
A SURVEY OF FISH ASSEMBLAGES IN THE SOUTH FORK KOYOKUK RIVER

Prepared for DOWL
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INTRODUCTION

The Ambler Mining District Access Project is a State of Alaska undertaking with the objective of identifying, designing, and constructing an access and transportation corridor to the Ambler mineral belt. Several preliminary road corridors were initially investigated for development potential and the engineering firm DOWL contracted ABR, Inc.—Environmental Research & Services (ABR) on behalf of the Alaska Industrial Development and Export Authority (AIDEA) to characterize fish and aquatic habitat resources along what would be known as the Brooks East Corridor in 2012 and 2013 (Lemke et al 2013, ABR 2014). Information collected during these aquatic surveys also provided data required to meet regulatory obligations defined by the National Environmental Policy Act (NEPA) process. In 2015, DOWL contracted ABR to assist the Alaska Department of Fish and Game (ADFG) in meeting their project-related goals in assessing fish assemblages in the South Fork Koyukuk River near Bettles, Alaska.

During the past surveys, ABR conducted field surveys to sample for the presence of resident and anadromous fish species in streams crossed by the proposed corridor (Lemke et al. 2013). Fish species not previously described in the area were reported to the ADFG for inclusion in the “Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes,” known as the Anadromous Waters Catalog (AWC; ADFG 2014). As a result of surveys conducted by ABR in 2012, a total of 175.5 km of streams were identified for nomination to the AWC for Pacific salmon (Lemke et al. 2013). Furthermore, 272.6 km of stream were identified as potential Dolly Varden (*Salvelinus malma*) habitat for inclusion in the ADFG Alaska Freshwater Fish Index (AFFI) (Lemke et al. 2013). During 2013 field surveys, ABR performed stream and riparian habitat assessments at proposed bridge crossings along the corridor (ABR

2014). During the 11 days of stream and riparian zone habitat surveys at proposed bridge crossings on the Brooks East Corridor, ABR described stream conditions at 28 habitat transects on 14 waterbodies.

In 2014, at the request of AIDEA, DOWL, and ADFG, ABR performed fish surveys in the South Fork Koyukuk River in areas upstream and downstream of the proposed Brooks East Corridor crossing. These surveys were undertaken to assist ADFG in completing some of their own fish survey objectives on the Koyukuk River system which had been postponed during 2013 due to a delay in project funding. The objectives of the 2014 South Fork Koyukuk fish surveys were to 1) characterize fish assemblages present, 2) document seasonal differences in fish assemblages, and 3) collect information on age, gender, maturity, and diet from fish present during sampling surveys.

METHODS

STUDY SITES

Using aerial imagery of the South Fork Koyukuk River, ABR identified potential fish sample sites within 15 km upstream or downstream of the proposed bridge crossing prior to surveys. Fishing sites were strategically located near the outflows of small tributaries or backwater and side-channel habitat. These sites served as a starting point for determination of sampling locations, but final sample locations were determined in the field based on stream flow, habitat conditions, and site accessibility.

Bureau of Land Management (BLM) permits were obtained to allow access to waters flowing through BLM land. Permits for access to waters flowing through the Kanuti National Wildlife Refuge were not obtained in time for July surveys (ruling out surveys in these waters), but were granted for September surveys. No sampling occurred in waters flowing through Native allotments. To ensure that no Native lands were trespassed upon and that no subsistence hunting activities were interrupted, the field survey team (composed of 4 ABR biologists) was accompanied in the field by a subsistence advisor, Harding Sam, a seasonal employee of DOWL with extensive local knowledge of the project area.

The survey team camped in Coldfoot during the brief July surveys and lodged in Bettles during the September surveys. The survey team accessed the South Fork Koyukuk River daily

via helicopter from both locations. Specific fish sampling sites were accessed from helicopter landing zones by a 14-foot inflatable raft powered by a 20-horsepower outboard engine.

FIELD SURVEYS

After determining the locations for fish sampling each day, a site name was identified that included the waterbody (South Fork Koyukuk = SF), 2-digit site code (e.g., 00), and year (14). A GPS location was recorded for the site as well as traps or nets. Ambient water chemistry (temperature [°C], dissolved oxygen [DO% and DO mg/L], conductivity [$\mu\text{s}/\text{cm}$ and mS/cm], and pH) data were collected using a YSI Professional Plus multimeter (Appendix B).

Fishing efforts took place from 10–13 July and 3–10 September 2014. However, fish surveys in July were hindered by unsafe conditions caused by recent rain and elevated water levels. Sampling in July focused on areas upstream of the proposed bridge crossing whereas sampling in September occurred in areas both upstream and downstream of the crossing.

Fish capture and handling was permitted under ADFG permit SF2014-218 (Appendix A). ABR used multiple gear types during fish surveys, including minnow traps (variable mesh up to 0.25 inch), hoop nets (0.25 and 1 inch mesh with 4.5 inch diameter net openings), variable mesh gill nets (60 feet long and 3 inch mesh, 80 feet long and 3 inch mesh, and 100 feet long and variable mesh net [2–5 inch]), and seines (20–100 feet long and 0.25 inch mesh). Hoop nets baited with betadine treated salmon roe or whitefish were typically deployed with the opening facing downstream to capture fish moving upstream, although in slack waters the direction of the net opening varied. Deployment of gill nets occurred only during July fishing efforts, although heavy rains and rising water conditions led to only 4 net sets. From 5–28 baited (betadine treated salmon roe) minnow traps were deployed at each site in varying habitat (e.g., pools and near aquatic vegetation). All traps and nets were left to fish overnight and fished between 14 and 24 hours. Seining hauls occurred over distances of ~10–50 m in shallow waters. A total of 4–8 hauls occurred at 3 locations during surveys. All captured fish were enumerated, identified to species, measured for length (mm), and returned to the stream alive or kept as voucher specimens or for tissue analysis (see *Fish Processing*).

FISH PROCESSING

Captured fish were anesthetized using Aqui-S® E (50% eugenol) diluted in stream water according to methods defined by the United States Fish and Wildlife Service (USFWS) Aqui-S fact sheet (USFWS 2014). After fish became lethargic, they were identified to species and measured for fork length, or total length in the case of Slimy Sculpin (*Cottus cognatus*) and Burbot (*Lota lota*), to the nearest millimeter (mm). After processing, fish were transferred to a bucket of cool, aerated stream water for recovery and then returned to the stream. Some voucher specimens were kept and carried to the ABR laboratory in Anchorage, Alaska, for confirmation of species identification.

Additional fish from a range of lengths were kept for later analysis of tissues. These fish were kept cool until arrival back at camp where they were measured for length (mm) and weighed (g). Otoliths (sagittae) were removed, cleaned with tap water, and stored in 96-well pipette trays. The gender of the individual fish was determined and sexual maturity was assessed on a qualitative scale (Immature, Developing, Mature, Spawning, Spent) (Moulton 2010). Stomach contents (if present) were removed and kept in labeled vials with denatured alcohol. A photo was taken of each individual fish processed. Due to a “stop work” order issued by the State of Alaska resulting from funding cuts, analysis of tissues remains incomplete at this time and is therefore not reported.

RESULTS AND DISCUSSION

During the July sampling event, a severe weather front brought heavy rains and rising waters to the South Fork Koyukuk River region. Rapid flowing flood stage waters created conditions unsuitable for leaving fishing gear in the water overnight. Dozens of large trees were seen floating downstream throughout the short sampling period. As a result, fishing effort was initiated cautiously and then ultimately canceled after limited sampling over a 4-day period. A total of 24 fish were captured using 14 hoop net sets, 4 gill net sets, and 19 minnow trap sets (Table 1). Catch rates were low, with 0.3–1.22 fish caught per sampling device during the sampling period (average = 0.66 fish per sampling device). A total of 5 species of fish were captured: Slimy Sculpin (n = 7), Arctic Grayling (*Thymallis arcticus*) (n = 7), Chinook Salmon (*Oncorhynchus tshawytscha*) (n = 6), Longnose Sucker (*Catostomus catostomus*) (n = 3) and

Burbot ($n = 1$). The highest catch rate occurred at SF-02-14 using hoop traps and minnow traps (1.22 fish per sampling device) (Table 1).

Weather conditions were better during September sampling with clear skies, no precipitation events, and daily high air temperatures from 10–16 °C. However, due to the large amount of large woody debris that had been introduced into the river from stream banks during the previous flooding event, there were still frequent sightings of floating trees in the river which deterred the team from deploying gill nets. A total of 42 hoop net sets and 135 minnow trap sets were made along with 1 hour of angling during 7 days of fishing (Table 1, Figures 2–5). An additional 20 seine hauls were made at 3 locations over parts of 2 days. Catch rates were higher than in July, but remained low with 0.44–5.75 fish caught per sampling device during the survey period (average = 1.68 fish per sampling device). A total of 4 species of fish were captured: Chinook Salmon ($n = 143$), Slimy Sculpin ($n = 52$), Arctic Grayling ($n = 27$), and Burbot ($n = 26$). A Chum Salmon (*Oncorhynchus keta*) ($n = 1$) carcass also was observed near SF-00-14 (Figures 1 and 3). The highest catch rate occurred at SF-30-14 using hoop traps and minnow traps (3.16 fish per sampling device) (Table 1, Figure 4).

