Technical Report No. 24-01

Ambler Road Corridor Fish Investigations in Upper Kobuk and Koyukuk River Tributaries, 2023

by

Chad E. Bear and Todd F. Nichols

May 2024

Alaska Department of Fish and Game **Habitat Section**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Habitat Section, as well as the Divisions of Sport Fish, and Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, Technical Reports and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

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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AMBLER ROAD CORRIDOR FISH INVESTIGATIONS IN UPPER KOBUK AND KOYUKUK RIVER TRIBUTARIES, 2023

By

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May 2024

Cover: Ambler River, upriver of road terminus at Mile 211, August 2023. Photograph by Chad Bear.

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This document should be cited as:

Bear, C. E., and F. T. Nichols. 2024. Ambler Road Corridor Fish Investigations in Upper Kobuk and Koyukuk River Tributaries, 2023. Alaska Department of Fish and Game, Technical Report No. 24-01, Fairbanks, Alaska.

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Acknowledgements

The authors would like to thank the Alaska Industrial Development and Export Authority (AIDEA) for providing logistical support and accommodations necessary for the successful investigations of the remote Kobuk and Koyukuk River tributaries along the southern foothills of the Brooks Range. Alaska Department of Fish and Game (ADF&G) Habitat Section staff Chad Bear, Todd "Nik" Nichols and Lauren Yancy performed field work. Lauren Yancy and Audra Brase (ADF&G Habitat) reviewed and edited this technical report.

Executive Summary

This report summarizes the results of fish presence survey work performed by the Alaska Department of Fish and Game (ADF&G) in 2023 at 215 proposed waterbody crossings within the Ambler Mining District Industrial Access Project (AMDIAP) Route-A corridor. The 2023 field work was a continuation of the 2021 sampling effort along the eastern extent of the proposed road alignment corridor described in Bear (2022) and some of those sites are also referenced in this report. The primary objective of these fish surveys was to document the presence of fish in the water body (river, lake or tributary) at or near each proposed road crossing site. Most effort was directed at crossings where culverts are proposed, rather than the crossings where small and large bridges are proposed. Specific focus was given to small streams where fish presence was unknown. The sampling effort and applied methodology does not conclusively verify the presence of all fish species or absence of any fish species, due to variability in flow rates, temperature, and seasonal fish use.

Fish presence was determined by visual observations, minnow traps, angling, and backpack electrofishing at proposed crossing locations of the Kobuk, Ambler, Shungnak, Kogoluktuk, Mauneluk, Selby, Reed, Koyukuk, Wild, John, and Alatna rivers; Beaver Creek; and numerous third and fourth order tributaries (Figures 1-4). Captured fish were identified, counted, measured, and released. Survey efforts included visual observations of waterbody characteristics upriver and downriver of the proposed road crossing locations for natural barriers to fish passage.

Fish presence was documented at 82 of the 215 sites surveyed in 2023 and 2021 (Bear 2022). Fish assemblages varied depending on stream characteristics, but consisting primarily of anadromous and resident Dolly Varden, Arctic grayling, Alaska blackfish, burbot, and slimy sculpin (Appendix 1). Abundant large beaver dam complexes in these drainages have altered fish distribution on a decades-long timescale changing the extent of fish presence from year to year. The presence of beaver damns blocking fish movement within drainages should not be considered permanent barriers for culvert design.

Introduction

The Ambler Mining District Industrial Access Project Route-A (AMDIAP or Ambler Road) is located along the south side of the Brooks Range in the Koyukuk and Kobuk River drainages. The proposed 211-mile-long road will travel west from the Dalton Highway at Milepost 161, near Coldfoot, and end at the south bank of the Ambler River. The proposed two-lane gravel road crosses primarily State lands (61%), Alaska Native corporation lands (15%), Gates of the Arctic National Park lands (12%) and the Bureau of Land Management (BLM) managed lands (12%). The Department of Natural Resources (DNR) manages all state-owned lands, water, and mineral resources. The Alaska Department of Fish and Game (ADF&G) Habitat Section reviews and authorizes activities proposed in all fish bearing water bodies under Alaska Statute Title 16. These activities may include bridges, culverts, gravel mining, water withdrawals, and/or other road construction related activities.

In 2009 the state of Alaska began studying the feasibility of the Ambler Access Road following the Brooks East Corridor. This Route-A corridor will cross several rivers including the Koyukuk and Alatna rivers on the eastern end near Bettles/Evansville and Kobuk River tributaries on the western end. In 2014 both the ADF&G Habitat and Sport Fish Divisions conducted systematic sampling of fish within the larger waterways of the Koyukuk, John, Alatna and Wild rivers, and various other smaller waterbodies. (Scannell 2015 and Wuttig et al. 2015). In 2012, ABR Inc. conducted research and fish sampling throughout the proposed corridor (Lemke et al. 2013). ADF&G Habitat Section fish inventories in 2021 focused on smaller tributaries of the Koyukuk, Wild, and John Rivers within the first 55 miles of the corridor. These proposed Ambler Road crossing locations were wholly unsampled or undocumented for fish presence but near known fish populations in larger river systems from the past inventory research (Bear 2022).

AIDEA has committed to ensuring fish passage design crossing structures for all anadromous and resident fish rivers and streams in the Ambler Road Final EIS (USDOI BLM 2020). AIDEA assumes that all perennial river and streams provide fish habitat and would therefore require fish passage structures (USDOI BLM 2020). AIDEA also assumes that some well-defined ephemeral streams may provide fish habitat and will maintain connectivity and fish passage at all road crossings (USDOI BLM 2020).

ADF&G requires surveys be conducted at stream crossing where fish data is lacking to inform culvert designs during permitting. AIDEA has committed to proper design and installation of all culverts placed in streams according to US Forestry Service stream simulation design standards (USDA FS 2008) and the Culvert Design Guidelines for Ecological Function (USDOI – FWS 2021). All fish passage culvert designs would additionally comply with the State of Washington Stream Simulations culvert standards (Barnard et al. 2013) to reduce impacts to fish passage from winter icing or blockage by woody debris. Proper design, installation, regular inspections, and

maintenance of crossing structures will reduce impacts to fish passage and the likelihood and severity of potential impacts to aquatic life.

The Alaska Statute Fishway Act (AS 16.05.841) requires authorization from ADF&G Habitat Section for activities within or across a stream (which could include ephemeral streams) used by fish if such an activity may impede the efficient passage of fish, regardless of fish species or land ownership status. ADF&G has committed to surveying undocumented streams and compiling information on fish presence to aid road crossing structure designs and issuing required authorizations for in-water work during road construction and the life of the fish passage structures.

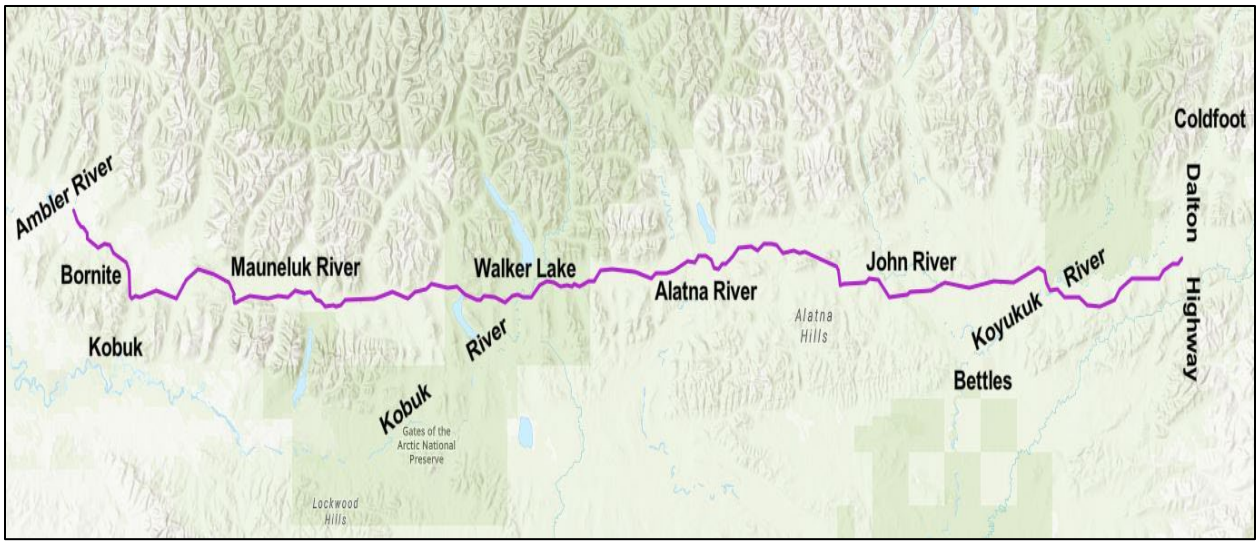

Figure 1. Proposed Ambler Industrial Road corridor alignment from the Dalton Highway (MP 161) to the south bank of the Ambler River.

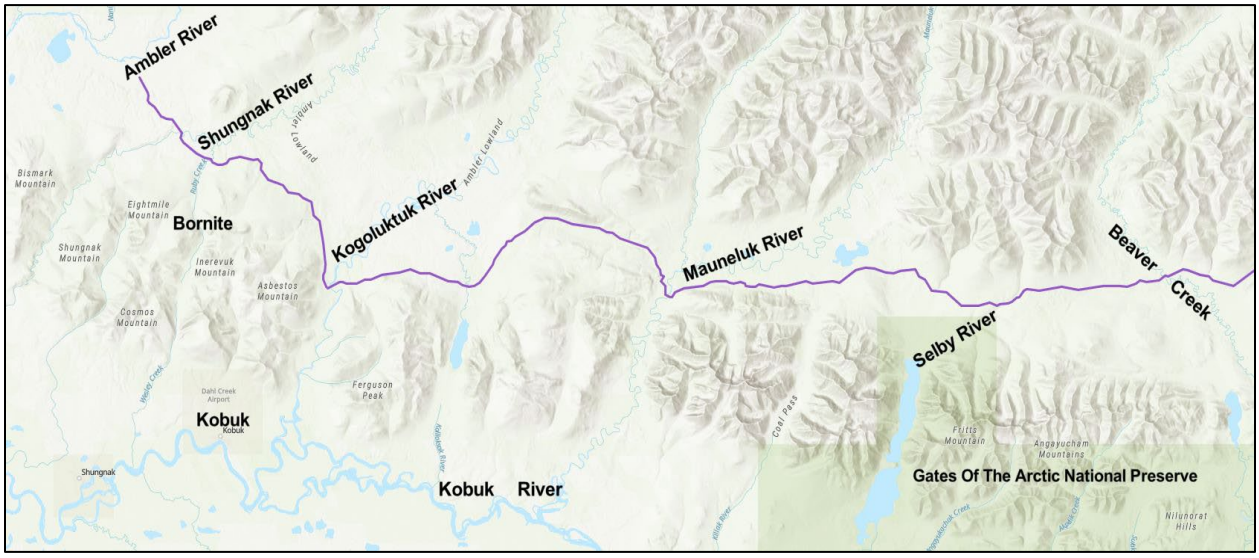

Figure 2. Western section of the Ambler Industrial Road corridor within the Kobuk River drainage.

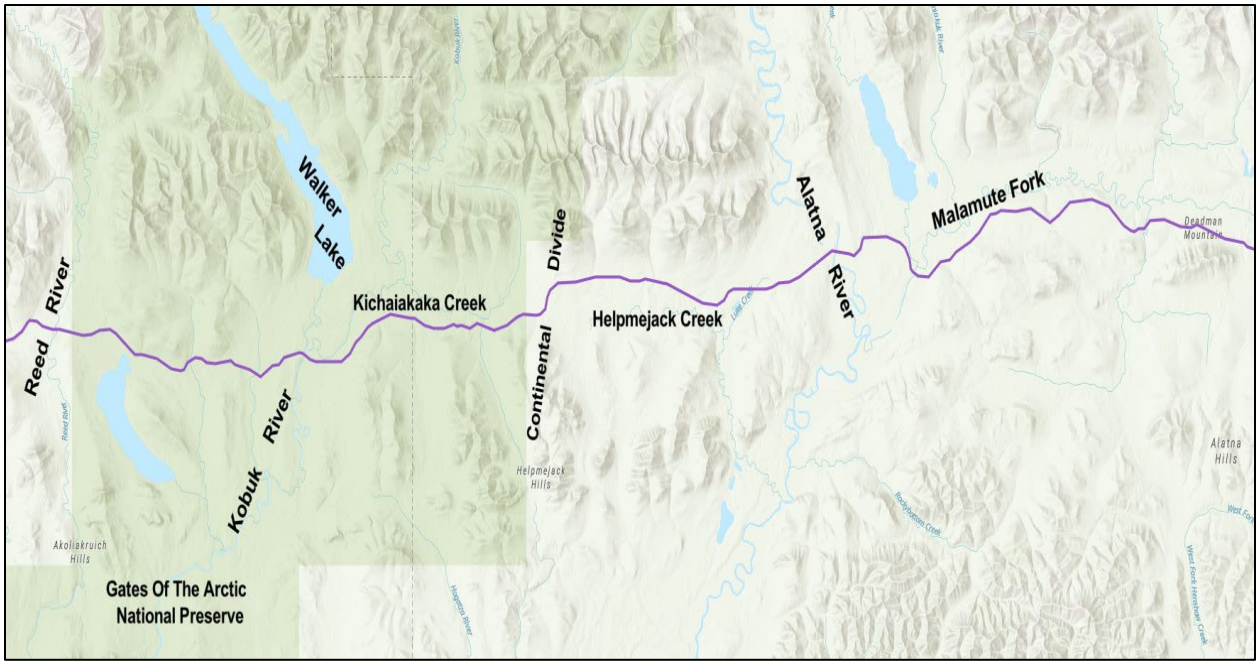

Figure 3. Central section of the Ambler Industrial Road corridor including the eastern most extent of the Kobuk River drainage (Kichaiakaka Creek) and the western most extent of the Koyukuk River drainage (Helpmejack Creek).

