

**Fishery Data Series No. 12-22**

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**Fish Inventory and Anadromous Cataloging in the  
Upper Koyukuk River and Chandalar River Basins,  
2010**

by

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and

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May 2012

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



## 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 Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management 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.

<b>Weights and measures (metric)</b>		<b>General</b>		<b>Mathematics, statistics</b>	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	$H_A$
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	$e$
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, $\chi^2$ , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient (multiple)	R
milliliter	mL	west	W	correlation coefficient (simple)	r
millimeter	mm	copyright	©	covariance	cov
		corporate suffixes:		degree (angular)	$^\circ$
<b>Weights and measures (English)</b>		Company	Co.	degrees of freedom	df
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	expected value	$E$
foot	ft	Incorporated	Inc.	greater than	>
gallon	gal	Limited	Ltd.	greater than or equal to	$\geq$
inch	in	District of Columbia	D.C.	harvest per unit effort	HPUE
mile	mi	et alii (and others)	et al.	less than	<
nautical mile	nmi	et cetera (and so forth)	etc.	less than or equal to	$\leq$
ounce	oz	exempli gratia (for example)	e.g.	logarithm (natural)	ln
pound	lb	Federal Information Code	FIC	logarithm (base 10)	log
quart	qt	id est (that is)	i.e.	logarithm (specify base)	log <sub>2</sub> , etc.
yard	yd	latitude or longitude	lat. or long.	minute (angular)	'
		monetary symbols (U.S.)	\$, ¢	not significant	NS
<b>Time and temperature</b>		months (tables and figures): first three letters	Jan,...,Dec	null hypothesis	$H_0$
day	d	registered trademark	®	percent	%
degrees Celsius	°C	trademark	™	probability	P
degrees Fahrenheit	°F	United States (adjective)	U.S.	probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
degrees kelvin	K	United States of America (noun)	USA	probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
hour	h	U.S.C.	United States Code	second (angular)	"
minute	min	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard deviation	SD
second	s			standard error	SE
<b>Physics and chemistry</b>				variance	
all atomic symbols				population sample	Var
alternating current	AC			sample	var
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				

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## ABSTRACT

During August 4–August 23, 2010, the Alaska Department of Fish and Game, Division of Sport Fish conducted an inventory of stream fish assemblages and associated aquatic and riparian habitats in a 22,057 square-km study area comprising the upper Koyukuk River and Chandalar River basins (excluding conservation units). We visited 145 study sites in streams ranging in size from wadeable headwaters to the mainstem Chandalar River. At each site, we collected data describing site location, aquatic habitat, riparian vegetation, and fish-assemblage composition. Fish were collected primarily using backpack and boat-mounted electrofishers. In total, 11 fish species, representing 10 genera and 6 families were found. Anadromous fish were documented at 17 study sites. As a result of this inventory, a total stream length of 130 km of previously-unlisted anadromous fish habitat was added to the State of Alaska's *Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes*.

Key words: fish inventory, stream survey, anadromous, Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes, Anadromous Waters Catalog, electrofishing, Koyukuk River, Chandalar River, John River, Your Creek, Coldfoot, Wiseman, Bettles, Anaktuvuk Pass, lake chub, *Couesius plumbeus*, longnose sucker, *Catostomus catostomus*, northern pike, *Esox lucius*, least cisco, *Coregonus sardinella*, round whitefish, *Prosopium cylindraceum*, Arctic grayling, *Thymallus arcticus*, chum salmon, *Oncorhynchus keta*, Chinook salmon, *Oncorhynchus tshawytscha*, Dolly Varden, *Salvelinus malma*, burbot, *Lota lota*, slimy sculpin, *Cottus cognatus*.

## INTRODUCTION

The State of Alaska is committed to conserving fish habitat. Alaska is the only state with a constitutional mandate<sup>1</sup> to maintain sustained yields of fish stocks (ADCCED 2009), and the Alaska Department of Fish and Game (ADF&G) has a statutory responsibility to manage the use of wild fish stocks for sustained yield (AS 16.05.730(a)). Along with proper management of harvests, protection of fully-functioning and connected aquatic habitats is necessary to sustain fish stocks supporting Alaska's commercial, subsistence, and recreational fishing economies.

The state has multiple administrative tools to protect fish habitat. Alaska Statute (AS) 16.05.871 (the Anadromous Fish Act), along with the Fishway Act (AS 16.05.841, which requires that fish passage be maintained in any stream "frequented by salmon or other fish"), constitute Alaska's strongest and most comprehensive in-stream fish-habitat protection standards. Several other Alaska statutes specifically reference fish habitat, including multiple sections in AS 41.17 (Forest Resources and Practices Act) and AS 46.15 (Water Use Act), both administered by the Department of Natural Resources, and AS 46.03.758 (Civil penalties for discharges of oil), administered by the Department of Environmental Conservation.

The Anadromous Fish Act requires ADF&G to "specify the various rivers, lakes and streams or parts of them" of the state that are important to the spawning, rearing or migration of anadromous fish. The *Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes* (Anadromous Waters Catalog, AWC) and its associated atlas are the media used to accomplish this specification, and are adopted as regulation under 5 AAC 95.011. Activities and uses conducted in, or otherwise affecting, either any AWC-listed water bodies (under the Anadromous Fish Act), or fish passage in any fish-bearing waters (under the Fishway Act) statewide, require prior approval from the ADF&G Division of Habitat, which is responsible for reviewing project plans and specifications submitted by permit applicants. Permitting biologists work closely with project applicants to ensure that project plans provide for

<sup>1</sup> The Constitution of the State of Alaska; Article 8, Section 4 – Sustained Yield states "Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses."

the proper protection of fish habitat. If so, a Fish Habitat Permit is issued authorizing the activity. Permit applications may be denied if impacts to fish habitat cannot be adequately avoided, minimized, or mitigated.