Arctic Grayling populations in the Tanana River are reported to reach 50% maturity at lengths of 243–273 mm (Clark 1992). The 34 Arctic Grayling caught in this survey ranged in length from 52–385 mm (average = 217, median = 255) (Figure 6, Appendix A). This suggested that a significant percentage of Arctic Grayling captured in this survey were likely mature.

Burbot in the Tanana River reach maturity between 500 and 800 mm length (Evenson 2000). The 28 Burbot caught in this survey ranged in length from 99 to 450 mm (average = 220, median = 200). This suggests that the majority of Burbot captured in this survey may not have reached sexual maturity.

Chinook Salmon, Chum Salmon, and Coho Salmon (*Oncorhynchus kisutch*) have been observed in the South Fork Koyukuk River according to the AWC (ADFG 2014). Only juvenile Chinook Salmon ($n = 149$) and a single adult Chum Salmon carcass were observed during July and September 2014 surveys. Juvenile Chinook Salmon were the most common fish captured during surveys and ranged in length from 53 to 80 mm (average = 66, median = 67) (Figure 6, Appendix A).

Slimy Sculpin are common in streams throughout Alaska and reach lengths up to 128 mm, though most are below 75 mm (Mecklenburg et al. 2002). Slimy Sculpin were the second most commonly captured fish in these surveys. Total lengths for Slimy Sculpin ranged from 31 to 92 mm (average = 57, median = 59) (Figure 6, Appendix A).

Only 1 water quality measurement was made during July sampling on the South Fork Koyukuk River (10 July 2014) (Figure 7, Appendix B). Temperature (10.6 °C), conductivity (99.5 $\mu\text{s}/\text{cm}$), and pH (7.06) were lower than for the nearby waterbodies sampled by ADFG during the same time period (Scannell 2014). Water temperatures recorded during September sampling (n = 8 measurements) on the South Fork Koyukuk River ranged from 3.7 to 5.6 °C (average = 4.5 °C). These water temperatures were closer to those measured by ADFG during the same time period in nearby streams in 2014. Dissolved oxygen levels in September (average = 112.1 % and 14.42 mg/L) were considerably higher than in July (80.6 % and 8.8 mg/L) (Figure 7, Appendix B). The pH of South Fork Koyukuk River waters increased from July (7.06) to September (average = 7.64), but was still slightly lower on average than for waterbodies measured by ADFG during the same period.

The results in this report represent only preliminary conclusions about fish presence in the South Fork Koyukuk River. Due to poor weather conditions in July, we were unable to sample effectively in July 2014. Therefore, we are hesitant to make conclusions as to seasonal fish presence and absence in the river. Furthermore, due to State of Alaska budget cuts for the 2015 budget year and a stop work order from the Governor's office in late December 2014, we were unable to complete our analysis of age and feeding habits of fish captured in this survey. Furthermore, we were required to provide only limited reporting for these surveys. However, we cautiously conclude that the South Fork Koyukuk River does not appear to support high fish densities and that species diversity is relatively low. Future sampling efforts that include boat-based electrofishing are likely to describe additional species (including whitefish species) not found during these surveys.

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Table 1. Results of fish sampling efforts on the S. Fork Koyukuk River, near Bettles, Alaska July and September, 2014.

Fishing Dates	Site Name	Number of Sample Devices						Number of Fish						Total Number of Fish	Fish/Sample Device
		Hoop Net (¼" mesh)	Hoop Net (1" mesh)	Gill Net	Minnow Trap	Angling ^a	Seine	Slimy Sculpin	Arctic Grayling	Longnose Sucker	Chinook Salmon	Chum Salmon ^b	Burbot		
10–11 July	SF-01-14	1	1	2	5	—	—	3	2	1	—	—	—	6	0.67
11–12 July	SF-02-14	2	2	—	5	—	—	2	2	—	6	—	1	11	1.22
12–13 July	SF-03-14	2	2	1	5	—	—	2	—	1	—	—	—	3	0.30
12–13 July	SF-04-14	2	2	1	4	—	—	—	3	1	—	—	—	4	0.44
3–4 Sept	SF-10-14	4	4	—	17	—	—	1	5	—	3	—	2	11	0.44
4–5 Sept	SF-20-14	2	2	—	15	—	—	4	—	—	4	—	9	17	0.89
4–5 Sept	SF-15-14	2	2	—	14	—	—	2	2	—	3	—	2	9	0.50
5–6 Sept	SF-30-14	2	2	—	15	—	—	4	1	—	50	—	5	60	3.16
6–7 Sept	SF-50-14	3	3	—	20	—	—	1	2	—	39	—	3	45	1.73
7–8 Sept	SF-45-14	4	4	—	26	—	—	6	—	—	23	—	4	33	0.97
8–9 Sept	SF-00-14	4	4	—	28	1	—	—	9	—	20	1	1	31	0.81
9 Sept	Seine 1	—	—	—	—	—	8	6	4	—	1	—	—	11	1.38
9 Sept	Seine 2	—	—	—	—	—	4	19	4	—	—	—	—	23	5.75
10 Sept	Seine 3	—	—	—	—	—	8	9	—	—	—	—	—	9	1.13

^a Angling at SF-00-14 occurred during an approximately 1 hour time period. Angling was treated as 1 sample device for calculation of "Fish/sample device".

^b Visual observation of Chum Salmon not included in calculation of "Fish/sample device"

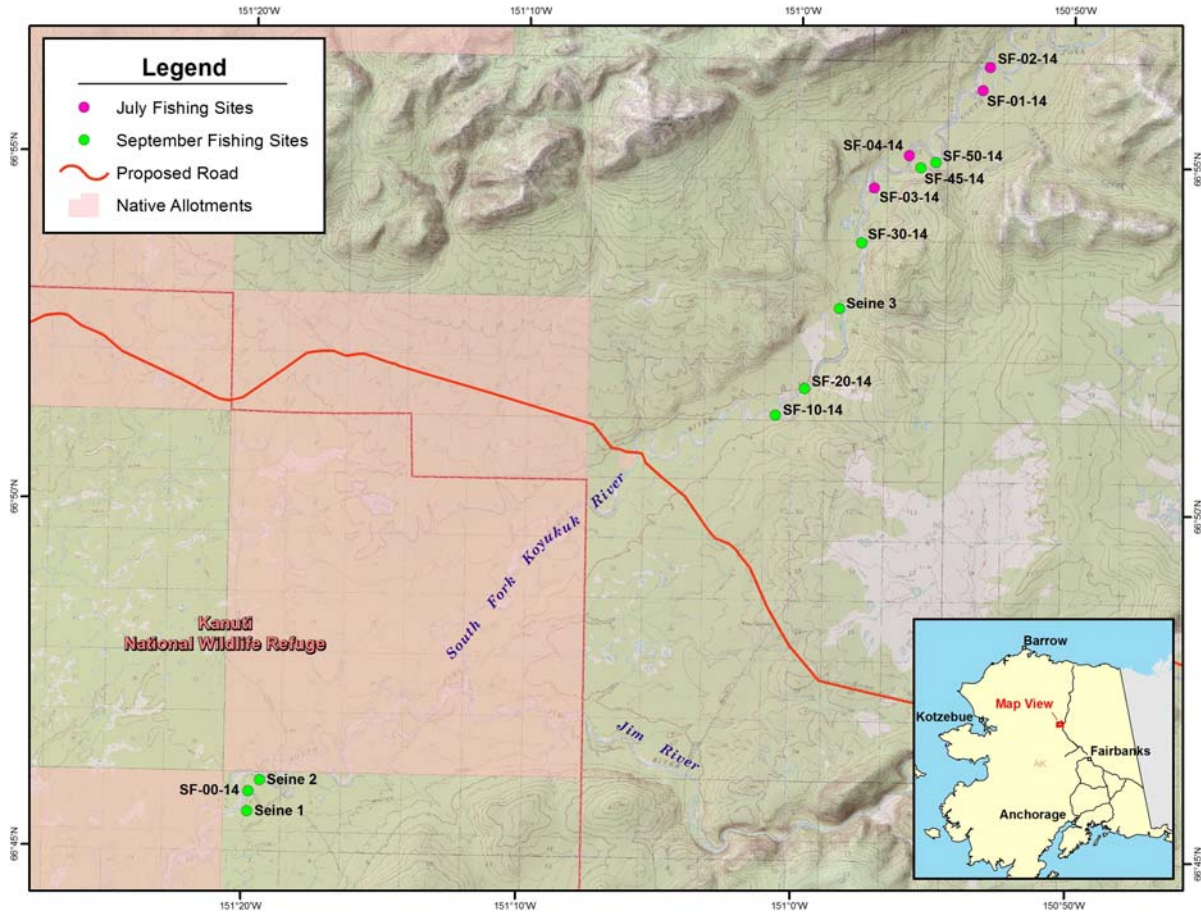


Figure 1. Study area sampling locations for fish surveys on the South Fork Koyukuk River near Bettles, Alaska, July and September 2014.