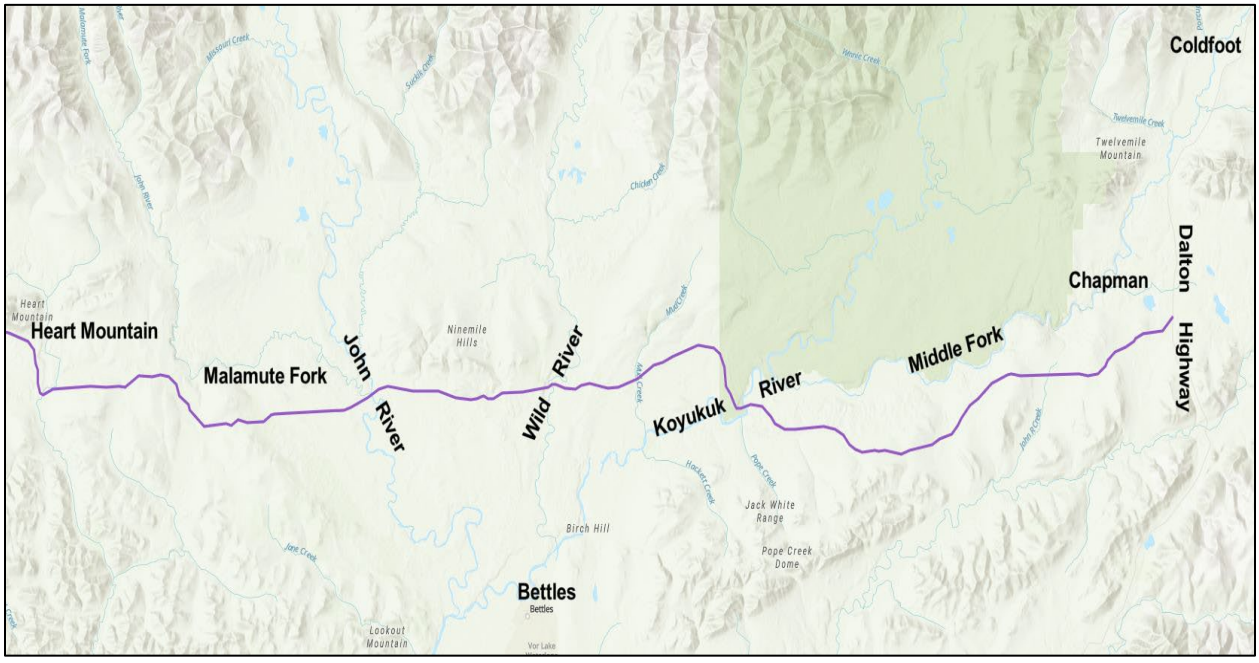

Figure 4. Eastern section of the Ambler Industrial Road corridor within the Koyukuk River drainage.

Methods

Survey Site Selection

In 2023, ADF&G conducted fish presence surveys primarily at proposed stream crossings along the western extent of the Ambler Road corridor from July 24 – August 1 and August 16 – 25 (Figures 1-4). Site access, via helicopter, and camp logistics was provided by the Alaska Industrial Development and Export Authority (AIDEA). Operations for the first survey were staged from the Bornite Prospect camp north of the village of Kobuk and south of Mile 205 of the alignment. This portion of the western and central extent of the alignment, between Mile 120 and Mile 211, included the mainstem Kobuk River, eight major Kobuk River tributaries (Ambler River, Shungnak River, Kogoluktuk River, Mauneluk River, Selby River, Beaver Creek, Nutuvukti Lake and Reed River), and numerous third and fourth order tributaries (Figures 2 and 3).

The second survey was staged from Coldfoot (Milepost 161 Dalton Highway) and covered the central and the remainder of the eastern extent of the alignment from Mile 0 to Mile 133. This survey effort included the upper Koyukuk system: Koyukuk River, Wild River, John River, Alatna River, and the upper mainstem Kobuk River drainage (Figures 3 and 4). Overlap was required to sample streams not surveyed during the first survey and additional streams along the alignment included since the 2021 survey.

Survey sites along the Ambler Road corridor were selected based on available satellite imagery, geographic information system watershed maps, and United States Geological Survey (USGS) topographic maps. Fish distribution and species assemblage data already exist for the larger rivers and is contained in the ADF&G Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes (AWC). The Alaska Freshwater Fish Inventory (AFFI) has documentation of resident fish species in waterbodies surveyed by ADF&G and other environmental agencies.

The goal of the fish surveys was to determine which crossing structures would need to be designed to accommodate fish passage. Therefore, most proposed bridge sites were not sampled, as a well-designed bridge does not impede fish passage. Some sites were not sampled because they did not provide fish habitat. For example, if a site had no discernable channel, or it was clearly in an isolated wetland environment; or the drainage was shallow and ephemeral, or dry, it was not sampled. Sites that had a downstream barrier to fish passage, such as high stream gradient and/or water flow rates, or a waterfall were not sampled either. Some locations were not sampled because they did not have a safe landing zone, or the landing zone was not close enough to the site for practical access.

Creek Characteristics

Survey sites were accessed by helicopter departing from the Bornite Prospect camp or the community of Coldfoot. Sites were sampled as close to the road crossing alignment as possible

when landing zones were available. During flight each creek was surveyed upriver and downriver of the crossing coordinates for obstructions to fish passage such as waterfalls or subsurface water flow. Some creeks were flown to their confluence with their mainstem rivers when within reasonable distance. Each creek was observed, photographed, and fish passage barriers were noted. Observations and fish species captured are presented in Appendix 1 and the results section of this report.

Fish Presence

Fish presence was determined by baited minnow traps, electrofishing, angling and visual observations. The survey method was dependent on the size and characteristics of each waterbody. At most sites ten minnow traps baited with cured salmon eggs were fished for 24 hours before they were checked for captured fish. Traps were set in juvenile fish habitat such as log jams or eddies within an approximately 2000-foot section of each creek. A Smith-Root LR-24 backpack electrofisher was used in this same section each of creek if minnow traps were ineffective after 24 hours of fishing. Angling was conducted for approximately one hour at creeks with a high probability of Arctic grayling, which don't typically respond to baited minnow traps. Visual observation for fish was done at all sample sites by walking the section of creek with polarized glasses. Juvenile northern pike were documented in stagnant grassy wetlands with this method where other fish sample methods are not as effective. All fish captured were identified, measured to fork length or total length (species dependent), and released. Large drainages were also examined for the presence of mature fish by angling and/or visual survey from the helicopter. The survey timing of late July and August was intended to target potential juvenile salmon rearing in small creeks and tributaries. Juvenile salmon respond to baited minnow traps and are relatively easy to capture. Resident fish species seasonally inhabit creeks and tributaries and are still typically present in high densities during summer months.

Results and Discussion

New fish were captured or were previously documented at 82 of the 215 surveyed sites. Fish species, abundance, and location are presented in Appendix 1. Descriptions of each major drainage, the fish captured, and photos of several proposed crossing locations are provided in this section. All crossing locations described in this report should be considered preliminary and may be subject to change after engineering surveys are completed.

KOBUK RIVER DRAINAGE

The Kobuk River originates from the south side of the Brooks Range in the Endicott Mountains and Walker Lake inside the Gates of the Arctic National Park & Preserve. The river flows roughly 380 miles west to its terminus at Hotham Inlet. During this 2023 fish survey the mainstem Kobuk River was not sampled as fish presence information is known and contained in the AWC (Appendix 1). Seven of the Kobuk's major tributaries were sampled: the Ambler, Shungnak, Kogoluktuk, Mauneluk, Selby, Reed rivers and Beaver Creek. The extent sampled of the Kobuk

River system (Figures 2 and 3) is along the western and central portions of the corridor. Many of its tributaries sampled during 2023 are in the foothills of the Brooks Range and thus have headwater streams of high gradient. There are also fewer but larger lakes in this region of the survey. High gradient sites with swift waters often contained Dolly Varden whereas low gradient sites within the Ambler Lowlands were the only sites where Alaska blackfish were captured.

Ambler River Drainage

The Ambler River near the proposed road terminus at Mile 211 is catalogued in the AWC as spawning habitat for chum salmon and rearing habitat for anadromous Dolly Varden (Figures 5 and 6). During the 2023 survey the Ambler River and six of its tributaries were surveyed for fish presence (Appendix 1). The river system also supports the following resident fish species: burbot, Arctic grayling, northern pike, whitefish, slimy sculpin, and Alaska blackfish (Figure 7).

Figure 5. Terminus of proposed road alignment (left, Mile 211) at a side channel of the Ambler River, (right, anadromous Dolly Varden).

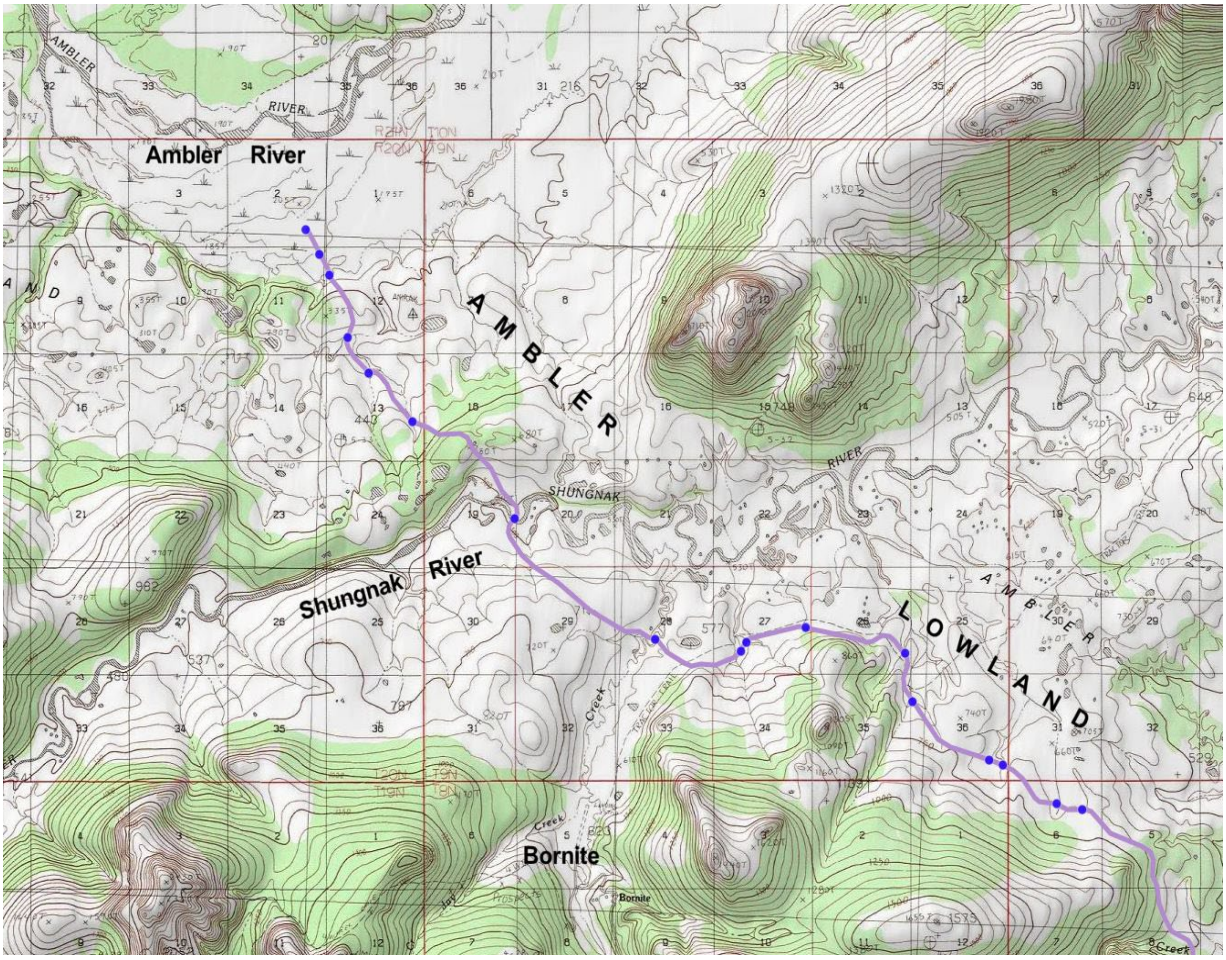

Figure 6. Mile 200-211 (right to left) of the Ambler Road corridor with 16 stream crossing sites (blue dots) within the Ambler and Shungnak River drainages.


Figure 7. Crossing CC_210_328, an unnamed tributary of Cabana Creek with a captured burbot.

Shungnak River Drainage

The Shungnak River has a barrier to fish passage at GPS coordinates 67.0401 N, 157.2766 W, approximately five miles downstream from the LB10 crossing site (Figure 8). Any fish captured above this barrier are considered resident only. During the 2023 survey the mainstem Shungnak River and eleven tributaries were sampled for fish presence (Appendix 1). The upper extent of the system near the LB10 crossing site supports Arctic graying, Alaska blackfish, slimy sculpin, round whitefish, and resident Dolly Varden (Figure 9).

Figure 8. Mainstem Shungnak River crossing LB10 (left), approximately five miles upstream of fish passage barrier (right) and cataloged anadromous fish.

Figure 9. Crossing CC_203_726, tributary of the Shungnak River within the Ambler Lowlands and a captured Alaska blackfish.

Kogoluktuk River Drainage

The Kogoluktuk River drains the eastern extent of the Ambler Lowlands (Figure 10). This system, specifically Riley Creek and 2.5 miles upstream of the Kogoluktuk River crossing LB7 near Mile 195, is catalogued as habitat for anadromous Dolly Varden. During 2023 field work the mainstem Kogoluktuk River and twenty of its tributaries were surveyed or sampled for fish presence (Appendix 1). The catalogued extent for chum salmon spawning habitat and anadromous whitefish presence is two miles downstream of LB7 crossing. No fish were captured by trap or electrofishing in 2023 at Riley Creek SB18 crossing site (Figure 11), but the AWC extent for anadromous Dolly Varden is approximately one mile downstream with no known barrier in between. Several Kogoluktuk River tributaries (Figure 12) support Arctic grayling, slimy sculpin, and Alaska blackfish (Appendix 1).