Many other federal, state, and local government policies specify additional protections for anadromous fish habitat in Alaska. Like the Anadromous Fish Act, however, these only apply to those waters where anadromous fish use is explicitly documented, typically by reference to the AWC. For example, the National Marine Fisheries Service (NMFS) identifies Essential Fish Habitat (EFH) for Alaska stocks of Pacific Salmon in freshwater by reference to the AWC. Three of the U.S. Army Corps of Engineers' regional conditions for nationwide permits in Alaska specify additional requirements and restrictions for proposed projects located in or near AWC-listed water bodies. Other policies that protect AWC-listed water bodies are found in: area plans for state lands; state forest management plans; resource management plans for Bureau of Land Management (BLM) lands; federal and state regulations specifying waters closed to commercial and subsistence fishing; and city and borough ordinances.

Comprehensive fish-distribution information is required for effective land-use, conservation, and restoration planning to identify sensitive and important habitats. State land-management plans, such as the *Susitna Area Plan* and the *Bristol Bay Area Plan*, and more specific plans such as the *Kenai Peninsula Brown Bear Conservation Strategy*, identify management guidelines or specify geographic areas of concern based in large part on the known distribution of fish. Watershed and conservation planning efforts also rely heavily on knowledge of fish distributions and aquatic habitat characteristics and their spatial and temporal relationship to other resources and activities. Planning for habitat-restoration programs, such as fish-passage enhancement, is also better informed with access to comprehensive fish-distribution information.

Resource developments, such as transportation and utility corridors, are most-effectively informed if complete fish distribution data is available at project onset. If comprehensive fish-distribution information is provided during project scoping, projects can be designed to avoid habitat impacts; however, absence of comprehensive fish distribution information can lead to unintended fish habitat impacts.

All these fish-habitat conservation authorities and planning processes are limited, however, by the extent of current knowledge of fish habitats and their distribution. The Anadromous Fish Act, along with other federal, state, and local government policies that refer to the AWC, provides protection only to those waters listed in the AWC. Listing new water bodies requires site-specific, direct, and unambiguous observations of anadromous fish followed by a biological and public-review process. Habitat modeling, speculation, or professional judgment is not sufficient to add water bodies to the AWC.

Previous field inventories have demonstrated significant data gaps in the understanding of Alaskan freshwater fish distribution and habitat characteristics. For example, recent (2003–2008) anadromous-cataloging work resulted in a 75% increase in the sum of the lengths of AWC-listed streams, and a 72% increase in the number of cataloged water bodies, in the Nushagak River basin. The state has limited authority to protect undocumented fish habitat.

To refine fish-habitat management in specific waters, resource agencies also need knowledge of local aquatic and riparian habitat characteristics. Since aquatic and riparian habitats vary in their sensitivity to human activities, these habitat characteristics should be well understood when planning or permitting general or specific activities. Physical and biological characteristics of

riparian and aquatic habitats are important factors in determining appropriate best-management practices and mitigation strategies. Therefore, at each fish-collection reach, we also recorded variables describing water quality, channel morphology, and riparian vegetation to provide basic habitat information needed to develop fish-habitat permit stipulations or to identify specific further sampling needs and methods necessary to design adequate stipulations or mitigation. Documenting habitat characteristics at fish-collection reaches also provides baseline information for comparison with future studies, and may contribute to improved understanding of fish-habitat associations.

In response to the above needs, in August 2010 we completed a rapid, baseline inventory of stream-fish assemblages and associated aquatic and riparian habitat characteristics in 3 high-priority subbasins in the upper Koyukuk River and Chandalar River basins in Interior Alaska. This project brings to 30 (listed below) the total number of subbasins in which we have completed similar baseline fish inventories since 2002.

Subbasin	Name	Year	Subbasin	Name	Year
19020501	Upper Susitna River	2003	19040404	Ramparts	2004
19020503	Talkeetna River	2003	19040507	Tanana Flats	2004
19020504	Yentna River	2003	19040508	Nenana River	2004
19020601	Redoubt-Trading Bays	2002	19040511	Lower Tanana River	2004
19030301	Upper Nushagak River	2003, 2005, 2006	19040601	Upper Koyukuk River	2010
19030302	Mulchatna River	2003, 2005, 2006	19040602	South Fork Koyukuk River	2010
19030303	Lower Nushagak River	2003, 2005, 2006	19040701	Tozitna River	2004
19030402	Farewell Lake	2007	19040801	Anvik River	2008
19030403	Takotna River	2007	19040802	Upper Innoko River	2008
19030404	Holitna River	2009	19040803	Lower Innoko River	2008
19030405	Stony River	2007	19040804	Anvik to Pilot Station	2008
19030501	Aniak	2009	19050102	Unalakleet	2009
19040301	MF-NF Chandalar Rivers	2010	19050103	Norton Bay	2004
			19050105	Imuruk Basin	2004
			19050201	Shishmaref	2004
			19050202	Goodhope-Spafarief Bay	2004
			19050203	Buckland River	2004

## STUDY AREA AND SETTING

We selected a 22,057 square-km (sq km [8,516 sq mi]) study area (Figure 1) in the southern Brooks Range bounded by the Arctic Circle to the south and the Continental Divide to the north. The study area was watershed based, encompassing the upper Koyukuk River (upstream of Bettles), South Fork Koyukuk River, and upper Chandalar River (upstream of the East Fork) watersheds, excluding any lands located within conservation units (i.e., Gates of the Arctic National Park and Preserve [Gates NP&P], Arctic National Wildlife Refuge [NWR], and Kanuti NWR). We selected this study area for fish-inventory fieldwork based on: suspected gaps in AWC coverage; information on human activities and infrastructure; land conservation-management status; and input from ADF&G area biologists and managers.