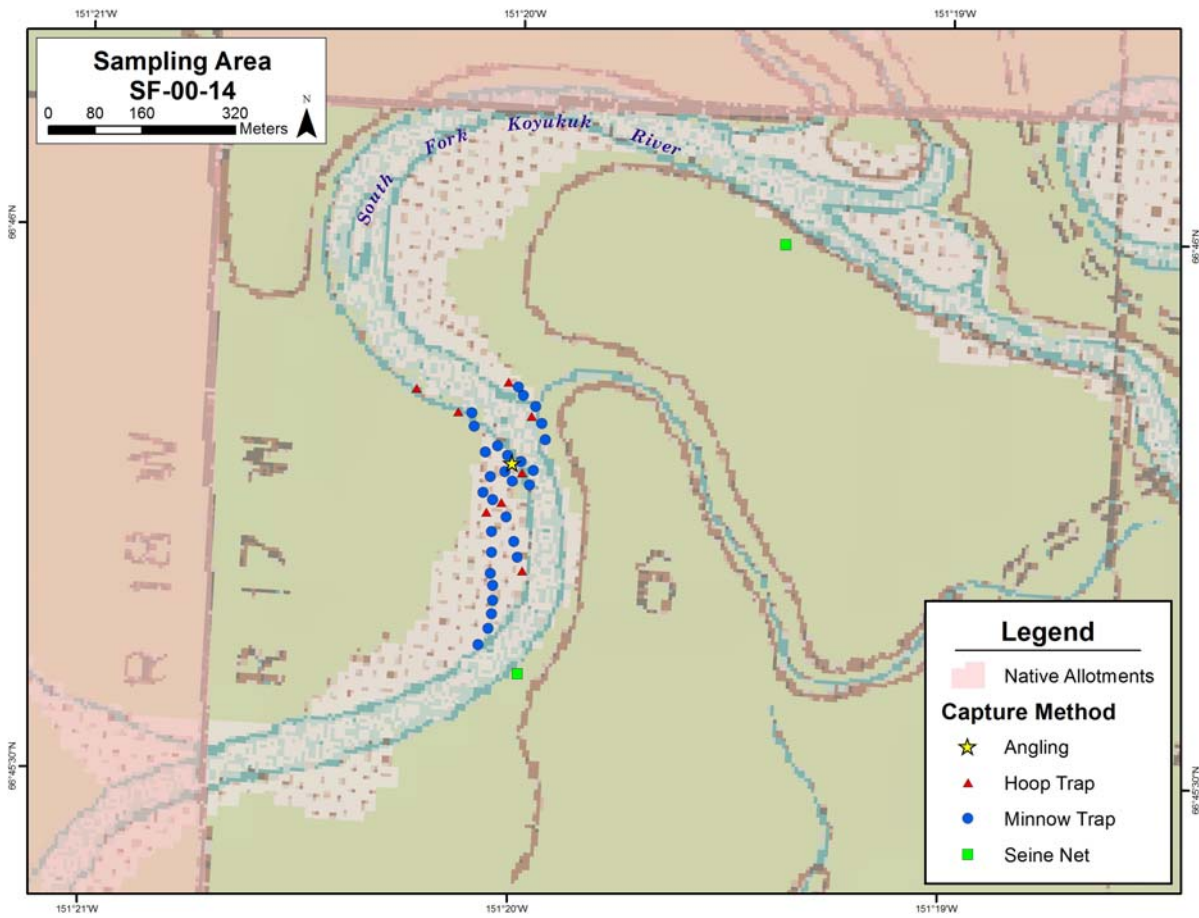


Figure 2. Location fishing effort at site SF-00-14 on the South Fork Koyukuk River near Bettles, Alaska, September 2014.

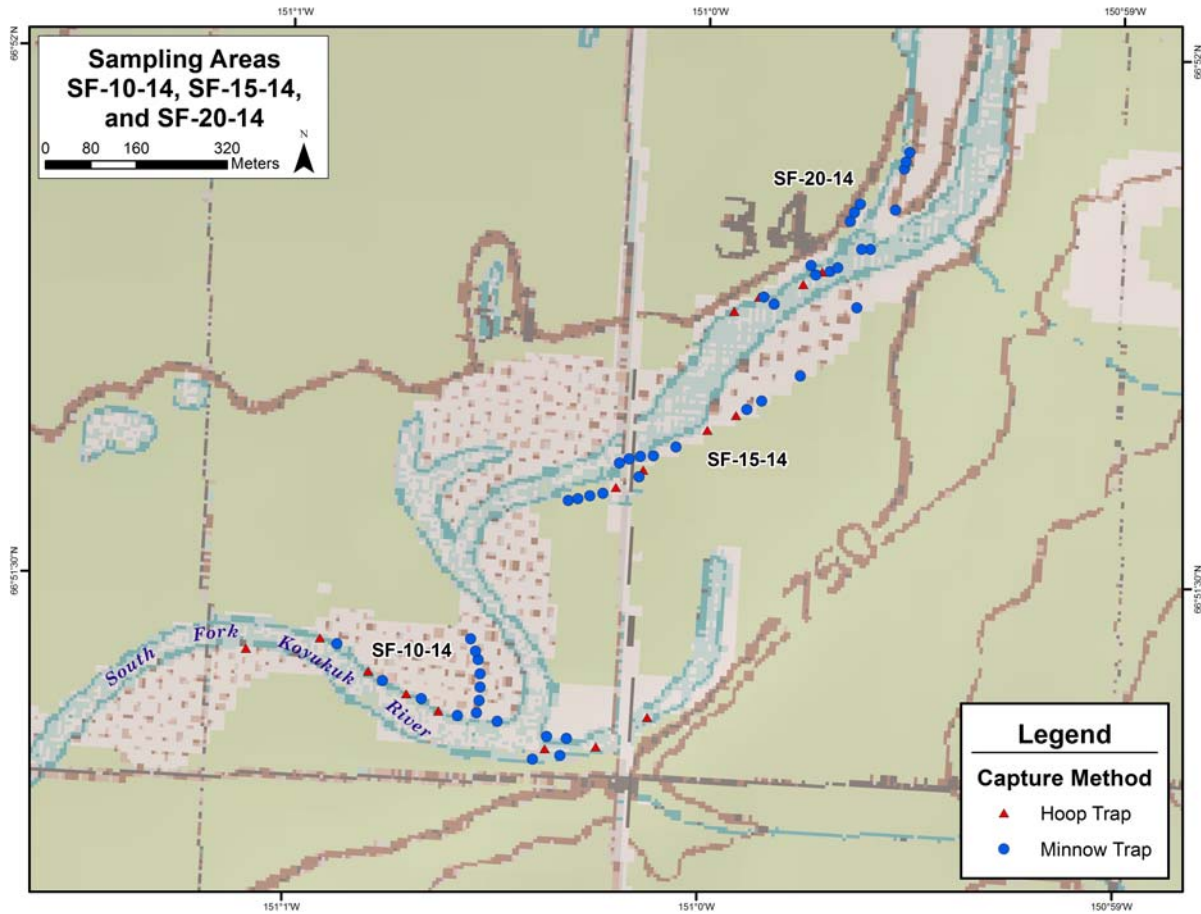


Figure 3. Location of fishing effort at sites SF-10-14, SF-15-14, and SF-20-14 on the South Fork Koyukuk River near Bettles, Alaska, September 2014.