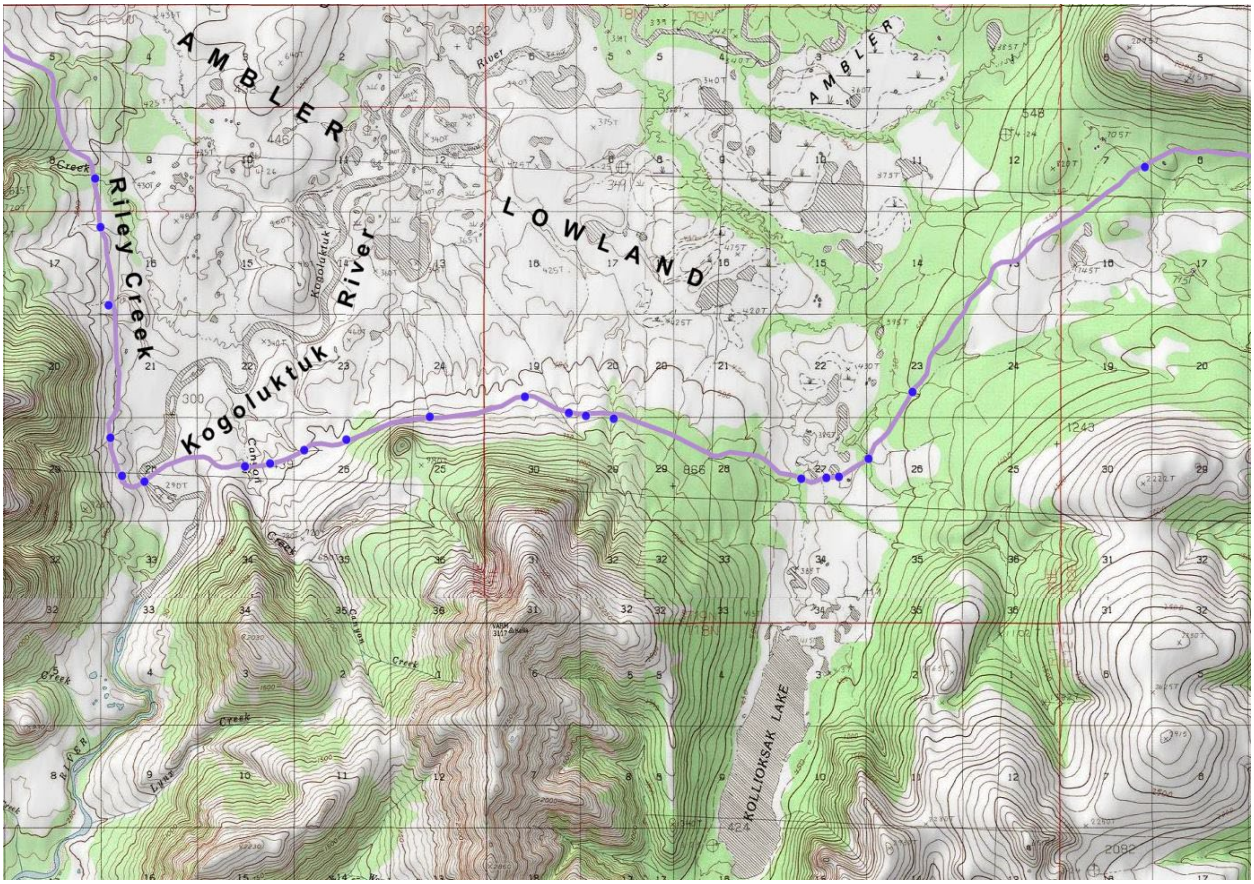

Figure 10. Kogoluktuk River drainage with crossing sites (blue dots).


Figure 11. Crossing SB18, Riley Creek.


Figure 12. Crossings SB13 and SB14 are adjacent forks of the same unnamed tributary of the Kogoluktuk River that drains Kollioksak Lake. Alaska Blackfish and slimy sculpin were captured.

Mauneluk River Drainage

Mauneluk River headwaters are in the Schwatka Mountains, and the river flows southwest into the Kobuk River crossing the Ambler Road corridor near Mile 174 (Figure 13). In 2023 the mainstem Mauneluk River and seventeen of its tributaries were surveyed or sampled for fish presence (Appendix 1). This drainage is catalogued as migration habitat for chum salmon and anadromous Dolly Varden. Juvenile Dolly Varden can reside in steeper gradient creek with faster moving water velocities than other fish species (Figure 14). The system also supports whitefish, Arctic grayling, northern pike, burbot, and slimy sculpin. Two Avaraat Lake tributaries were also sampled, and juvenile northern pike were visually observed in their creeks (Figure 15).

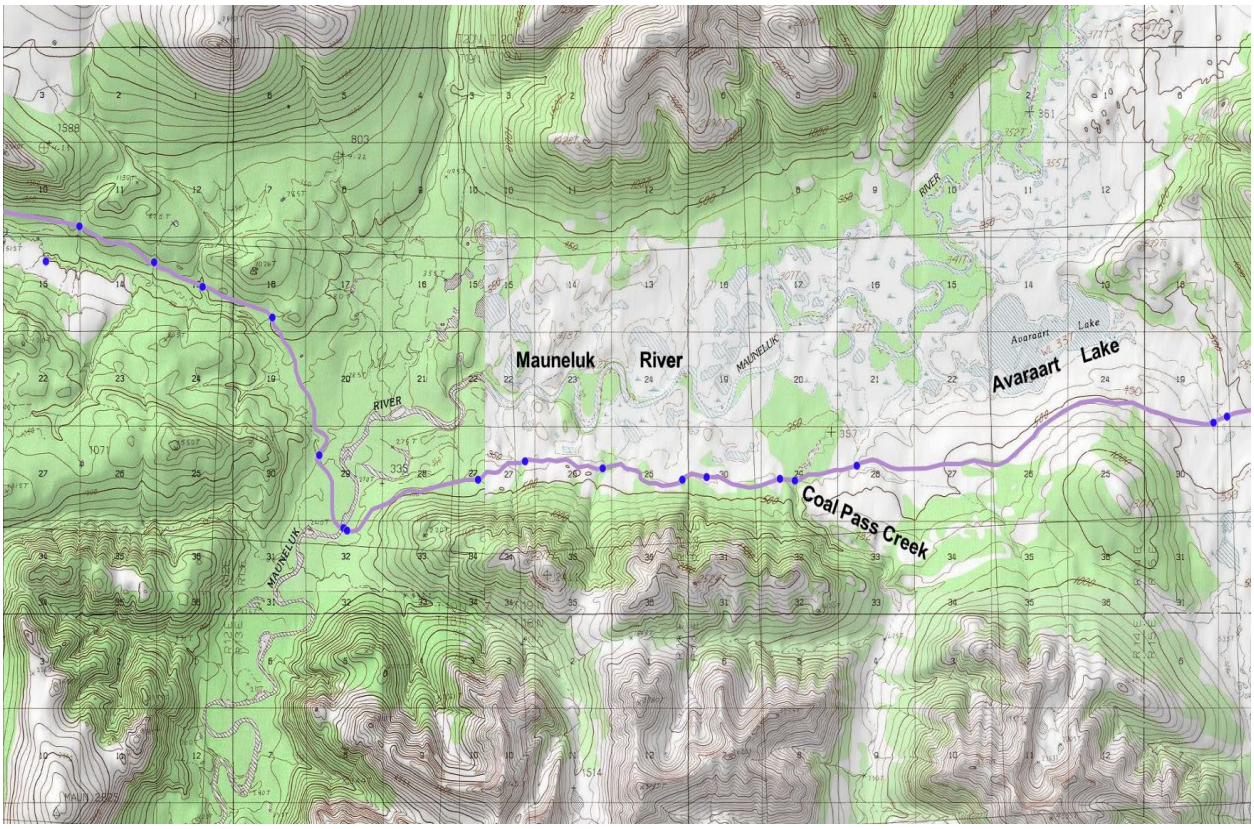

Figure 13. Mauneluk River drainage crossing sites (blue dots).


Figure 14. Unnamed tributary of the Mauneluk River site MB10 with captured Dolly Varden. Note: Dolly Varden are commonly found in streams with high water velocities (right) that may preclude juveniles of other species.

Figure 15. Crossings SB22 and CC_160_906 on tributaries of Avaraart Lake that drains into the Mauneluk River. Northern pike were visually observed.

Selby River Drainage

The upper Selby River drainage is north of and drains into Narvak Lake. This river section is catalogued as habitat for chum salmon and anadromous Dolly Varden. During 2023 field work, three upper Shelby River and two Narvak Lake tributaries were surveyed or sampled for fish presence, but no fish were captured (Figure 16; Appendix 1). The road corridor and survey areas were above of the extent of chum spawning habitat documented downriver of Narvak Lake (Figure 17). The AWC and AFFI document this system as supporting whitefish, Arctic grayling, northern pike, burbot, and slimy sculpin (Appendix 1).

Figure 16. Crossing SB19 on a tributary of Narvak Lake (left) with no fish captured. Crossing MB15 on a tributary of the Selby River (right) approximately 1.5 miles upstream of catalogued Dolly Varden habitat.

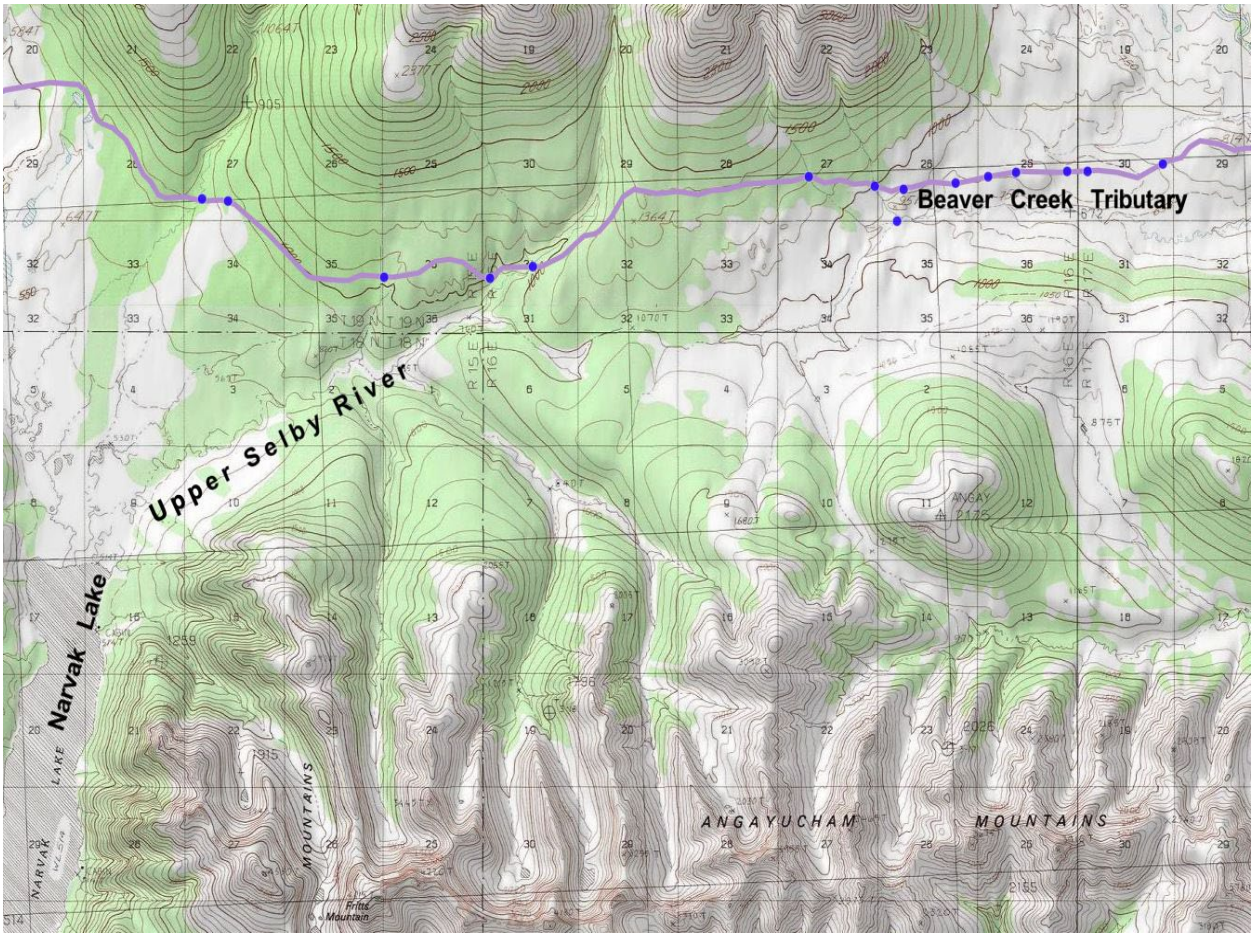

Figure 17. Upper Selby River-Narvak Lake drainage crossing sites (blue dots).

Beaver Creek Drainage

The Beaver Creek drainage is catalogued as habitat for chum salmon and anadromous Dolly Varden in the AWC and burbot, Arctic grayling and northern pike in the AFFI. During the 2023 fieldwork mainstem Beaver Creek and 22 of its tributaries were surveyed or sampled for fish presence (Figure 18; Appendix 1). At the road crossing site CC_151_56 two juvenile Dolly Varden were captured (Figure 19). Site CC_151_56 is the furthest upstream of nine hillside tributary crossing sites that drain into an unnamed Beaver Creek tributary in the valley floor (Figure 19). We sampled this unnamed tributary as a reference site for these nine hillside drainages and captured slimy sculpin and Arctic grayling (Figure 20). These nine sites had similar stream characteristics of being steep with fast moving water and demonstrate the swimming capabilities of juvenile Dolly Varden. All nine sites on this hillside, including CC_151_56 should be designed to accommodate fish passage (Appendix 1).