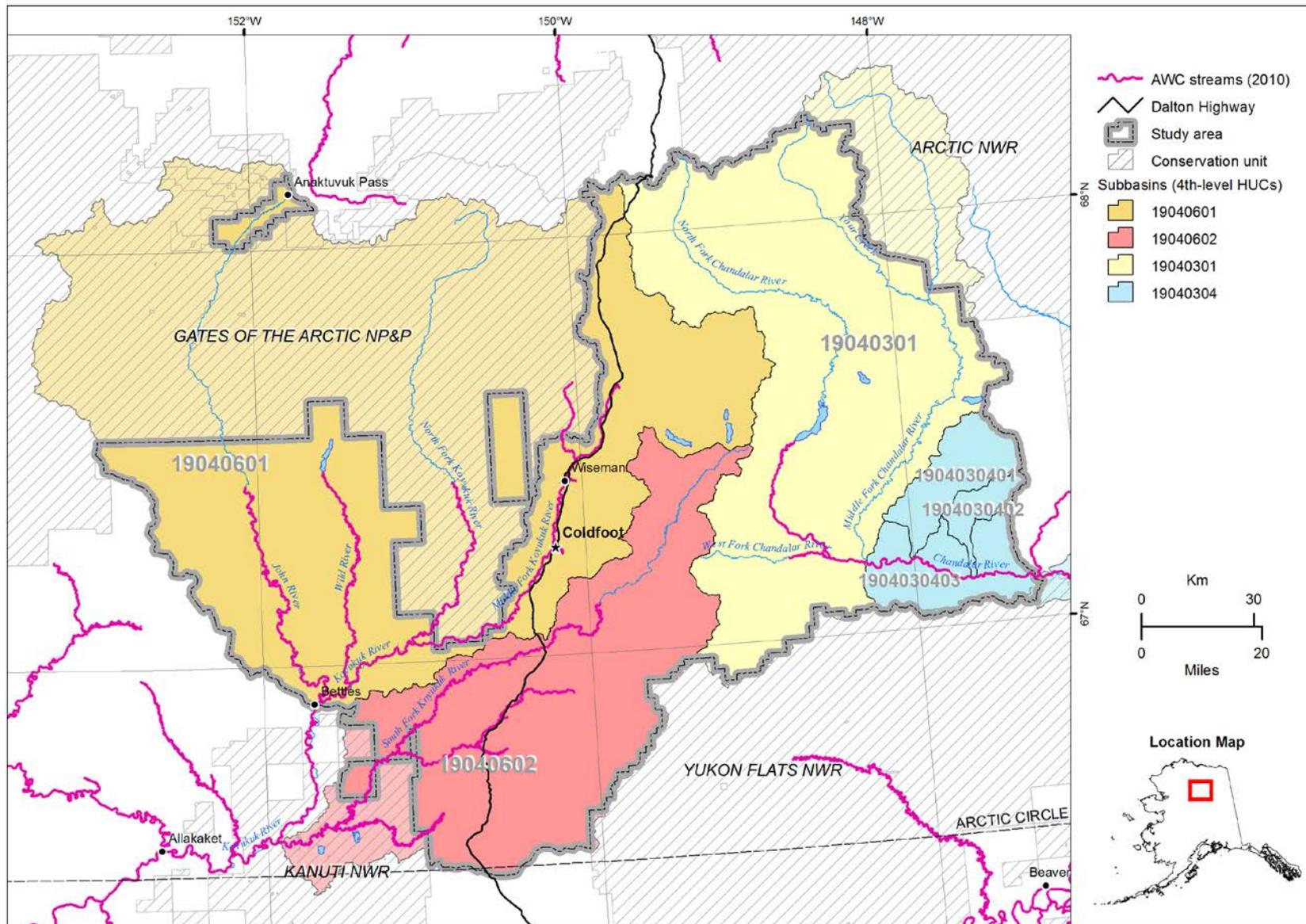


Figure 1.—Study area map.

## **Watersheds and major water bodies**

The upper Koyukuk River watershed (17,947 sq km [6,929 sq mi], maximum elevation 2,273 m [7,457 ft], mean elevation 848 m [2,782 ft], Strahler stream order = 8) drains the southern slope of the Endicott Mountains. We excluded 10,029 sq km (3,872 sq mi) of the North Fork Koyukuk River and the northern half of the John River (except for the Anaktuvuk Pass vicinity) drainages located in Gates NP&P from the study area (Figure 1). The longest channel, following the John River from its source to Bettles, is 255 river km (158 mi) long. Other large tributaries include the Wild, North Fork Koyukuk, and Middle Fork Koyukuk rivers. There are 3 large lakes in this watershed: Bob Johnson (8.9 sq km [3.4 sq miles]); Wild (8.9 sq km [3.4 sq miles]); and Twin (8.7 sq km [3.3 sq miles]) lakes.