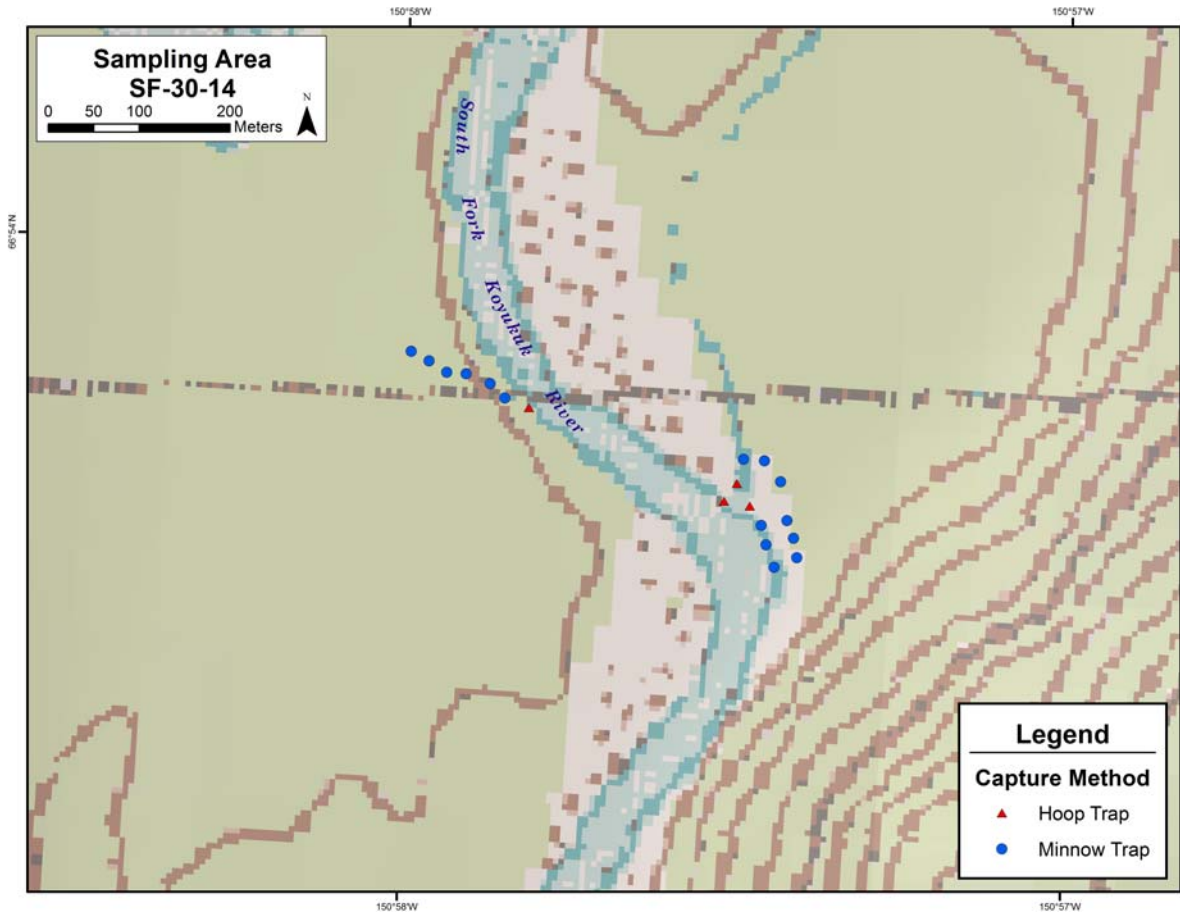


Figure 4. Location of fishing effort at site SF-30-14 on the South Fork Koyukuk River near Bettles, Alaska, September 2014.

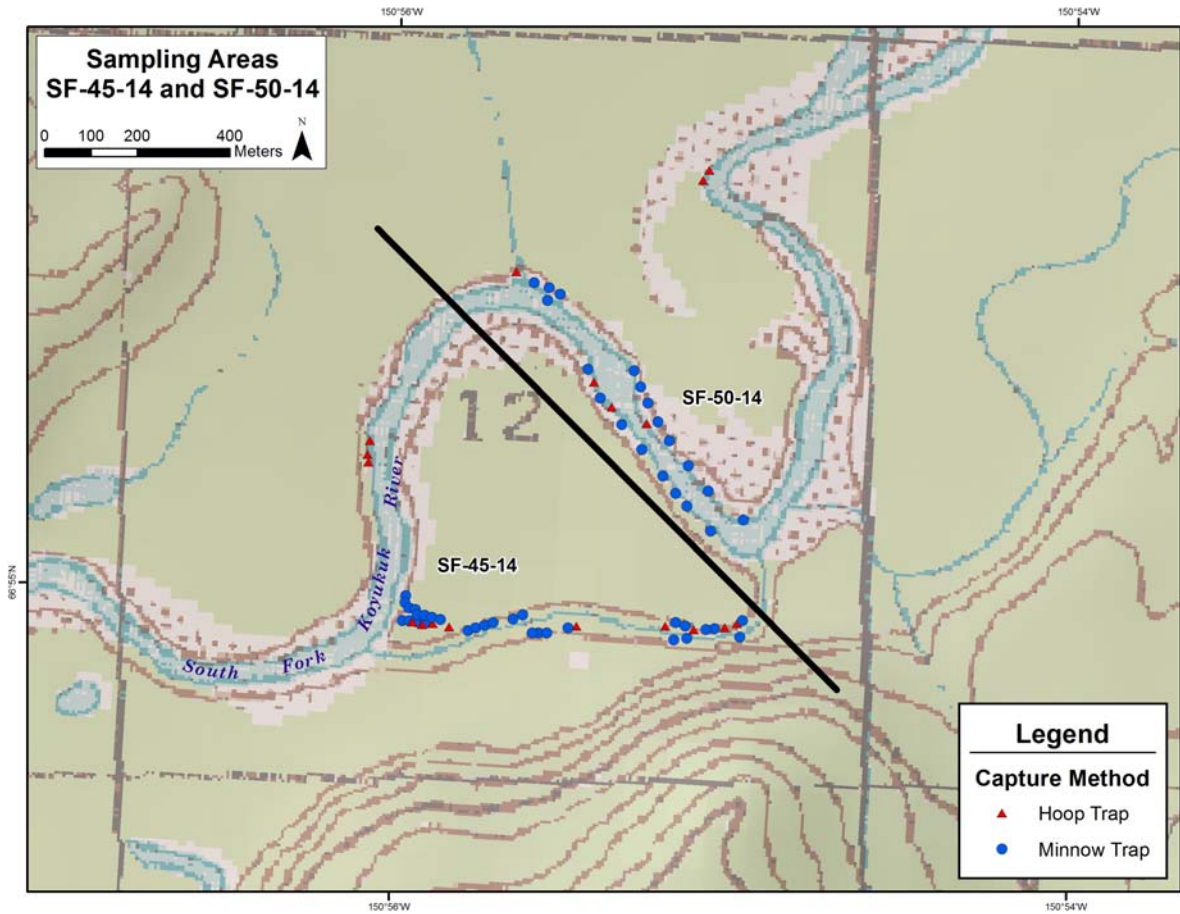


Figure 5. Location of fishing effort at sites SF-45-14 and SF-50-14 on the South Fork Koyukuk River near Bettles, Alaska, September 2014.

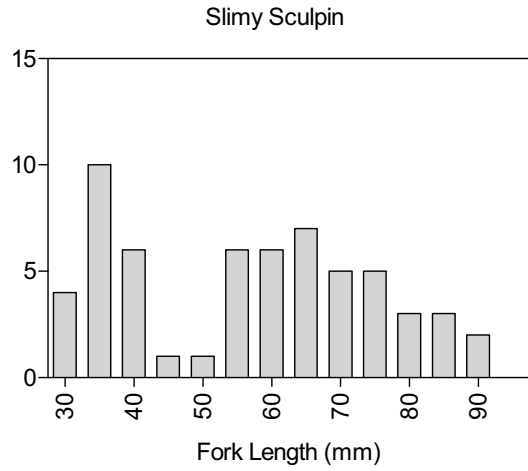
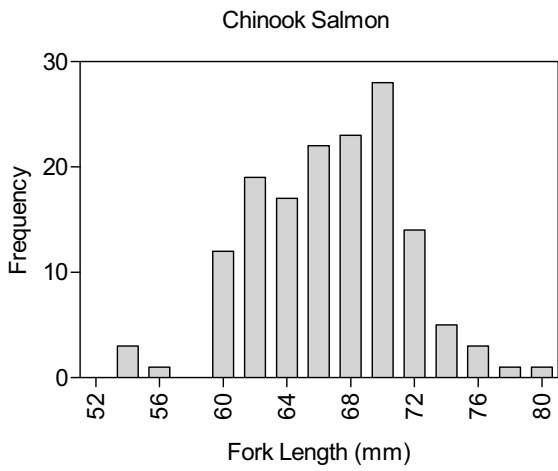
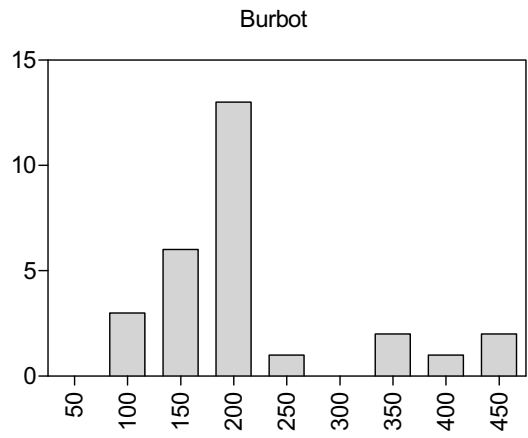
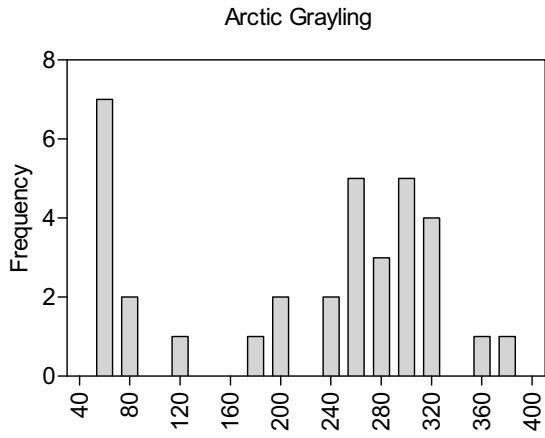


Figure 6. Fork length frequency distribution for Arctic Grayling, Burbot, Chinook Salmon, and Slimy Sculpin caught in the South Fork Koyukuk River, near Bettles, Alaska, July and September 2014.