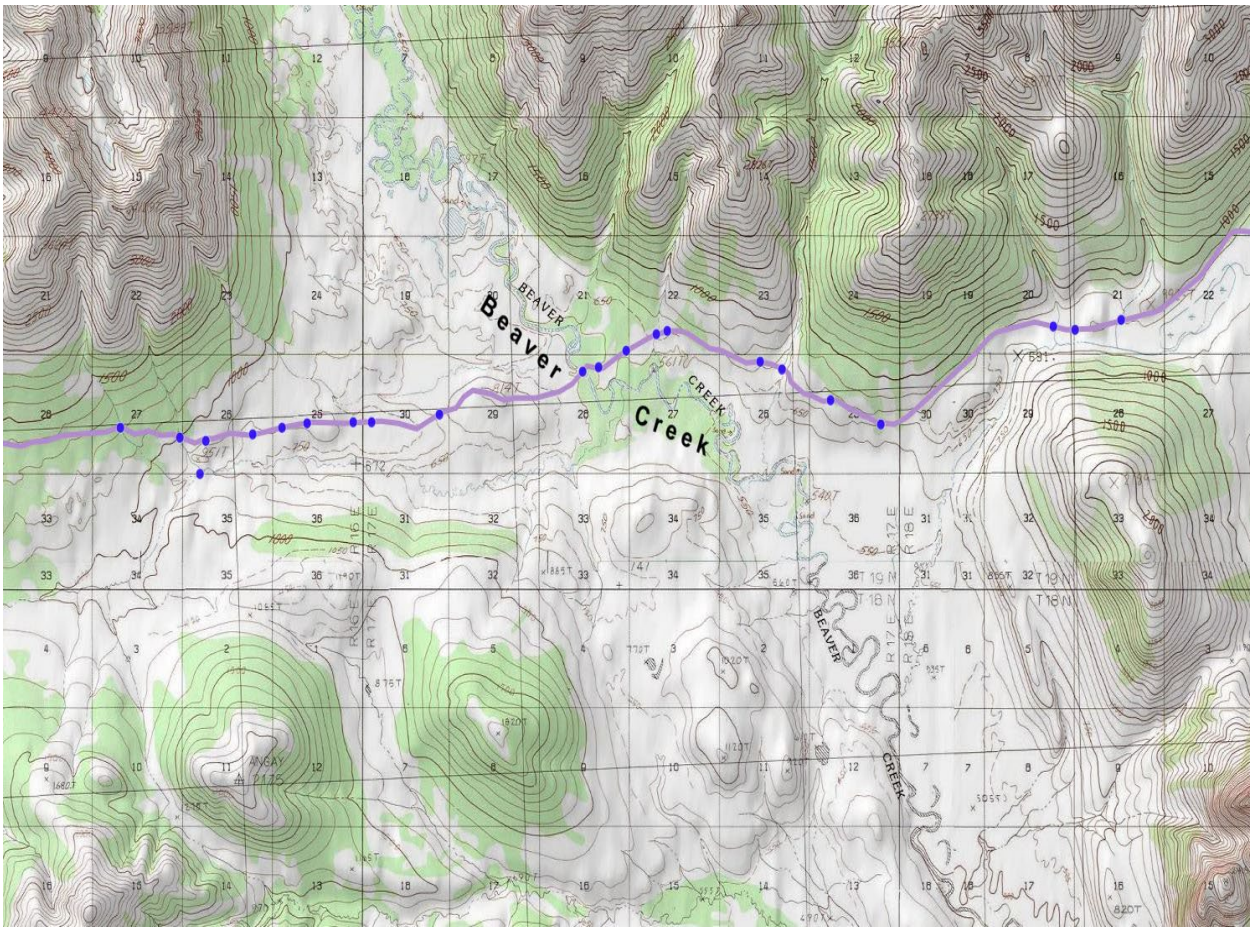

Figure 18. Beaver Creek drainage crossing sites (blue dots).


Figure 19. Hillside crossing site CC_151_56 (left), valley floor tributary reference site (right).

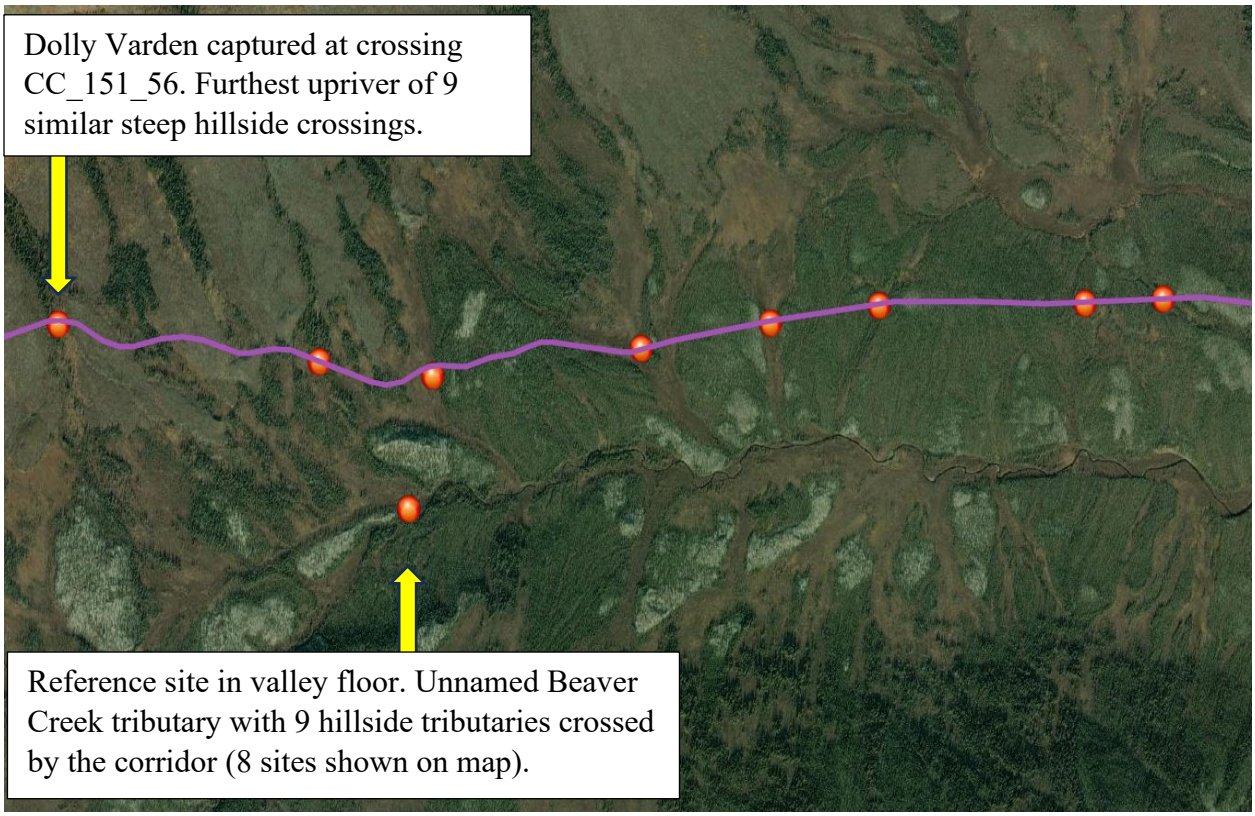

Figure 20. CC_151_56 is the most upstream site of nine tributaries that drain into the unnamed Beaver Creek tributary in the valley floor. Adult Arctic grayling and slimy sculpin were captured at the reference site.

Dolly Varden were captured in the mainstem Beaver Creek at crossing site LB2 near Mile 147 and at SB3, one of the larger tributaries near Mile 145 (Figure 21). Two juvenile Dolly Varden were captured at Beaver Creek tributary crossing sites SB4 and SB5 near Mile 141 (Figure 22). These are the eastern most site samples of the Beaver Creek drainage crossings.

Figure 21. LB2 on the mainstem of Beaver Creek (left) and the crossing site SB3 on a tributary of Beaver Creek with Dolly Varden captured (right).

Figure 22. Crossing SB4 (left) and SB5 (right), the easternmost end of a Beaver Creek drainage with Dolly Varden captured.

Reed River Drainage

The Reed River Hot Spring was discovered by Ensign Reed during the U.S Navy's Brooks Range expedition of 1886. The spring's exact location was not well documented, and it was rediscovered during a 1973 U.S. geological survey. Located in Angiaak Pass it is part of the headwaters of the Reed River which flows south into the Kobuk River. The upper most extent of the Reed River drainage above the ambler road LB1 crossing is catalogued as habitat for anadromous Dolly Varden and resident fish species including Arctic grayling, burbot, and slimy sculpin (Figure 23). Chum salmon presence was documented in 2018 1.6 miles downriver of the proposed corridor crossing bridge LB1 near Mile 137 (AWC). During the 2023 field work an aerial survey was conducted near the crossing locations, no chum salmon were observed. One hour of rod and reel fishing effort was conducted, no resident or anadromous fish were captured.

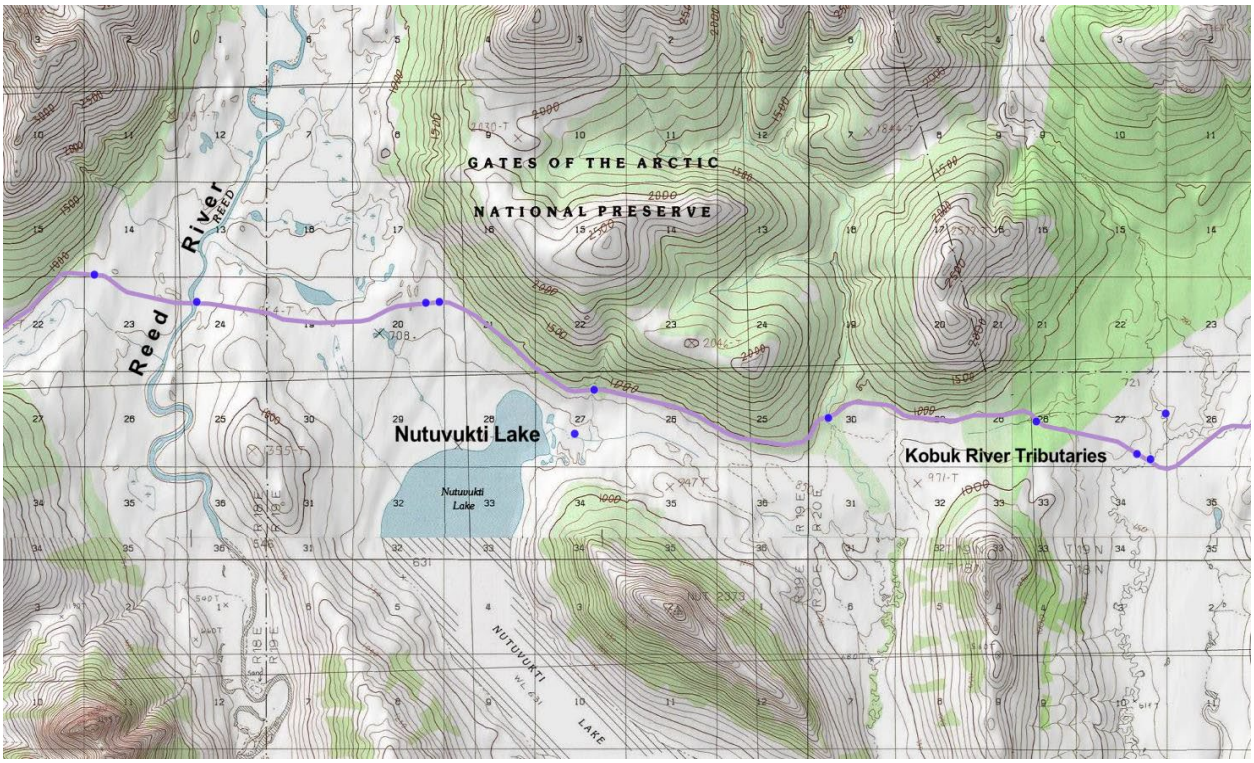

Figure 23. Reed River and Nutuvukti Lake drainage proposed crossing sites (blue dots).

Nutuvukti Lake Drainage

Nutuvukti Lake is one of the largest lakes in northern Alaska at six miles long. It is part of the headwaters of the Kobuk River, and smaller than Walker Lake but similar in resident fish species. Two drainages were surveyed that are near the glacial moraine and fen just north of Nutuvukti Lake (Figure 23). There were not suitable landing zones near these two sites and fish sampling was not conducted. These sites have the potential for fish habitat since they are in close proximity to Nutuvukti Lake and on an established creek. A reference site was sampled in a creek near the corridor crossing site CC_131_843 (Figure 24). This creek had a direct connection to Nutuvukti Lake; however, no fish were captured.


Figure 24. Nutuvukti Lake drainage reference site sampled near crossing site CC_131_843.

Upper Kobuk River Drainage

The upper section of the Kobuk River drainage (Figure 25) is catalogued as habitat for chum salmon and Dolly Varden. It supports resident fish species of Arctic char, lake trout, northern pike, Arctic grayling, burbot, and slimy sculpin. During the 2023 field survey 22 sites were surveyed or sampled for fish presences such as Gout Creek and West Clijstersen Creek (Figure 26). As a result, anadromous Dolly Varden habitat will be extended further up Kichaiakaka Creek to a tributary creek near MB8 at Mile 113 (Figure 27). The Kobuk River corridor crossing LB9 near Mile 123 is upriver of the AWC documented spawning extent of chum salmon and potentially beyond sheefish spawning habitat (Figure 25). Adult chum salmon carcasses were found in 2019 upriver of LB9 in Kichaiakaka Creek near Gourd Creek suggesting chum spawn above LB9, but the exact location has not been documented (Figure 28). The Alatna Portage over the Continental Divide marks the eastern boundary of the Kobuk River drainage and the western boundary of the Koyukuk River drainage along the road corridor (Figure 25).