The South Fork Koyukuk River watershed (5,978 sq km [2,308 sq mi], maximum elevation 1,884 m [6,180 ft], mean elevation 546 m [1,791 ft], order = 6) drains the southern foothills of the Philip Smith Mountains (Brooks Range) and northwestern flank of the Ray Mountains. The mainstem is 298 km (185 mi) long. Fish Creek and Jim River are the largest tributaries. We excluded 843 sq km (325 sq mi) of the South Fork Koyukuk River watershed located in Kanuti NWR, mostly in the flats at the lower southwestern end of the watershed, from the study area.

The upper Chandalar River watershed (10,557 sq km [4,076 sq mi], maximum elevation 2,338 m [7,670 ft], mean elevation 954 m [3,129 ft], order = 7) drains the Philip Smith Mountains and northern flank of the Ray Mountains. Its longest channel, following Your Creek from its source to the East Fork Chandalar River confluence, is 307 km (191 mi) long. The North and Middle Forks of the Chandalar River and Your Creek are the largest tributaries. We excluded 1,536 sq km (593 sq mi) of the upper Middle Fork Chandalar River drainage located in Arctic NWR from the study area. There are 3 large lakes in this watershed: Chandalar (22.2 sq km [8.5 sq miles]); Ackerman (7.4 sq km [2.8 sq miles]); and Squaw (4.9 sq km [1.9 sq miles]) lakes.

## **Climate**

The climate varies from polar (short, cool summers; long, cold winters) in the Brooks Range to continental (warmer summers; long, cold winter) south of the Brooks Range (Nowacki et al. 2001), with extreme seasonal variations in temperature. Extreme temperatures reported at Bettles Airport (elev. 196 m [642 ft]) range from -57 to 34°C (-70 to 93°F; WRCC 2011). The climate is dry—average total annual precipitation is 25 cm (9.75 in) at Anaktuvuk Pass (elev. 640 m [2100 ft]) and 36 cm (14.1 in) at Bettles Airport. About half the annual precipitation falls as snow, ranging from 147 cm (58 in) at Anaktuvuk Pass to 292 cm (115 in) at the Chandalar Shelf DOT weather station (elev. 991 m [3250 ft], WRCC 2011). Due to temperature inversions, the coldest winter temperatures usually occur in the valley bottoms.

## **Landscape**

The topography of the study area varies from high, steep, angular Brooks Range peaks in the northeast, to a zone of lower and more rounded foothills centrally and in the southeast, to broad valleys and rolling lowlands in the southwest. A broad east-west oriented valley separates the Brooks Range in the north from the Ray Mountains in the southeast. Surficial deposits vary from coarse rubble and scree on the steep mountain slopes to thick alluvial and glacial sediments in the valleys. Thick continuous permafrost in the Brooks Range thins some and becomes discontinuous to the south (Nowacki et al. 2001). In the Brooks Range, vegetation consists mostly of various alpine barrens, tundra, and sedge-tussock types, transitioning to a patchwork of

boreal forest, shrub, and bog communities at lower elevations (Fleming 1998, Viereck et al. 1992). Fires are very frequent in the forested lowlands.

## **Geology**

The geology of the Brooks Range was described by Moore et al. (1994) and most-recently mapped by Till et al. (2008). Structurally, the Brooks Range is basically a stack of imbricated thrust sheets that were transported to the north (McCarthy 2002). In the upper portion of the Koyukuk River and Chandalar River watersheds, sedimentary rock, including carbonates, of the Endicott Mountains subterrane dominate. The Schist Belt of metamorphic rock (schists, phyllite, quartzite) of the Hammond subterrane passes through the middle and lower portion of these watersheds, along with the upper South Fork Koyukuk River watershed. The southern portion of the South Fork Koyukuk River watershed (Jim River and Fish Creek), along with the southern (north-flowing) upper Chandalar River tributary drainages (West Fork Chandalar River, Trail Creek, Monarch Creek) comprises primarily intrusive igneous and volcanic rocks of the Ruby Terrane and a southwest extension of the Schist Belt.

## **Glaciation**

During the Wisconsin glaciation (80,000–10,000 years ago), an ice cap covered the Brooks Range (Milner et al. 1997). Small remnant cirque glaciers persist along the Continental Divide in the eastern Brooks Range, including in the North Fork Koyukuk River and Middle Fork Chandalar River headwaters. In the southern Brooks Range foothills and Ray Mountains, Pleistocene glaciation was limited to the higher peaks. The lowlands remained ice-free during Pleistocene glaciations.

## **Flow regime**

Stream flow in the study area typically peaks in May–June during snowmelt (Figure 2). Due to the prevalence of frozen soil and steep, sparsely-vegetated mountain slopes, soil infiltration capacity is low. Summer storms cause brief, localized high discharges. The result of these conditions is a flashy hydrograph and extremely low or no flow in winter. Streams are generally frozen over for 6–6.5 months in the winter. Many streams freeze solid, and fish are restricted to deep (>2 m) pools, lakes or perennial springs (Milner et al. 1997).

## **Thermal regime**

High air temperature in the summer can cause elevated stream temperatures in Interior Alaska, but accumulated annual degree days are lower with increasing latitude. Thus, at high latitudes, the typical annual stream temperature curve has a narrower, but as high or higher, peak compared to similar streams farther south (Milner et al. 1997). Little annual stream temperature data was available for the study area—Slate Creek at Coldfoot apparently has the only active stream gage. At Slate Creek over the past 10 years, a maximum daily mean water temperature of 10°C (50°F) was reached on July 10, but a daily maximum of 16°C (61°F) was recorded. Daily maxima typically remain near 0°C from mid-October through mid-May in Slate Creek (USGS 2011a). Reduced annual stream temperature results in decreased food availability and assimilation rate in high-latitude streams. As a result, biotic diversity is typically lower with increasing latitude. Diptera (true flies and mosquitoes) larvae dominate the stream macroinvertebrate community, and salmonids dominate the freshwater fish community (Oswood 1997).