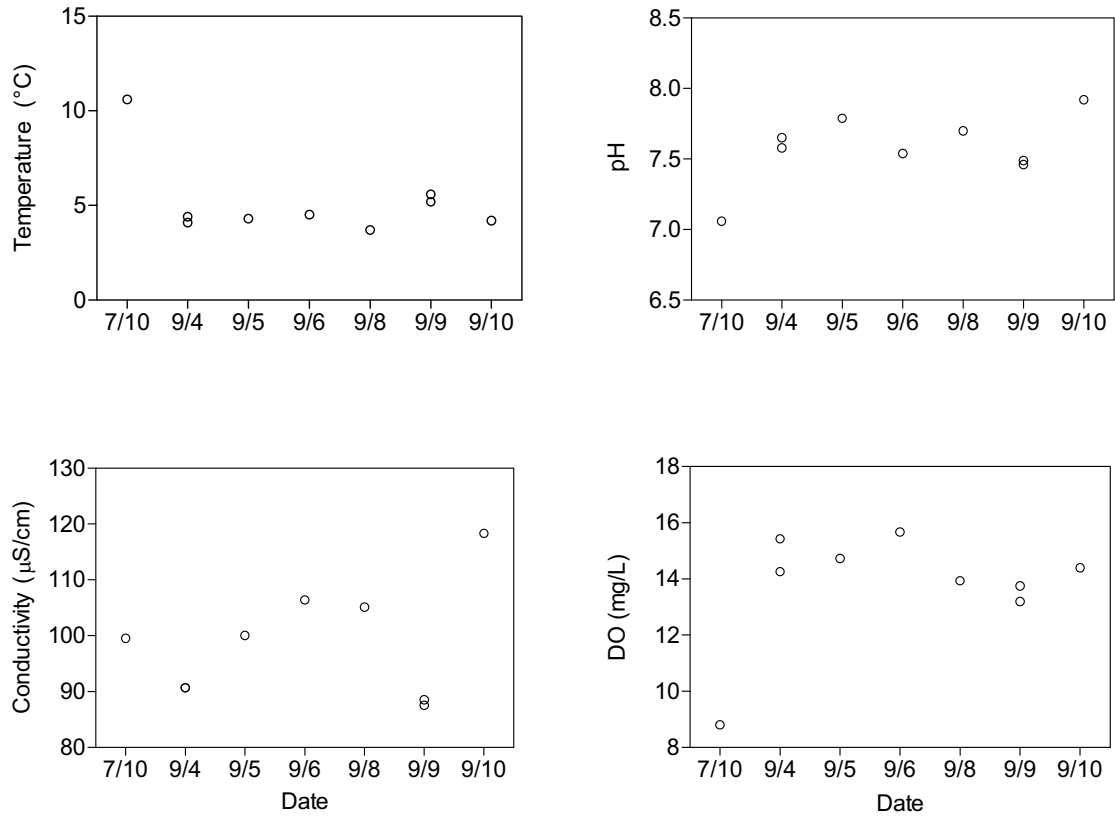


Figure 7. Stream temperature (°C), pH, conductivity (μS/cm), and dissolved oxygen (DO [mg/L]) measured on the South Fork Koyukuk River near Bettles, Alaska, July and September 2014.

Appendix A. Summary report of fish collection activity by site on the South Fork Koyukuk River near Bettles, Alaska, July and September 2014. This summary was submitted to the Alaska Department of Fish and Game Fish (ADFG) on 30 January 2015 as required to fulfill stipulations of the ADFG Fish Resource Permit (FRP) (SF2014-218).

Date	Site Name	Latitude	Longitude	Fishing method	Species	Life stage	Fork length (mm) ^a	Weight (g)	Sex	Disposition
07/11/14	SF-01-14	66.935011	-150.889066	minnow trap	Slimy Sculpin	juvenile/adult	60	not recorded	unknown	measured and released
07/11/14	SF-01-14	66.935011	-150.889066	minnow trap	Slimy Sculpin	juvenile/adult	67	not recorded	unknown	measured and released
07/11/14	SF-01-14	66.935011	-150.889066	minnow trap	Slimy Sculpin	juvenile/adult	61	not recorded	unknown	measured and released
07/11/14	SF-01-14	66.935011	-150.889066	gill net	Arctic Grayling	juvenile/adult	273	196	female	voucher specimen
07/11/14	SF-01-14	66.935011	-150.889066	gill net	Arctic Grayling	adult	385	549	female	voucher specimen
07/11/14	SF-01-14	66.935011	-150.889066	gill net	Longnose Sucker	adult	410	749	female	unintended mortality
07/12/14	SF-02-14	66.940545	-150.884863	hoop net	Chinook Salmon	juvenile	53	not recorded	unknown	measured and released
07/12/14	SF-02-14	66.940545	-150.884863	hoop net	Chinook Salmon	juvenile	63	not recorded	unknown	measured and released
07/12/14	SF-02-14	66.940545	-150.884863	hoop net	Chinook Salmon	juvenile	55	not recorded	unknown	measured and released
07/12/14	SF-02-14	66.940545	-150.884863	hoop net	Chinook Salmon	juvenile	53	not recorded	unknown	measured and released
07/12/14	SF-02-14	66.940545	-150.884863	hoop net	Chinook Salmon	juvenile	60	not recorded	unknown	measured and released
07/12/14	SF-02-14	66.940545	-150.884863	hoop net	Chinook Salmon	juvenile	54	not recorded	unknown	measured and released
07/12/14	SF-02-14	66.940545	-150.884863	minnow trap	Slimy Sculpin	juvenile/adult	68	not recorded	unknown	measured and released
07/12/14	SF-02-14	66.940545	-150.884863	hoop net	Slimy Sculpin	adult	81	not recorded	unknown	measured and released
07/12/14	SF-02-14	66.940545	-150.884863	hoop net	Burbot	juvenile/adult	362	193	female	voucher specimen
07/12/14	SF-02-14	66.940545	-150.884863	hoop net	Arctic Grayling	juvenile/adult	253	166	female	voucher specimen
07/12/14	SF-02-14	66.940545	-150.884863	hoop net	Arctic Grayling	juvenile/adult	304	266	male	voucher specimen
07/13/14	SF-03-14	66.911320	-150.954836	minnow trap	Slimy Sculpin	juvenile/adult	61	not recorded	unknown	measured and released
07/13/14	SF-03-14	66.911320	-150.954836	hoop net	Slimy Sculpin	juvenile/adult	62	not recorded	unknown	measured and released
07/13/14	SF-03-14	66.911320	-150.954836	gill net	Longnose Sucker	adult	444	840	female	unintended mortality
07/13/14	SF-04-14G	66.919165	-150.933724	gill net	Longnose Sucker	adult	373	452	female	voucher specimen
07/13/14	SF-04-14G	66.919165	-150.933724	gill net	Arctic Grayling	juvenile/adult	294	285	female	voucher specimen
07/13/14	SF-04-14G	66.919165	-150.933724	gill net	Arctic Grayling	juvenile/adult	292	243	female	voucher specimen
07/13/14	SF-04-14G	66.919165	-150.933724	hoop net	Arctic Grayling	juvenile/adult	282	214	male	voucher specimen
09/04/14	SF-10-14	66.857166	-151.018209	hoop net	Arctic Grayling	juvenile/adult	237	not recorded	female	voucher specimen

Appendix A. Continued.