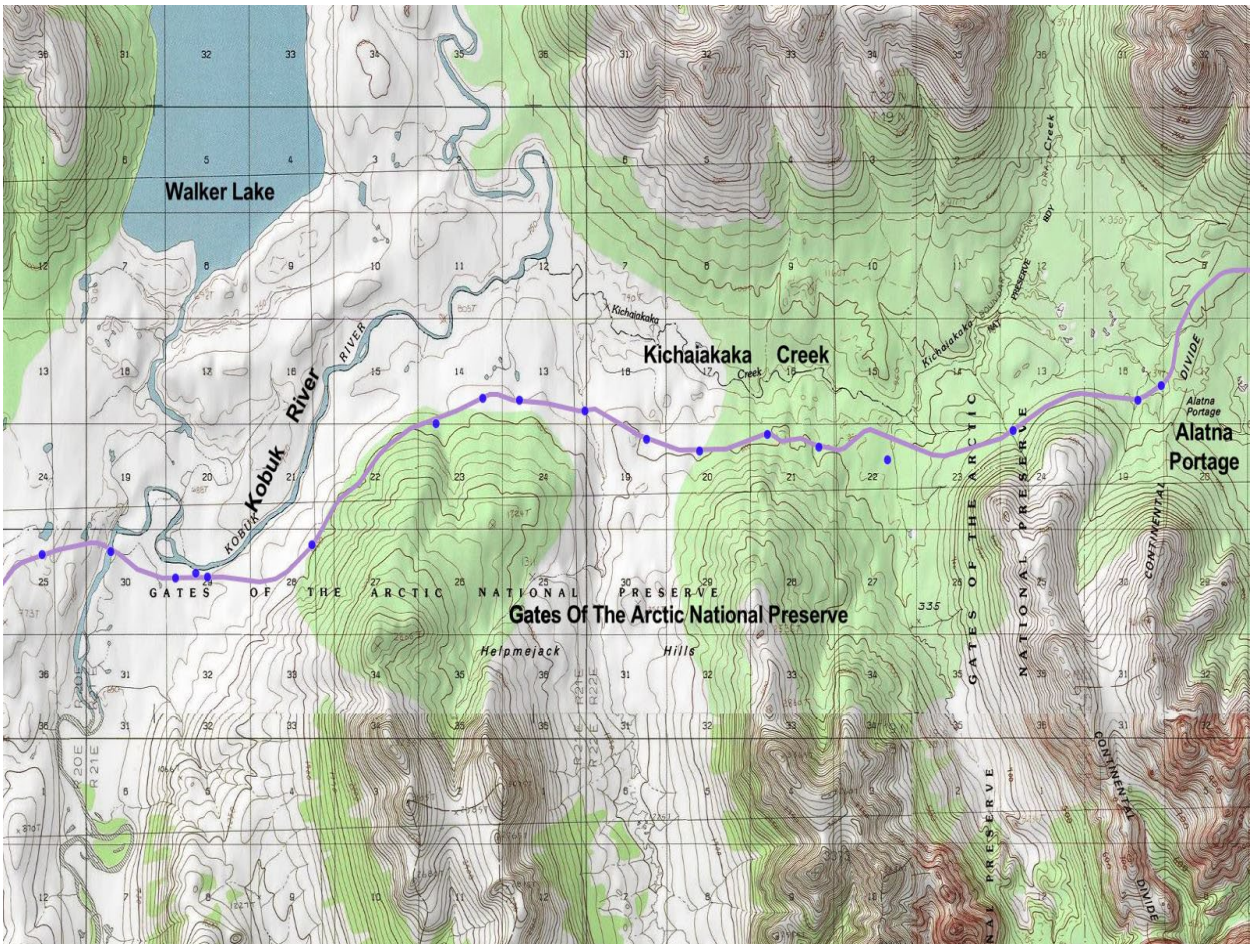

Figure 25. Upper Kobuk River-Kichaiakaka Creek drainage crossing sites (blue dots).

Figure 26. Crossings MB14 at Gout Creek (left), and MB5 at West Clijstersen Creek (right). Dolly Varden, Arctic grayling, and slimy sculpin were documented.

Figure 27. Crossing MB8, tributary of Kichaiakaka Creek with Dolly Varden captured.

Figure 28. Chum salmon carcasses observed upriver of LB9 near confluence of Gourd and Kichaiakaka creeks.

KOYUKUK RIVER DRAINAGE

The Koyukuk River, a major tributary of the Yukon River, originates from headwater rivers on the southern slopes of the Endicott Mountains in the central Brooks Range. It flows 550 miles, starting along the Gates of the Arctic National Wildlife Refuge and eventually joins the Yukon River approximately 30 miles downriver of Galena. The Ambler Road corridor crosses the upper extent of the Koyukuk River system near Bettles (Figure 3 and 4). This section of the Koyukuk River supports Chinook, coho and chum salmon. In this system it is unknown but assumed that Dolly Varden are resident fish rather than anadromous given the distance from the Bering Sea. There are more off-channel small lake and wetland complexes in the region of the eastern extent of the Ambler Road corridor which may explain why more species such as northern pike, lake chub, and longnose sucker are catalogued and/or observed while fewer Dolly Varden were captured during the 2021 and 2023 sampling. During the August 2023 trip, heavy precipitation in the Brooks Range resulted in many creeks being at bank full conditions reducing capture efficiency. Other survey sites and drainages had subsurface or ephemeral creeks despite the rainfall and did not have a defined channel, or enough water flow to set fish traps for sampling.

Alatna River Drainage

The Alatna River drainage is a western boundary of the Koyukuk River drainage and is catalogued as Chinook, coho, and chum salmon habitat, with spawning habitat for Chinook and chum salmon. Whitefish, Dolly Varden, Arctic grayling, burbot, northern pike, and slimy sculpin are also documented in this system. Twenty-seven sites were surveyed or sampled during the 2021 and 2023 field seasons. Similar to the steep hillside sites of the Kobuk River, Dolly Varden were captured at CC_104_543 in a high gradient tributary of Helpmejack Creek (Figure 29). This site was one of seven crossing sites with similar characteristics along a hillside where Dolly Varden were not captured yet have the potential to be fish habitat (Figure 30).

Figure 29. Dolly Varden Captured at Helpmejack Creek tributary crossing site CC_104_543 with high gradient.

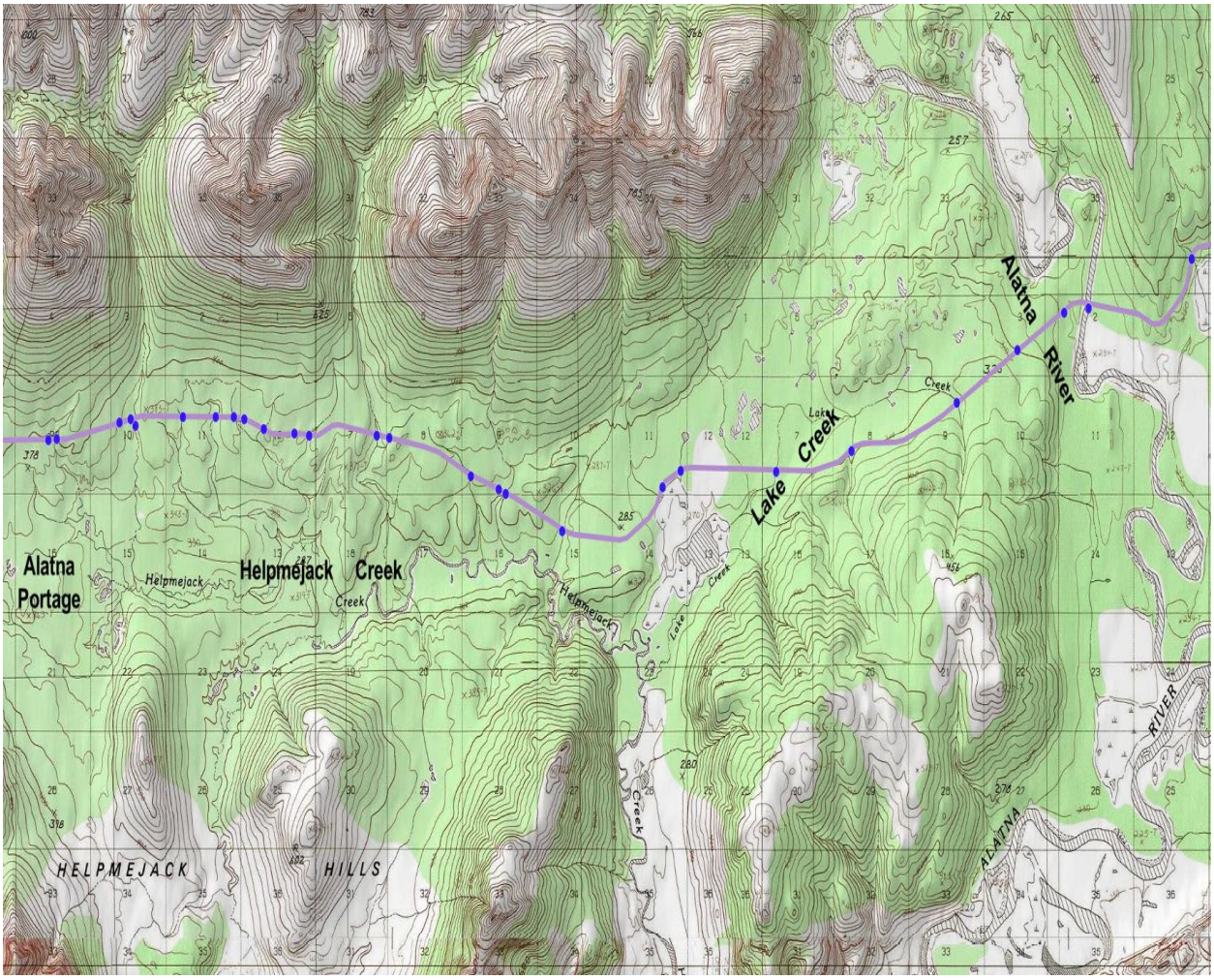

Figure 30. Upper Alatna River-Helpmejack Creek drainage crossing sites (blue dots). The headwaters of Helpmejack Creek drain the western road corridor boundary of the Koyukuk River drainage.

Malamute Fork Alatna River Drainage

The Malamute Fork Alatna River drainage is formed by the junction of Bedrock Creek and Mettenpherg Creek and joins the Alatna River downriver of Iniakuk Lake (Figure 31). Twenty-one sites were sampled or surveyed for fish presence within this drainage. One coho salmon was captured at crossing CC_087_521, a tributary of Tobuk Creek that connects Iniakuk Lake to the Malamute Fork (Figure 32). This is the first coho salmon rearing documented in Tobuk Creek, but coho rearing was documented near Bedrock Creek in 2012 (Lemke 2013). Coho rearing in Tobuk Creek has been nominated for addition to the AWC after the 2023 sampling.

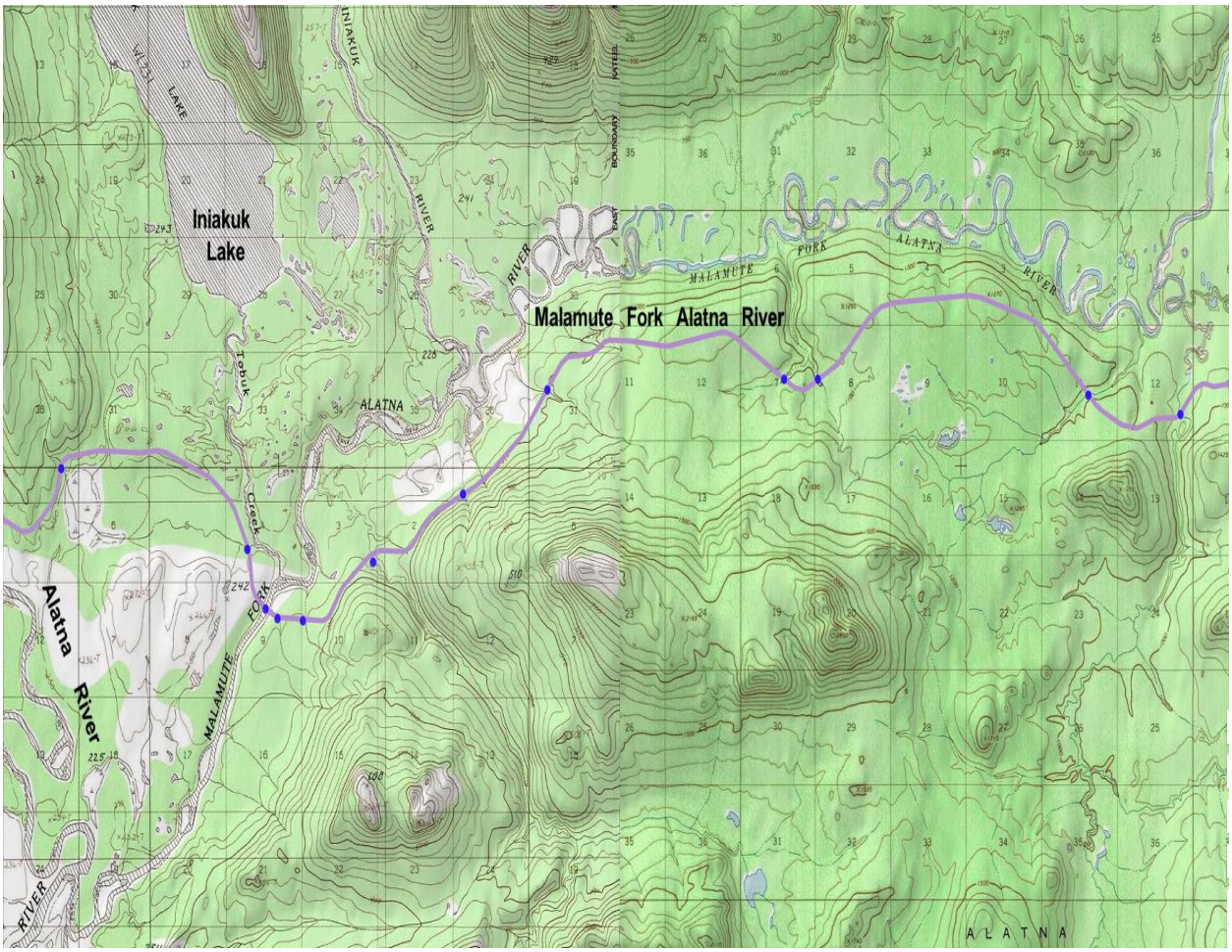

Figure 31. Malamute Fork of the Alatna River proposed crossing sites (blue dots). Unlike the upper Kobuk drainage, this system supports Chinook and coho salmon.

Figure 32. Crossing CC_087_521 with a juvenile coho salmon captured.

Henshaw Creek Drainage (also known as Sozhekla Creek)

Henshaw Creek is formed by the junction of the East and West forks on the south side of Deadman and Heart Mountains (Figure 33). This drainage flows south to join the mainstem Koyukuk River 12 miles upstream of Allakaket. The Amber Road corridor crosses the East Fork Henshaw Creek near Ambler Road Mile 63. The East Fork Henshaw Creek and three of its tributary creeks were surveyed or sampled in 2023 but no fish were captured or observed (Appendix 1). However Arctic grayling and burbot were documented in 2018 just downriver of the MB4 proposed crossing location (AFFI).