## **Human activity**

While climate, topography, geology, ground- and surface-water flow and thermal regimes, and extent of glaciations are likely among the dominant landscape-scale drivers shaping extant fish assemblages in the study area, human activities affect fish-occurrence locally. Existing stream-crossing structures impede fish movements. For example, an ADF&G fish-passage survey in 2010 found that only 4 of 15 culverts surveyed along the Dalton Highway in our study area were adequate for fish passage (ADF&G 2011). The Trans Alaska Pipeline System (TAPS) has had relatively-minor impacts to freshwater systems so far (Milner et al. 1997), but the potential for a major spill increases as the pipeline ages. Sand and gravel mining and ice-road construction activities associated with construction and maintenance of the Dalton Highway, TAPS, and spur roads providing access to mines have likely impacted freshwater fish habitats in the study area.

Chandalar and Wiseman are among the important mining districts in Alaska. Placer- and lode-gold mining have occurred in the study area since gold was discovered in 1899 on the Middle Fork Koyukuk River, and in 1906 on Big Creek in the Chandalar area (Brosge and Reiser 1972). In the upper Chandalar River and Koyukuk River watersheds, there are currently 2 active lode-gold mines (both in the Chandalar District), Little Squaw (on the ridge between Little Squaw and Squaw creeks) and Mikado (upper Tobin Creek) mines, and at least 19 active placer-gold mines (USGS 2011b).

According to LaPerriere and Reynolds (1997), the major potential effects of placer mining on Alaskan stream ecosystems are related to an increase in sediment, organic loading, and heavy metals to nearby streams. It has been generally assumed that because most Alaskan placer deposits contain a low percentage of easily-oxidizable sulfide minerals, drainage of acid water from placer mines will not be a major problem (Madison 1981). Acid mine drainage and high concentrations of associated dissolved metals in streams (effects on fish reviewed by Jennings et al. 2008) may result from processing lode ore from high-sulfide deposits. According to Barker et al. (2009), more than 95 percent of the ore milled in the Chandalar district to-date was processed in the Tobin Creek mill and placed in ponds, which were sealed in the early 1990s. Natural weathering and drainage from high-sulfide deposits can also cause naturally-acidic streams with associated dissolved metals. Barker (2007) reported acidic streams and seeps (pH as low as 2.5) associated with patches of dead vegetation and acid-tolerant moss and lichen resulting from oxidizing sulfides in subsurface bedrock on the ridge dividing Big Creek from Little Squaw Creek and elsewhere in the Chandalar district.

## **Recent conditions**

Some extreme climactic events occurred in 2010 prior to our fieldwork. The month of May had the highest mean air temperature recorded during Wiseman's 62-year period of record (WRCC 2011). And the snow pack was below average during the winter of 2009–2010. As a result, the volume of snowmelt runoff was likely low and tapered off early, so base flow during late May through June (coinciding with Chinook and summer chum salmon migration to spawning grounds) was likely very low throughout the region, as seen in the Slate Creek hydrograph (Figure 2). This period of low water was followed by the wettest month on record in July (12.6 cm [4.96 in] of rainfall at Wiseman), with a flood advisory issued July 6 for the Southeastern Brooks Range. Water levels likely remained higher than normal during our fieldwork.

## PRIOR FISH STUDIES IN THE STUDY AREA

Most of the prior fish-occurrence studies in the study area were limited geographically to water bodies intersected by the TAPS (e.g., Rockwell and Johnson 1974, Netsch 1975, Gnath et al. 2002) or proposed gas pipeline corridors (e.g., unpublished data emailed to the author January 13, 2011 from Stewart Seaberg, Environmental Services Department Manager, ASRC Energy Services, Anchorage), or limited in scope to lake surveys (e.g. Roguski and Spetz 1968, Kramer et al. 1976, Pearse 1978) or adult salmon counts.

The U.S. Fish and Wildlife Service (USFWS) counts Chandalar River chum salmon by sonar (e.g., Melegari 2009), and has previously counted chum and Chinook salmon by weir and sonar in the South Fork Koyukuk River (e.g., Troyer 1993, Wiswar 1997). The ADF&G Division of Commercial Fisheries conducts aerial salmon surveys in the South Fork Koyukuk River from Fish Creek to Mosquito Fork, and up the Jim River as far as Grayling Creek (email to author from Bonnie Borba, Fishery Biologist, ADF&G Division of Commercial Fisheries, Fairbanks, June 30, 2010; e.g., Barton [1984]). Historical salmon escapement (weir, sonar) and aerial survey counts are available online via ADF&G's AYK Database Management System (ADF&G 2010).

From 2002–2004, ADF&G and the National Marine Fisheries Service (NMFS) conducted a basin-wide Yukon River Chinook salmon radio-telemetry study (Eiler et al. 2004, 2006a, and 2006b). Adult Chinook salmon were captured and tagged near the village of Russian Mission and tracked to spawning sites upriver using remote tracking stations and aerial tracking surveys. Chinook salmon were tracked to final destinations in the upper Chandalar (as far as Chandalar Lake), Middle Fork Koyukuk (as far as Slate Creek), and South Fork Koyukuk (as far as Prospect Creek) rivers.

