11,269	33,063	[a]
2001	18,300	[b]	16,724	19,983	[a]
2002	27,643	[b]	6,759	14,515	11,156
2003	52,504	[b]	32,873	74,915	[a]
2004	42,049	[b]	12,499	26,078	16,446
2005	20,168	[b]	8,294	25,407	7,076
2006	26,909	[a]	12,705	16,268	[a]
2007	19,442	[a]	28,398	26,423	8,500
2008	37,690	10,974	21,931	29,237	11,022
2009	19,123	6,351	12,490	22,289	10,148
2010	26,287	[b]	12,639	14,689	3,773
2011	24,668	[b]	29,120	21,800	14,184
2012	[a]	[a]	14,478	13,421	8,015
2013	[a]	2,797	15,308	21,207	12,764
2014	[a]	8,254	35,771	52,975	19,814
Average	26,634	6,707	15,862	22,328	9,700

Note: Average is derived from all annual escapements on record at each project except 2014, and may include escapements prior to 2000. Escapement data for all projects entirety are archived in the AYK 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.

[b] Weir did not operate this year.

Table 17.–Age, sex, and length sample collection at Kuskokwim Area weir projects, 2014.

Species	Project	Season sample goal	Scales per fish sampled	Season total number of samples collected	Dates samples collected
Chinook	Middle Fork Goodnews	230	3	108	2 July–29 July
	Kanektok	230	3	265	3 July–2 August
	Salmon	230	3	143	29 June–31 July
	George	230	3	231	26 June–26 July
	Kogrukluk	230	3	230	29 June–3 August
	Tatlawiksuk	230	3	187	29 June–27 July
chum	Middle Fork Goodnews	600	1	494	6 July–5 August
	Kanektok	600	1	631	1 July–4 August
	Salmon	600	1	273	9 July–3 August
	George	600	1	604	26 June–5 August
	Kogrukluk	600	1	616	1 July–30 July
	Tatlawiksuk	600	1	611	29 June–2 August
sockeye	Middle Fork Goodnews	600	3	605	27 June–28 July
	Kanektok	600	3	722	30 June–30 July
	Salmon	230	3	68	22 July–14 August
	Kogrukluk	230	3	235	11 July–6 August
	Telaquana	230	3	279	8 July–2 August
coho	Salmon	400	3	406	10 August–11 September
	George	400	3	422	8 August–10 September
	Kogrukluk	400	3	327	11 August–12 September
	Tatlawiksuk	400	3	401	3 August–13 September

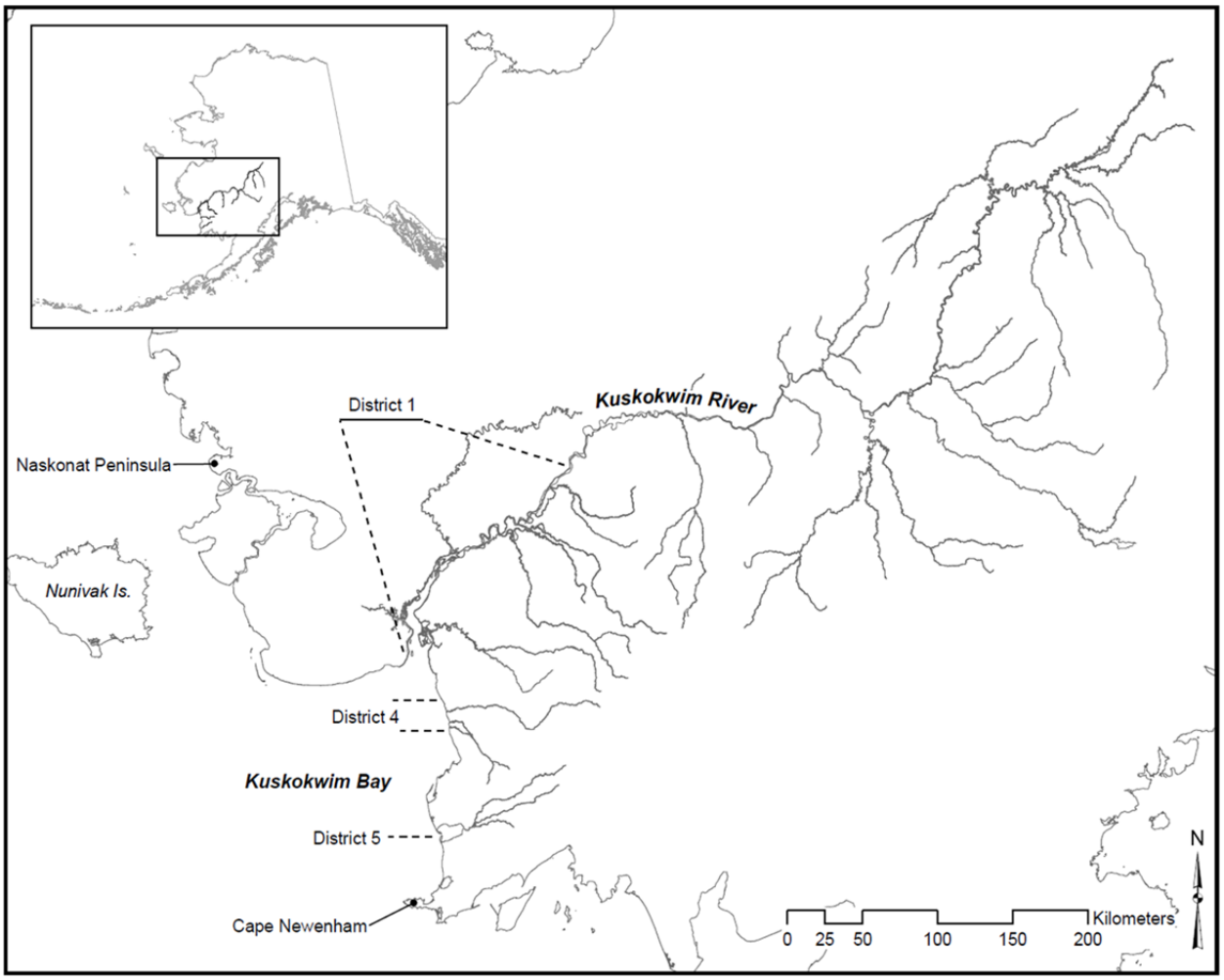

Figure 1.–The Kuskokwim Management Area, including Kuskokwim Bay, the Kuskokwim River, and all commercial fishing districts.

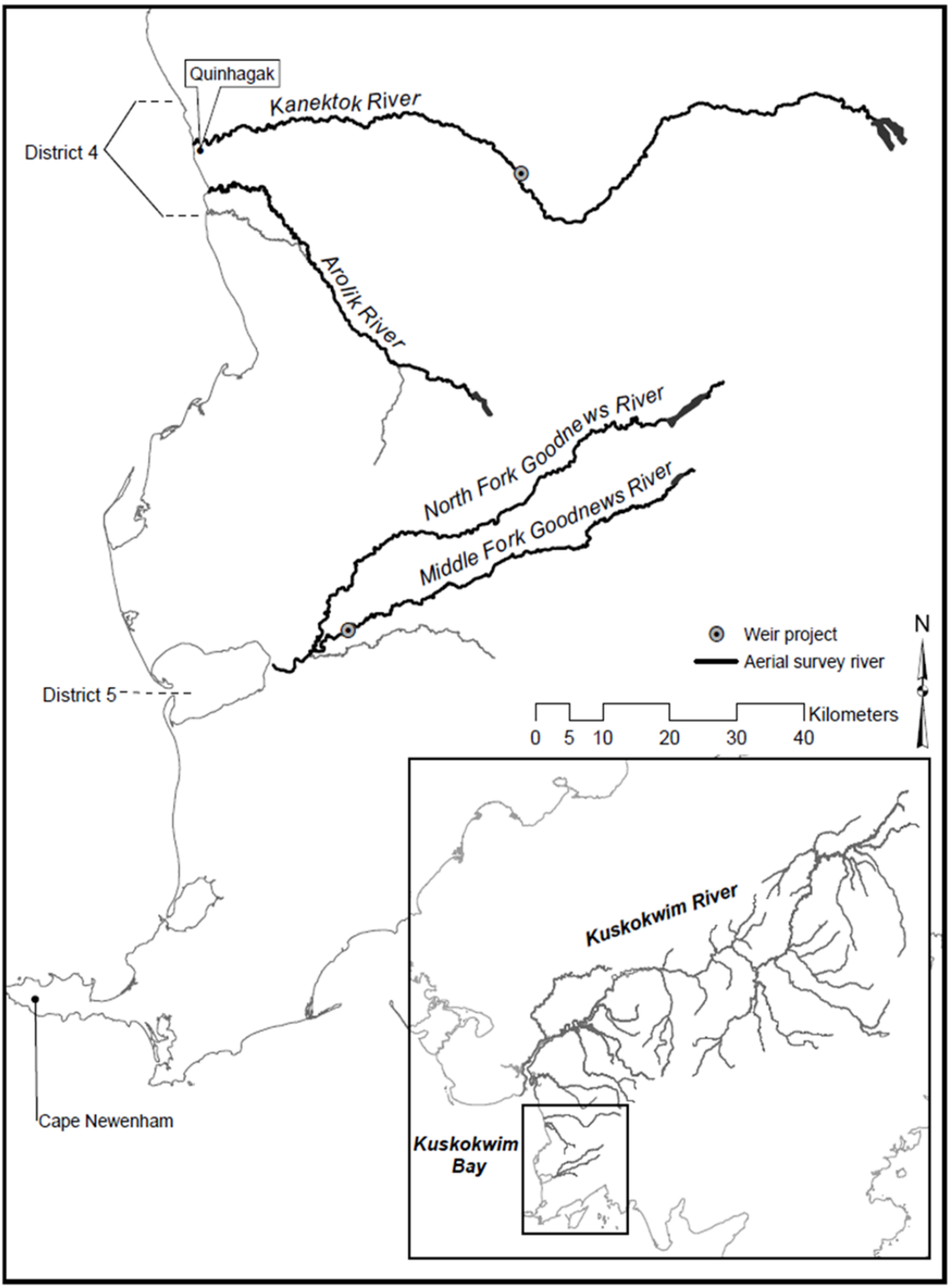

Figure 2.–Monitored Kuskokwim Bay rivers, 2014.

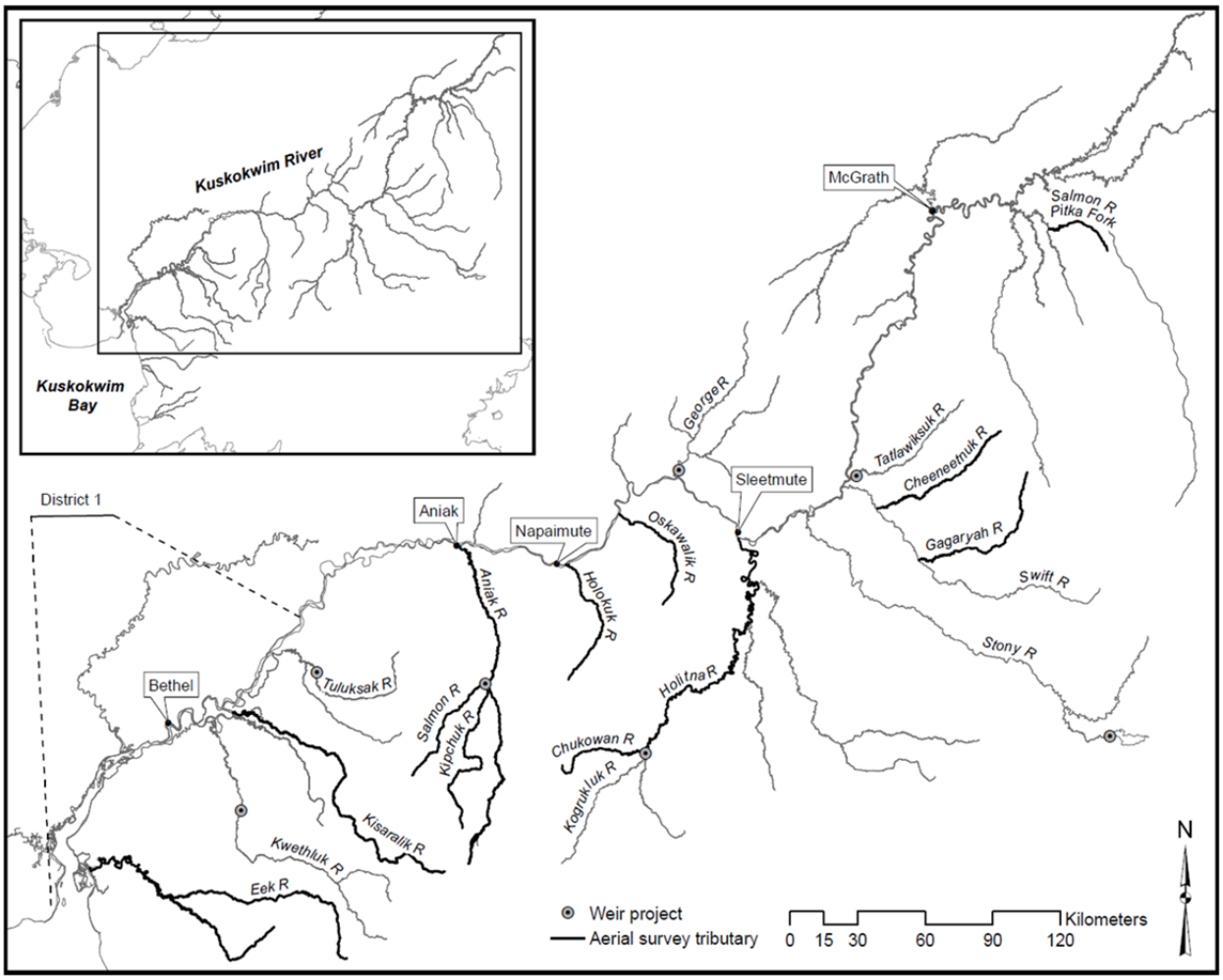

Figure 3.–Monitored Kuskokwim River tributaries, 2014.

Note: Kwethluk and Tuluksak river weirs are operated by the U.S. Fish and Wildlife Service and are displayed to show monitoring of the Kuskokwim River in its entirety.

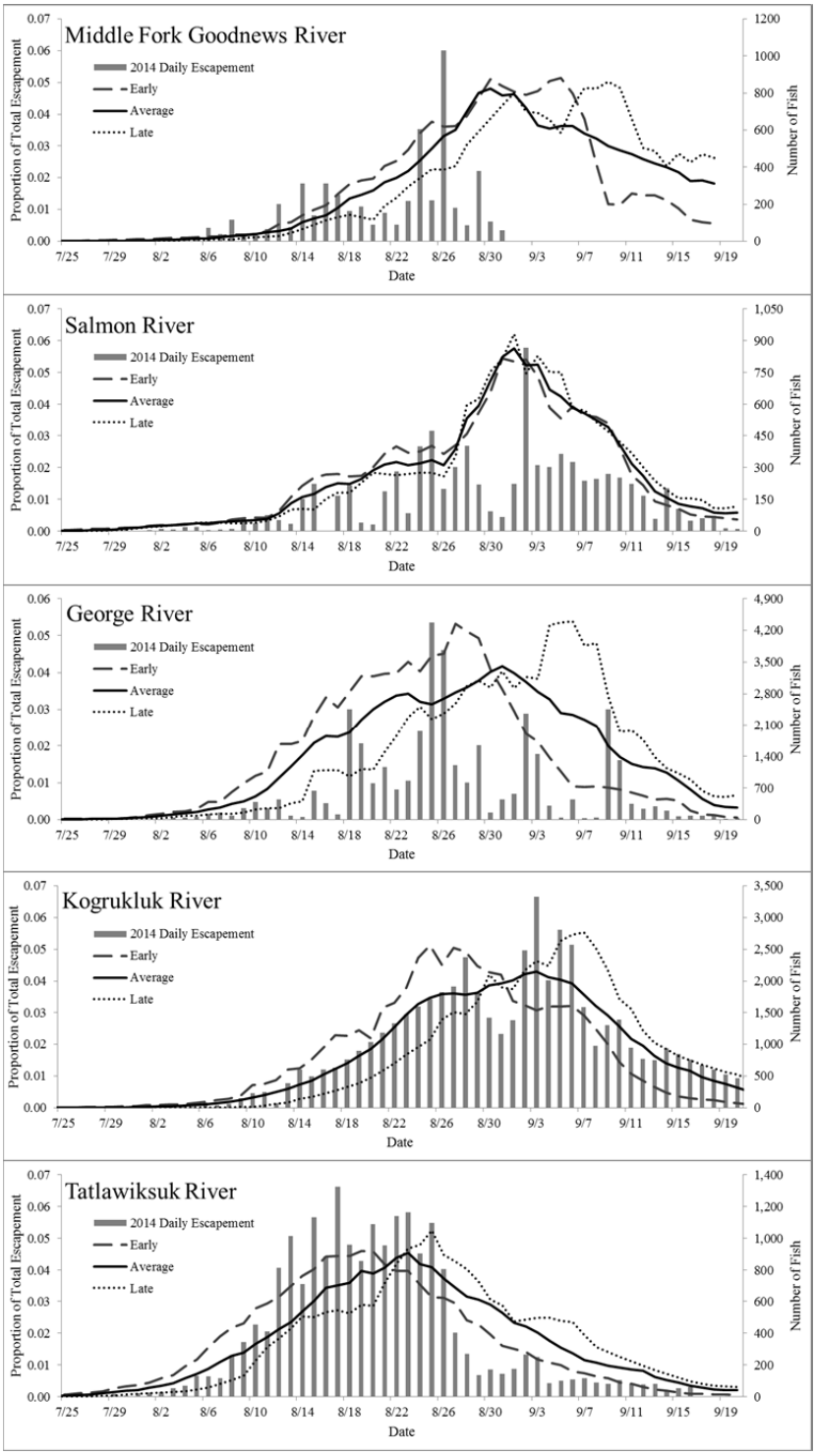

Figure 4.–Early, average, and late run timings and 2014 daily escapements of coho salmon at Kuskokwim Area weir projects.

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.