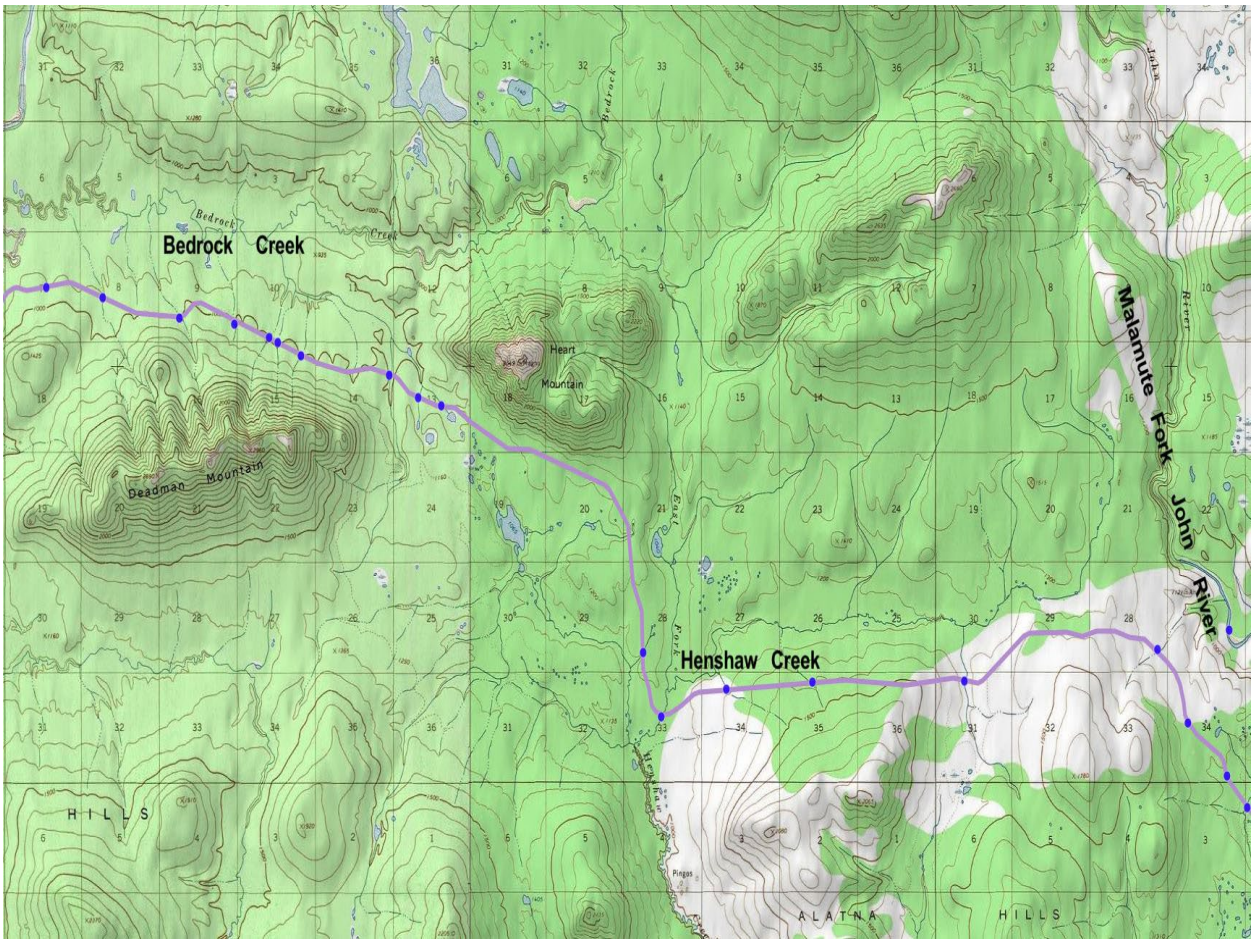

Figure 33. Crossing sites (blue dots) for Bedrock Creek, a tributary of the Malamute Fork Alatna River; and Henshaw Creek, a tributary of the Malamute Fork of the John River drainage.

Malamute Fork John River Drainage

Four Malamute Fork John River tributary creeks were surveyed or sampled during 2023 (Figure 33). The Ambler Road corridor does not cross the main stem Malamute Fork, but SB9 crosses one mile up a tributary creek that enters the south bank. Two Arctic grayling were captured at the SB9 crossing and two chum salmon carcasses were observed on the mainstem Malamute Fork near this tributary's confluence (Figure 34). The Malamute Fork John River is cataloged as chum salmon spawning and rearing habitat (AWC) and supports longnose sucker and Arctic grayling (AFFI).

Figure 34. Crossing SB9, tributary of Malamute Fork John River, two Arctic grayling captured.

John River Drainage

This section of the John River (Figure 35) is catalogued as habitat for Chinook and chum salmon, and anadromous whitefish. Chinook salmon spawning has been documented 1 mile upriver from the Ambler Road corridor crossing LB11 near Mile 45 at the mouth of Timber Creek, but no anadromous fish spawning is cataloged at the LB11 crossing site (AWC). In this system it is unknown but assumed that Dolly Varden are resident rather than anadromous given the distance from the Bering Sea coast. Fish presence and abundance were documented in 2014 through survey work completed by ADF&G (Wuttig et al, 2015). Arctic grayling, burbot, northern pike, slimy sculpin, lake chub, longnose sucker, and resident whitefish are also documented in the system. During 2021 and 2023, eighteen sites were sampled and surveyed with catches predominantly consisting of juvenile Arctic grayling (Figure 36).

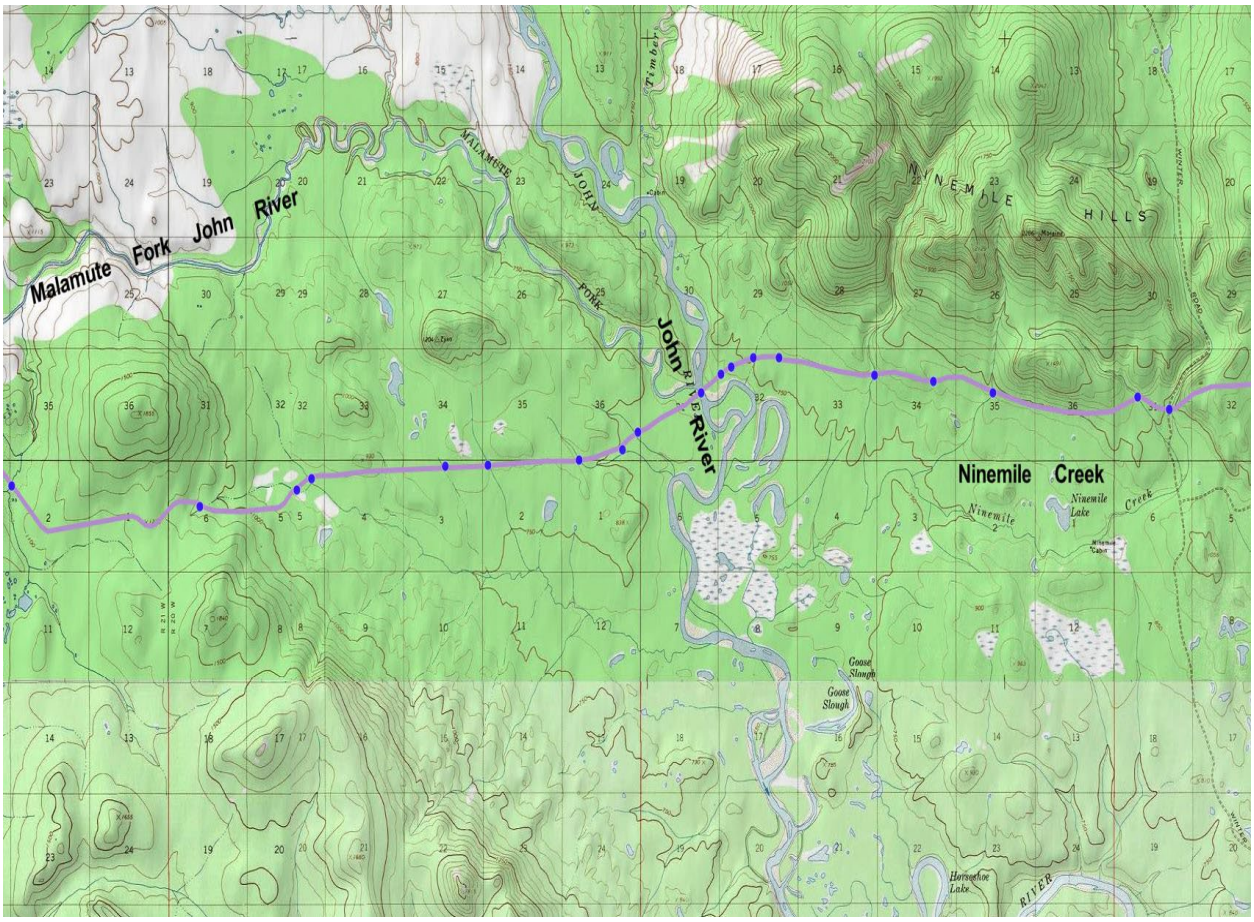

Figure 35. John River drainage crossing sites (blue dots).


Figure 36. John River crossing site LB11 (left) and a juvenile Arctic grayling captued at Ninemile Creek crossing CC_038_530.

Wild River Drainage

The Wild River originates in the Sirr mountains north of Wild Lake. LB3 crosses the Wild River downriver of the documented chum and Chinook salmon spawning extent (AWC) between Chicken Creek and Michigan Creek (Figure 37; Wuttig et al., 2015). The AFFI database documents broad and humpback whitefish utilizing this section of river, as well as resident species including Arctic grayling, burbot, northern pike, and Dolly Varden. In the AWC, Wild Lake is documented as Chinook salmon and anadromous whitefish habitat (Figure 38). During the 2021 and 2023 surveys three Wild River tributaries were sampled (Appendix 1), no juvenile salmon were captured, and no adult salmon were observed in the known spawning reaches.

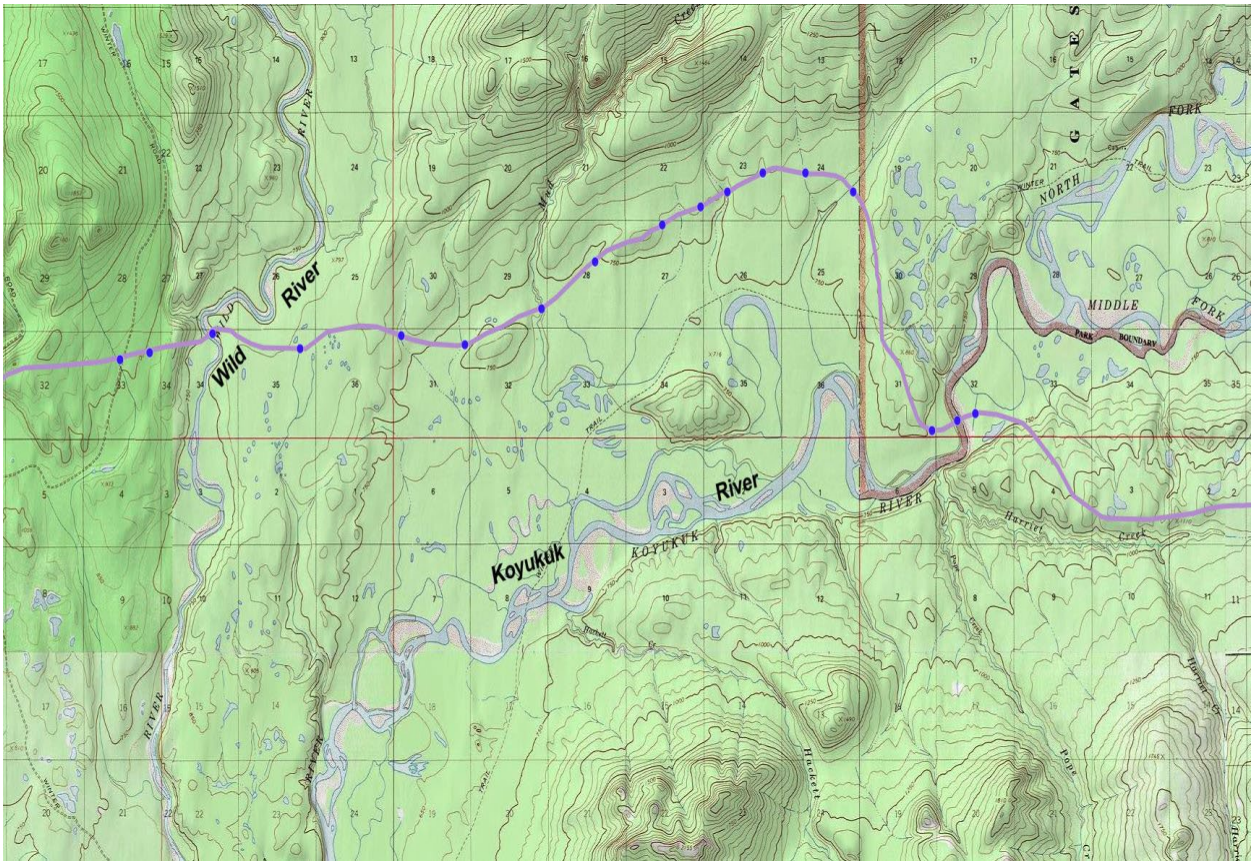

Figure 37. Lower Wild River (LB3) and upper Koyukuk River mainstem (LB5) drainage crossing sites (blue dots).

Figure 38. Wild Lake (left) and Wild River LB3 crossing site (right).

Upper Koyukuk River Drainage

This section of the upper Koyukuk River system provides spawning habitat for Chinook salmon, and habitat for chum salmon and whitefish, including sheefish (Figure 37). The system also supports Arctic grayling, northern pike, burbot, Dolly Varden, longnose sucker, slimy sculpin, and resident whitefish. During 2021 and 2023, fifteen sites were sampled or surveyed near the LB5 crossing site at Mile 24 with catches including Arctic grayling and burbot (Figure 39).

Figure 39. Burbot captured in Upper Koyukuk River mainstem near LB5 crossing site.

Middle Fork Koyukuk River Drainage

The Middle Fork Koyukuk River is formed by the confluence of the Bettles and Dietrich Rivers and flows 62 miles south to its confluence with the North Fork Koyukuk River (Figure 40). This section of the Middle Fork Koyukuk provides migration and spawning habitat for Chinook and chum salmon as well as anadromous sheefish and whitefish. Resident species such as Arctic grayling, burbot and northern pike also inhabit the river and its tributaries (AWC). During 2021 and 2023 ten tributary creeks were surveyed or sampled for fish presence, Arctic grayling and northern pike were captured or observed (Appendix 1). Chapman Creek upriver of Chapman Lake is proposed for two bridge crossings, SB12 and SB15 near Mile 1, Northern pike and Arctic grayling were documented in Chapman Lake in a 2010 and 2018 ADF&G fish survey (Bear 2022). Lower Chapman Creek has a waterfall which is a natural barrier to fish passage, preventing anadromous fish from moving from the Middle Fork Koyukuk River into Chapman Lake (Figure 41).