Other relevant fish-distribution studies conducted recently in our study area include:

- During July 2005, BLM, ADF&G, and the Yukon River Drainage Fisheries Association cooperated on an anadromous-cataloging project to document juvenile salmon habitat in a portion of our study area (unpublished data emailed to the author June 18, 2010 from Bob Karlen, Fisheries Biologist, BLM, Fairbanks). They deployed minnow traps at 29 sites in the South Fork Koyukuk River and 8 sites in the Middle Fork Koyukuk River drainages.
- Andersen et al. (2004) and Andersen (2007) recorded traditional ecological knowledge of local expert fishers in the upper Koyukuk River drainage, including observations on the distribution and seasonal movements of non-salmon fishes.
- Brown (2009) tracked movements of radio-tagged adult whitefishes in the upper Koyukuk River drainage (mostly within Kanuti NWR downstream of our study area).

These prior studies documented the following 12 fish species in the study area:

longnose sucker ( <i>Catostomus catostomus</i> )	chum salmon ( <i>Oncorhynchus keta</i> )
northern pike ( <i>Esox lucius</i> )	Chinook salmon ( <i>Oncorhynchus tshawytscha</i> )
humpback whitefish ( <i>Coregonus pidschian</i> )	Dolly Varden ( <i>Salvelinus malma</i> )
least cisco ( <i>Coregonus sardinella</i> )	lake trout ( <i>Salvelinus namaycush</i> )
round whitefish ( <i>Prosopium cylindraceum</i> )	burbot ( <i>Lota lota</i> )
Arctic grayling ( <i>Thymallus arcticus</i> )	slimy sculpin ( <i>Cottus cognatus</i> )

Lake trout and least cisco reported from locations in our study area were only collected from lakes (although Andersen [2007] indicated least cisco may also occur within the study area in the lower South Fork Koyukuk River). At least 4 additional species may occur in the study area, but their presence has not been confirmed. Alaska blackfish (*Dallia pectoralis*), broad whitefish

(*Coregonus nasus*), and inconnu (sheefish, *Stenodus leucichthys*) occur downstream of our study area in the Koyukuk River lowlands. However, Kramer et al. (1976) reported a single broad whitefish (500 mm long) from Chandalar Lake, and Brown (2009) reported a single broad whitefish from the lower South Fork Koyukuk River drainage during spring-time sampling in lakes. One sheefish passed the South Fork Koyukuk River weir downstream of the study area in 1996 (Wiswar 1997). Alaska blackfish occur in certain (deep, vegetated, land-locked) lakes in the Koyukuk River lowlands (Andersen et al. 2004). Andersen et al. (2004) reported that a local resident described fish apparently similar to lake chub (*Couesius plumbeus*) found in Bob Johnson Lake.