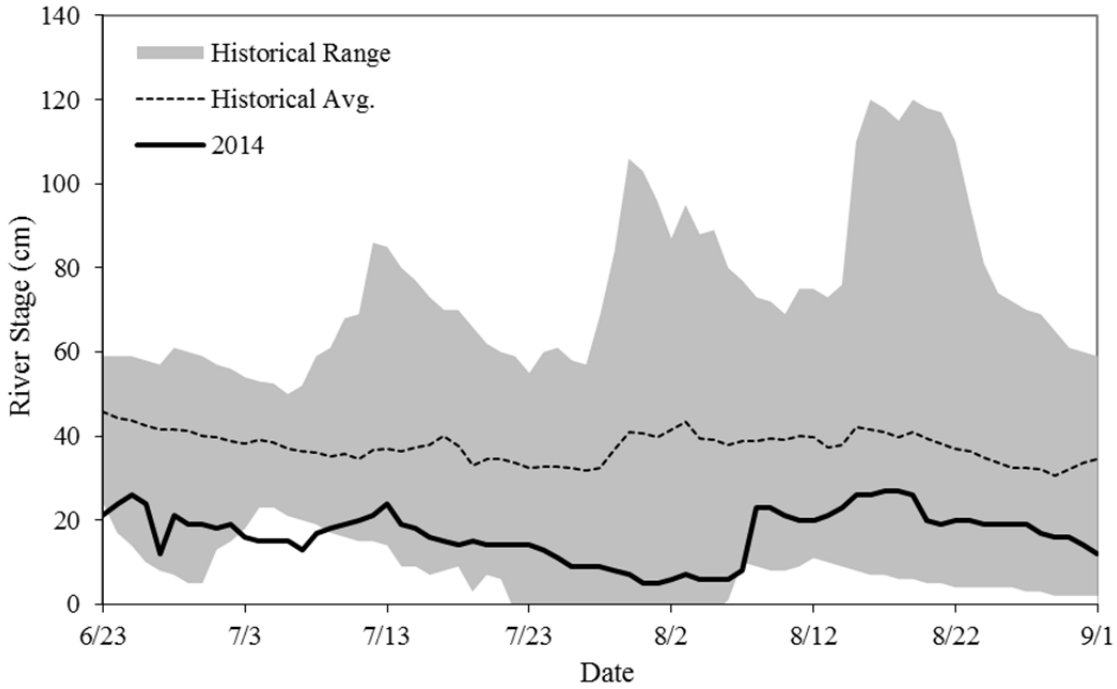

Figure 5.–Daily morning river stage at Middle Fork Goodnews River weir in 2014 relative to historical average, minimum, and maximum morning readings, 2004–2013.

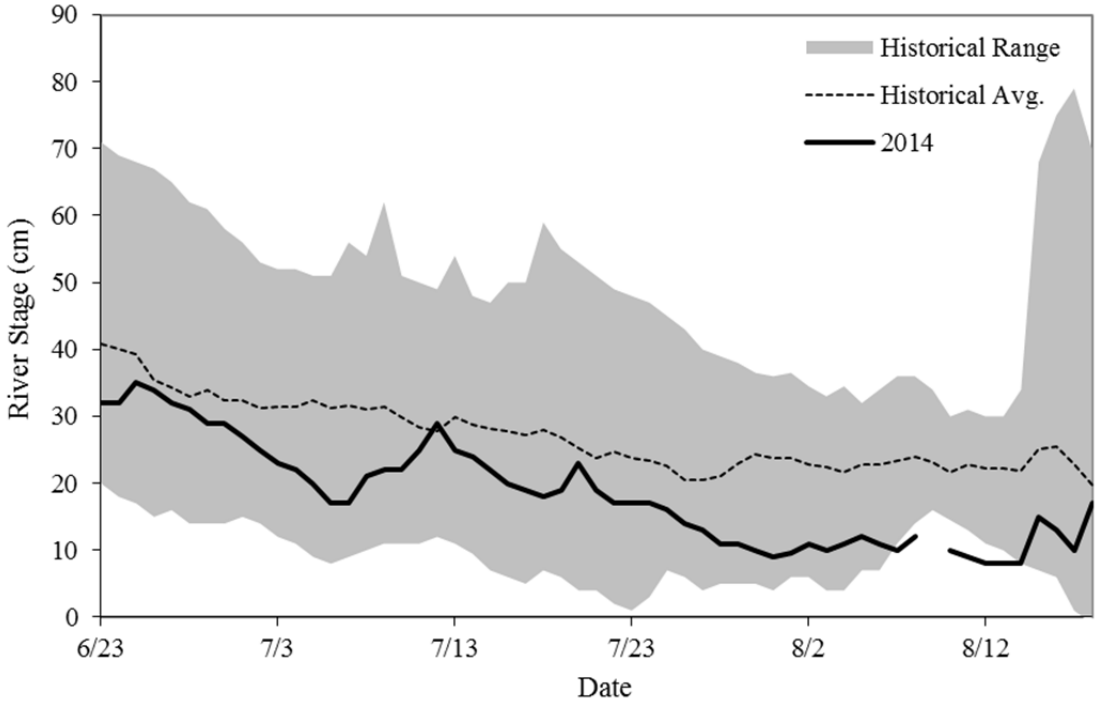

Figure 6.–Daily morning river stage at Kanektok River weir in 2014 relative to historical average, minimum, and maximum morning readings, 2004–2013.

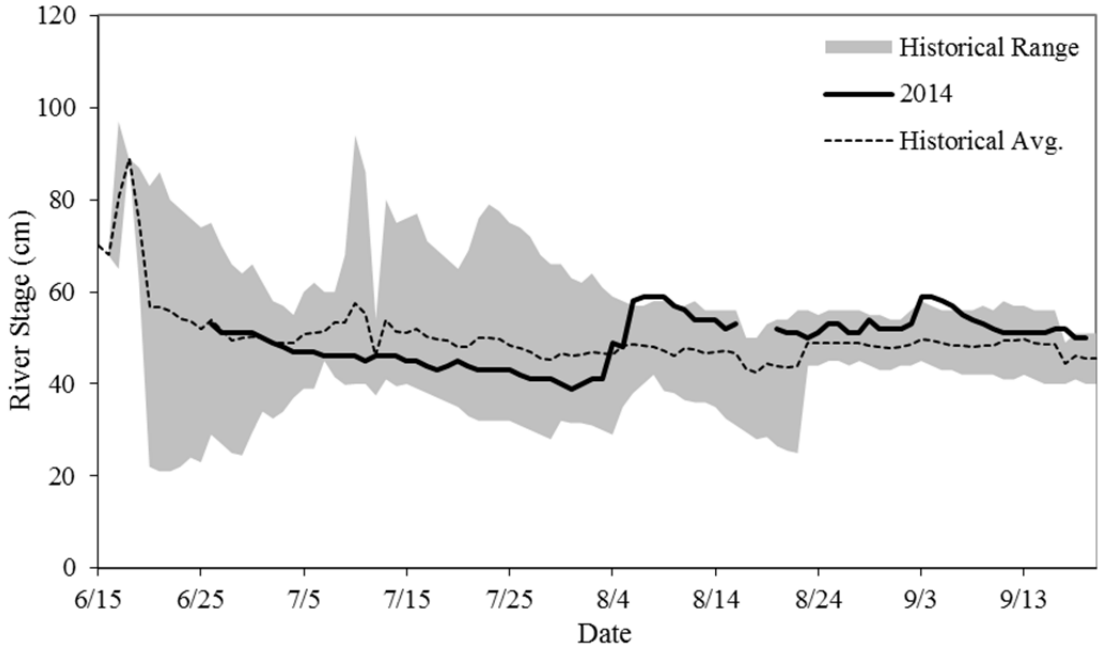

Figure 7.–Daily morning river stage at Salmon River weir in 2014 relative to historical average, minimum, and maximum morning readings, 2006–2009 and 2012–2013.

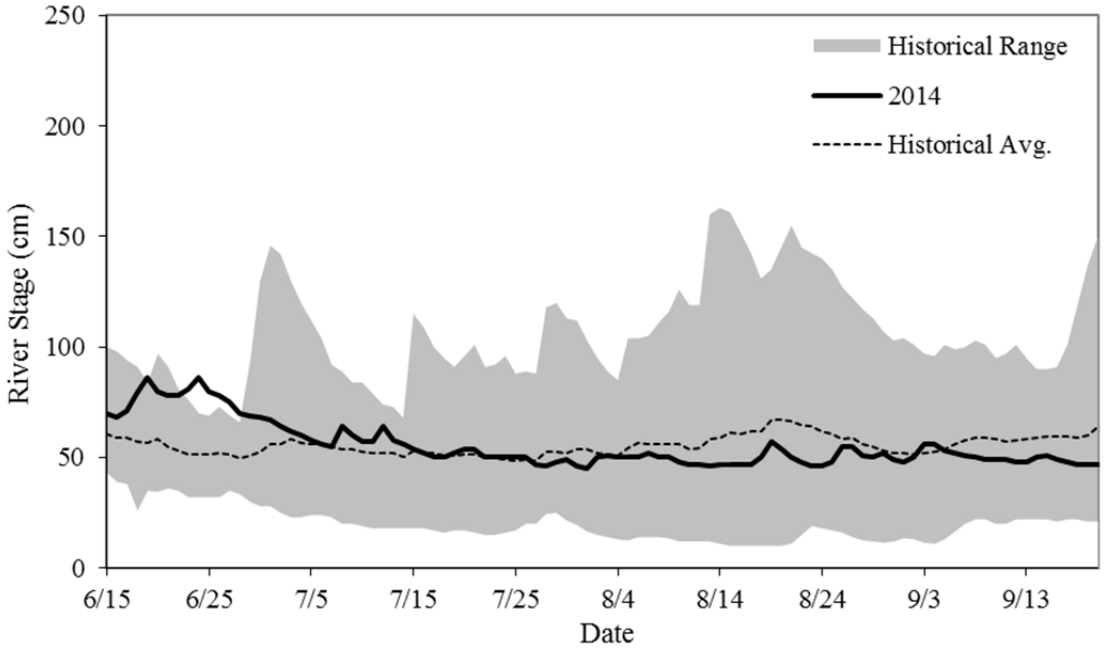

Figure 8.–Daily morning river stage at George River weir in 2014 relative to historical average, minimum, and maximum morning readings, 2000–2013.

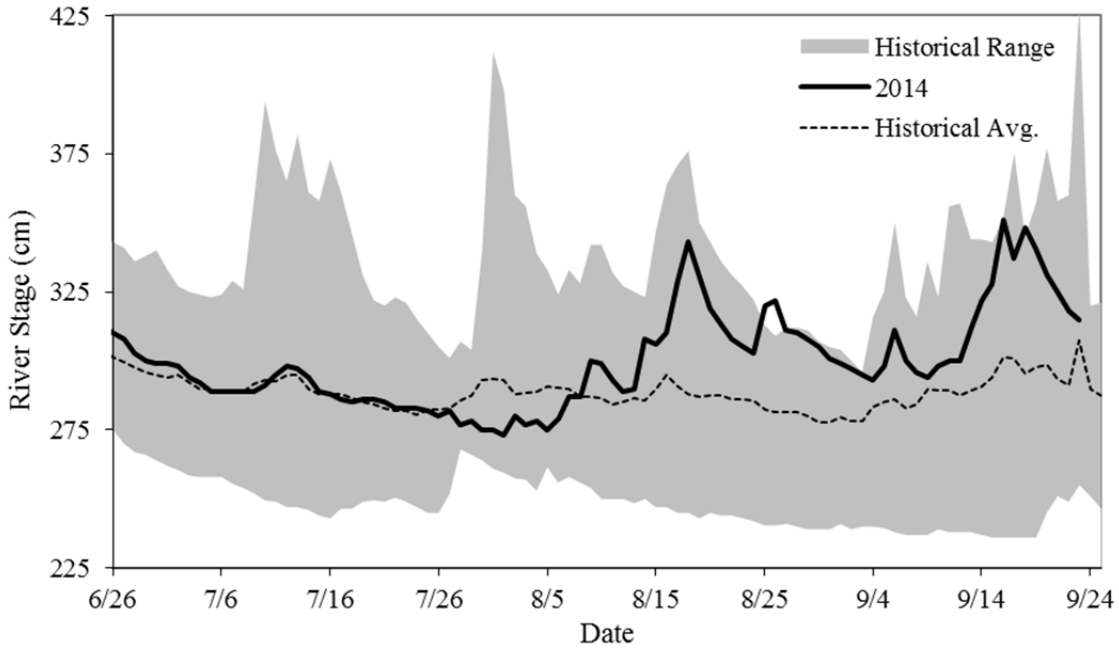

Figure 9.–Daily morning river stage at Kogrukluk River weir in 2014 relative to historical average, minimum, and maximum morning readings, 2002–2013.

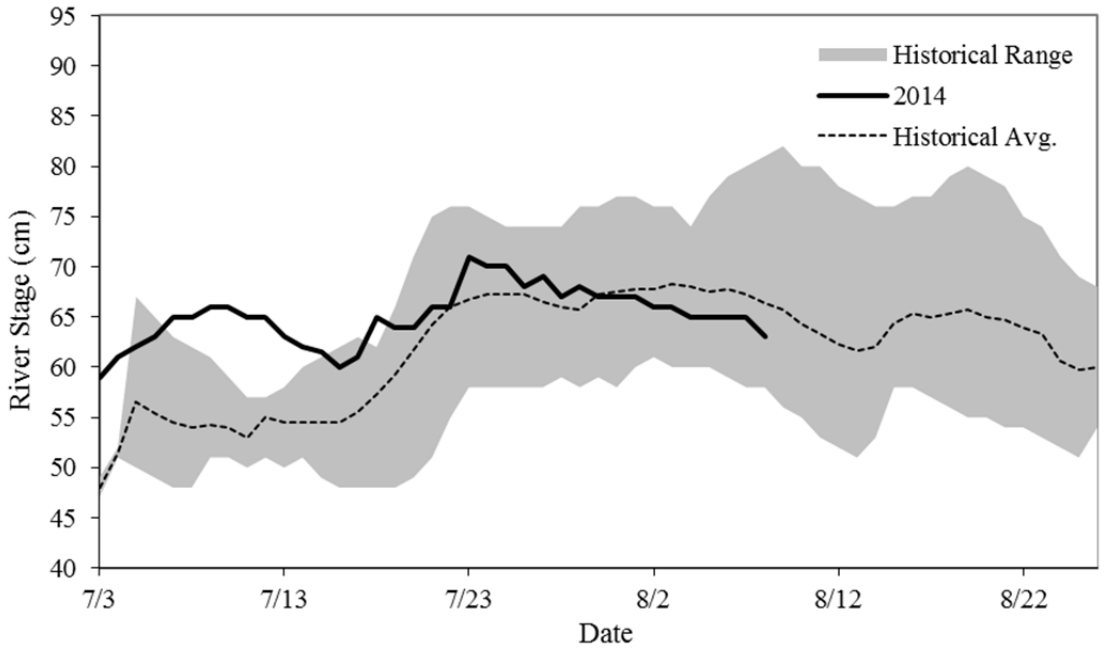

Figure 10.–Daily morning river stage at Telaquana River weir in 2014 relative to historical average, minimum, and maximum morning readings, 2010–2013.

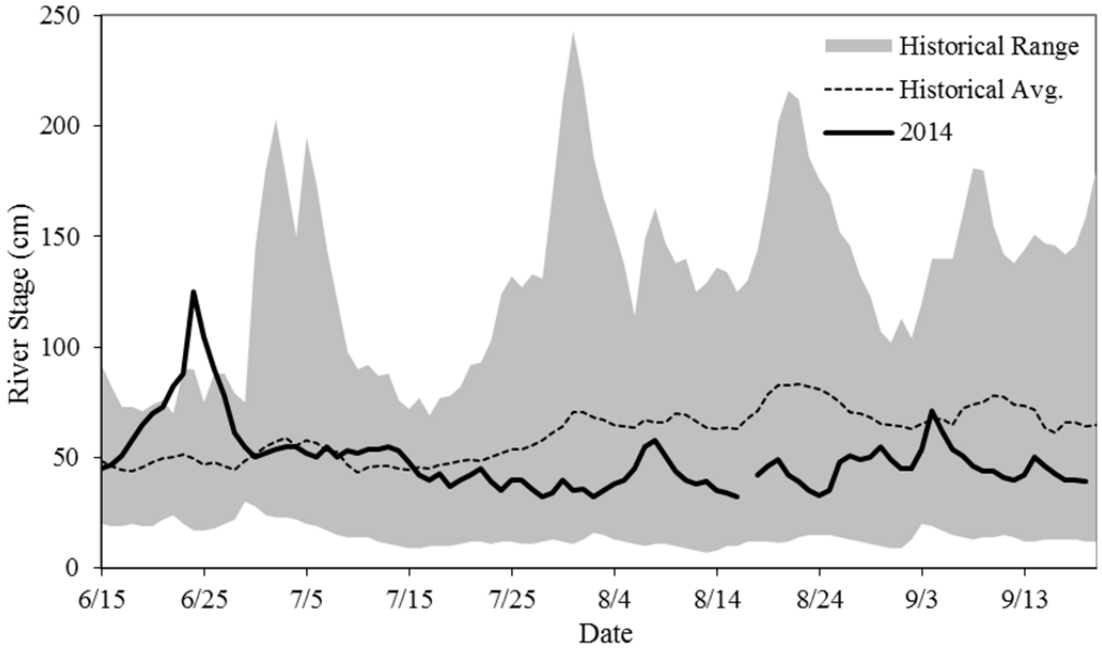

Figure 11.–Daily morning river stage at Tatlawiksuk River weir in 2014 relative to historical average, minimum, and maximum morning readings, 1998–2013.

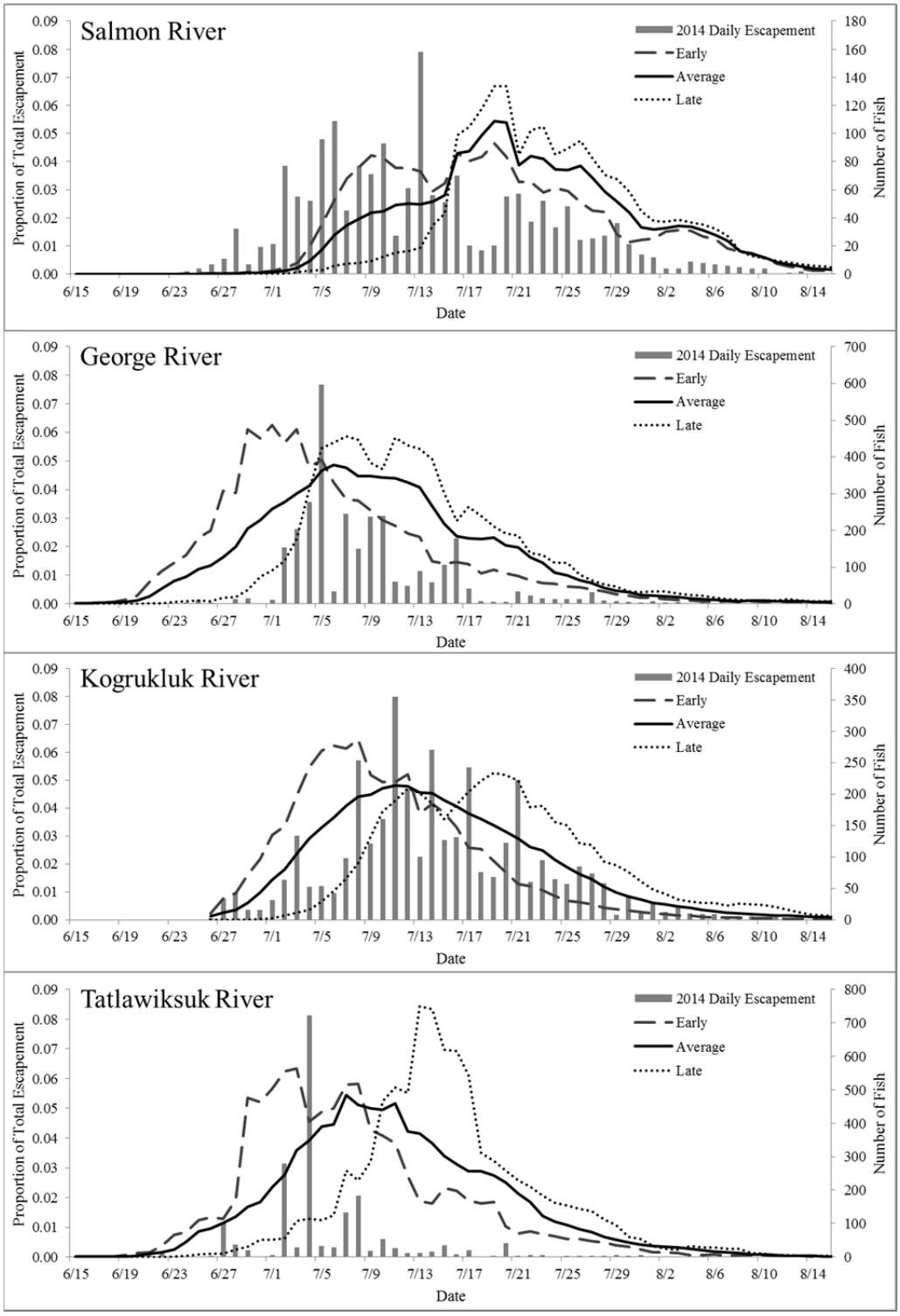

Figure 12.–Early, average, and late run timings and 2014 daily escapements of Chinook salmon at Kuskokwim Area weir projects.