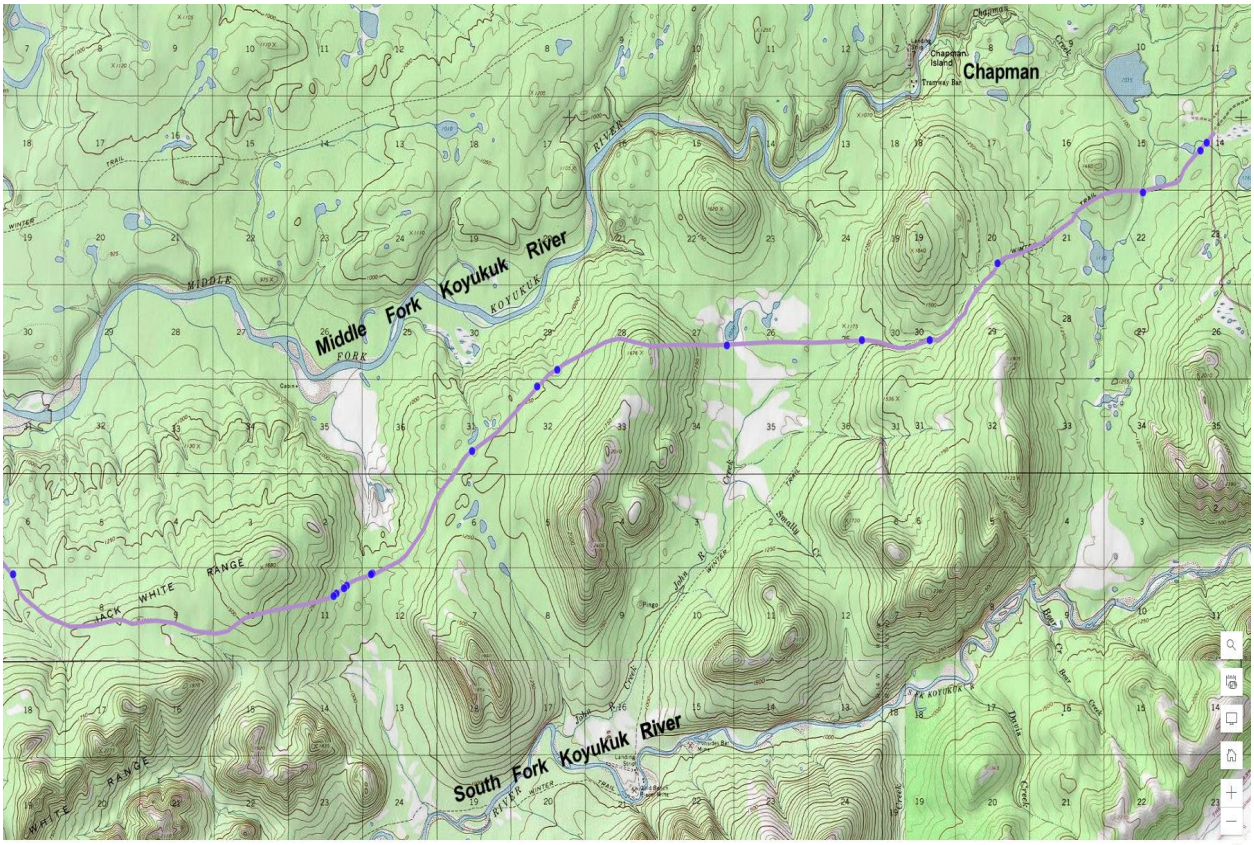

Figure 40. Middle and South Forks Koyukuk River crossing sites (blue dots). This is the eastern end of the road corridor with Mile 0-1 crossing tributaries of the Chapman Creek system.

Figure 41. Chapman Creek Falls is between the Middle Fork Koyukuk River and Chapman Lake.

South Fork Koyukuk River Drainage

The Amber Road corridor crosses one tributary of the South Fork Koyukuk River, the John R Creek (Figure 42). During the 2021 survey three sample sites were surveyed in John R Creek and juvenile Arctic grayling were captured at two of them (Appendix 1). Survey sites in the Middle and South Fork Koyukuk Rivers were typically low gradient with slow moving water making ideal habitat for Arctic grayling spawning and rearing (Figure 42).

Figure 42. South Fork Koyukuk River wetlands habitat and a captured juvenile Arctic grayling.

Conclusion

The 2023 ADF&G Habitat Section fish presence surveys of the upper Kobuk and Koyukuk River drainages was a continuation of the 2021 and 2014 survey efforts. The 215 survey sites listed in this report are the most likely water crossings to require fish passage structures along the proposed Ambler Road corridor. Other small water body crossings may seasonally contain fish but not all were able to be surveyed due to time and logistical restraints. Survey efforts and fish capture data contained in the AWC and AFFI confirmed fish presence at 82 of the 215 sites. Of the remaining 133 crossings, fish capture was attempted at 45 but no fish were captured or observed. This does not exclude the possibility of fish at these crossings as fish seasonally migrate through drainages to access upriver or downriver spawning or rearing habitats.

Recommendations

Identifying fish presence and use of spatially intermittent and ephemeral tributary creeks can take multiple sampling attempts to document. ADF&G Habitat supports AIDEA's commitment to ensure fish passage design crossing structures for all anadromous and resident fish rivers and streams, as described in the Ambler Road Final EIS (USDOI BLM 2020). AIDEA assumes that all perennial river and streams provide fish habitat and therefore require fish passage structures. AIDEA also assumes that some well-defined ephemeral streams may provide fish habitat and will maintain connectivity and fish passage at all road crossings (USDOI BLM 2020). Proper design, installation, regular inspections, and maintenance of crossing structures will reduce impacts to fish passage and the likelihood and severity of potential impacts to aquatic life.

Additional spawning surveys may be needed in the vicinity of all proposed bridges that will have components placed in anadromous waters (piers, abutments, etc.). These surveys will be used to identify appropriate work windows, and ensure minimal disturbance to spawning fish and their habitat. These spawning surveys should be done during peak spawning timing of the different species of fish present in the rivers. For example, Chinook salmon spawning surveys in the Kobuk and Koyukuk River drainages would be in July while chum salmon spawning surveys in the upper Koyukuk River drainages would be in August.

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Appendix 1. Ambler Road corridor water body crossing locations within the Kobuk and Koyukuk River drainage systems, surveyed for fish presence in 2021 and 2023.

Crossing Site/ Type[1]	Latitude	Longitude	Water Body/ Stream Tributary (Trib)	Fish Documented[2,3]
KOBUK RIVER SYSTEM				
Ambler River Drainage				
End of Road	67.15708	-157.04724	Ambler River Side Channel	CHs, DV, W, AG, BB, SS *
CC_210_328	67.15379	-157.04253	Cabana Creek Trib	ABF, SS *
MB2	67.15109	-157.03892	Cabana Creek	BB, SS *
SB1	67.14267	-157.03212	Cabana Creek Trib	AG, SS *
CC_209_04	67.13785	-157.02401	Cabana Creek Trib	AG, SS *
CC_208_394	67.13133	-157.00798	Cabana Creek Trib	Same Trib as SB1
Shungnak River Drainage				
LB10	67.11824	-156.96927	Shungnak River	DV (resident), W, AG, SS, LS (AFFI)
MB3	67.10195	-156.91634	Ruby Creek	Same (AFFI) as Above AG, SS Captured
CC_203_856	67.10018	-156.88468	Shungnak R Trib	Same as next Trib
CC_203_726	67.10150	-156.88217	Shungnak R Trib	ABF *
CC_203_118	67.10358	-156.85977	Shungnak R Trib	No Fish Captured
CC_202_008	67.10002	-156.82240	Shungnak R Trib	DV (resident) *
CC_201_532	67.09346	-156.81961	Shungnak R Trib	DV (resident) *
CC_200_496	67.08562	-156.79085	Shungnak R Trib	ABF, SS *
CC_200_384	67.07889	-156.75639	Shungnak R Trib	Wetland

CC_199_688	67.07980	-156.76656	Shungnak R Trib	Wetland
CC_199_398	67.07889	-156.75639	Shungnak R Trib	Wetland
Kogoluktuk River Drainage				
SB18	67.05851	-156.71295	Riley Creek	DV, AG, SS (AWC/AFFI) No Fish Captured
CC_196_903	67.05165	-156.71097	Kogoluktuk River Trib	Wetland
CC_196_119	67.04066	-156.70778	Kogoluktuk River Trib	Low/no Water
CC_194_771	67.02203	-156.70736	Kogoluktuk River Trib	Low/no Water
CC_194_378	67.01684	-156.70221	Kogoluktuk River Trib	No LZ
LB7	67.01586	-156.69423	Kogoluktuk River	CHs, DV, W, AG, SS (AWC/AFFI)
SB20	67.01798	-156.65560	Canyon Creek	DV *
CC_192_62	67.01853	-156.64548	Kogoluktuk River Trib	No LZ
CC_192_279	67.02026	-156.63427	Kogoluktuk River Trib	Low/no Water
CC_191_835	67.02180	-156.61695	Kogoluktuk River Trib	Low/no Water
CC_190_885	67.02492	-156.58498	Kogoluktuk River Trib	Low/no Water
CC_189_7	67.02782	-156.54861	Kogoluktuk River Trib	No Fish Captured
CC_189_475	67.02514	-156.52567	Kogoluktuk River Trib	No Fish Captured
CC_189_232	67.02526	-156.52624	Kogoluktuk River Trib	No Fish Captured
SB6	67.02475	-156.51458	Kogoluktuk River Trib	No Fish Captured but is Fish Habitat
SB14	67.01629	-156.44286	Kogoluktuk River Trib	No Fish Captured SS (AFFI)
SB13	67.01636	-156.43316	Kogoluktuk River Trib	SS
CC_186_409	67.01649	-156.42856	Kogoluktuk River Trib	SS
CC_186_011	67.01913	-156.41704	Kogoluktuk River Trib	ABF, SS *
SB11	67.02846	-156.40026	Kogoluktuk River Trib	No Fish Captured Same System as SB14

Mauneluk River Drainage				
CC_181_827	67.06036	-156.31160	Mauneluk River Trib	Not Sampled - Fish at Reference Site
Reference Site	67.04881	-156.21301	Main Valley (unnamed) Mauneluk River Trib	SS *
CC_178_641	67.05532	-156.19807	Mauneluk River Trib	No LZ
CC_177_581	67.04995	-156.16250	Mauneluk River Trib	Low/no Water
MB10	67.04609	-156.13913	Mauneluk River Trib	DV, ABF *
CC_175_975	67.04142	-156.10544	Mauneluk River Trib	Not Sampled - Fish Present in Main Creek
MB13	67.02049	-156.08286	Mauneluk River Trib	SS *
LB6	67.00945	-156.07140	Mauneluk River	CH, DV, W, AG, BB, SS (AWC/AFFI)
MB9	67.00926	-156.07123	Mauneluk River Side Channel	Just above AWC Extent for CHs
CC_171_281	67.01673	-156.00647	Mauneluk River Trib	No LZ
CC_170_642	67.01936	-155.98529	Mauneluk River Trib	No LZ
CC_169_479	67.01851	-155.94455	Mauneluk River Trib	No LZ
CC_168_409	67.01653	-155.90874	Mauneluk River Trib	No LZ
CC_168_038	67.01707	-155.89586	Mauneluk River Trib	Low/no Water
CC_167_038	67.01679	-155.86001	Mauneluk River Trib	No LZ
MB6	67.01652	-155.85352	Coal Pass Creek	DV, AG, SS (AWC/AFFI) DV, SS Captured *
CC_166_034	67.01898	-155.82388	Mauneluk River Trib	SS *
SB22	67.02542	-155.65151	Avaraart Lake Trib	NP Captured Downstream *
CC_160_906	67.02640	-155.64507	Avaraart Lake Trib	No Fish Captured but NP Observed *
Selby River Drainage				
			Selby River	CH, DV, AG (AWC/AFFI)
SB19	67.01309	-155.56896	Selby River Narvak Lake Trib	No Fish Captured (likely supports AG)
CC_158_05	67.01218	-155.56284	Selby River	No LZ

			Narvak Lake Trib	
CC_156_18	67.00317	-155.50079	Selby River Trib	High Gradient
CC_154_914	67.00408	-155.45811	Selby River Trib	Close to Main Creek, likely supports AG
MB15	67.00447	-155.44645	Selby River Trib	No LZ
Beaver Creek Drainage				
CC_151_56	67.01584	-155.34454	Beaver Creek Trib	DV *
Reference Site	67.01004	-155.31110	Main Valley (unnamed) Beaver Creek Trib	AG, SS *
CC_150_955	67.01470	-155.32025	Beaver Creek Trib	Fish at Site CC_151_56 and Reference Site
CC_150_600	67.01426	-155.30966	Beaver Creek Trib	Fish at Site 56 - Ref Site
CC_149_995	67.01512	-155.29029	Beaver Creek Trib	Fish at Site 56 - Ref Site
CC_149_698	67.01588	-155.27829	Beaver Creek Trib	Fish at Site 56 - Ref Site
CC_149_414	67.01642	-155.26813	Beaver Creek Trib	Fish at Site 56 - Ref Site
CC_148_935	67.01648	-155.24901	Beaver Creek Trib	Low/no Water
CC_148_702	67.01659	-155.24170	Beaver Creek Trib	Low/no Water
CC_147_897	67.01754	-155.21377	Beaver Creek Trib	Low/no Water
LB2	67.02271	-155.15502	Beaver Creek	CH, DV, AG, NP, BB, W, SS (AWC/AFFI)
CC_146_039	67.02398	-155.14619	Beaver Creek Trib	Wetland
CC_145_652	67.02524	-155.13715	Beaver Creek Trib	No Fish Captured
CC_145_260	67.02727	-155.12482	Beaver Creek Trib	No Fish Captured
CC_145_140	67.02769	-155.12033	Beaver Creek Trib	Low/no Water
CC_144_040	67.02386	-155.08225	Beaver Creek Trib	Low/no Water
SB3	67.02304	-155.07344	Beaver Creek Trib	DV *
CC_143_118	67.01917	-155.05363	Beaver Creek Trib	Wetland
CC_142_571	67.01738	-155.03370	Beaver Creek Trib	No LZ
CC_140_336	67.02810	-154.96097	Beaver Creek Trib	No LZ