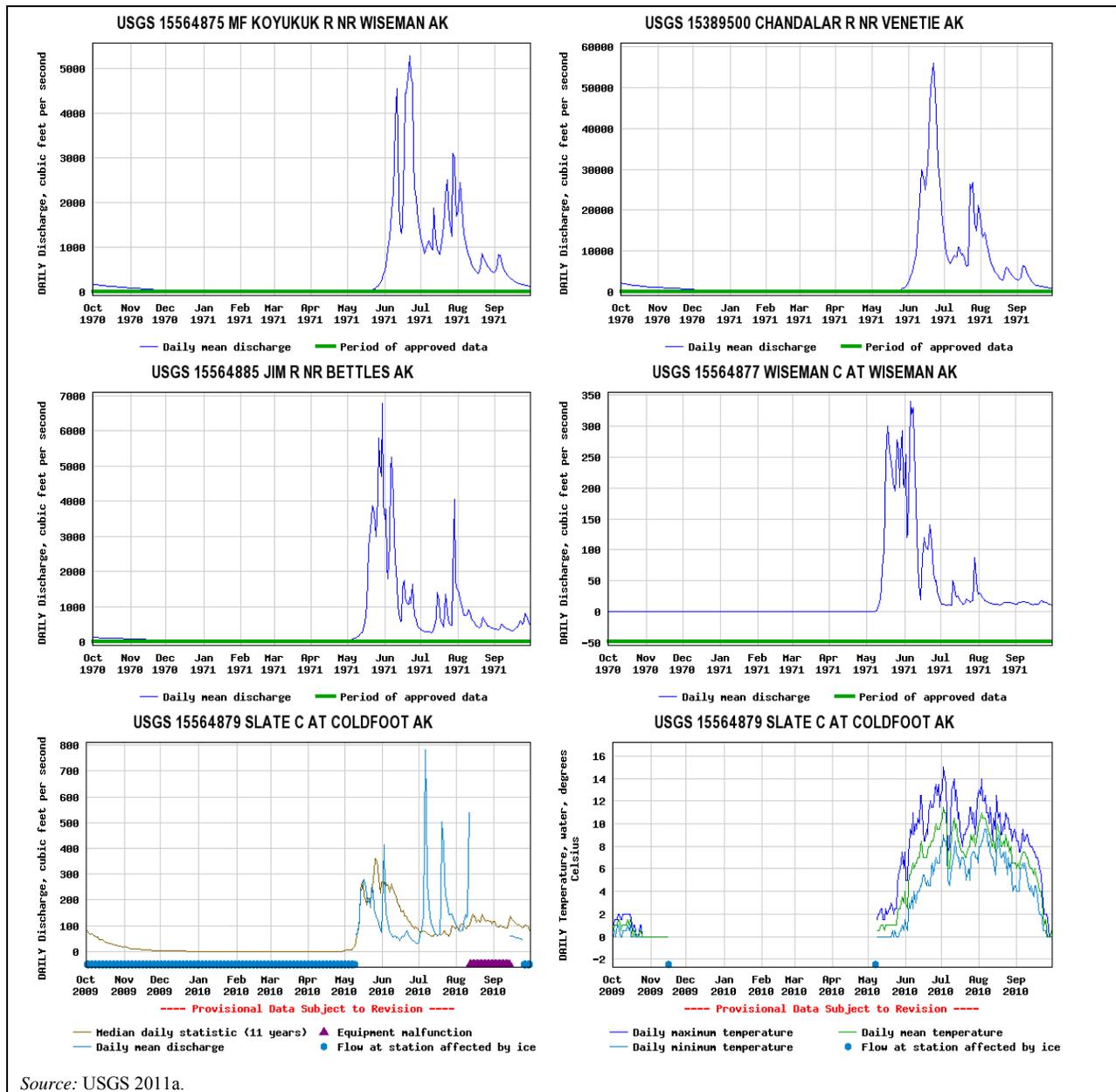


Figure 2.—Example hydrographs and water-temperature profile for study-area rivers.

## OBJECTIVES

The overall goal of the AFFI program is to provide information needed for management of the habitats that support Alaska's freshwater fishes. This project contributed to that goal by achieving the following objectives:

Objective 1: To maximize the spatial increase of mapped anadromous fish habitat depicted in the AWC by completing a baseline inventory of fish (with emphasis on anadromous fish) assemblages in high-priority upper Koyukuk River and Chandalar River subbasins.

Task 1: Locate fish-collection reaches to maximize the spatial increase of specified anadromous fish habitat in targeted streams while minimizing the number of study sites per stream. At each reach, record GPS (Global Positioning System) coordinates and the occurrence and type of barriers to fish passage.

Task 2: Sample each reach using standardized fish collection techniques and sufficient sampling effort to document the presence of all common fish species occurring in the reach at the time of sampling.

Task 3: Record the species, life stage, number, and fork length of all fish collected, and record the species, life stage, and (estimated) number of visually-observed (but not collected) fish from each fish-collection reach. Describe the fish collection effort and extent of area sampled.

Task 4: For each water body in which anadromous fish are observed, submit a nomination to the AWC, providing sufficient information to achieve the intended result (i.e., addition, deletion, correction, or backup information).

Objective 2: To record characteristics of aquatic and riparian habitats at each study site such that sufficient information is documented to: (a) identify well-supported and adequate habitat protection stipulations for permitting of local low level disturbances; or (b) identify specific further sampling needs necessary to design adequate habitat protection stipulations or mitigation for permitting moderate or greater-level disturbances.

Task 1: Record a suite of standard aquatic habitat parameters at each study site.

Task 2: Characterize the dominant riparian vegetation communities at each study site.

Objective 3: For nonwadeable streams—To develop stopping rules to guide fish-inventory field crews in estimating when a sufficient length of stream has been sampled to meet Objective 1, Task 2.

Task 1: At each nonwadeable stream (200- and 1500-sq km target streams), record fish observations separately for a minimum of 10 spatially-sequential subreaches (or as many as can be sampled in 1 day), each equivalent in length to 10 wetted channel widths. Sample additional subreaches as necessary until no new fish species are recorded from 6 consecutive subreaches.

Task 2: Based on field data collected at nonwadeable target streams, develop appropriate stopping rules for single-pass electrofishing in nonwadeable Alaskan rivers.

## METHODS

Unless otherwise specified below, we followed the methods of Buckwalter et al. (2010). The following sections (Study Area Selection, Target Streams, Fish-Collection Reaches, and Stations) describe how we determined, prior to fieldwork, *where* to conduct this project. The

Fish-Collection Methods section and Aquatic and Riparian Habitat Assessment section describe the fish-collection and habitat-characterization protocols followed during fieldwork.

Because of a lack of road access to most target streams within the study area, this project was supported by helicopter (a Robinson R-44 and a Bell 206BIII). The field crew based at the National Park Service housing facility at Marion Creek (mile 179 Dalton Highway, 5 miles north of Coldfoot).

On each team, one person was the designated crew leader, based on experience with similar surveys and knowledge of the goals, objectives, and protocols of this project. Each crew leader was responsible for all aspects of the field operations of a team, determined the daily sequence of target stream visits, and selected the location of fish-collection reaches. The other crewmember assisted with all data collection responsibilities.

## STUDY AREA SELECTION

### Hydrologic units

The study area boundaries were based on watershed boundaries, with conservation units excluded. We adopted Seaber et al.'s (1987) national hydrologic-unit classification, as revised for Alaska by Lamke and McIntire (1995), as our spatial framework. The entire nation is divided and sub-divided into successively smaller nested watersheds: regions; subregions; basins; and subbasins. Alaska comprises an entire region (19), which is divided into 6 subregions (1901, Southeast; 1902, Southcentral; 1903, Southwest; 1904, Yukon; 1905, Northwest; and 1906, Arctic). These 6 subregions are further divided into 33 basins and 136 subbasins. The subbasin is the hydrologic unit that most closely matches the size of a typical AFFI fish-inventory project study area; therefore, the subbasin was chosen as the fundamental spatial unit for prioritizing and implementing AFFI projects. Subbasins may be further sub-divided into watersheds and subwatersheds<sup>2</sup>.