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.

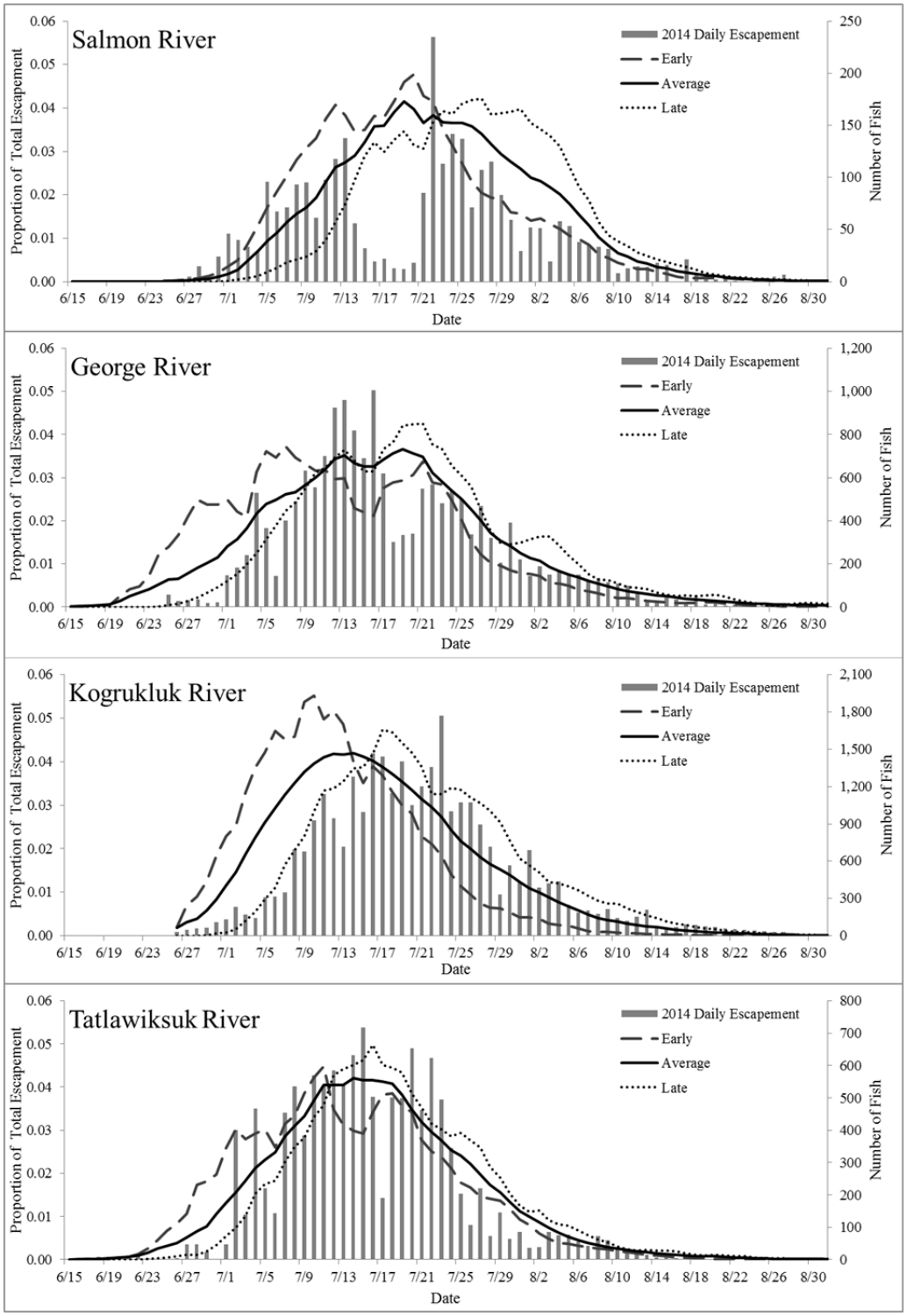

Figure 13.–Early, average, and late run timings and 2014 daily escapements of chum salmon at Kuskokwim Area weir projects.

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.

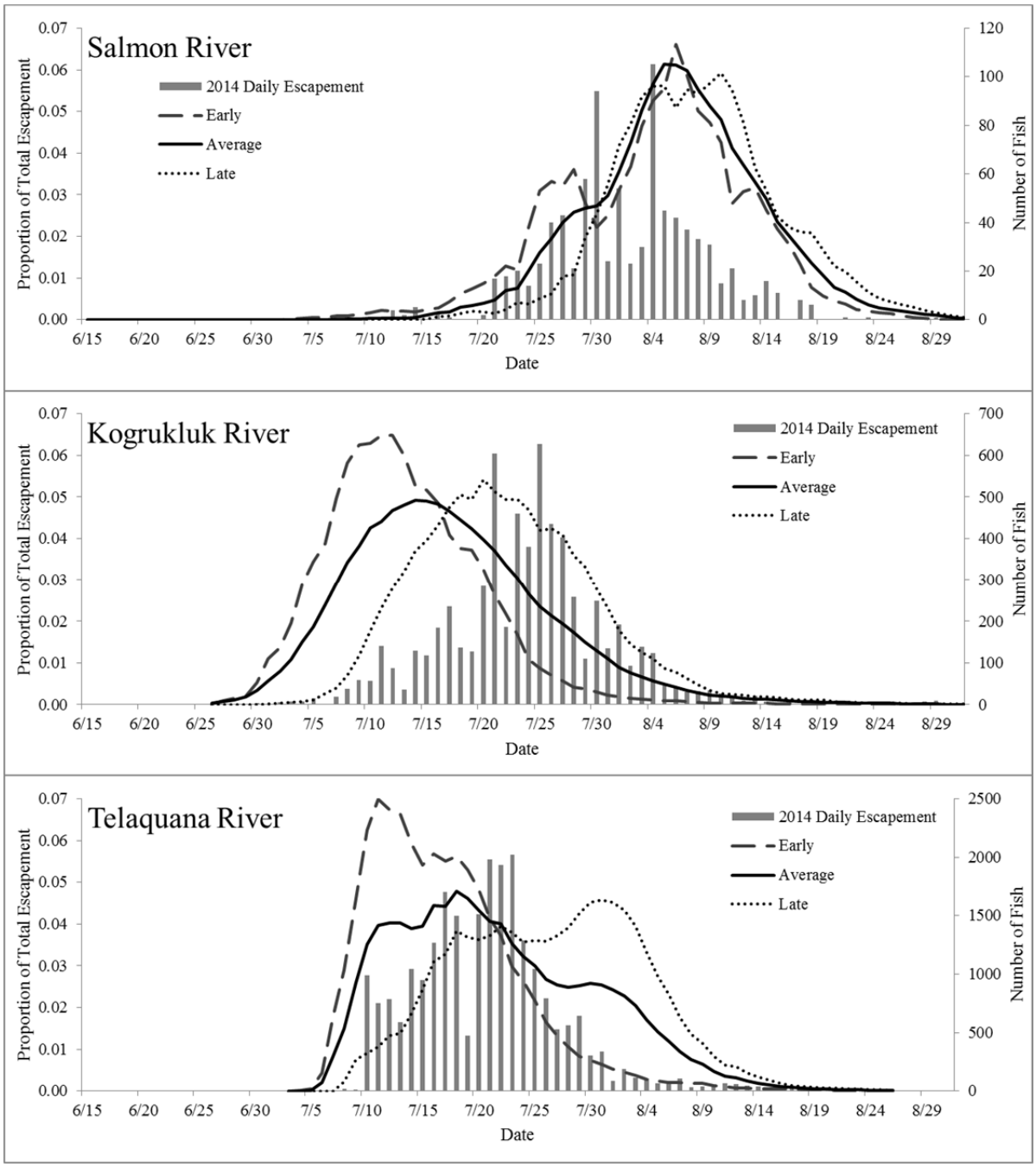

Figure 14.–Early, average, and late run timings and 2014 daily escapements of sockeye salmon at Kuskokwim Area weir projects.

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.

APPENDIX A: INDEX AREAS

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. up river 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)	
Arolik R.	101 (59.41.68 N, 161.52.86 W)	North Mouth of the Arolik R.	[d]
	102 (59.37.29 N, 161.34.94 W)	Confluence w/ South and North Mouth of Arolik R.	
	103 (59.31.68 N, 161.22.99 W)	Edge of SE open valley upstream of Snow Gulch	
	STOP (59.28.45 N, 161.07.40 W)	Outlet of Arolik Lake	
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]
Eek R.	101 (60.12.47 N, 162.15.91 W)	Confluence w/ Eek Channel	
	102 (60.07.74 N, 161.34.72 W)	Confluence w/ Middle Fork to Southeast	
	103 (60.10.71 N, 160.40.53 W)	Bend in river after end of Great Ridge	102, 103, 104
	104 (60.11.81 N, 160.24.25 W)	Confluence w/ small creek draining Eek Lake	
	STOP (59.59.21 N, 160.12.46 W)	Small fork adj. to old Airstrip (Rainy Cr. upper reach)	
Middle Fork Eek R.	101 (60.07.74 N, 161.34.72 W)	Confluence w/ Eek River	101
	STOP (60.02.15 N, 160.47.05 W)	Confluence w/ small tributary to Southeast	
Kisaralik R.	101 (60.51.43 N, 161.14.31 W)	Confluence w/ Kuskokwim R.	
	102 (60.44.52 N, 160.22.75 W)	Confluence w/ Nukluk Cr.	102, 103
	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 (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)	102, 103, 104
	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.	
	102 (60.57.55 N, 159.23.68 W)	Confluence w/ Dominion Cr.	101, 102, 103
	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.	
	102 (60.46.67 N, 159.19.14 W)	Confluence w/ small cr. from South at beginning of Horseshoe Canyon	101, 102, 103
	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.	
	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.	101, 102
	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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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	
Chukowan R.	101 (60.51.01 N, 157.51.12 W)	Confluence w/ Kogrukluk R.	101, 102, 103
	102 (60.50.81 N, 158.10.62 W)	Confluence w/ Oksotalik Cr.	
	103 (60.44.83 N, 158.27.35 W)	Confluence w/ Bairo Cr.	
	STOP (60.46.54 N, 158.31.25 W)	Confluence of Gemuk R. and Chikululnuk Cr.	
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	

[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 estimate the escapement index. 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.

[d] No index objective is defined for the river.

APPENDIX B: WEATHER AND STREAM OBSERVATIONS

Appendix B1.–Daily weather and stream observations at the Middle Fork Goodnews River weir, 2014.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)
				Air	Water	
6/23	AM	2	0.0	15.0	12.0	21
6/24	AM	4	0.0	8.0	11.0	24
6/25	AM	1	0.0	15.0	10.0	26
6/26	AM	1	0.0	14.0	11.0	24
6/27	AM	1	0.0	13.0	11.0	12
6/28	AM	1	0.0	16.0	12.0	21
6/29	AM	4	1.0	9.0	10.0	19
6/30	AM	3	0.0	13.0	10.0	19
7/1	AM	5	0.5	13.0	10.0	18
7/2	AM	5	0.0	7.0	11.0	19
7/3	AM	3	0.0	11.0	11.0	16
7/4	AM	1	0.0	14.0	11.0	15
7/5	AM	1	0.0	13.0	11.0	15
7/6	AM	4	0.0	12.0	12.0	15
7/7	AM	4	0.0	8.0	10.0	13
7/8	AM	4	12.2	10.0	10.0	17
7/9	AM	3	4.6	13.0	10.0	18
7/10	AM	4	3.3	10.0	10.0	19
7/11	AM	3	3.0	12.0	10.0	20
7/12	AM	4	36.8	11.0	10.0	21
7/13	AM	1	1.0	12.0	10.0	24
7/14	AM	2	0.0	13.0	10.0	19
7/15	AM	2	0.0	13.0	10.0	18
7/16	AM	2	0.0	14.0	10.0	16
7/17	AM	5	0.0	7.0	10.0	15
7/18	AM	1	1.3	10.0	10.0	14
7/19	AM	2	2.3	12.0	10.0	15
7/20	AM	1	2.5	11.0	10.0	14
7/21	AM	5	0.0	10.0	11.0	14
7/22	AM	4	0.0	10.0	11.0	14
7/23	AM	4	0.0	10.0	11.0	14
7/24	AM	4	2.5	12.0	11.0	13
7/25	AM	2	0.0	11.0	10.0	11
7/26	AM	3	0.3	10.0	11.0	9
7/27	AM	4	0.0	11.0	11.0	9
7/28	AM	1	0.0	20.0	13.0	9
7/29	AM	1	0.0	11.0	11.0	8
7/30	AM	1	0.0	11.0	12.0	7
7/31	AM	4	0.0	11.0	13.0	5

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)
8/1	AM	4	5.3	12.0	13.0	5
8/2	AM	4	5.1	12.0	12.0	6
8/3	AM	5	0.8	12.0	11.0	7
8/4	AM	4	4.8	12.0	12.0	6
8/5	AM	5	0.8	13.0	13.0	6
8/6	AM	4	0.0	12.0	12.0	6
8/7	AM	4	18.5	12.0	12.0	8
8/8	AM	4	15.2	12.0	11.0	23
8/9	AM	4	1.8	13.0	11.0	23
8/15	AM	5	0.0	10.0	11.0	26
8/17	AM	3	2.3	11.0	12.0	27
8/19	AM	3	0.8	11.0	11.0	26
8/20	AM	3	0.0	12.0	11.0	20
8/21	AM	4	5.1	12.0	11.0	19
8/22	AM	3	0.0	12.0	11.0	20
8/23	AM	4	0.0	10.0	11.0	20
8/24	AM	4	5.1	12.0	11.0	19
8/25	AM	5	2.8	5.0	9.0	19
8/26	AM	3	2.0	12.0	10.0	19
8/27	AM	3	0.0	7.0	10.0	19
8/28	AM	3	0.0	12.0	10.0	17
8/29	AM	2	5.3	6.0	10.0	16
8/30	AM	2	0.0	9.0	10.0	16
8/31	AM	1	0.0	1.0	7.0	14
9/1	AM	4	0.5	12.0	9.0	12
Average	–	–	2.3	11.3	10.8	16

[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, 2014.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)
6/23	AM	4	1.5	11.0	ND	32
6/23	PM	ND	ND	ND	ND	ND
6/24	AM	4	0.0	11.0	9.0	32
6/24	PM	ND	ND	ND	ND	ND
6/25	AM	2	0.6	12.0	9.0	35
6/25	PM	ND	ND	ND	ND	ND
6/26	AM	5	0.2	5.0	9.0	34
6/26	PM	ND	ND	ND	ND	ND
6/27	AM	5	0.0	9.0	9.0	32
6/27	PM	2	ND	12.0	12.5	32
6/28	AM	5	0.0	8.0	9.5	31
6/28	PM	4	ND	15.0	11.5	30
6/29	AM	4	0.0	6.0	9.5	29
6/29	PM	4	ND	11.0	10.0	29
6/30	AM	4	0.2	8.0	8.0	27
6/30	PM	4	ND	12.0	11.5	29
7/1	AM	4	0.1	10.0	9.0	25
7/1	PM	3	ND	18.0	11.5	27
7/2	AM	5	0.0	6.0	9.0	23
7/2	PM	3	ND	20.0	12.5	25
7/3	AM	4	0.0	12.0	9.5	22
7/3	PM	4	ND	19.0	11.5	22
7/4	AM	2	0.0	14.0	9.5	20
7/4	PM	2	ND	14.0	12.0	22
7/5	AM	3	0.0	15.0	9.0	17
7/5	PM	1	ND	20.0	14.0	19
7/6	AM	1	0.0	22.0	10.5	17
7/6	PM	3	ND	14.0	12.0	17
7/7	AM	4	0.1	7.0	9.0	21
7/7	PM	3	ND	16.0	11.0	18
7/8	AM	4	0.8	10.0	9.5	22
7/8	PM	4	ND	15.0	11.0	21
7/9	AM	4	0.3	9.0	9.0	22
7/9	PM	3	ND	16.0	12.0	22

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)
7/10	AM	4	0.4	8.0	9.0	25
7/10	PM	3	ND	13.0	11.0	23
7/11	AM	4	0.7	10.0	10.0	29
7/11	PM	4	ND	11.0	13.0	31
7/12	AM	3	7.4	11.0	9.0	25
7/12	PM	3	ND	15.0	11.5	26
7/13	AM	4	0.0	10.0	9.0	24
7/13	PM	3	ND	15.0	11.0	24
7/14	AM	1	0.0	11.0	9.0	22
7/14	PM	3	ND	18.5	12.0	23
7/15	AM	1	0.0	8.0	8.5	20
7/15	PM	3	ND	19.5	11.5	22
7/16	AM	1	0.0	12.0	9.0	19
7/16	PM	2	ND	20.0	13.0	20
7/17	AM	3	0.0	6.0	9.0	18
7/17	PM	3	ND	15.0	13.0	19
7/18	AM	4	0.0	8.0	11.0	19
7/18	PM	4	ND	11.0	12.0	18
7/19	AM	4	0.3	6.0	8.5	23
7/19	PM	4	ND	7.0	8.5	19
7/20	AM	4	1.0	7.0	8.0	19
7/20	PM	1	ND	12.0	12.0	21
7/21	AM	1	0.0	9.0	9.0	17
7/21	PM	4	ND	16.0	11.5	18
7/22	AM	4	0.1	9.0	10.0	17
7/22	PM	4	ND	14.0	10.5	17
7/23	AM	4	0.4	8.0	9.5	17
7/23	PM	4	ND	9.5	10.0	17
7/24	AM	5	0.3	10.0	9.0	16
7/24	PM	4	ND	12.0	10.0	17
7/25	AM	1	0.1	4.0	8.0	14
7/25	PM	2	ND	16.0	12.0	15
7/26	AM	4	0.0	9.0	9.5	13
7/26	PM	2	ND	17.5	13.0	14