SB5	67.02774	-154.95306	Beaver Creek Trib	DV *
SB4	67.02899	-154.93435	Beaver Creek Trib	Not Sampled - DV at SB5
Reed River Drainage				
CC_137_827	67.03959	-154.87550	Reed River Trib	Wetland
LB1	67.03537	-154.83404	Reed River	CH, DV, W, AG, SS (AWC/AFFI)
			Nutuvukti Lake Drainage	LT, AG, AC, NP, W
CC_133_923	67.03531	-154.73853	Nutuvukti Lake Trib	No LZ
CC_133_777	67.03545	-154.73287	Nutuvukti Lake Trib	No LZ
CC_131_843	67.02209	-154.67314	Nutuvukti Lake Trib	No LZ
Reference Site	67.01548	-154.68035	Nutuvukti Lake Trib	No Fish Captured
Kobuk River Drainage				
MB14	67.01780	-154.57750	Gout Creek	CH, DV (AWC) AG Captured *
SB7	67.01724	-154.49304	West Clijstersen Creek Trib	No LZ
SB8	67.01230	-154.45221	West Clijstersen Creek Trib	AG, SS *
MB5	67.01151	-154.44675	West Clijstersen Creek	DV, SS (AWC/AFFI) DV, SS Captured*
CC_123_332	67.02001	-154.38462	Kobuk River Trib	Wetland
LB9	67.02181	-154.35549	Kobuk River	CH, DV, W, AC, AG, SS, BB, LT (AWC/AFFI)
CC_121_882	67.01844	-154.33621	Kobuk River Trib	Wetland
CC_121_262	67.01826	-154.31346	Kobuk River Trib	No Fish Captured
CC_120_045	67.02117	-154.27095	Kobuk River Trib	High Gradient
CC_118_074	67.03939	-154.21743	Kobuk River Trib	No LZ
CC_117_386	67.04270	-154.19314	Kobuk River Trib	Wetland
CC_116_921	67.04249	-154.17555	Kobuk River Trib	Wetland

			Kichaiakaka Creek	CH, DV, AG, BB, SS (AWC/AFFI)
MB7	67.04101	-154.14681	Gourd Creek	DV (AWC)
CC_115_296	67.03736	-154.11856	Kichaiakaka Creek Trib	No Fish Captured
CC_114_607	67.03563	-154.09621	Kichaiakaka Creek Trib	Wetland
CC_113_821	67.03758	-154.06620	Kichaiakaka Creek Trib	Fish Passage Blockage
CC_113_193	67.03461	-154.04554	Kichaiakaka Creek Trib	No LZ
MB8	67.03640	-154.01246	Kichaiakaka Creek Trib	DV *
CC_110_739	67.03729	-153.95797	Kichaiakaka Creek Trib	No LZ
CC_109_127	67.04259	-153.90326	Kichaiakaka Creek Trib	No Fish Captured
CC_108_838	67.04452	-153.89290	Kichaiakaka Creek Trib	No Fish Captured
KOYUKUK RIVER SYSTEM				
Alatna River Drainage				
CC_106_741	67.06039	-153.83905	Helpmejack Creek Trib	High Gradient
CC_106_613	67.06039	-153.83457	Helpmejack Creek Trib	High Gradient
CC_105_655	67.06253	-153.79899	Helpmejack Creek Trib	Wetland
CC_105_61	67.06264	-153.79659	Helpmejack Creek Trib	Wetland
SB16	67.06213	-153.79575	Helpmejack Creek	Upstream of Extent for Ks, CHs, DV, W, AG, NP, BB, SS (AWC/AFFI)
CC_104_927	67.06313	-153.77239	Helpmejack Creek Trib	Wetland
CC_104_453	67.06315	-153.75629	Helpmejack Creek Trib	DV *
CC_104_245	67.06311	-153.74756	Helpmejack Creek Trib	Wetland
CC_104_127	67.06286	-153.74228	Helpmejack Creek Trib	No Fish Captured
CC_103_811	67.06165	-153.73279	Helpmejack Creek Trib	No Fish Captured
CC_103_384	67.06108	-153.71755	Helpmejack Creek Trib	No Fish Captured
CC_103_216	67.06084	-153.71036	Helpmejack Creek Trib	No Fish Captured
MB12	67.06089	-153.67708	Helpmejack Creek Trib	AG *

CC_102_129	67.06065	-153.67107	Helpmejack Creek Trib	Wetland
CC_101_007	67.05614	-153.63105	Helpmejack Creek Trib	No Fish Captured
CC_100_569	67.05434	-153.61667	Helpmejack Creek Trib	No Fish Captured
CC_100_519	67.05383	-153.61365	Helpmejack Creek Trib	No Fish Captured
CC_099_667	67.04926	-153.58585	Helpmejack Creek Trib	No Fish Captured
CC_098_248	67.05349	-153.53843	Helpmejack Creek Trib	Wetland
CC_097_862	67.05657	-153.52731	Lake Creek Trib	No Fish Captured
CC_096_569	67.05641	-153.48030	Lake Creek	Wetland
CC_095_562	67.05896	-153.44316	Lake Creek Trib	No Fish Captured
CC_094_029	67.06484	-153.39161	Lake Creek Trib	No Fish Captured
CC_093_034	67.07218	-153.35729	Alatna River Trib	Wetland
CC_092_450	67.07672	-153.33632	Alatna River Trib	Low/no Water
LB4	67.07641	-153.32669	Alatna River	CH (AWC)
CC_090_380	67.08280	-153.27568	Alatna River Trib	No Fish Captured
Malamute Fork Alatna River Drainage				
			Tobuk Creek	Ks (AWC)
CC_087_521	67.07233	-153.18432	Tobuk Creek Trib	CO * SS *
LB8	67.06476	-153.17584	Malamute Fork	Ks, CO, CHs, W, AG, NP, BB, SS (AWC/AFFI)
CC_086_741	67.06356	-153.17000	Malamute Fork Trib	Low/no Water
CC_086_391	67.06337	-153.15703	Malamute Fork Trib	Fish Passage Blockage
MB1	67.07066	-153.12342	Opposite Creek	K, AG, BB, SS (AWC/AFFI)
CC_083_885	67.07925	-153.07928	Malamute Fork Trib	High Gradient
CC_082_444	67.09217	-153.03865	Malamute Fork Trib	No Fish Captured
CC_079_044	67.09371	-152.92260	Malamute Fork Trib	No LZ (Large Creek – Needs Bridge)

CC_078_538	67.09354	-152.90588	Malamute Fork Trib	No Fish Captured
SB21	67.09169	-152.77381	Malamute Fork Trib	½-Mile from CO Extent
MB11	67.08928	-152.08928	Bedrock Creek Trib	W, AG, NP, BB (AFFI) No Fish Captured
CC_072_309	67.09309	-152.70300	Bedrock Creek Trib	Low/no Water
CC_071_507	67.09177	-152.67621	Bedrock Creek Trib	No Fish Captured
CC_070_518	67.08899	-152.63890	Bedrock Creek Trib	No Fish Captured
CC_069_807	67.08830	-152.61397	Bedrock Creek Trib	No Fish Captured
CC_069_306	67.08650	-152.59749	Bedrock Creek Trib	No Fish Captured
CC_069_2	67.08645	-152.59289	Bedrock Creek Trib	No Fish Captured
CC_068_873	67.08494	-152.58113	Bedrock Creek Trib	No Fish Captured
CC_067_713	67.08158	-152.54006	Bedrock Creek Trib	No Fish Captured
CC_067_275	67.07878	-152.52609	Bedrock Creek Trib	Low/no Water
CC_066_95	67.07735	-152.51401	Bedrock Creek Trib	Low/no Water
Henshaw Creek Drainage				
CC_063_065	67.04547	-152.41998	East Fork Henshaw Creek Trib	Low/no Water
MB4	67.03675	-152.41138	East Fork Henshaw Creek	AG, BB (AFFI)
CC_061_393	67.04064	-152.37539	East Fork Henshaw Creek Trib	No Fish Captured
CC_060_448	67.04118	-152.34076	East Fork Henshaw Creek Trib	No Fish Captured
CC_058_442	67.04148	-152.26693	East Fork Henshaw Creek Trib	No Fish Captured
Malamute Fork John River Drainage				
CC_055_812	67.04603	-152.17612	Malamute Fork Trib	Low/no Water
CC_055_209	67.04016	-152.15349	Malamute Fork Trib	Low/no Water
CC_054_244	67.02884	-152.14277	Malamute Fork Trib	Low/no Water
SB9	67.02495	-152.13319	Malamute Fork Trib	AG, DV * 2-miles from Malamute Fork with CH
John River Drainage				

CC_051_158	67.02204	-152.04337	John River Trib	No Fish Captured
CC_050_100	67.02404	-152.00187	John River Trib	AG *
CC_049_744	67.02576	-151.99434	John River Trib	AG *
CC_048_019	67.02722	-151.93097	John River Trib	AG *
CC_047_600	67.02743	-151.91012	John River Trib	No Fish Captured
CC_046_267	67.02825	-151.86674	John River Trib	No Fish Captured
CC_045_720	67.02927	-151.84497	John River Trib	No Fish Captured
CC_045_650	67.03147	-151.84244	John River Trib	No Fish Captured
LB11	67.03707	-151.81055	John River	Ks, CHs, Wp, AG, BB, NP, LC, LS, SS (AWC/AFFI)
CC_044_332	67.03930	-151.80208	John River Trib	Not Sampled/ No LZ
CC_044_200	67.04035	-151.79682	John River Trib	Not Sampled/ No LZ
CC_043_960	67.04142	-151.78660	John River Trib	Not Sampled/ No LZ
CC_043_609	67.04154	-151.77603	John River Trib	Low/no Water
CC_042_350	67.03918	-151.73043	Ninemile Creek Trib	AG *
CC_041_612	67.03845	-151.70343	Ninemile Creek Trib	Not Sampled/ No LZ
CC_040_860	67.03714	-151.67485	Ninemile Creek Trib	No Fish Captured
CC_038_948	67.03629	-151.60715	Ninemile Creek Trib	No Fish Captured
CC_038_530	67.03485	-151.59198	Ninemile Creek Trib	AG *
Wild River Drainage				
CC_036_760	67.03997	-151.51406	Wild River - UN Trib	No Fish Captured
CC_036_344	67.03997	-151.51406	Wild River - UN Trib	No Fish Captured
LB3	67.04220	-151.48537	Wild River	Ks, CH, W, AG, NP, DV, BB, LS, SS (AWC/AFFI)
Upper Koyukuk River Drainage				
CC_034_307	67.04023	-151.44188	Upper Koyukuk River Trib	Low/no Water

CC_032_975	67.04204	-151.39410	Upper Koyukuk River Trib	Not Sampled/ No LZ
CC_032_159	67.04006	-151.36505	Upper Koyukuk River Trib	Wetland
SB17	67.04582	-151.32704	Mud Creek	AG *
CC_030_380	67.05185	-151.30304	Mud Creek Trib	Not Sampled/ No LZ
CC_029_331	67.05690	-151.27023	Upper Koyukuk River Trib	Wetland
CC_028_900	67.05924	-151.25257	Upper Koyukuk River Trib	Wetland
CC_028_600	67.06119	-151.23994	Upper Koyukuk River Trib	No Fish Captured
CC_027_382	67.06382	-151.20217	Upper Koyukuk River Trib	Wetland
CC_027_121	67.05907	-153.44357	Upper Koyukuk River Trib	Wetland
SB21	67.06147	-151.17973	Upper Koyukuk River Trib	AG *
CC_024_159	67.02941	-151.14206	Upper Koyukuk River Side Channel	Fish Habitat See Below
LB5	67.03040	-151.13066	Upper Koyukuk River	Ks, CH, SF, W, AG, DV, BB, NP, LS, SS (AWC/AFFI)
SB10	67.03160	-151.12198	Upper Koyukuk River Side Channel	BB
			Harriet Creek (just below LB5 crossing)	W, AG, NP, LS, SS (AFFI)
Middle Fork Koyukuk River Drainage				
CC_018_301	67.01233	-150.94536	Middle Fork Koyukuk River Trib	Wetland
4 Sites (unnumbered)	67.01010	-150.78118	Upstream from next 2 Sites (CC_013_129 and 103)	Not Sampled
CC_013_129	67.01278	-150.76792	Middle Fork Koyukuk River Trib	AG *
CC_013_103	67.01280	-150.76711	Middle Fork Koyukuk River Trib	AG *
CC_011_200	67.03181	-150.71751	Middle Fork Koyukuk River Trib	Wetland

CC_010_100	67.04162	-150.68533	Middle Fork Koyukuk River Trib	Wetland
CC_009_800	67.04431	-150.67613	Middle Fork Koyukuk River Trib	Wetland
SB12	67.07153	-150.38468	Chapman Creek Trib	NP *
CC_000_252	67.07754	-150.35638	Chapman Creek Trib	Low/no Water
SB15	67.07872	-150.35387	Chapman Creek Trib	NP *
			Chapman Creek / Lake	NP (AFFI)
South Fork Koyukuk River Drainage				
CC_005_750	67.04869	-150.52414	John R Creek	AG *
CC_004_621	67.04838	-150.49022	John R Creek	AG *
CC_003_345	67.06037	-150.45738	John R Creek	AG *

[1] CC (Corrugated Culvert), SB (Small Bridge), MB (Medium Bridge), LB (Large Bridge)

[2] ABF (Alaska blackfish), AC (Arctic char), AG (Arctic grayling), BB (burbot), CH (chum/ dog salmon), CO (coho/ silver salmon), DV (Dolly Varden), K (King/ Chinook salmon), LC (lake chub), LT (lake trout), LS (longnose sucker), NP (northern pike), P (pink/ humpy salmon), SH (sheefish), SS (slimy sculpin), W (whitefish), s (spawning habitat), * (New species/life stage/ water body AWC & AFFI Nomination).

[3] AWC – Anadromous Waters Catalog (https://www.adfg.alaska.gov/sf/sarr/awc/), and AFFI – Alaska Freshwater Fish Inventory (https://www.adfg.alaska.gov/index.cfm?adfg=ffinventory.main).