Date	Site Name	Latitude	Longitude	Fishing method	Species	Life stage	Fork length (mm) ^a	Weight (g)	Sex	Disposition
09/04/14	SF-10-14	66.857166	-151.018209	hoop net	Arctic Grayling	juvenile/adult	299	not recorded	male	voucher specimen
09/04/14	SF-10-14	66.855698	-151.004093	hoop net	Arctic Grayling	juvenile/adult	260	not recorded	male	voucher specimen
09/04/14	SF-10-14	66.855698	-151.004093	hoop net	Arctic Grayling	juvenile/adult	324	not recorded	female	voucher specimen
09/04/14	SF-10-14	66.856488	-151.011744	minnow trap	Burbot	juvenile	205	not recorded	unknown	voucher specimen
09/04/14	SF-10-14	66.856488	-151.011744	minnow trap	Slimy Sculpin	adult	69	not recorded	unknown	measured and released
09/04/14	SF-10-14	66.857350	-151.015246	hoop net	Arctic Grayling	juvenile/adult	282	not recorded	female	voucher specimen
09/04/14	SF-10-14	66.856838	-151.013282	hoop net	Burbot	juvenile/adult	380	not recorded	male	voucher specimen
09/04/14	SF-10-14	66.857180	-151.008992	minnow trap	Burbot	juvenile	217	not recorded	unknown	voucher specimen
09/04/14	SF-10-14	66.857180	-151.008992	minnow trap	Chinook Salmon	juvenile	59	not recorded	unknown	measured and released
09/04/14	SF-10-14	66.857180	-151.008992	minnow trap	Chinook Salmon	juvenile	64	not recorded	unknown	measured and released
09/04/14	SF-10-14	66.857180	-151.008992	minnow trap	Chinook Salmon	juvenile	78	not recorded	unknown	measured and released
09/05/14	SF-20-14	66.863257	-150.995304	hoop net	Burbot	juvenile/adult	441	not recorded	male	voucher specimen
09/05/14	SF-20-14	66.863257	-150.995304	minnow trap	Burbot	juvenile	205	45	female	voucher specimen
09/05/14	SF-20-14	66.863257	-150.995304	minnow trap	Burbot	juvenile	145	14	unknown	voucher specimen
09/05/14	SF-20-14	66.863257	-150.995304	minnow trap	Burbot	juvenile	223	54	male	voucher specimen
09/05/14	SF-20-14	66.863257	-150.995304	minnow trap	Burbot	juvenile	218	48	female	voucher specimen
09/05/14	SF-20-14	66.863257	-150.995304	hoop net	Burbot	juvenile	176	30	female	voucher specimen
09/05/14	SF-20-14	66.863257	-150.995304	hoop net	Burbot	juvenile	142	12	unknown	voucher specimen
09/05/14	SF-20-14	66.863257	-150.995304	hoop net	Burbot	juvenile	118	8	female	voucher specimen
09/05/14	SF-20-14	66.863257	-150.995304	hoop net	Burbot	juvenile	195	37	male	voucher specimen
09/05/14	SF-20-14	66.863257	-150.995304	hoop net	Slimy Sculpin	juvenile/adult	67	not recorded	unknown	measured and released
09/05/14	SF-20-14	66.863257	-150.995304	minnow trap	Slimy Sculpin	adult	73	not recorded	unknown	measured and released
09/05/14	SF-20-14	66.863257	-150.995304	minnow trap	Slimy Sculpin	juvenile/adult	67	not recorded	unknown	measured and released
09/05/14	SF-20-14	66.863257	-150.995304	minnow trap	Slimy Sculpin	adult	79	not recorded	unknown	measured and released
09/05/14	SF-20-14	66.863257	-150.995304	minnow trap	Chinook Salmon	juvenile	70	4	unknown	measured and released
09/05/14	SF-20-14	66.863257	-150.995304	minnow trap	Chinook Salmon	juvenile	71	4	unknown	measured and released

Appendix A. Continued.

Date	Site Name	Latitude	Longitude	Fishing method	Species	Life stage	Fork length (mm) ^a	Weight (g)	Sex	Disposition
09/05/14	SF-20-14	66.863257	-150.995304	minnow trap	Chinook Salmon	juvenile	68	3	unknown	measured and released
09/05/14	SF-20-14	66.863257	-150.995304	minnow trap	Chinook Salmon	juvenile	69	4	unknown	measured and released
09/05/14	SF-15-14	66.859584	-151.005358	minnow trap	Burbot	juvenile	162	17	male	voucher specimen
09/05/14	SF-15-14	66.859584	-151.005358	minnow trap	Chinook Salmon	juvenile	70	3	unknown	measured and released
09/05/14	SF-15-14	66.859584	-151.005358	minnow trap	Chinook Salmon	juvenile	72	4	unknown	measured and released
09/05/14	SF-15-14	66.859584	-151.005358	minnow trap	Slimy Sculpin	adult	83	6	unknown	measured and released
09/05/14	SF-15-14	66.859584	-151.005358	minnow trap	Chinook Salmon	juvenile	65	3	unknown	measured and released
09/05/14	SF-15-14	66.859584	-151.005358	minnow trap	Slimy Sculpin	juvenile/adult	67	1	unknown	measured and released
09/05/14	SF-15-14	66.859584	-151.005358	minnow trap	Arctic Grayling	juvenile	71	>1	unknown	voucher specimen
09/05/14	SF-15-14	66.859584	-151.005358	minnow trap	Burbot	juvenile	99	4	unknown	voucher specimen
09/05/14	SF-15-14	66.860970	-150.998676	hoop net	Arctic Grayling	juvenile/adult	208	80	male	voucher specimen
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Burbot	juvenile	191	30	male	voucher specimen
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	72	4	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	72	4	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	66	3	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	68	3	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	65	3	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Slimy Sculpin	adult	79	5	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	64	3	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	68	4	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	68	3	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	62	3	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	66	3	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	65	3	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	66	4	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	64	3	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Slimy Sculpin	adult	73	4	unknown	measured and released

Appendix A. Continued.

Date	Site Name	Latitude	Longitude	Fishing method	Species	Life stage	Fork length (mm) ^a	Weight (g)	Sex	Disposition
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Slimy Sculpin	adult	75	4	unknown	measured and released
09/06/14	SF-30-14	66.898434	-150.964113	minnow trap	Chinook Salmon	juvenile	66	4	unknown	measured and released
09/06/14	SF-30-14	66.898342	-150.963501	hoop net	Chinook Salmon	juvenile	69	4	unknown	measured and released
09/06/14	SF-30-14	66.898342	-150.963501	hoop net	Chinook Salmon	juvenile	80	6	unknown	measured and released
09/06/14	SF-30-14	66.898342	-150.963501	hoop net	Chinook Salmon	juvenile	70	4	unknown	measured and released
09/06/14	SF-30-14	66.898342	-150.963501	hoop net	Chinook Salmon	juvenile	72	4	unknown	measured and released
09/06/14	SF-30-14	66.898342	-150.963501	hoop net	Chinook Salmon	juvenile	73	4	unknown	measured and released
09/06/14	SF-30-14	66.898342	-150.963501	hoop net	Burbot	juvenile/adult	450	not recorded	male	voucher specimen
09/06/14	SF-30-14	66.898342	-150.963501	hoop net	Burbot	juvenile	207	not recorded	female	voucher specimen
09/06/14	SF-30-14	66.898342	-150.963501	hoop net	Arctic Grayling	juvenile	171	not recorded	female	voucher specimen
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Burbot	juvenile	223	53	female	voucher specimen
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Burbot	juvenile	192	35	male	voucher specimen
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	66	4	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	69	4	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	64	3	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	76	4	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	65	3	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	67	4	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	72	5	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	69	4	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	59	3	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	68	4	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Slimy Sculpin	juvenile/adult	56	2	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	67	3	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	67	3	unknown	measured and released
09/06/14	SF-30-14	66.897266	-150.956969	minnow trap	Chinook Salmon	juvenile	68	4	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	69	4	unknown	measured and released

Appendix A. Continued.