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)
7/27	AM	4	0.0	11.0	10.0	11
7/27	PM	3	ND	15.0	13.0	12
7/28	AM	4	0.0	9.0	10.5	11
7/28	PM	4	ND	13.0	11.0	11
7/29	AM	2	0.0	9.0	9.0	10
7/29	PM	1	ND	22.0	14.0	11
7/30	AM	1	0.0	11.0	10.0	9
7/30	PM	2	ND	27.0	15.0	9
7/31	AM	4	0.0	11.5	10.0	9.5
7/31	PM	4	ND	18.0	14.0	9.5
8/1	AM	4	0.8	10.0	11.0	10
8/1	PM	4	ND	13.0	11.0	11
8/2	AM	5	0.4	12.0	10.0	10
8/2	PM	4	ND	16.0	12.0	10
8/3	AM	4	0.0	12.0	10.5	9.5
8/3	PM	4	ND	18.0	13.0	11
8/4	AM	4	0.4	13.0	10.5	13
8/4	PM	4	ND	19.0	14.0	12
8/5	AM	5	0.3	14.0	11.0	11
8/5	PM	3	ND	19.0	13.0	11
8/6	AM	4	0.1	13.0	11.0	12
8/6	PM	3	ND	17.0	13.0	10
8/7	AM	4	0.2	11.0	11.0	12
8/7	PM	4	ND	13.0	12.5	12
8/8	AM	4	0.5	12.0	10.0	ND
8/8	PM	ND	ND	ND	ND	ND
8/9	AM	ND	0.0	ND	ND	11
8/9	PM	4	ND	19.0	13.5	10
8/10	AM	2	0.0	18.0	10.5	9
8/10	PM	4	ND	21.0	13.0	9
8/11	AM	4	0.0	10.0	10.0	8
8/11	PM	4	ND	20.0	13.0	8
8/12	AM	4	0.0	15.0	10.0	8
8/12	PM	4	ND	13.0	11.0	8

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)
8/13	AM	3	0.1	9.0	9.5	7
8/13	PM	2	ND	17.0	12.0	8
8/14	AM	2	0.7	9.0	9.0	8
8/14	PM	3	ND	16.0	8.0	15
8/15	AM	4	3.4	13.0	10.0	17
8/15	PM	3	ND	16.0	12.5	13
8/16	AM	4	0.8	9.0	9.0	8
8/16	PM	3	ND	12.0	13.0	10
8/17	AM	4	0.1	10.0	10.0	10
8/17	PM	4	ND	13.0	10.0	17
8/18	AM	4	1.4	11.0	10.0	18
8/18	PM	4	ND	12.5	11.0	18
Average	–	–	0.4	12.8	10.7	18

[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 weir, 2014.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
6/26	AM	2	0.0	13.0	8.0	53	1
6/26	PM	ND	ND	ND	ND	ND	ND
6/27	AM	1	0.0	9.0	9.0	51	1
6/27	PM	1	0.0	19.0	12.0	51	1
6/28	AM	1	0.0	13.0	9.0	51	1
6/28	PM	3	0.0	17.0	12.0	51	1
6/29	AM	4	1.0	9.0	9.0	51	1
6/29	PM	3	0.1	14.0	10.0	51	1
6/30	AM	3	3.0	9.0	8.0	51	1
6/30	PM	2	0.0	15.0	10.0	51	1
7/1	AM	1	0.0	13.0	8.0	50	1
7/1	PM	2	0.0	18.0	11.0	50	1
7/2	AM	1	0.0	12.0	9.0	49	1
7/2	PM	1	0.0	18.0	12.0	48	1
7/3	AM	1	0.0	12.0	9.0	48	1
7/3	PM	3	0.0	21.0	12.0	48	1
7/4	AM	1	0.0	15.0	10.0	47	1
7/4	PM	1	0.0	24.0	13.0	47	1
7/5	AM	1	0.0	10.0	10.0	47	1
7/5	PM	1	0.0	25.0	14.0	47	1
7/6	AM	2	1.0	14.0	10.0	47	1
7/6	PM	3	0.0	15.0	12.0	46	1
7/7	AM	3	2.0	11.0	9.0	46	1
7/7	PM	3	0.0	19.0	12.0	46	1
7/8	AM	2	0.0	14.0	10.0	46	1
7/8	PM	3	0.1	15.0	13.0	46	1
7/9	AM	4	2.0	12.0	10.0	46	1
7/9	PM	3	5.0	17.0	12.0	46	1
7/10	AM	3	1.5	12.0	10.0	46	1
7/10	PM	3	0.0	16.0	11.0	46	1
7/11	AM	2	0.5	10.0	10.0	45	1
7/11	PM	3	0.4	16.0	12.0	48	1
7/12	AM	3	0.0	12.0	10.0	46	1
7/12	PM	ND	ND	ND	ND	ND	ND
7/13	AM	1	0.0	13.0	10.0	46	1
7/13	PM	1	0.0	19.0	13.0	46	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
7/14	AM	2	0.0	13.0	10.0	46	1
7/14	PM	2	0.0	17.0	12.0	45	1
7/15	AM	2	0.0	13.0	9.0	45	1
7/15	PM	3	0.0	16.0	11.0	45	1
7/16	AM	2	0.0	13.0	9.0	45	1
7/16	PM	3	0.0	16.0	11.0	44	1
7/17	AM	3	0.0	12.0	9.0	44	1
7/17	PM	ND	ND	ND	ND	ND	ND
7/18	AM	4	4.0	12.0	10.0	43	1
7/18	PM	4	1.0	13.0	11.0	43	1
7/19	AM	4	0.0	13.0	10.0	44	1
7/19	PM	ND	ND	ND	ND	ND	ND
7/20	AM	1	0.0	11.0	8.0	45	1
7/20	PM	1	0.0	17.0	12.0	46	1
7/21	AM	1	0.0	11.0	9.0	44	1
7/21	PM	2	0.0	21.0	12.0	44	1
7/22	AM	3	1.0	12.0	10.0	43	1
7/22	PM	3	0.0	16.0	11.0	43	1
7/23	AM	4	0.0	11.0	9.0	43	1
7/23	PM	ND	ND	ND	ND	ND	ND
7/24	AM	4	0.0	11.0	9.0	43	1
7/24	PM	2	0.0	15.0	10.0	44	1
7/25	AM	2	0.0	10.0	9.0	43	1
7/25	PM	ND	ND	ND	ND	ND	ND
7/26	AM	1	0.0	2.0	8.0	42	1
7/26	PM	1	0.0	16.0	8.0	42	1
7/27	AM	2	0.0	13.0	9.0	41	1
7/27	PM	2	0.0	18.0	12.0	41	1
7/28	AM	4	0.0	10.0	10.0	41	1
7/28	PM	4	0.5	11.0	10.0	41	1
7/29	AM	1	0.0	12.0	9.0	41	1
7/29	PM	2	0.0	20.0	13.0	41	1
7/30	AM	1	0.0	12.0	10.0	40	1
7/30	PM	1	0.0	15.0	13.0	40	1
7/31	AM	3	0.0	16.0	11.0	39	1
7/31	PM	4	0.0	17.0	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]
8/1	AM	4	4.0	13.0	11.0	40	1
8/1	PM	4	0.0	15.0	12.0	40	1
8/2	AM	4	0.0	13.0	11.0	41	1
8/2	PM	ND	ND	ND	ND	ND	ND
8/3	AM	4	11.0	14.0	11.0	41	1
8/3	PM	3	0.6	17.0	13.0	41	1
8/4	AM	2	3.0	15.0	11.0	49	2
8/4	PM	2	0.0	18.0	13.0	50	2
8/5	AM	3	0.0	15.0	11.0	48	1
8/5	PM	4	12.5	15.0	12.0	49	1
8/6	AM	4	4.0	14.0	10.0	58	3
8/6	PM	2	0.0	18.0	12.0	57	2
8/7	AM	3	0.0	13.0	10.0	59	2
8/7	PM	2	0.0	16.0	11.0	58	2
8/8	AM	3	2.0	12.0	9.0	59	2
8/8	PM	4	0.0	16.0	10.0	61	3
8/9	AM	3	0.0	12.0	9.0	59	2
8/9	PM	3	0.0	18.0	11.0	59	1
8/10	AM	1	0.0	14.0	9.0	57	1
8/10	PM	2	0.3	17.0	11.0	57	1
8/11	AM	2	0.0	11.0	9.0	56	1
8/11	PM	1	0.0	18.0	11.0	56	1
8/12	AM	1	0.0	12.0	9.0	54	1
8/12	PM	3	1.0	16.0	10.0	54	1
8/13	AM	1	0.0	13.0	9.0	54	1
8/13	PM	3	0.0	16.0	10.0	54	1
8/14	AM	3	0.3	12.0	8.0	54	1
8/14	PM	3	0.0	16.0	10.0	54	1
8/15	AM	2	2.0	12.0	9.0	52	1
8/15	PM	1	0.0	16.0	11.0	52	1
8/16	AM	3	0.0	10.0	9.0	53	1
8/16	PM	ND	ND	ND	ND	ND	ND
8/17	AM	ND	ND	ND	ND	ND	ND
8/17	PM	3	0.5	16.0	12.0	53	1
8/18	AM	2	0.0	13.0	11.0	53	1
8/18	PM	2	0.0	16.0	11.0	53	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
8/19	AM	ND	ND	ND	ND	ND	ND
8/19	PM	2	0.5	14.0	10.0	53	1
8/20	AM	3	0.0	12.0	11.0	52	1
8/20	PM	2	0.0	17.0	13.0	52	1
8/21	AM	3	0.0	11.0	11.0	51	1
8/21	PM	ND	ND	ND	ND	ND	ND
8/22	AM	3	2.0	9.0	11.0	51	1
8/22	PM	3	0.0	16.0	11.0	51	1
8/23	AM	3	0.5	11.0	11.0	50	1
8/23	PM	2	0.0	15.0	10.0	50	1
8/24	AM	4	2.5	10.0	11.0	51	1
8/24	PM	4	3.1	13.0	12.0	51	1
8/25	AM	4	3.8	10.0	11.0	53	1
8/25	PM	3	0.0	15.0	11.0	53	1
8/26	AM	3	0.0	12.0	11.0	53	1
8/26	PM	2	0.0	14.0	12.0	52	1
8/27	AM	3	1.5	8.0	10.0	51	1
8/27	PM	3	0.5	14.0	11.0	51	1
8/28	AM	2	0.0	9.0	10.0	51	1
8/28	PM	2	0.0	13.0	11.0	51	1
8/29	AM	2	1.5	10.0	10.0	54	1
8/29	PM	2	0.0	12.0	11.0	52	1
8/30	AM	1	0.0	-1.0	8.0	52	1
8/30	PM	1	0.0	13.0	10.0	52	1
8/31	AM	1	0.0	4.0	8.0	52	1
8/31	PM	3	0.2	10.0	8.0	52	1
9/1	AM	3	0.0	11.0	9.0	52	1
9/1	PM	2	0.0	14.0	10.0	52	1
9/2	AM	4	0.0	11.0	10.0	53	1
9/2	PM	4	3.2	9.0	9.0	55	1
9/3	AM	4	2.2	7.0	9.0	59	2
9/3	PM	4	0.4	12.0	10.0	59	2
9/4	AM	4	0.0	4.0	9.0	59	2
9/4	PM	4	0.1	10.0	9.0	59	1
9/5	AM	2	0.2	3.0	7.0	58	1
9/5	PM	1	0.0	14.0	9.0	58	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
9/6	AM	1	0.0	0.0	5.0	57	1
9/6	PM	1	0.0	14.0	8.0	56	1
9/7	AM	2	0.0	1.0	5.0	55	1
9/7	PM	4	0.0	15.0	6.0	55	1
9/8	AM	3	0.2	7.0	6.0	54	1
9/8	PM	3	0.0	14.0	8.0	54	1
9/9	AM	3	0.3	12.0	7.0	53	1
9/9	PM	3	0.0	16.0	8.0	53	1
9/10	AM	1	0.3	10.0	8.0	52	1
9/10	PM	1	0.0	15.0	8.0	52	1
9/11	AM	4	3.5	11.0	7.0	51	1
9/11	PM	3	0.0	14.0	9.0	51	1
9/12	AM	3	1.5	13.0	8.0	51	1
9/12	PM	3	0.0	15.0	9.0	51	1
9/13	AM	2	2.3	8.0	8.0	51	1
9/13	PM	3	0.7	11.0	9.0	50	1
9/14	AM	4	0.3	11.0	7.0	51	1
9/14	PM	4	0.0	11.0	8.0	52	1
9/15	AM	2	0.0	11.0	8.0	51	1
9/15	PM	3	2.0	10.0	8.0	52	1
9/16	AM	4	2.6	8.0	7.0	52	1
9/16	PM	4	0.9	11.0	8.0	52	1
9/17	AM	4	0.3	7.0	7.0	52	1
9/17	PM	4	2.5	9.0	7.0	50	1
9/18	AM	4	0.7	6.5	7.0	50	1
9/18	PM	2	0.0	11.0	8.0	50	1
9/19	AM	4	0.7	7.0	7.0	50	1
9/19	PM	ND	ND	ND	ND	ND	ND
Average	–	–	0.7	12.9	9.9	50	–

[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, 2014.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
6/8	PM	3	ND	12.0	9.0	72	2
6/9	AM	4	0.0	6.0	7.0	71	2
6/9	PM	4	1.4	8.0	8.0	70	2
6/10	AM	5	4.0	5.0	8.0	70	2
6/10	PM	3	3.0	8.0	8.0	70	2
6/11	AM	2	1.8	8.0	6.0	71	2
6/11	PM	3	0.7	12.0	8.0	69	2
6/12	AM	4	2.0	8.0	7.0	68	1
6/12	PM	3	1.4	12.0	8.0	68	1
6/13	AM	4	2.1	8.0	6.0	66	1
6/13	PM	4	10.1	10.0	9.5	69	2
6/14	AM	4	4.2	11.0	8.0	72	2
6/14	PM	3	0.0	10.0	8.0	72	1
6/15	AM	3	0.0	11.0	9.0	70	1
6/15	PM	2	0.0	15.0	9.5	68	1
6/16	AM	4	4.6	10.0	9.0	68	1
6/16	PM	3	3.0	14.0	9.0	70	1
6/17	AM	4	2.9	9.5	9.0	71	1
6/17	PM	4	13.0	10.0	9.5	72	2
6/18	AM	3	10.1	10.0	8.5	79	3
6/18	PM	3	2.6	11.0	9.0	90	3
6/19	AM	5	0.0	4.0	8.0	86	3
6/19	PM	2	0.2	15.0	10.0	82	2
6/20	AM	3	0.0	10.5	9.0	80	2
6/20	PM	3	0.0	13.0	9.0	80	2
6/21	AM	5	0.0	6.0	9.0	78	2
6/21	PM	3	0.0	17.0	13.0	78	2
6/22	AM	4	1.1	11.0	10.0	78	2
6/22	PM	4	0.8	15.0	10.0	78	2
6/23	AM	4	8.0	9.0	8.0	81	2
6/23	PM	3	0.7	17.0	9.0	86	3
6/24	AM	3	0.0	11.5	9.0	86	3
6/24	PM	3	0.5	17.0	13.0	82	3
6/25	AM	5	0.8	8.0	9.0	80	2
6/25	PM	2	0.0	18.0	15.0	80	2
6/26	AM	2	0.0	9.5	10.0	78	2
6/26	PM	2	0.0	20.0	12.0	78	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
6/27	AM	1	0.0	11.0	10.0	75	1
6/27	PM	3	0.0	22.0	14.0	72	1
6/28	AM	2	0.0	17.0	11.0	70	1
6/28	PM	2	0.0	22.5	13.0	70	1
6/29	AM	4	1.0	12.0	10.0	69	1
6/29	PM	4	1.2	14.0	11.0	69	1
6/30	AM	5	5.0	10.0	9.0	68	1
6/30	PM	2	1.0	18.0	14.0	68	1
7/1	AM	1	0.0	7.0	10.0	67	1
7/1	PM	3	0.0	24.0	15.0	66	1
7/2	AM	4	0.0	10.0	11.5	64	1
7/2	PM	ND	ND	ND	ND	ND	ND
7/3	AM	3	0.0	13.0	10.0	62	1
7/3	PM	3	0.0	22.0	14.0	60	1
7/4	AM	3	0.0	12.0	11.5	60	1
7/4	PM	ND	ND	ND	ND	ND	ND
7/5	AM	1	0.0	17.0	13.0	58	1
7/5	PM	2	0.0	22.0	14.0	58	1
7/6	AM	2	0.0	15.0	13.0	56	1
7/6	PM	3	0.0	22.5	14.5	55	1
7/7	AM	4	15.0	11.0	12.0	55	1
7/7	PM	3	5.0	17.0	13.0	57	1
7/8	AM	3	0.0	9.5	12.0	64	3
7/8	PM	3	0.0	18.0	14.0	65	1
7/9	AM	3	1.8	12.5	13.0	60	1
7/9	PM	3	0.6	16.5	14.0	59	1
7/10	AM	4	5.2	10.0	12.0	57	1
7/10	PM	3	2.5	15.0	14.0	56	1
7/11	AM	4	6.5	12.0	12.0	57	1
7/11	PM	4	3.3	16.0	13.0	59	1
7/12	AM	3	0.7	13.0	11.5	64	1
7/12	PM	ND	ND	ND	ND	ND	ND
7/13	AM	2	0.0	12.0	13.0	58	1
7/13	PM	3	0.0	19.0	15.0	56	1
7/14	AM	3	0.0	13.0	11.5	56	1
7/14	PM	ND	ND	ND	ND	ND	ND
7/15	AM	4	0.0	13.0	11.0	54	1
7/15	PM	3	0.0	17.0	12.0	52	1
7/16	AM	3	0.0	13.5	11.5	52	1
7/16	PM	3	0.0	21.5	15.0	52	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
7/17	AM	3	0.0	9.0	12.0	50	1
7/17	PM	4	0.0	17.0	13.0	50	1
7/18	AM	4	0.5	10.0	11.5	50	1
7/18	PM	4	5.2	14.0	12.0	50	1
7/19	AM	3	1.3	9.0	11.0	52	1
7/19	PM	4	6.0	8.0	9.5	53	1
7/20	AM	3	1.1	9.0	9.0	54	1
7/20	PM	2	0.0	9.0	11.0	56	1
7/21	AM	4	0.0	7.0	10.0	54	1
7/21	PM	4	0.0	20.0	12.5	52	1
7/22	AM	4	3.0	12.0	12.0	50	1
7/22	PM	ND	ND	ND	ND	ND	ND
7/23	AM	4	2.9	14.0	10.0	50	1
7/23	PM	4	1.0	12.0	11.0	50	1
7/24	AM	4	0.5	12.0	10.0	50	1
7/24	PM	3	1.0	15.0	10.0	50	1
7/25	AM	2	0.0	10.0	9.5	50	1
7/25	PM	2	0.0	18.0	12.0	50	1
7/26	AM	1	0.0	5.0	9.0	50	1
7/26	PM	2	0.0	17.0	13.0	49	1
7/27	AM	1	0.0	7.0	10.0	47	1
7/27	PM	3	0.0	19.0	13.0	46	1
7/28	AM	4	6.0	11.0	11.0	46	1
7/28	PM	5	1.9	12.0	11.0	46	1
7/29	AM	1	0.7	9.5	10.0	48	1
7/29	PM	2	0.0	21.0	13.0	50	1
7/30	AM	1	0.0	13.0	11.0	49	1
7/30	PM	2	0.0	24.0	14.5	47	1
7/31	AM	4	0.0	12.0	13.0	46	1
7/31	PM	4	0.0	19.0	14.0	45	1
8/1	AM	4	2.6	13.0	13.0	45	1
8/1	PM	4	4.6	16.5	14.0	46	1
8/2	AM	4	1.6	14.0	12.0	50	2
8/2	PM	4	0.6	17.0	13.0	51	1
8/3	AM	4	0.0	15.0	12.0	51	2
8/3	PM	3	0.0	17.5	14.0	52	2
8/4	AM	5	0.0	11.0	12.0	50	1
8/4	PM	2	0.0	22.0	15.0	52	1
8/5	AM	5	2.1	12.0	13.0	50	1
8/5	PM	4	1.6	17.0	14.0	50	1