Date	Site Name	Latitude	Longitude	Fishing method	Species	Life stage	Fork length (mm) ^a	Weight (g)	Sex	Disposition
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	70	4	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	61	4	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	71	4	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	70	4	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	64	3	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	69	3	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	72	4	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	67	3	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	62	3	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	64	3	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	60	3	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	67	3	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	72	4	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	62	2	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	69	4	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	67	3	unknown	measured and released
09/06/14	SF-30-14	66.897625	-150.958241	hoop net	Chinook Salmon	juvenile	73	4	unknown	measured and released
09/07/14	SF-50-14	66.922386	-150.925300	minnow trap	Chinook Salmon	juvenile	63	2	unknown	measured and released
09/07/14	SF-50-14	66.922386	-150.925300	minnow trap	Chinook Salmon	juvenile	64	3	unknown	measured and released
09/07/14	SF-50-14	66.922386	-150.925300	minnow trap	Chinook Salmon	juvenile	69	4	unknown	measured and released
09/07/14	SF-50-14	66.922386	-150.925300	minnow trap	Chinook Salmon	juvenile	66	3	unknown	measured and released
09/07/14	SF-50-14	66.922386	-150.925300	minnow trap	Chinook Salmon	juvenile	66	4	unknown	measured and released
09/07/14	SF-50-14	66.922386	-150.925300	minnow trap	Chinook Salmon	juvenile	71	4	unknown	measured and released
09/07/14	SF-50-14	66.922386	-150.925300	minnow trap	Chinook Salmon	juvenile	66	4	unknown	measured and released
09/07/14	SF-50-14	66.922386	-150.925300	minnow trap	Chinook Salmon	juvenile	65	4	unknown	measured and released
09/07/14	SF-50-14	66.922386	-150.925300	minnow trap	Chinook Salmon	juvenile	61	3	unknown	measured and released
09/07/14	SF-50-14	66.924827	-150.918042	hoop net	Arctic Grayling	juvenile/adult	320	not recorded	female	voucher specimen

Appendix A. Continued.

Date	Site Name	Latitude	Longitude	Fishing method	Species	Life stage	Fork length (mm) ^a	Weight (g)	Sex	Disposition
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	68	3	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	64	3	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	59	3	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	61	3	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	74	5	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	69	4	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	66	4	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	60	4	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	59	2	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	61	2	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	68	4	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	63	2	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	59	2	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	62	3	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Slimy Sculpin	adult	73	6	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	64	3	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	61	3	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	63	2	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	66	4	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	59	2	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Arctic Grayling	juvenile	112	14	unknown	voucher specimen
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	61	3	unknown	measured and released
09/07/14	SF-50-14	66.920929	-150.921601	minnow trap	Chinook Salmon	juvenile	68	4	unknown	measured and released
09/07/14	SF-50-14	66.920220	-150.922686	hoop net	Burbot	juvenile	245	72	male	voucher specimen
09/07/14	SF-50-14	66.920940	-150.923887	minnow trap	Burbot	juvenile	197	36	male	voucher specimen
09/07/14	SF-50-14	66.920940	-150.923887	minnow trap	Burbot	juvenile	165	20	female	voucher specimen
09/07/14	SF-50-14	66.920940	-150.923887	minnow trap	Chinook Salmon	juvenile	62	3	unknown	measured and released

Appendix A. Continued.

Date	Site Name	Latitude	Longitude	Fishing method	Species	Life stage	Fork length (mm) ^a	Weight (g)	Sex	Disposition
09/07/14	SF-50-14	66.920940	-150.923887	minnow trap	Chinook Salmon	juvenile	61	3	unknown	measured and released
09/07/14	SF-50-14	66.920940	-150.923887	minnow trap	Chinook Salmon	juvenile	61	2	unknown	measured and released
09/07/14	SF-50-14	66.920940	-150.923887	minnow trap	Chinook Salmon	juvenile	66	3	unknown	measured and released
09/07/14	SF-50-14	66.920940	-150.923887	minnow trap	Chinook Salmon	juvenile	69	3	unknown	measured and released
09/07/14	SF-50-14	66.920940	-150.923887	minnow trap	Chinook Salmon	juvenile	63	3	unknown	measured and released
09/07/14	SF-50-14	66.920940	-150.923887	minnow trap	Chinook Salmon	juvenile	62	3	unknown	measured and released
09/07/14	SF-50-14	66.920940	-150.923887	minnow trap	Chinook Salmon	juvenile	65	3	unknown	measured and released
09/07/14	SF-50-14	66.920940	-150.923887	minnow trap	Chinook Salmon	juvenile	66	3	unknown	measured and released
09/08/14	SF-45-14	66.915966	-150.917459	minnow trap	Chinook Salmon	juvenile	67	4	unknown	measured and released
09/08/14	SF-45-14	66.915966	-150.917459	minnow trap	Chinook Salmon	juvenile	68	4	unknown	measured and released
09/08/14	SF-45-14	66.916073	-150.916352	hoop net	Chinook Salmon	juvenile	64	4	unknown	measured and released
09/08/14	SF-45-14	66.916073	-150.916352	hoop net	Chinook Salmon	juvenile	68	4	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Burbot	juvenile	156	27	male	voucher specimen
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Chinook Salmon	juvenile	64	3	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Chinook Salmon	juvenile	68	4	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Chinook Salmon	juvenile	71	3	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Chinook Salmon	juvenile	68	4	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Chinook Salmon	juvenile	70	4	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Chinook Salmon	juvenile	60	3	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Chinook Salmon	juvenile	71	5	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Slimy Sculpin	adult	72	3	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Slimy Sculpin	juvenile/adult	59	2	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Chinook Salmon	juvenile	69	3	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Slimy Sculpin	adult	74	4	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Slimy Sculpin	juvenile/adult	66	3	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Slimy Sculpin	adult	92	9	unknown	measured and released
09/08/14	SF-45-14	66.915859	-150.929599	minnow trap	Slimy Sculpin	adult	70	3	unknown	measured and released

Appendix A. Continued.

Date	Site Name	Latitude	Longitude	Fishing method	Species	Life stage	Fork length (mm) ^a	Weight (g)	Sex	Disposition
09/08/14	SF-45-14	66.915974	-150.924257	hoop net	Chinook Salmon	juvenile	74	4	unknown	measured and released
09/08/14	SF-45-14	66.915938	-150.924684	minnow trap	Burbot	juvenile	159	18	female	voucher specimen
09/08/14	SF-45-14	66.916514	-150.932690	minnow trap	Burbot	juvenile	123	8	male	voucher specimen
09/08/14	SF-45-14	66.919505	-150.934556	hoop net	Burbot	juvenile	202	34	male	voucher specimen
09/08/14	SF-45-14	66.915938	-150.924684	minnow trap	Chinook Salmon	juvenile	62	3	unknown	measured and released
09/08/14	SF-45-14	66.915938	-150.924684	minnow trap	Chinook Salmon	juvenile	64	4	unknown	measured and released
09/08/14	SF-45-14	66.915938	-150.924684	minnow trap	Chinook Salmon	juvenile	62	3	unknown	measured and released
09/08/14	SF-45-14	66.915938	-150.924684	minnow trap	Chinook Salmon	juvenile	65	4	unknown	measured and released
09/08/14	SF-45-14	66.915938	-150.924684	minnow trap	Chinook Salmon	juvenile	69	4	unknown	measured and released
09/08/14	SF-45-14	66.915938	-150.924684	minnow trap	Chinook Salmon	juvenile	68	4	unknown	measured and released
09/08/14	SF-45-14	66.915938	-150.924684	minnow trap	Chinook Salmon	juvenile	68	5	unknown	measured and released
09/08/14	SF-45-14	66.915938	-150.924684	minnow trap	Chinook Salmon	juvenile	62	3	unknown	measured and released
09/08/14	SF-45-14	66.915938	-150.924684	minnow trap	Chinook Salmon	juvenile	62	2	unknown	measured and released
09/08/14	SF-45-14	66.915938	-150.924684	minnow trap	Chinook Salmon	juvenile	67	3	unknown	measured and released
09/09/14	SF-00-14	66.761487	-151.332949	hoop net	Chinook Salmon	juvenile	70	5	unknown	measured and released
09/09/14	SF-00-14	66.761487	-151.332949	hoop net	Chinook Salmon	juvenile	69	3	unknown	measured and released
09/09/14	SF-00-14	66.761487	-151.332949	hoop net	Chinook Salmon	juvenile	69	4	unknown	measured and released
09/09/14	SF-00-14	66.763159	-151.333087	minnow trap	Chinook Salmon	juvenile	69	3	unknown	measured and released
09/09/14	SF-00-14	66.763159	-151.333087	minnow trap	Chinook Salmon	juvenile	60	3	unknown	measured and released
09/09/14	SF-00-14	66.763159	-151.333087	minnow trap	Chinook Salmon	juvenile	69	4	unknown	measured and released
09/09/14	SF-00-14	66.763159	-151.333087	minnow trap	Chinook Salmon	juvenile	66	4	unknown	measured and released
09/09/14	SF-00-14	66.763159	-151.333087	minnow trap	Chinook Salmon	juvenile	61	2	unknown	measured and released
09/09/14	SF-00-14	66.763159	-151.333087	minnow trap	Chinook Salmon	juvenile	71	4	unknown	measured and released
09/09/14	SF-00-14	66.763159	-151.333087	minnow trap	Chinook Salmon	juvenile	71	4	unknown	measured and released
09/09/14	SF-00-14	66.763159	-151.333087	minnow trap	Chinook Salmon	juvenile	74	5	unknown	measured and released
09/09/14	SF-00-14	66.763159	-151.333087	minnow trap	Chinook Salmon	juvenile	66	3	unknown	measured and released
09/09/14	SF-00-14	66.763159	-151.333087	minnow trap	Chinook Salmon	juvenile	70	5	unknown	measured and released

Appendix A. Continued.