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
8/6	AM	5	2.2	14.0	13.0	50	1
8/6	PM	3	0.0	18.0	14.0	50	1
8/7	AM	4	1.0	14.5	13.5	52	1
8/7	PM	4	0.4	17.5	14.0	52	1
8/8	AM	4	0.6	12.5	12.0	50	1
8/8	PM	4	0.5	19.0	13.0	51	1
8/9	AM	3	0.0	12.0	11.0	50	1
8/9	PM	3	0.0	21.0	14.0	50	1
8/10	AM	5	0.0	9.5	12.0	48	1
8/10	PM	1	0.0	24.5	15.0	48	1
8/11	AM	5	0.0	9.0	12.0	47	1
8/11	PM	3	0.0	20.0	14.0	47	1
8/12	AM	5	0.0	7.5	11.0	47	1
8/12	PM	4	0.0	17.0	13.0	47	1
8/13	AM	5	0.1	10.0	12.0	46	1
8/13	PM	4	0.2	15.0	13.0	46	1
8/14	AM	5	0.1	8.0	11.0	47	1
8/14	PM	4	0.0	18.0	13.0	48	1
8/15	AM	3	1.8	10.5	11.0	47	1
8/15	PM	3	0.1	17.0	13.0	47	1
8/16	AM	4	0.1	8.0	10.5	47	1
8/16	PM	4	1.8	14.5	12.0	47	1
8/17	AM	4	0.7	11.0	10.0	47	1
8/17	PM	4	5.6	13.0	13.0	47	1
8/18	AM	5	4.4	12.5	10.5	50	1
8/18	PM	3	1.6	15.5	11.5	54	2
8/19	AM	4	0.2	11.5	10.5	57	2
8/19	PM	3	0.1	14.0	11.5	56	2
8/20	AM	3	0.0	7.0	10.5	54	1
8/20	PM	2	0.0	15.0	13.0	52	1
8/21	AM	5	0.0	3.0	10.0	50	1
8/21	PM	3	0.0	17.0	14.0	49	1
8/22	AM	5	0.0	5.0	10.0	48	1
8/22	PM	2	0.0	20.0	13.0	47	1
8/23	AM	5	0.0	8.0	10.0	46	1
8/23	PM	3	0.0	18.0	13.0	46	1
8/24	AM	4	0.4	10.0	11.0	46	1
8/24	PM	4	4.0	13.0	11.0	46	1
8/25	AM	4	10.0	11.0	10.0	48	1
8/25	PM	4	2.0	13.5	11.0	49	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	0.9	6.0	10.0	55	2
8/26	PM	4	0.3	11.0	10.0	58	2
8/27	AM	5	0.0	6.0	9.0	55	2
8/27	PM	3	0.0	15.0	11.0	53	1
8/28	AM	5	0.0	6.0	9.0	51	1
8/28	PM	2	0.5	14.0	10.0	50	1
8/29	AM	3	2.8	4.0	9.0	50	1
8/29	PM	3	0.0	11.0	9.0	51	2
8/30	AM	5	0.0	-2.0	6.5	52	2
8/30	PM	1	0.0	13.0	9.0	51	2
8/31	AM	3	0.0	-2.0	6.5	49	2
8/31	PM	2	0.6	16.0	9.0	48	2
9/1	AM	4	0.0	9.0	7.5	48	2
9/1	PM	4	0.0	13.0	7.0	48	2
9/2	AM	4	5.3	10.0	8.0	50	2
9/2	PM	3	0.8	9.5	9.0	51	2
9/3	AM	5	0.1	2.0	7.5	56	2
9/3	PM	1	0.0	7.0	8.0	57	2
9/4	AM	2	0.0	1.5	7.0	56	2
9/4	PM	3	0.0	10.0	7.0	54	2
9/5	AM	2	0.0	3.0	6.0	53	2
9/5	PM	1	0.0	15.0	8.0	52	1
9/6	AM	1	0.0	-3.0	5.5	52	1
9/6	PM	1	0.0	15.0	8.0	52	1
9/7	AM	1	0.0	-3.0	5.5	51	1
9/7	PM	2	0.0	12.0	7.0	50	1
9/8	AM	4	0.0	5.0	6.0	50	1
9/8	PM	3	0.0	14.0	8.0	49	1
9/9	AM	3	0.0	11.0	8.0	49	1
9/9	PM	3	0.0	13.0	10.0	49	1
9/10	AM	3	0.0	12.0	8.0	49	1
9/10	PM	1	0.0	18.0	12.0	49	1
9/11	AM	4	0.1	10.0	9.0	49	1
9/11	PM	3	1.4	14.0	9.5	49	1
9/12	AM	4	0.0	11.0	9.0	48	1
9/12	PM	4	0.5	17.0	10.0	48	1
9/13	AM	2	2.0	8.0	8.0	48	1
9/13	PM	2	0.1	16.0	9.0	49	1
9/14	AM	4	0.5	5.0	8.0	50	1
9/14	PM	4	0.1	12.0	9.0	52	2

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
9/15	AM	3	0.6	3.0	8.0	51	2
9/15	PM	3	0.1	13.0	8.5	51	2
9/16	AM	4	0.0	7.0	7.0	49	1
9/16	PM	3	0.8	12.0	8.5	49	1
9/17	AM	3	0.0	7.0	8.0	48	1
9/17	PM	3	0.3	13.0	8.0	48	1
9/18	AM	5	0.0	6.0	8.0	47	1
9/18	PM	2	0.0	14.0	10.0	47	1
9/19	AM	4	0.0	9.0	8.0	47	1
9/19	PM	3	3.0	11.0	10.0	47	1
9/20	AM	4	0.5	8.0	8.0	47	1
9/20	PM	4	0.0	9.0	8.0	48	1
Average	–	–	1.1	12.3	10.6	56	–

[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, 2014.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
6/18	AM	3	1.0	12.0	8.0	312	1
6/18	PM	4	0.5	10.0	8.0	313	1
6/19	AM	3	1.0	10.0	7.0	310	1
6/19	PM	3	0.0	18.0	8.0	310	1
6/20	AM	2	0.0	15.0	8.0	314	1
6/20	PM	3	0.0	19.0	9.0	312	1
6/21	AM	1	0.0	11.0	8.0	310	1
6/21	PM	3	0.0	22.0	11.0	309	1
6/22	AM	4	0.0	10.0	7.0	309	1
6/22	PM	4	0.7	11.0	7.0	309	1
6/23	AM	4	6.4	10.0	7.5	310	1
6/23	PM	4	0.0	17.0	8.0	312	1
6/24	AM	3	0.0	11.0	7.0	318	1
6/24	PM	3	0.0	19.0	9.5	315	1
6/25	AM	1	0.3	10.0	8.0	313	1
6/25	PM	2	0.0	25.0	12.0	312	1
6/26	AM	1	0.0	12.0	9.0	310	1
6/26	PM	1	0.0	24.0	11.0	310	1
6/27	AM	1	0.0	13.0	10.0	308	1
6/27	PM	2	0.0	24.0	13.0	306	1
6/28	AM	1	0.0	12.0	10.0	303	1
6/28	PM	1	0.0	24.0	14.5	302	1
6/29	AM	3	1.8	10.0	13.0	300	1
6/29	PM	4	0.0	14.0	10.0	300	1
6/30	AM	4	1.3	13.0	8.0	299	1
6/30	PM	3	1.1	18.0	12.0	299	1
7/1	AM	1	0.1	12.0	8.0	299	1
7/1	PM	1	0.0	23.0	12.0	299	1
7/2	AM	1	0.0	12.0	10.0	298	1
7/2	PM	3	0.0	23.0	12.0	296	1
7/3	AM	2	0.0	15.0	10.0	294	1
7/3	PM	2	0.0	25.0	13.0	294	1
7/4	AM	2	0.0	14.0	10.0	292	1
7/4	PM	1	0.0	28.0	13.0	290	1
7/5	AM	1	0.0	13.0	11.0	289	1
7/5	PM	3	0.0	23.0	12.0	288	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	3	0.3	15.0	11.0	289	1
7/6	PM	3	0.5	18.0	12.0	289	1
7/7	AM	3	1.3	15.0	9.0	289	1
7/7	PM	3	0.6	20.0	11.0	289	1
7/8	AM	4	0.0	14.0	10.0	289	1
7/8	PM	4	1.0	15.0	12.0	289	1
7/9	AM	3	6.0	13.0	9.0	289	1
7/9	PM	ND	ND	ND	ND	ND	ND
7/10	AM	4	4.0	12.0	9.0	291	1
7/10	PM	4	1.0	15.0	12.0	292	1
7/11	AM	4	7.0	15.0	10.0	295	1
7/11	PM	4	10.0	18.0	10.0	297	1
7/12	AM	4	1.0	13.0	9.0	298	1
7/12	PM	2	0.6	27.0	12.0	298	1
7/13	AM	3	0.1	13.0	11.0	297	1
7/13	PM	2	0.0	26.0	13.0	295	1
7/14	AM	2	0.0	12.0	9.0	294	1
7/14	PM	2	0.0	24.0	13.0	294	1
7/15	AM	2	0.0	14.0	11.0	289	1
7/15	PM	2	0.0	23.0	12.0	288	1
7/16	AM	4	0.0	14.0	10.0	288	1
7/16	PM	3	0.0	20.0	13.0	287	1
7/17	AM	3	0.0	14.0	10.0	286	1
7/17	PM	2	0.0	26.0	13.0	285	1
7/18	AM	4	0.1	12.0	9.0	285	1
7/18	PM	3	1.3	15.0	12.0	284	1
7/19	AM	2	3.2	9.0	9.0	286	1
7/19	PM	4	1.2	13.0	9.0	286	1
7/20	AM	2	0.0	11.0	8.0	286	1
7/20	PM	2	0.0	20.0	11.0	286	1
7/21	AM	3	0.0	9.0	9.0	285	1
7/21	PM	ND	0.0	23.0	10.0	284	1
7/22	AM	4	0.0	11.0	8.0	283	1
7/22	PM	3	1.3	18.0	10.0	284	1

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Appendix B5.–Page 3 of 6.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
7/23	AM	4	1.1	13.0	7.0	283	1
7/23	PM	ND	ND	ND	ND	ND	ND
7/24	AM	4	0.0	12.0	7.0	283	1
7/24	PM	4	3.0	14.0	9.0	282	1
7/25	AM	3	0.0	10.0	8.0	282	1
7/25	PM	2	0.0	22.0	10.0	282	1
7/26	AM	1	0.0	5.0	7.0	280	1
7/26	PM	1	0.0	20.0	11.0	280	1
7/27	AM	1	0.0	9.0	7.0	282	1
7/27	PM	1	0.0	24.0	10.0	279	1
7/28	AM	4	0.0	13.0	8.0	277	1
7/28	PM	4	0.2	14.0	9.0	278	1
7/29	AM	1	0.0	10.0	7.0	278	1
7/29	PM	2	0.1	22.0	12.0	275	1
7/30	AM	1	0.0	17.0	10.0	275	1
7/30	PM	1	0.0	27.0	13.0	274	1
7/31	AM	2	0.0	18.0	12.0	275	1
7/31	PM	4	0.0	22.0	13.0	273	1
8/1	AM	3	0.0	12.0	11.0	273	1
8/1	PM	3	1.8	21.0	12.0	276	1
8/2	AM	3	0.8	10.0	10.0	280	1
8/2	PM	4	0.7	17.0	12.0	274	1
8/3	AM	3	1.0	13.0	10.0	277	1
8/3	PM	3	0.0	17.0	12.0	276	1
8/4	AM	1	1.1	9.0	10.0	278	1
8/4	PM	2	0.1	20.0	13.0	275	1
8/5	AM	3	1.0	15.0	12.0	275	1
8/5	PM	3	0.1	20.0	13.0	278	1
8/6	AM	4	5.0	10.0	11.0	279	1
8/6	PM	3	6.5	17.0	13.0	280	1
8/7	AM	3	0.0	13.0	11.0	287	1
8/7	PM	3	0.2	15.0	12.0	287	1
8/8	AM	4	2.0	12.0	10.0	287	1
8/8	PM	3	0.5	17.0	10.0	290	1

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Appendix B5.–Page 4 of 6.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
8/9	AM	4	0.1	12.0	10.0	300	1
8/9	PM	3	0.0	21.0	12.0	297	1
8/10	AM	3	0.0	13.0	10.0	299	1
8/10	PM	2	0.0	26.0	13.0	295	1
8/11	AM	3	0.0	12.0	9.0	293	1
8/11	PM	2	0.0	22.0	12.0	292	1
8/12	AM	4	0.0	11.0	10.0	289	1
8/12	PM	4	1.0	15.0	10.0	287	1
8/13	AM	4	4.2	12.0	9.0	290	1
8/13	PM	3	2.2	17.0	10.0	296	1
8/14	AM	3	2.6	10.0	10.0	308	2
8/14	PM	3	0.5	18.0	10.0	305	2
8/15	AM	4	1.8	12.0	9.0	306	2
8/15	PM	2	0.7	18.0	12.0	310	1
8/16	AM	4	0.7	11.0	9.0	310	2
8/16	PM	4	5.0	14.0	9.0	309	2
8/17	AM	4	4.6	13.0	9.0	329	3
8/17	PM	3	4.0	14.0	9.0	337	3
8/18	AM	3	0.7	13.0	10.0	343	3
8/18	PM	3	0.0	18.0	11.0	337	3
8/19	AM	3	0.0	12.0	10.0	330	3
8/19	PM	3	0.0	17.0	10.0	325	2
8/20	AM	1	0.0	8.0	9.0	319	2
8/20	PM	ND	ND	ND	ND	ND	ND
8/21	AM	3	0.0	11.0	9.0	313	1
8/21	PM	4	0.0	19.0	11.0	310	1
8/22	AM	3	0.0	8.0	8.0	308	1
8/22	PM	3	0.0	19.0	11.0	308	1
8/23	AM	4	0.0	7.0	9.0	305	1
8/23	PM	4	0.0	15.0	9.0	303	1
8/24	AM	4	1.8	10.0	8.0	303	1
8/24	PM	4	8.0	14.0	10.0	305	1
8/25	AM	4	2.1	10.0	10.0	320	2
8/25	PM	4	4.0	15.0	10.0	328	3

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
8/26	AM	3	0.4	11.0	9.0	322	2
8/26	PM	3	0.0	16.0	10.0	318	2
8/27	AM	4	0.5	11.0	9.0	311	2
8/27	PM	4	0.2	14.0	9.0	311	1
8/28	AM	3	0.3	9.0	8.0	310	1
8/28	PM	3	0.8	17.0	10.0	310	1
8/29	AM	2	0.0	12.0	9.0	308	1
8/29	PM	3	0.0	13.0	9.0	307	1
8/30	AM	1	0.0	-1.0	6.0	305	1
8/30	PM	1	0.0	13.0	9.0	303	1
8/31	AM	1	0.0	0.0	7.0	301	1
8/31	PM	3	0.0	12.0	8.0	300	1
9/1	AM	4	0.0	8.0	7.0	299	1
9/1	PM	3	0.0	18.0	8.0	298	1
9/2	AM	2	0.0	8.0	7.0	297	1
9/2	PM	4	0.0	14.0	8.0	296	1
9/3	AM	4	0.0	9.0	7.0	295	1
9/3	PM	ND	ND	ND	ND	ND	ND
9/4	AM	4	0.0	5.0	6.0	293	1
9/4	PM	4	3.0	8.0	7.0	293	1
9/5	AM	4	6.0	7.0	6.0	298	1
9/5	PM	3	0.4	17.0	8.0	306	1
9/6	AM	5	0.0	0.0	6.0	311	2
9/6	PM	1	0.0	16.0	9.0	307	2
9/7	AM	1	0.0	0.0	6.0	300	1
9/7	PM	2	0.0	13.0	8.0	299	1
9/8	AM	4	0.2	9.0	6.0	296	1
9/8	PM	4	0.0	15.0	8.0	295	1
9/9	AM	4	0.0	11.0	6.0	294	1
9/9	PM	4	1.6	15.0	9.0	295	1
9/10	AM	4	6.2	11.0	8.0	298	1
9/10	PM	2	0.0	20.0	10.0	301	1
9/11	AM	4	0.7	11.0	9.0	300	1
9/11	PM	4	1.0	15.0	9.0	298	1

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Appendix B5.–Page 6 of 6.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
9/12	AM	4	0.0	11.0	9.0	300	1
9/12	PM	4	6.2	15.0	9.0	303	1
9/13	AM	3	0.5	8.0	8.0	312	2
9/13	PM	3	0.0	16.0	9.0	323	2
9/14	AM	4	0.0	8.0	8.0	322	3
9/14	PM	4	3.2	11.0	8.0	328	3
9/15	AM	3	3.1	10.0	8.0	328	3
9/15	PM	3	0.5	14.0	8.0	334	3
9/16	AM	3	0.0	9.0	7.0	351	3
9/16	PM	4	0.0	12.0	9.0	350	3
9/17	AM	4	2.6	9.0	7.0	337	3
9/17	PM	4	7.8	9.0	7.0	335	3
9/18	AM	4	4.7	8.0	7.0	348	3
9/18	PM	2	2.0	13.0	8.0	351	3
9/19	AM	4	0.0	8.0	7.0	341	3
9/19	PM	4	0.0	13.0	8.0	338	3
9/20	AM	3	0.0	9.0	7.0	331	2
9/20	PM	3	0.0	12.0	7.0	328	2
9/21	AM	1	0.0	0.0	6.0	325	2
9/21	PM	1	0.0	9.0	7.0	323	2
9/22	AM	1	0.0	-2.0	4.0	318	2
9/22	PM	1	0.0	9.0	6.0	317	1
9/23	AM	2	0.0	0.0	4.0	315	1
9/23	PM	3	0.0	10.0	6.0	314	1
Average	–	–	0.9	13.9	9.4	301	–

[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, 2014.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
7/2	PM	1	0.0	19.0	14.0	59	1
7/3	AM	ND	ND	ND	ND	ND	ND
7/3	PM	3	0.0	16.0	17.0	59	1
7/4	AM	2	0.0	20.0	15.0	60	1
7/4	PM	2	0.0	23.0	17.0	59	1
7/5	AM	1	0.0	20.0	16.0	59	1
7/5	PM	1	0.0	19.0	17.0	61	1
7/6	AM	3	0.0	16.0	14.0	61	1
7/6	PM	2	0.5	15.0	17.0	61	1
7/7	AM	3	4.8	11.0	13.0	62	1
7/7	PM	4	0.3	17.0	16.0	64	1
7/8	AM	2	0.0	15.0	15.0	63	1
7/8	PM	3	0.8	14.0	15.0	64	1
7/9	AM	4	0.5	10.0	14.0	65	1
7/9	PM	4	2.0	14.0	15.0	65	1
7/10	AM	4	0.8	9.0	14.0	65	1
7/10	PM	4	0.3	17.0	15.0	66	1
7/11	AM	4	1.8	9.0	13.0	66	1
7/11	PM	4	0.3	17.0	15.0	65	1
7/12	AM	2	0.0	13.0	14.0	66	1
7/12	PM	2	0.0	15.0	14.0	67	1
7/13	AM	4	0.0	9.0	14.0	65	1
7/13	PM	2	0.3	16.0	15.0	66	1
7/14	AM	3	1.3	10.0	14.0	65	1
7/14	PM	3	0.0	17.0	15.0	64	1
7/15	AM	4	0.0	12.0	14.0	63	1
7/15	PM	3	0.0	18.0	15.0	63	1
7/16	AM	4	0.0	12.0	14.0	62	1
7/16	PM	4	0.0	17.0	15.0	62	1
7/17	AM	2	0.0	15.0	15.0	62	1
7/17	PM	2	0.0	20.0	16.0	61	1
7/18	AM	4	0.0	10.0	13.0	60	1
7/18	PM	4	0.0	14.0	14.0	59	1
7/19	AM	4	6.9	8.0	11.0	61	1
7/19	PM	4	1.0	9.0	12.0	63	1

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Appendix B6.–Page 2 of 3.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
7/20	AM	4	6.4	7.0	10.0	65	1
7/20	PM	2	0.3	15.0	12.0	64	1
7/21	AM	4	0.0	6.0	11.0	64	1
7/21	PM	4	0.0	19.0	14.0	64	1
7/22	AM	2	0.0	12.0	13.0	64	1
7/22	PM	4	0.0	15.0	14.0	63	1
7/23	AM	4	15.2	9.0	12.0	66	1
7/23	PM	4	0.0	14.0	12.0	66	1
7/24	AM	4	6.1	12.0	10.0	66	1
7/24	PM	4	2.0	12.0	13.0	67	1
7/25	AM	1	1.3	8.0	12.0	71	1
7/25	PM	2	0.0	14.0	12.0	71	1
7/26	AM	3	0.0	6.0	10.0	70	1
7/26	PM	3	0.0	17.0	13.0	70	1
7/27	AM	1	0.0	8.0	11.0	70	1
7/27	PM	2	0.0	19.0	14.0	69	1
7/28	AM	4	1.3	10.0	12.0	68	1
7/28	PM	4	10.7	10.0	14.0	68	1
7/29	AM	5	2.0	8.0	12.0	69	1
7/29	PM	1	0.0	18.0	15.0	69	1
7/30	AM	1	0.0	12.0	12.0	67	1
7/30	PM	1	0.0	23.0	16.0	68	1
7/31	AM	2	0.0	12.0	14.0	68	1
7/31	PM	3	0.0	21.0	16.0	67	1
8/1	AM	4	0.0	13.0	14.0	67	1
8/1	PM	4	0.0	16.0	15.0	67	1
8/2	AM	3	1.5	12.0	15.0	67	1
8/2	PM	2	0.3	21.0	16.0	67	1
8/3	AM	3	0.0	13.0	15.0	67	1
8/3	PM	4	0.3	16.0	16.0	67	1
8/4	AM	4	0.3	10.0	15.0	66	1
8/4	PM	4	0.5	15.0	15.0	67	1
8/5	AM	2	0.0	12.0	14.0	66	1
8/5	PM	3	0.0	19.0	16.0	65	1

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Appendix B6.–Page 3 of 3.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
8/6	AM	4	7.6	10.0	15.0	65	1
8/6	PM	4	1.0	11.0	15.0	65	1
8/7	AM	3	0.3	12.0	15.0	65	1
8/7	PM	4	0.0	15.0	15.0	65	1
8/8	AM	3	0.0	16.0	14.0	65	1
8/8	PM	4	0.0	15.0	14.0	65	1
8/9	AM	3	0.0	14.0	14.0	65	1
8/9	PM	3	0.0	16.0	15.0	65	1
8/10	AM	3	0.0	14.0	14.0	63	1
8/10	PM	3	0.0	21.0	16.0	64	1
Average	–	–	1.0	14.0	14.1	65	–

[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, 2014.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C)		River Stage (cm)	Water Clarity[b]
				Air	Water		
6/13	PM	4	ND	15.0	11.0	45	2
6/14	AM	5	ND	16.0	9.0	45	2
6/14	PM	2	0.0	14.0	11.0	45	2
6/15	AM	2	0.0	11.0	10.0	45	2
6/15	PM	3	0.0	11.0	12.0	45	2
6/16	AM	3	2.5	10.0	10.0	47	2
6/16	PM	1	1.1	14.0	11.0	50	2
6/17	AM	2	1.7	10.0	10.0	51	2
6/17	PM	ND	ND	ND	ND	ND	ND
6/18	AM	3	4.0	14.0	11.0	58	2
6/18	PM	2	2.0	15.0	12.0	60	3
6/19	AM	3	0.0	12.0	10.0	65	3
6/19	PM	2	0.0	20.0	12.0	70	3
6/20	AM	4	3.5	10.0	10.0	70	3
6/20	PM	3	8.6	20.0	13.0	70	3
6/21	AM	1	0.7	12.0	10.0	73	3
6/21	PM	4	0.0	23.0	13.0	80	3
6/22	AM	4	16.5	10.0	12.0	82	3
6/22	PM	4	2.2	12.0	10.0	89	3
6/23	AM	3	0.0	6.0	9.0	88	3
6/23	PM	2	0.0	18.0	11.0	121	3
6/24	AM	2	0.0	8.0	12.0	125	3
6/24	PM	3	0.0	20.0	12.0	118	3
6/25	AM	3	0.0	10.0	10.0	105	3
6/25	PM	3	0.0	27.0	14.0	96	3
6/26	AM	2	0.0	10.0	11.0	90	3
6/26	PM	3	0.0	18.0	11.0	80	3
6/27	AM	1	0.0	8.0	10.0	78	3
6/27	PM	2	0.0	20.0	12.0	65	3
6/28	AM	1	0.0	10.0	10.0	61	3
6/28	PM	2	0.0	23.0	14.0	58	3
6/29	AM	3	0.0	12.0	12.0	55	3
6/29	PM	4	0.0	14.0	12.5	52	3

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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	3	2.2	10.0	10.0	50	3
6/30	PM	2	0.3	22.0	12.0	51	3
7/1	AM	1	0.0	9.0	10.0	52	3
7/1	PM	3	0.0	20.0	13.0	56	2
7/2	AM	3	0.0	10.0	12.0	54	2
7/2	PM	3	0.0	16.0	13.0	55	2
7/3	AM	3	0.0	13.0	12.0	55	2
7/3	PM	3	0.0	23.0	14.0	55	2
7/4	AM	3	0.0	15.0	13.0	55	2
7/4	PM	1	0.0	25.0	15.0	55	2
7/5	AM	2	0.0	10.0	12.0	52	2
7/5	PM	3	1.0	21.0	15.0	52	2
7/6	AM	3	0.0	13.0	13.0	50	2
7/6	PM	4	0.2	15.0	14.0	48	2
7/7	AM	4	10.0	10.0	12.0	55	2
7/7	PM	2	1.5	24.0	15.0	49	2
7/8	AM	3	7.8	10.0	14.0	50	2
7/8	PM	3	0.6	20.0	15.0	54	2
7/9	AM	3	14.0	13.0	14.0	53	2
7/9	PM	4	0.5	16.0	12.0	52	2
7/10	AM	4	0.0	10.0	13.0	52	2
7/10	PM	4	0.3	18.0	13.0	54	2
7/11	AM	3	3.0	12.0	13.0	54	2
7/11	PM	2	0.0	18.0	14.0	55	2
7/12	AM	3	0.4	9.0	12.0	54	2
7/12	PM	3	0.0	20.0	14.0	57	2
7/13	AM	3	0.2	12.0	12.0	55	2
7/13	PM	2	0.0	19.0	14.0	57	2
7/14	AM	3	0.0	11.0	12.0	53	3
7/14	PM	3	0.3	17.0	13.0	52	3
7/15	AM	3	1.0	11.0	11.0	48	3
7/15	PM	2	0.0	22.0	14.0	47	3
7/16	AM	3	0.0	12.0	13.0	42	3
7/16	PM	3	0.0	20.0	13.0	41	3

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
7/17	AM	2	0.0	5.0	11.0	40	2
7/17	PM	3	0.4	20.0	14.0	45	2
7/18	AM	3	0.0	12.0	12.0	43	2
7/18	PM	2	11.4	11.0	13.0	37	2
7/19	AM	3	0.8	9.0	11.0	37	2
7/19	PM	4	2.1	8.0	11.0	37	2
7/20	AM	2	3.8	9.0	9.0	40	2
7/20	PM	1	0.0	14.0	11.0	40	2
7/21	AM	3	0.0	5.0	9.0	42	2
7/21	PM	2	0.5	20.0	12.0	42	2
7/22	AM	3	0.4	12.0	10.0	45	2
7/22	PM	3	0.5	16.0	10.0	42	2
7/23	AM	3	2.0	12.0	12.0	39	2
7/23	PM	3	3.0	16.0	13.0	37	2
7/24	AM	3	3.0	10.0	10.0	35	2
7/24	PM	3	2.0	15.0	11.0	38	2
7/25	AM	2	0.3	5.0	9.0	40	2
7/25	PM	2	0.0	15.0	11.0	39	2
7/26	AM	2	0.0	6.0	10.0	40	2
7/26	PM	1	0.0	14.0	12.0	38	2
7/27	AM	1	0.0	8.0	10.0	36	2
7/27	PM	3	0.0	19.0	13.0	35	2
7/28	AM	3	5.0	10.0	10.0	32	2
7/28	PM	4	5.7	13.0	12.0	32	2
7/29	AM	1	0.0	10.0	9.0	34	2
7/29	PM	1	0.0	17.0	13.0	35	2
7/30	AM	1	0.0	15.0	11.0	40	2
7/30	PM	1	0.0	30.0	15.0	39	2
7/31	AM	3	0.0	11.0	13.0	35	2
7/31	PM	3	0.0	22.0	14.0	35	2
8/1	AM	4	2.4	15.0	11.0	36	2
8/1	PM	4	4.1	16.0	10.0	30	2
8/2	AM	4	1.0	14.0	11.0	32	2
8/2	PM	4	0.5	18.0	13.0	32	2

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
8/3	AM	4	4.0	13.0	11.0	35	2
8/3	PM	3	15.0	17.0	12.0	38	2
8/4	AM	4	0.5	10.0	11.0	38	2
8/4	PM	3	0.0	22.0	15.0	38	2
8/5	AM	4	5.0	15.0	13.0	40	2
8/5	PM	4	10.0	18.0	15.0	41	2
8/6	AM	4	6.0	13.0	13.0	45	3
8/6	PM	4	3.0	12.0	13.0	50	3
8/7	AM	3	0.5	13.0	13.0	55	3
8/7	PM	3	0.0	17.0	13.0	57	3
8/8	AM	3	0.7	13.0	13.0	58	3
8/8	PM	4	0.5	19.0	13.5	56	3
8/9	AM	4	0.1	14.0	11.0	51	3
8/9	PM	2	0.0	26.0	14.0	50	3
8/10	AM	2	0.0	10.0	12.0	44	3
8/10	PM	ND	ND	ND	ND	ND	ND
8/11	AM	3	0.0	6.0	12.0	40	2
8/11	PM	3	0.0	24.0	14.0	40	2
8/12	AM	5	0.4	5.0	10.0	38	2
8/12	PM	3	0.1	20.0	12.0	38	2
8/13	AM	3	1.6	14.0	11.0	39	2
8/13	PM	3	0.0	18.0	12.0	37	2
8/14	AM	3	1.0	10.0	10.0	35	2
8/14	PM	4	0.1	19.0	13.0	34	2
8/15	AM	4	8.2	10.0	10.0	34	2
8/15	PM	2	1.0	18.0	14.0	34	2
8/16	AM	4	0.3	10.0	10.0	32	2
8/16	PM	4	0.7	16.0	11.0	34	2
8/17	AM	4	15.0	10.0	NA	NA	NA
8/17	PM	3	3.0	16.0	11.0	36	2
8/18	AM	3	5.6	12.0	10.0	42	2
8/18	PM	4	0.7	14.0	12.0	44	2
8/19	AM	4	0.3	10.0	10.0	46	2
8/19	PM	4	0.0	16.0	12.0	49	2

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Appendix B7.–Page 5 of 6.

Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
8/20	AM	4	1.0	11.0	10.0	49	3
8/20	PM	2	3.2	16.0	12.0	45	2
8/21	AM	2	0.0	8.0	11.0	42	2
8/21	PM	2	0.0	17.0	12.0	41	2
8/22	AM	2	0.1	5.0	10.0	39	2
8/22	PM	2	0.0	18.0	13.0	38	2
8/23	AM	2	0.0	5.0	11.0	35	2
8/23	PM	3	0.0	15.0	11.0	34	2
8/24	AM	3	0.1	12.0	11.0	33	2
8/24	PM	4	8.2	13.0	12.0	34	2
8/25	AM	4	16.5	10.0	10.0	35	2
8/25	PM	4	9.0	14.0	11.0	39	2
8/26	AM	2	0.5	10.0	10.0	48	2
8/26	PM	2	0.0	12.0	11.0	50	2
8/27	AM	5	0.0	3.0	10.0	51	2
8/27	PM	4	3.6	12.0	11.0	50	2
8/28	AM	4	1.0	10.0	10.0	49	2
8/28	PM	3	2.6	17.0	11.0	49	2
8/29	AM	3	0.7	6.0	10.0	50	2
8/29	PM	3	0.2	11.0	10.0	53	2
8/30	AM	1	0.0	2.0	9.0	55	3
8/30	PM	2	0.0	17.0	13.0	54	2
8/31	AM	3	0.0	-2.0	9.0	49	2
8/31	PM	2	0.8	18.0	13.0	49	2
9/1	AM	4	4.0	6.0	8.0	45	2
9/1	PM	4	0.5	10.0	7.0	44	2
9/2	AM	4	2.8	10.0	9.0	45	2
9/2	PM	4	1.2	11.0	8.0	46	2
9/3	AM	4	0.5	6.0	8.0	54	2
9/3	PM	1	0.2	18.0	9.0	63	2
9/4	AM	2	0.0	5.0	8.0	71	3
9/4	PM	3	0.0	11.0	8.0	69	3
9/5	AM	3	0.0	6.0	7.0	62	3
9/5	PM	2	0.0	20.0	8.0	59	3

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Date	Time	Sky Conditions[a]	Precipitation (mm)	Temperature (°C) Air	Temperature (°C) Water	River Stage (cm)	Water Clarity[b]
9/6	AM	2	0.0	0.0	6.0	54	3
9/6	PM	1	0.0	19.0	8.0	54	3
9/7	AM	1	0.0	6.0	6.0	51	3
9/7	PM	3	0.0	15.0	8.0	50	2
9/8	AM	3	0.0	6.0	7.0	46	2
9/8	PM	3	0.0	12.0	6.0	46	2
9/9	AM	4	0.1	8.0	7.0	44	2
9/9	PM	4	1.0	13.0	8.0	43	2
9/10	AM	4	6.0	8.0	7.0	44	2
9/10	PM	1	2.0	20.0	9.0	43	2
9/11	AM	3	0.0	6.0	8.0	41	2
9/11	PM	4	1.2	14.0	8.0	42	2
9/12	AM	4	0.1	10.0	8.0	40	2
9/12	PM	4	2.0	16.0	9.0	40	2
9/13	AM	4	22.2	10.0	9.0	42	2
9/13	PM	2	0.7	17.0	10.0	45	2
9/14	AM	ND	0.0	6.0	8.0	50	2
9/14	PM	4	0.0	14.0	9.0	50	2
9/15	AM	4	0.0	8.0	8.0	46	2
9/15	PM	3	0.9	20.0	8.5	47	2
9/16	AM	4	0.2	8.0	9.0	43	2
9/16	PM	3	0.0	19.0	9.0	43	2
9/17	AM	3	0.5	9.0	8.0	40	2
9/17	PM	4	0.2	13.0	8.0	42	2
9/18	AM	3	0.0	8.0	6.0	40	2
9/18	PM	4	0.0	18.0	8.0	41	2
9/19	AM	4	0.0	5.0	8.0	39	2
9/19	PM	ND	ND	ND	ND	ND	ND
Average	–	–	1.6	13.3	11.0	49	–

[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 riverstage at that observation.

APPENDIX C: OBSERVATION OF NON-TARGET SPECIES

Appendix C1.–Daily observed passage of non-target species at Middle Fork Goodnews River weir, 2014.

Date	Pink Salmon	Dolly Varden	Arctic Grayling	Rainbow Trout	Whitefish
6/25	12	168	0	0	3
6/26	12	116	0	1	7
6/27	9	54	0	0	3
6/28	50	317	0	0	29
6/29	29	673	0	0	8
6/30	23	762	0	0	7
7/1	25	808	0	1	9
7/2	39	459	0	0	13
7/3	37	402	0	0	7
7/4	18	175	0	0	17
7/5	76	432	0	0	24
7/6	126	248	0	1	15
7/7	74	359	0	0	5
7/8	90	473	0	0	1
7/9	41	112	0	0	26
7/10	39	190	0	0	0
7/11	86	142	1	0	0
7/12	55	57	0	0	6
7/13	30	61	0	0	1
7/14	27	33	0	0	16
7/15	29	36	0	0	4
7/16	33	11	0	0	4
7/17	130	47	0	0	3
7/18	80	61	0	0	10
7/19	14	1	0	0	2
7/20	52	25	0	2	12
7/21	81	19	0	0	7
7/22	90	19	0	0	2
7/23	44	3	0	2	2
7/24	77	6	0	0	3
7/25	163	5	0	0	1
7/26	44	9	0	0	3
7/27	71	2	0	2	2
7/28	303	1	0	0	2
7/29	115	1	0	0	1
7/30	557	4	0	0	5
7/31	927	1	0	0	3
8/1	200	1	0	0	3
8/2	75	5	0	0	1
8/3	114	0	0	1	0
8/4	111	0	0	0	3
8/5	151	0	0	0	0
8/6	458	9	0	0	2
8/7	173	1	0	0	0

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Appendix C1.–Page 2 of 2.