Date	Site Name	Latitude	Longitude	Fishing method	Species	Life stage	Fork length (mm) ^a	Weight (g)	Sex	Disposition
09/09/14	SF-00-14	66.763159	-151.333087	minnow trap	Chinook Salmon	juvenile	70	5	unknown	measured and released
09/09/14	SF-00-14	66.763159	-151.333087	minnow trap	Chinook Salmon	juvenile	69	4	unknown	measured and released
09/09/14	SF-00-14	66.764174	-151.333047	minnow trap	Chinook Salmon	juvenile	69	3	unknown	measured and released
09/09/14	SF-00-14	66.764174	-151.333047	minnow trap	Chinook Salmon	juvenile	69	4	unknown	measured and released
09/09/14	SF-00-14	66.764174	-151.333047	minnow trap	Chinook Salmon	juvenile	76	5	unknown	measured and released
09/09/14	SF-00-14	66.764174	-151.333047	minnow trap	Chinook Salmon	juvenile	75	5	unknown	measured and released
09/09/14	SF-00-14	66.764174	-151.333047	minnow trap	Chinook Salmon	juvenile	66	3	unknown	measured and released
09/09/14	SF-00-14	66.764174	-151.333047	visual	Chum Salmon	carcass	not recorded	not recorded	unknown	identified and released
09/09/14	SF-00-14	66.764375	-151.333629	hoop net	Burbot	juvenile/adult	360	240	male	voucher specimen
09/09/14	SF-00-14	66.764375	-151.333629	angling	Arctic Grayling	juvenile/adult	294	not recorded	male	voucher specimen
09/09/14	SF-00-14	66.764375	-151.333629	angling	Arctic Grayling	juvenile/adult	312	not recorded	female	voucher specimen
09/09/14	SF-00-14	66.764375	-151.333629	angling	Arctic Grayling	juvenile/adult	261	not recorded	female	voucher specimen
09/09/14	SF-00-14	66.764375	-151.333629	angling	Arctic Grayling	juvenile/adult	322	not recorded	male	voucher specimen
09/09/14	SF-00-14	66.764375	-151.333629	angling	Arctic Grayling	juvenile/adult	255	not recorded	male	voucher specimen
09/09/14	SF-00-14	66.764375	-151.333629	angling	Arctic Grayling	adult	357	not recorded	male	voucher specimen
09/09/14	SF-00-14	66.764375	-151.333629	angling	Arctic Grayling	juvenile/adult	255	not recorded	male	voucher specimen
09/09/14	SF-00-14	66.764375	-151.333629	angling	Arctic Grayling	juvenile/adult	199	not recorded	unknown	voucher specimen
09/09/14	SF-00-14	66.764375	-151.333629	angling	Arctic Grayling	juvenile/adult	230	not recorded	male	voucher specimen
09/09/14	Seine1	66.759908	-151.333054	seine	Arctic Grayling	juvenile	66	2	unknown	measured and released
09/09/14	Seine1	66.759908	-151.333054	seine	Arctic Grayling	juvenile	52	<1	unknown	measured and released
09/09/14	Seine1	66.759908	-151.333054	seine	Arctic Grayling	juvenile	65	2	unknown	measured and released
09/09/14	Seine1	66.759908	-151.333054	seine	Arctic Grayling	juvenile	67	2	unknown	measured and released
09/09/14	Seine1	66.759908	-151.333054	seine	Chinook Salmon	juvenile	60	3	unknown	measured and released
09/09/14	Seine1	66.759908	-151.333054	seine	Slimy Sculpin	juvenile/adult	65	3	unknown	measured and released
09/09/14	Seine1	66.759908	-151.333054	seine	Slimy Sculpin	juvenile	45	1	unknown	measured and released
09/09/14	Seine1	66.759908	-151.333054	seine	Slimy Sculpin	juvenile	34	<1	unknown	measured and released

Appendix A. Continued.

Date	Site Name	Latitude	Longitude	Fishing method	Species	Life stage	Fork length (mm) ^a	Weight (g)	Sex	Disposition
09/09/14	Seine1	66.759908	-151.333054	seine	Slimy Sculpin	juvenile/adult	56	2	unknown	measured and released
09/09/14	Seine1	66.759908	-151.333054	seine	Slimy Sculpin	juvenile	33	<1	unknown	measured and released
09/09/14	Seine1	66.759908	-151.333054	seine	Slimy Sculpin	juvenile/adult	53	2	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Arctic Grayling	juvenile	75	4	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Arctic Grayling	juvenile	64	2	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	adult	88	8	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile	35	1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	adult	84	4	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile/adult	59	3	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile/adult	57	2	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile	36	1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile	39	1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile/adult	52	1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Arctic Grayling	juvenile	66	3	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile	40	<1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile	39	<1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile	31	<1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile/adult	65	3	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile	34	<1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Arctic Grayling	juvenile	66	2	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile	37	<1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile/adult	56	1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile	32	<1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile	32	<1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile	40	<1	unknown	measured and released
09/09/14	Seine2	66.766570	-151.322993	seine	Slimy Sculpin	juvenile	31	<1	unknown	measured and released
09/10/14	Seine3	66.882173	-150.975136	seine	Slimy Sculpin	juvenile	36	1	unknown	measured and released

Appendix A. Continued.

Date	Site Name	Latitude	Longitude	Fishing method	Species	Life stage	Fork length (mm) ^a	Weight (g)	Sex	Disposition
09/10/14	Seine3	66.882173	-150.975136	seine	Slimy Sculpin	juvenile	35	<1	unknown	measured and released
09/10/14	Seine3	66.882173	-150.975136	seine	Slimy Sculpin	juvenile	39	<1	unknown	measured and released
09/10/14	Seine3	66.882173	-150.975136	seine	Slimy Sculpin	juvenile/adult	56	2	unknown	measured and released
09/10/14	Seine3	66.882173	-150.975136	seine	Slimy Sculpin	juvenile	36	<1	unknown	measured and released
09/10/14	Seine3	66.882173	-150.975136	seine	Slimy Sculpin	juvenile	35	<1	unknown	measured and released
09/10/14	Seine3	66.882173	-150.975136	seine	Slimy Sculpin	adult	70	3	unknown	measured and released
09/10/14	Seine3	66.882173	-150.975136	seine	Slimy Sculpin	adult	84	6	unknown	measured and released
09/10/14	Seine3	66.882173	-150.975136	seine	Slimy Sculpin	juvenile	39	<1	unknown	measured and released

^aTotal length is reported for Slimy Sculpin and Burbot.

Appendix B. Ambient water chemistry (Temperature [°C], dissolved oxygen [DO% and DO mg/L], conductivity [$\mu\text{S}/\text{cm}$ and mS/cm], and pH at sample sites on the South Fork Koyukuk River, near Bettles, Alaska, July and September 2014.

Date	Site Name	Latitude	Longitude	Temperature (°C)	DO (%)	DO (mg/L)	Conductivity ($\mu\text{S}/\text{cm}$)	Specific conductivity (mS/cm)	pH
7/10/2014	SF-01-14	66.935011	-150.889066	10.6	80.6	8.80	99.5	0.138	7.06
7/11/2014	SF-02-14	66.940545	-150.884863	—	—	—	—	—	—
7/12/2014	SF-03-14	66.911320	-150.954836	—	—	—	—	—	—
7/12/2014	SF-04-14	66.919165	-150.933724	—	—	—	—	—	—
9/3/2014	SF-10-14	66.857166	-151.018209	—	—	—	—	—	—
9/4/2014	SF-20-14	66.863257	-150.995304	4.1	119.0	15.43	90.7	0.151	7.58
9/4/2014	SF-15-14	66.859584	-151.005358	4.4	109.4	14.26	90.7	0.150	7.65
9/5/2014	SF-30-14	66.898434	-150.964113	4.3	115.1	14.73	100.0	0.165	7.79
9/6/2014	SF-50-14	66.922386	-150.925300	4.5	122.0	15.67	106.4	0.175	7.54
9/8/2014	SF-45-14	66.915966	-150.917459	3.7	105.7	13.94	105.1	0.177	7.70
9/9/2014	SF-00-14	66.761487	-151.332949	5.2	108.5	13.75	87.5	0.138	7.49
9/9/2014	Seine 1	66.759908	-151.333054	—	—	—	—	—	—
9/9/2014	Seine 2	66.766570	-151.322993	5.6	105.9	13.20	88.5	0.140	7.46
9/10/2014	Seine 3	66.882173	-150.975136	4.2	111.1	14.40	118.3	0.196	7.92