Date	Pink Salmon	Dolly Varden	Arctic Grayling	Rainbow Trout	Whitefish
8/8	1,788	6	0	0	1
8/9	173	6	0	0	3
8/10	133	5	0	0	0
8/11	166	2	0	0	0
8/12	437	7	0	0	4
8/13	87	3	0	0	0
8/14	328	2	0	1	0
8/15	178	5	0	0	1
8/16	131	0	0	0	2
8/17	184	4	0	0	2
8/18	107	6	0	0	2
8/19	29	1	0	0	0
8/20	98	0	0	0	0
8/21	100	2	0	0	0
8/22	27	1	0	0	0
8/23	64	0	0	0	0
8/24	80	6	0	1	0
8/25	22	0	0	0	0
8/26	57	1	0	0	1
8/27	13	0	0	0	0
8/28	9	0	0	0	1
8/29	65	4	0	0	0
8/30	7	0	0	0	0
8/31	14	0	0	0	0
Total	9,287	6,369	1	12	289

Appendix C2.–Daily observed passage of non-target species at Kanektok River weir, 2014.

Date	Coho Salmon	Pink Salmon	Dolly Varden	Arctic Grayling	Rainbow Trout	Whitefish
6/26	0	0	0	0	0	0
6/27	0	26	51	1	0	0
6/28	0	12	174	0	4	2
6/29	0	30	304	4	0	2
6/30	0	18	305	3	1	1
7/1	0	53	1,155	6	1	0
7/2	0	37	2,355	5	2	1
7/3	0	80	3,913	1	3	1
7/4	0	46	2,652	3	1	1
7/5	0	154	6,095	5	1	0
7/6	0	251	5,445	2	0	4
7/7	0	128	1,758	1	0	0
7/8	0	203	2,201	3	0	7
7/9	0	197	1,794	0	0	3
7/10	0	237	1,491	0	0	3
7/11	0	251	1,938	2	0	1
7/12	0	498	1,720	0	1	0
7/13	0	256	901	0	0	0
7/14	0	151	1,453	0	0	0
7/15	0	283	1,037	0	1	2
7/16	0	335	2,043	0	1	0
7/17	0	322	1,158	0	4	0
7/18	0	381	774	1	0	1
7/19	0	177	198	0	1	1
7/20	0	272	226	0	2	2
7/21	2	295	458	0	0	0
7/22	4	362	312	1	1	0
7/23	4	289	257	0	0	1
7/24	43	461	111	0	0	1
7/25	35	400	237	0	1	1
7/26	22	722	377	0	0	1
7/27	27	838	382	0	4	1
7/28	41	1,098	485	0	0	0
7/29	44	665	203	0	1	0
7/30	41	1,298	225	0	1	0
7/31	97	1,767	262	0	3	0
8/1	130	2,156	66	0	4	0
8/2	158	995	61	0	1	0
8/3	85	1,084	185	0	1	0
8/4	117	1,343	118	0	0	1
8/5	262	1,626	146	0	0	1
8/6	280	1,325	103	0	0	2
8/7	167	883	56	0	0	1
8/8	305	910	357	0	0	1
8/9	165	540	12	0	0	0
8/10	310	423	15	0	0	1
8/11	301	467	6	0	0	1
8/12	295	336	8	0	1	0
8/13	190	190	5	0	0	0
8/14	496	270	1	0	0	0
8/15	1,165	577	3	0	0	18
Total	4,786	25,718	45,592	38	41	63

Appendix C3.–Daily observed passage of non-target species at Salmon River weir, 2014.

Date	Pink Salmon	Longnose Sucker	Dolly Varden	Arctic Grayling	Rainbow Trout	Whitefish
6/26 [a]	0	2	0	0	0	0
6/27 [a]	0	5	2	0	0	0
6/28	0	4	0	0	0	1
6/29	0	25	0	0	0	0
6/30	0	4	1	0	0	0
7/1	0	1	0	0	0	0
7/2	0	4	2	0	0	0
7/3 [a]	1	33	5	0	1	1
7/4	0	4	1	0	0	0
7/5	7	36	5	0	1	0
7/6	0	7	1	0	1	0
7/7	0	1	12	0	0	0
7/8	1	4	10	1	0	0
7/9	3	5	10	0	0	0
7/10	7	4	5	0	0	0
7/11	14	1	3	0	0	0
7/12	9	1	2	0	0	0
7/13	3	1	6	0	0	0
7/14	7	0	10	0	0	0
7/15	6	0	4	0	0	0
7/16	11	0	5	1	0	0
7/17	2	0	1	0	0	0
7/18	8	0	1	0	1	0
7/19	1	0	0	0	0	0
7/20	4	0	4	0	0	0
7/21 [a]	4	1	0	0	1	0
7/22	6	0	0	0	2	3
7/23	3	0	0	0	0	0
7/24	4	0	0	0	0	0
7/25	4	0	1	0	0	0
7/26 [a]	0	0	1	0	0	0
7/27	1	0	5	0	0	0
7/28	0	0	0	0	0	0
7/29	0	0	4	0	0	0
7/30	1	0	9	0	0	0
7/31	0	0	0	0	0	0
8/1 [a]	2	0	2	0	0	0
8/2	0	0	1	0	0	0
8/3	0	2	1	0	0	0
8/4	0	4	2	0	0	0
8/5	1	1	0	1	1	0
8/6 [b]	ND	ND	ND	ND	ND	ND
8/7 [b]	ND	ND	ND	ND	ND	ND
8/8 [b]	ND	ND	ND	ND	ND	ND
8/9 [a]	0	0	2	0	0	0
8/10	0	2	0	0	0	0
8/11	1	1	1	0	0	0
8/12	0	0	0	0	0	0
8/13	0	0	1	0	0	0
8/14	1	0	0	0	0	0
8/15	0	0	0	0	0	1

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Date	Pink Salmon	Longnose Sucker	Dolly Varden	Arctic Grayling	Rainbow Trout	Whitefish
8/16	0	0	0	0	0	0
8/17	0	0	0	0	0	0
8/18	0	0	0	0	0	0
8/19	0	0	0	0	0	0
8/20	1	0	0	0	1	0
8/21	1	0	1	0	0	0
8/22	0	0	0	0	0	0
8/23	0	0	0	0	0	0
8/24	0	0	0	0	0	0
8/25	0	0	0	0	0	0
8/26	2	0	0	0	0	0
8/27 [a]	0	0	0	0	0	0
8/28	0	0	0	0	0	0
8/29	0	0	0	0	0	0
8/30	0	0	0	0	0	0
8/31	0	0	0	0	0	0
9/1	0	0	1	0	0	0
9/2 [a]	0	0	0	0	0	0
9/3 [a]	0	0	0	0	0	0
9/4 [a]	0	1	0	0	0	0
9/5	0	0	0	0	0	2
9/6	0	0	0	0	0	0
9/7	0	0	1	0	0	0
9/8 [a]	0	0	0	0	0	0
9/9	0	0	0	0	0	0
9/10	0	0	0	0	0	0
9/11	0	0	1	0	0	0
9/12	0	0	0	0	0	0
9/13	0	0	0	0	0	0
9/14	0	0	1	0	0	0
9/15	0	0	1	0	1	0
9/16	0	0	0	0	0	0
9/17	0	0	1	0	0	0
9/18	0	0	0	0	0	0
9/19	0	0	0	0	0	0
9/20	0	0	0	0	1	0
Total	116	154	127	3	11	8

[a] Partial day count.

[b] The weir was not operational.

Appendix C4.–Daily observed passage of non-target species at George River weir, 2014.

Date	Sockeye Salmon	Pink Salmon	Longnose Sucker	Dolly Varden	Arctic Grayling	Whitefish
6/16	0	0	0	0	0	0
6/17	0	0	0	0	0	0
6/18	0	0	0	0	0	0
6/19	0	0	14	0	0	0
6/20 [a]	0	0	0	0	0	0
6/21	0	0	1	0	0	0
6/22	0	0	1	0	0	0
6/23	0	0	17	0	1	0
6/24	0	0	19	0	0	0
6/25	0	0	1	0	0	0
6/26	0	0	1	0	0	0
6/27	0	1	1	0	0	0
6/28 [a]	0	1	9	0	0	0
6/29	0	1	53	0	0	0
6/30	0	1	57	0	1	1
7/1	1	4	65	0	4	0
7/2 [a]	0	2	0	0	0	0
7/3 [a]	0	5	8	0	0	0
7/4	1	20	203	0	0	0
7/5	1	39	744	0	0	0
7/6	0	11	89	0	0	0
7/7	0	31	117	0	0	2
7/8	0	20	175	0	0	0
7/9	0	26	94	0	0	2
7/10	3	23	44	0	0	1
7/11	1	13	34	0	0	4
7/12	3	36	48	0	0	0
7/13	3	49	74	0	0	0
7/14	2	71	56	0	0	0
7/15	3	46	34	0	0	0
7/16	4	61	83	0	1	0
7/17	0	35	79	0	0	0
7/18	0	18	22	0	0	0
7/19	0	12	6	0	0	0
7/20	3	26	0	0	1	0
7/21 [a]	6	44	5	0	0	0
7/22	4	43	6	0	0	0
7/23 [a]	2	33	3	0	0	0
7/24	1	22	2	0	1	0
7/25	3	22	5	0	4	0
7/26	3	21	4	0	0	1
7/27	5	23	7	0	1	0
7/28	1	13	0	0	1	0

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

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Date	Sockeye Salmon	Pink Salmon	Longnose Sucker	Dolly Varden	Arctic Grayling	Whitefish
9/11	0	0	1	0	1	0
9/12	0	1	1	0	1	0
9/13	0	0	0	0	1	4
9/14	0	0	2	0	0	0
9/15	0	0	2	0	1	4
9/16	1	0	1	0	0	3
9/17	1	0	0	0	2	0
9/18	0	0	0	0	0	1
9/19	0	0	1	0	0	4
9/20	1	0	0	0	0	3
Total	156	906	2,294	4	45	48

[a] Partial day count.

Appendix C5.–Daily observed passage of non-target species at Kogrukluk River weir, 2014.

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

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Date	Pink Salmon	Dolly Varden	Arctic Grayling	Whitefish
7/31	0	0	0	0
8/1	7	3	0	0
8/2	9	4	0	0
8/3	16	1	0	0
8/4	14	3	0	0
8/5	11	5	0	0
8/6	5	3	0	0
8/7	16	8	0	0
8/8	16	7	0	0
8/9	20	33	0	0
8/10	22	21	0	0
8/11	20	21	0	0
8/12	11	9	0	0
8/13	10	71	0	2
8/14	23	31	0	0
8/15	8	21	0	2
8/16	13	30	0	3
8/17 [c]	ND	ND	ND	ND
8/18 [c]	ND	ND	ND	ND
8/19 [c]	ND	ND	ND	ND
8/20 [c]	ND	ND	ND	ND
8/21 [c]	ND	ND	ND	ND
8/22 [c]	ND	ND	ND	ND
8/23 [c]	ND	ND	ND	ND
8/24 [c]	ND	ND	ND	ND
8/25 [c]	ND	ND	ND	ND
8/26 [c]	ND	ND	ND	ND
8/27 [a]	0	1	0	0
8/28	0	7	0	2
8/29	0	7	0	4
8/30	0	2	0	0
8/31	0	3	0	2
9/1	0	10	0	5
9/2	0	2	1	2
9/3	1	1	0	8
9/4	0	2	0	1
9/5	4	3	0	1
9/6	1	1	0	3
9/7	0	1	0	0
9/8	0	1	0	7
9/9	0	1	0	1
9/10	0	1	0	2
9/11	0	0	0	6
9/12	0	0	0	3
9/13	0	0	0	2
9/14 [a]	0	0	1	0
Total	288	319	4	56

[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 non-target species at Telaquana River weir, 2014.

Date	Chinook Salmon	Chum Salmon	Coho Salmon	Pink Salmon	Longnose Sucker	Arctic Grayling	Whitefish	Northern Pike	Lake Trout
7/2	0	0	0	0	0	0	0	0	0
7/3	0	0	0	0	20	0	0	1	0
7/4	0	0	0	0	75	0	0	0	0
7/5	0	0	0	0	28	0	0	1	2
7/6	0	0	0	0	91	0	0	0	1
7/7	0	0	0	0	52	0	1	0	0
7/8	0	0	0	0	32	0	0	0	0
7/9	0	0	0	0	167	0	1	0	1
7/10	0	0	0	0	119	0	3	1	1
7/11	0	0	0	0	114	0	0	0	1
7/12	1	2	0	0	78	0	5	0	0
7/13	0	1	0	2	93	0	0	0	0
7/14	0	3	0	0	44	0	3	1	0
7/15	0	0	0	0	50	0	1	1	2
7/16	0	1	0	0	47	0	0	0	0
7/17	0	0	0	0	55	0	0	0	0
7/18	0	0	0	0	47	0	0	0	1
7/19	0	0	0	0	16	0	0	0	0
7/20 [a]	2	2	0	1	19	0	0	0	0
7/21	0	3	0	0	36	0	0	0	0
7/22	2	7	0	0	29	0	0	0	1
7/23	0	8	0	1	20	2	0	0	0
7/24	5	10	0	0	12	1	0	0	0
7/25	3	7	0	0	9	0	0	0	0
7/26	4	3	0	0	11	0	0	0	0
7/27	1	0	0	0	11	0	0	0	0
7/28	2	2	0	0	10	0	0	0	0
7/29	11	3	0	0	3	0	0	0	0
7/30	6	3	0	0	11	0	1	0	2
7/31	0	-2	0	0	4	0	0	0	0
8/1	2	5	0	0	3	0	0	1	0
8/2	5	1	0	0	5	0	0	0	0
8/3	3	3	0	0	8	1	2	0	0
8/4	5	3	0	0	5	0	2	0	0
8/5	0	0	0	0	8	0	0	0	0
8/6	4	3	0	0	7	0	0	0	0
8/7	3	0	0	0	6	0	0	0	0
8/8	3	1	0	0	4	0	0	0	0
8/9	1	3	0	0	7	0	0	0	0
8/10	4	0	0	0	5	0	2	0	0
Total	67	72	0	4	1,361	4	21	6	12

[a] Partial day count.

Appendix C7.–Daily observed passage of non-target species at Tatlawiksuk River weir, 2014.

Date	Sockeye Salmon	Pink Salmon	Longnose Sucker	Dolly Varden	Arctic Grayling	Whitefish
6/13 [a]	0	0	0	0	0	0
6/14 [a]	0	0	3	0	1	0
6/15	0	0	136	0	0	0
6/16	0	0	49	0	0	0
6/17	0	0	2	0	0	0
6/18	0	0	88	0	0	0
6/19	0	0	122	0	0	0
6/20	0	0	56	0	0	0
6/21	0	0	103	0	0	0
6/22	0	0	75	0	0	0
6/23 [b]	0	0	3	0	0	0
6/24 [c]	ND	ND	ND	ND	ND	ND
6/25 [c]	ND	ND	ND	ND	ND	ND
6/26 [c]	ND	ND	ND	ND	ND	ND
6/27 [b]	0	0	0	0	0	0
6/28	0	0	5	0	0	0
6/29	0	0	9	0	0	0
6/30	0	0	0	0	0	0
7/1	0	0	2	0	0	0
7/2	0	0	26	0	0	0
7/3	0	0	8	0	0	0
7/4	0	0	17	0	0	0
7/5	0	0	28	0	0	0
7/6	0	0	4	0	0	0
7/7	0	0	3	0	0	0
7/8	0	0	9	0	0	0
7/9	0	0	3	0	0	0
7/10	0	0	1	0	0	0
7/11	2	0	0	0	0	0
7/12	0	0	0	0	0	0
7/13	0	0	0	0	0	0
7/14	0	0	2	0	0	0
7/15	0	0	0	0	0	0
7/16	0	0	0	0	0	0
7/17	1	0	0	0	0	0
7/18 [b]	3	0	0	0	0	0
7/19	0	0	0	0	0	0
7/20	1	0	0	0	0	0
7/21	1	0	0	0	0	0
7/22	0	0	0	0	0	0
7/23	0	0	1	0	0	0
7/24	0	0	0	0	0	0
7/25	0	0	0	0	0	0
7/26	0	0	0	0	0	0
7/27 [b]	0	0	0	0	0	0
7/28	0	0	3	1	0	0
7/29	0	0	1	0	0	0
7/30	0	0	1	0	0	0
7/31	0	0	2	0	0	0

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Date	Sockeye Salmon	Pink Salmon	Longnose Sucker	Dolly Varden	Arctic Grayling	Whitefish
8/1	0	0	0	0	0	0
8/2	0	0	0	0	0	0
8/3	0	0	3	0	0	0
8/4	0	0	1	0	0	0
8/5	0	0	0	0	0	0
8/6	0	0	2	0	0	0
8/7	0	0	0	0	0	0
8/8	0	2	0	0	0	0
8/9	0	0	0	0	0	0
8/10	0	0	0	0	0	0
8/11	0	0	0	0	0	0
8/12	0	2	0	0	0	0
8/13	0	1	0	0	0	0
8/14	0	0	0	0	0	0
8/15	0	0	0	0	0	0
8/16	1	0	0	0	0	0
8/17	0	0	0	0	0	0
8/18	0	0	0	0	0	0
8/19	0	0	0	0	0	0
8/20	0	0	0	0	0	0
8/21	0	0	0	0	0	0
8/22	0	0	0	0	0	0
8/23	0	0	0	0	0	0
8/24	0	0	1	0	0	0
8/25	0	0	0	0	0	0
8/26	0	0	0	0	0	0
8/27	0	0	0	0	0	0
8/28	0	0	0	0	0	0
8/29	0	0	0	0	0	0
8/30	0	0	0	0	0	0
8/31	0	0	0	0	0	0
9/1	0	0	0	0	0	0
9/2	0	0	1	0	0	0
9/3	0	0	0	0	0	0
9/4	0	0	0	0	1	0
9/5	0	0	0	0	0	0
9/6	0	0	0	0	0	0
9/7	0	0	0	0	0	0
9/8	0	0	0	0	0	0
9/9	0	0	0	0	0	1
9/10	0	0	0	0	0	0
9/11	0	0	0	0	0	0
9/12	0	0	0	0	0	0
9/13	0	0	0	0	0	0
9/14	0	0	0	0	0	0
9/15	0	0	0	0	0	0
9/16	0	0	0	0	0	0
Total	9	5	770	1	2	1

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

[b] Partial day count.

[c] The weir was not operational.

APPENDIX D: OBSERVATION OF SALMON

Appendix D1.–Daily and annual observed Chinook salmon counts at Kuskokwim Area weir projects, 2014.

Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
6/13	[a]	[a]	[a]	[a]	[a]	[a]	0 [a]
6/14	[a]	[a]	[a]	[a]	[a]	[a]	0 [a]
6/15	[a]	[a]	[b]	[b]	[a]	[a]	2
6/16	[a]	[a]	[b]	0	[a]	[a]	0
6/17	[a]	[a]	[b]	0	[a]	[a]	0
6/18	[a]	[a]	[b]	0	[a]	[a]	0
6/19	[a]	[a]	[b]	0	[a]	[a]	2
6/20	[a]	[a]	[b]	0 [c]	0 [a c]	[a]	3
6/21	[a]	[a]	[b]	1	2 [a]	[a]	5
6/22	[a]	[a]	[b]	0	1 [a]	[a]	12
6/23	[a]	[a]	[b]	0	0 [a]	[a]	1 [c]
6/24	[a]	[a]	[b]	3	2 [a]	[a]	[b]
6/25	6	[b]	[b]	11	3 [a]	[a]	[b]
6/26	7	[b]	3 [c]	3	2	[a]	[b]
6/27	5	6	7 [c]	1	33	[a]	99 [c]
6/28	18	27	32	8 [c]	43	[a]	37
6/29	20	16	7	15	16	[a]	21
6/30	2	8	19	1	16	[a]	2
7/1	11	7	21	11	31	[a]	6
7/2	4	7	77	3 [c]	63	0 [a]	280
7/3	9	17	33 [c]	33 [c]	134	0	29
7/4	9	8	52	278	52	0	723
7/5	30	27	96	597	54	0	33
7/6	20	55	109	34	42	0	29
7/7	15	35	45	244	98	0	132
7/8	52	156	77	150	254	0	183
7/9	11	73	71	237	122	0	19
7/10	13	72	93	239	160	0	54
7/11	111	113	27	61	355	0	27
7/12	18	234	61	48	208	1	12
7/13	19	100	158	89	100	0	12
7/14	16	142	56	59	271	0	16
7/15	43	120	51	105	127	0	35
7/16	10	200	70	178	132	0	8

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Appendix D1.–Page 2 of 4.

Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
7/17	93	155	20	42	243	0	20
7/18	18	159	17	6	76	0	1 [c]
7/19	1	86	20	5	68	0	3
7/20	22	220	55	5	123	2 [c]	41
7/21	10	131	57 [c]	34 [c]	223	0	3
7/22	30	154	37	23	60	2	6
7/23	13	142	52	15 [c]	95	0	6
7/24	19	148	33	12	65	5	0
7/25	4	95	48	13	57	3	4
7/26	16	93	24 [c]	13	85	4	3
7/27	1	135	25	31	74	1	3 [c]
7/28	7	91	27	8	58	2	3
7/29	3	45	36	7	8	11	5
7/30	1	103	21	5	39	6	4
7/31	4	65	14	3	10	0	5
8/1	10	46	4 [c]	7	26	2	1
8/2	6	36	4	3 [c]	12	5	1
8/3	1	52	4	4	20	3	1
8/4	9	40	9	0	10	5	0
8/5	0	51	8	3	9	0	1
8/6	5	36	[b]	0	9	4	1
8/7	0	22	[b]	2	3	3	2
8/8	3	20	[b]	1	3	3	1
8/9	0	10	3 [c]	2	6	1	0
8/10	4	8	4	0	5	4	0
8/11	2	6	0	0 [c]	4	[b]	0
8/12	6	7	1	0	0	[b]	0
8/13	1	3	2	0	0	[b]	0
8/14	5	3	0	0	0	[b]	0
8/15	0	9	0	4	3	[b]	0
8/16	3	[a]	0	1	4	[b]	0
8/17	1	[a]	0	0	[b]	[b]	0

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Appendix D1.–Page 3 of 4.

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

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Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
9/19	[a]	[a]	0	0	[b]	[a]	[b]
9/20	[a]	[a]	0	0	[b]	[a]	[b]
9/21	[a]	[a]	[a]	[a]	[b]	[a]	[a]
9/22	[a]	[a]	[a]	[a]	[b]	[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	750	3,594	1,693	2,668	3,724	67	1,898

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, 2014.

Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
6/13	[a]	[a]	[a]	[a]	[a]	[a]	0 [a]
6/14	[a]	[a]	[a]	[a]	[a]	[a]	5 [a]
6/15	[a]	[a]	[b]	[b]	[a]	[a]	3
6/16	[a]	[a]	[b]	0	[a]	[a]	0
6/17	[a]	[a]	[b]	0	[a]	[a]	1
6/18	[a]	[a]	[b]	0	[a]	[a]	9
6/19	[a]	[a]	[b]	1	[a]	[a]	8
6/20	[a]	[a]	[b]	0 [c]	0 [a c]	[a]	5
6/21	[a]	[a]	[b]	0	5 [a]	[a]	13
6/22	[a]	[a]	[b]	1	8 [a]	[a]	13
6/23	[a]	[a]	[b]	2	19 [a]	[a]	5 [c]
6/24	[a]	[a]	[b]	7	28 [a]	[a]	[b]
6/25	21	[b]	[b]	56	9 [a]	[a]	[b]
6/26	42	[b]	0 [c]	29	34	[a]	[b]
6/27	37	89	4 [c]	32	47	[a]	46 [c]
6/28	165	80	15	28 [c]	58	[a]	46
6/29	168	99	2	20	66	[a]	24
6/30	96	77	24	22	111	[a]	1
7/1	189	140	46	147	131	[a]	48
7/2	158	198	40	22 [c]	233	0 [a]	401
7/3	158	275	26 [c]	52 [c]	173	0	140
7/4	236	302	29	530	144	0	467
7/5	393	559	96	365	309	0	221
7/6	525	757	67	144	314	0	143
7/7	104	297	71	401	349	0	453
7/8	43	485	93	491	695	0	536
7/9	53	519	95	632	680	0	384
7/10	290	647	61	556	929	0	570
7/11	761	739	98	699	1,137	0	538
7/12	419	651	118	925	944	2	585
7/13	330	466	138	960	719	1	539
7/14	172	746	56	819	1,279	3	631
7/15	703	720	32	689	994	0	717
7/16	372	924	19	1,006	1,469	1	504

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Appendix D2.–Page 2 of 4.

Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
7/17	925	811	22	619	1,437	0	191
7/18	351	713	13	303	1,143	0	214 [c]
7/19	64	337	12	335	1,400	0	498
7/20	565	357	18	339	1,049	2 [c]	653
7/21	593	738	52 [c]	452 [c]	1,203	3	462
7/22	495	626	235	569	1,354	7	623
7/23	226	564	113	374 [c]	1,769	8	494
7/24	347	368	142	540	1,000	10	345
7/25	18	392	137	501	1,075	7	204
7/26	219	492	68 [c]	338	1,072	3	106
7/27	153	481	107	470	897	0	133 [c]
7/28	246	400	115	320	718	2	73
7/29	156	233	83	205	332	3	146
7/30	397	325	59	392	564	3	64
7/31	224	419	29	222	430	-2	85
8/1	101	227	19 [c]	145	689	5	36
8/2	47	203	51	78 [c]	389	1	39
8/3	132	196	19	152	423	3	85
8/4	169	267	58	170	440	3	75
8/5	60	285	53	154	250	0	77
8/6	67	274	[b]	151	186	3	56
8/7	37	219	[b]	117	206	0	42
8/8	127	160	[b]	135	179	1	72
8/9	41	110	31 [c]	116	215	3	59
8/10	75	136	8	108	145	0	38
8/11	50	122	13	98 [c]	120	[b]	31
8/12	70	100	15	68	154	[b]	29
8/13	20	60	14	28	208	[b]	15
8/14	23	121	18	19	68	[b]	6
8/15	17	80	16	51	66	[b]	13
8/16	21	[a]	0	34	73	[b]	5
8/17	20	[a]	21	20	[b]	[b]	10

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Appendix D2.–Page 3 of 4.

Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
8/18	4	[a]	8	55	[b]	[b]	8
8/19	4	[a]	2	12	[b]	[b]	3
8/20	4	[a]	2	19	[b]	[b]	3
8/21	4	[a]	2	7	[b]	[b]	0
8/22	0	[a]	1	11	[b]	[b]	4
8/23	5	[a]	0	7	[b]	[b]	6
8/24	1	[a]	3	11	[b]	[b]	9
8/25	2	[a]	0	7	[b]	[b]	2
8/26	0	[a]	5	6	[b]	[b]	2
8/27	0	[a]	2 [c]	6	1 [c]	[a]	0
8/28	0	[a]	0	12	8	[a]	1
8/29	1	[a]	0	3	3	[a]	0
8/30	0	[a]	0	0	3	[a]	1
8/31	2	[a]	0	2	1	[a]	0
9/1	[b]	[a]	0	1	7	[a]	0
9/2	[b]	[a]	0 [c]	10	5	[a]	2
9/3	[b]	[a]	0 [c]	10	3	[a]	1
9/4	[b]	[a]	0 [c]	5	3	[a]	0
9/5	[b]	[a]	0	3	5	[a]	0
9/6	[b]	[a]	0	3	3	[a]	1
9/7	[b]	[a]	1	0	3	[a]	0
9/8	[b]	[a]	0 [c]	0	1	[a]	1
9/9	[b]	[a]	0	6	1	[a]	1
9/10	[b]	[a]	0	5	2	[a]	0
9/11	[b]	[a]	0	4	3	[a]	0
9/12	[b]	[a]	0	3	1	[a]	0
9/13	[b]	[a]	0	1	0	[a]	0
9/14	[b]	[a]	0	0	0 [c]	[a]	0
9/15	[b]	[a]	0	0	[b]	[a]	1
9/16	[b]	[a]	0	4	[b]	[a]	0
9/17	[b]	[a]	0	3	[b]	[a]	[b]
9/18	[b]	[a]	0	1	[b]	[a]	[b]

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Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
9/19	[a]	[a]	0	1	[b]	[a]	[b]
9/20	[a]	[a]	0	2	[b]	[a]	[b]
9/21	[a]	[a]	[a]	[a]	[b]	[a]	[a]
9/22	[a]	[a]	[a]	[a]	[b]	[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	11,518	18,586	2,697	16,479	30,191	72	12,081

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, 2014.

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

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Appendix D3.–Page 2 of 4.

Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
7/17	0	0	0	0	0	0	0
7/18	0	0	0	0	0	0	0 [c]
7/19	0	0	0	0	0	0	0
7/20	0	0	0	0	0	0 [c]	0
7/21	0	2	0 [c]	0 [c]	0	0	1
7/22	0	4	0	0	0	0	3
7/23	0	4	0	0 [c]	0	0	3
7/24	0	43	1	0	0	0	2
7/25	0	35	3	0	0	0	2
7/26	0	22	3 [c]	0	0	0	3
7/27	0	27	0	0	2	0	12 [c]
7/28	0	41	1	0	0	0	0
7/29	2	44	2	0	1	0	18
7/30	4	41	8	16	6	0	7
7/31	10	97	1	8	3	0	20
8/1	8	130	5 [c]	9	4	0	24
8/2	7	158	9	7 [c]	12	0	29
8/3	15	85	8	47	33	0	54
8/4	16	117	20	48	47	0	69
8/5	9	262	20	57	17	0	133
8/6	71	280	[b]	126	79	0	129
8/7	38	167	[b]	164	47	0	115
8/8	117	305	[b]	92	60	0	262
8/9	32	165	54 [c]	254	155	0	345
8/10	44	310	36	389	234	0	453
8/11	66	301	75	252 [c]	248	[b]	413
8/12	201	295	52	454	76	[b]	814
8/13	75	190	35	94	390	[b]	1,013
8/14	312	496	152	62	607	[b]	711
8/15	139	1,165	223	635	497	[b]	1,131
8/16	312	[a]	0	360	603	[b]	883
8/17	252	[a]	167	119	[b]	[b]	1,323

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Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
8/18	165 [a]		218	2,459	[b]	[b]	958
8/19	186 [a]		41	1,684	[b]	[b]	857
8/20	88 [a]		31	804	[b]	[b]	1,088
8/21	152 [a]		188	1,162	[b]	[b]	953
8/22	88 [a]		281	663	[b]	[b]	1,137
8/23	217 [a]		83	859	[b]	[b]	1,161
8/24	604 [a]		399	1,967	[b]	[b]	902
8/25	221 [a]		474	4,377	[b]	[b]	1,097
8/26	1,031 [a]		199	3,770	[b]	[b]	806
8/27	181 [a]		227 [c]	1,198	747 [c]	[a]	404
8/28	86 [a]		404	824	2,372	[a]	268
8/29	380 [a]		221	1,643	1,806	[a]	134
8/30	105 [a]		92	164	1,421	[a]	171
8/31	60 [a]		67	444	1,164	[a]	145
9/1	[b]	[a]	223	575	1,379	[a]	174
9/2	[b]	[a]	865 [c]	2,363	2,484	[a]	266
9/3	[b]	[a]	165 [c]	1,454	3,326	[a]	251
9/4	[b]	[a]	181 [c]	307	2,010	[a]	86
9/5	[b]	[a]	363	47	2,807	[a]	100
9/6	[b]	[a]	326	444	2,568	[a]	110
9/7	[b]	[a]	238	33	1,589	[a]	115
9/8	[b]	[a]	128 [c]	53	978	[a]	87
9/9	[b]	[a]	270	2,463	1,304	[a]	80
9/10	[b]	[a]	253	1,309	1,396	[a]	105
9/11	[b]	[a]	222	357	954	[a]	81
9/12	[b]	[a]	167	242	769	[a]	75
9/13	[b]	[a]	58	295	754	[a]	80
9/14	[b]	[a]	203	206	175 [c]	[a]	32
9/15	[b]	[a]	105	75	[b]	[a]	52
9/16	[b]	[a]	50	89	[b]	[a]	62
9/17	[b]	[a]	60	88	[b]	[a]	[b]
9/18	[b]	[a]	72	100	[b]	[a]	[b]

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Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
9/19	[a]	[a]	12	25	[b]	[a]	[b]
9/20	[a]	[a]	11	35	[b]	[a]	[b]
9/21	[a]	[a]	[a]	[a]	[b]	[a]	[a]
9/22	[a]	[a]	[a]	[a]	[b]	[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	5,294	4,786	7,772	35,771	33,124	0	19,809

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, 2014.

Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
6/13	[a]	[a]	[a]	[a]	[a]	[a]	0 [a]
6/14	[a]	[a]	[a]	[a]	[a]	[a]	0 [a]
6/15	[a]	[a]	[b]	[b]	[a]	[a]	0
6/16	[a]	[a]	[b]	0	[a]	[a]	0
6/17	[a]	[a]	[b]	0	[a]	[a]	0
6/18	[a]	[a]	[b]	0	[a]	[a]	0
6/19	[a]	[a]	[b]	0	[a]	[a]	0
6/20	[a]	[a]	[b]	0 [c]	0 [a c]	[a]	0
6/21	[a]	[a]	[b]	0	0 [a]	[a]	0
6/22	[a]	[a]	[b]	0	0 [a]	[a]	0
6/23	[a]	[a]	[b]	0	0 [a]	[a]	0 [c]
6/24	[a]	[a]	[b]	0	0 [a]	[a]	[b]
6/25	1,824	[b]	[b]	0	0 [a]	[a]	[b]
6/26	2,052	[b]	0 [c]	0	0	[a]	[b]
6/27	1,844	3,584	0 [c]	0	0	[a]	0 [c]
6/28	2,200	3,470	0	0 [c]	0	[a]	0
6/29	2,343	4,099	0	0	0	[a]	0
6/30	1,915	5,433	0	0	4	[a]	0
7/1	2,933	7,219	0	1	0	[a]	0
7/2	2,022	7,955	0	0 [c]	6	0 [a]	0
7/3	2,272	11,753	0 [c]	0 [c]	8	0	0
7/4	1,964	8,712	0	1	7	0	0
7/5	2,667	11,730	0	1	15	0	0
7/6	2,307	18,070	0	0	1	1	0
7/7	1,496	12,440	0	0	19	1	0
7/8	1,259	19,173	2	0	37	16	0
7/9	1,401	12,946	1	0	59	13	0
7/10	1,422	7,548	0	3	56	991	0
7/11	1,224	9,661	0	1	140	751	2
7/12	1,035	11,040	4	3	87	783	0
7/13	827	9,822	2	3	36	589	0
7/14	607	8,744	5	2	129	1,044	0
7/15	1,286	6,613	0	3	117	949	0
7/16	485	9,481	3	4	184	1,270	0

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Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
7/17	882	8,337	1	0	236	1,702	1
7/18	327	5,783	0	0	136	1,496	3 [c]
7/19	73	3,791	0	0	126	475	0
7/20	576	4,507	2	3	284	1,439 [c]	1
7/21	222	5,737	17 [c]	6 [c]	603	1,982	1
7/22	327	4,042	18	4	186	1,933	0
7/23	179	4,040	20	2 [c]	460	2,023	0
7/24	234	3,306	14	1	380	1,286	0
7/25	68	3,079	23	3	626	1,046	0
7/26	128	3,008	40 [c]	3	435	796	0
7/27	103	2,706	43	5	403	526	0 [c]
7/28	100	2,560	21	1	258	562	0
7/29	55	1,470	58	4	109	646	0
7/30	108	1,980	94	4	248	307	0
7/31	44	1,765	24	2	135	339	0
8/1	43	1,002	19 [c]	0	192	90	0
8/2	27	1,440	23	1 [c]	93	187	0
8/3	26	1,741	30	5	139	116	0
8/4	40	1,165	105	6	123	104	0
8/5	31	1,127	45	5	45	67	0
8/6	57	806 [b]		7	41	69	0
8/7	24	534 [b]		4	30	108	0
8/8	60	610 [b]		0	32	35	0
8/9	41	495	31 [c]	4	34	39	0
8/10	51	559	15	5	26	39	0
8/11	38	394	21	5 [c]	14	[b]	0
8/12	101	341	8	3	10	[b]	0
8/13	12	279	10	3	21	[b]	0
8/14	18	413	16	0	8	[b]	0
8/15	21	459	11	7	4	[b]	0
8/16	23	[a]	0	7	9	[b]	1
8/17	11	[a]	8	1	[b]	[b]	0

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

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Date	Kuskokwim Bay		Kuskokwim River				
	Middle Fork Goodnews R	Kanektok River	Salmon River	George River	Kogrukluk River	Telaquana River	Tatlawiksuk River
9/19	[a]	[a]	0	0	[b]	[a]	[b]
9/20	[a]	[a]	0	1	[b]	[a]	[b]
9/21	[a]	[a]	[a]	[a]	[b]	[a]	[a]
9/22	[a]	[a]	[a]	[a]	[b]	[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	41,473	256,969	747	156	6,407	23,820	9

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.