The 22,057-square-km (sq km) study area (Figure 1) comprises subbasins 19040601 (Upper Koyukuk River), 19040602 (South Fork Koyukuk River), 19040301 (Middle Fork-North Fork Chandalar River) and the portion of subbasin 19040304 (Lower Chandalar River) upstream of the East Fork Chandalar River (including subbasins 1904030401, 1904030402, and 1904030403). The study area is located within subregion 1904 (Yukon) and basins 190403 (Chandalar and Christian rivers) and 190406 (Koyukuk River).

The study region considered for fish-inventory fieldwork in 2010 comprised the entire state, excluding: selected conservation units<sup>3</sup>; the North Slope (Div. of Habitat is planning a multi-year fish-inventory and anadromous-cataloging project on the North Slope); Southeast Alaska (ADF&G's anadromous cataloging in Southeast Alaska is conducted by the Div. of Sport Fish, Region 1, Resource Mapping and Inventory Group); Bristol Bay, Shelikof Strait, and Cook Inlet drainages (to be surveyed with dedicated funding during 2011–2013); subbasins 19040509 (Tolovana River) and 19040506 (Chena River), which were partially surveyed by ABR, Inc. in 2009 (no new anadromous water bodies were found); 3 subbasins for which sufficient hydrography data is lacking (19030103—Western Aleutian Islands, 19050101—St. Lawrence

<sup>2</sup> Source: Watershed Boundary Dataset for Alaska. Available at: <http://datagateway.nrcs.usda.gov>. Accessed 5/13/2010.

<sup>3</sup> Lands classified by Smith et al. (2006) with a Conservation Management Status (CMS) value of 1–2. Using the framework of the USGS Gap Analysis Program, Smith et al. (2006) developed CMS categories for Alaska according to the degree to which the land is managed for conservation. A CMS value of 1 indicates that a management plan permanently protects the total land system, allowing natural disturbance events, and motorized access is limited. A CMS value of 1.5 is identical to a CMS value of 1, except motorized access is generally allowed. A CMS value of 2 indicates a management plan protects the total land system, but some/all natural disturbance events are suppressed and human use occurs on more than 5% of the land.

Island, and 19030104—Pribilof Islands); and the following 27 subbasins sampled during prior AFFI fieldwork:

Subbasin	Name	Year	Subbasin	Name	Year
19020501	Upper Susitna River	2003	19030501	Aniak	2009
19020503	Talkeetna River	2003	19040404	Ramparts	2004
19020504	Yentna River	2003	19040507	Tanana Flats	2004
19020601	Redoubt-Trading Bays	2002	19040508	Nenana River	2004
19030301	Upper Nushagak River	2003, 2005, 2006	19040511	Lower Tanana River	2004
19030302	Mulchatna River	2003, 2005, 2006	19040701	Tozitna River	2004
19030303	Lower Nushagak River	2003, 2005, 2006	19040801	Anvik River	2008
19030402	Farewell Lake	2007	19040802	Upper Innoko River	2008
19030403	Takotna River	2007	19040803	Lower Innoko River	2008
19030404	Holitna River	2009	19040804	Anvik to Pilot Station	2008
19030405	Stony River	2007	19050102	Unalakleet	2009
			19050103	Norton Bay	2004
			19050105	Imuruk Basin	2004
			19050201	Shishmaref	2004
			19050202	Goodhope-Spafarief Bay	2004
			19050203	Buckland River	2004

Of the remaining subbasins in the study region, 19040601 (Upper Koyukuk River) and 19040602 (South Fork Koyukuk River) had the highest Survey Priority Index<sup>4</sup> (SPI; described by Buckwalter et al. 2010) scores, so these subbasins were selected for the 2010 study area. Subbasin 19040301 (Middle Fork-North Fork Chandalar River) and the portion of subbasin 19040304 (Lower Chandalar River) upstream of the East Fork Chandalar River (including subbasins 1904030401, 1904030402, and 190430403) were added to expand the study area to include a sufficient number of target streams. Tom Taube (Interior Region Management Coordinator, ADF&G Div. of Sport Fish, Fairbanks, personal communication, June 2010), John Burr (Arctic-Yukon Area Management Biologist, ADF&G Div. of Sport Fish, Fairbanks, personal communication, June 2010), Mac McLean (Regional Supervisor, ADF&G Div. of Habitat, Fairbanks, personal communication, June 2010), and Jim Durst (Habitat Biologist, ADF&G Div. of Habitat, Fairbanks, personal communication, June 2010) confirmed this is a high-priority study area for anadromous-cataloging and fish inventories because there may be significant gaps in AWC coverage and because mining activity is high in this area.

## FIELDWORK DATES

The 20 field days were scheduled for August 4–23, which was consistent with the timing of prior AFFI projects. By conducting fieldwork in August, we believed we would maximize our chances of observing a variety of anadromous fishes, especially stream-rearing species and life stages, at the upstream limits of their range, in order to achieve Objective 1. Anadromous fishes rearing in headwater streams are presumed to be at or near their maximum upstream distribution in the study area during July–August, after they emerge and disperse from their natal habitats, but prior to the onset of rapidly-cooling waters in the fall, when they likely begin moving to their winter habitats.

We also expected that August would be the optimal period to observe adult Chinook and summer chum salmon and carcasses on spawning grounds. In Henshaw Creek, a Koyukuk River

<sup>4</sup> Statewide SPI scores were recalculated for this project using updated AWC (2010 update) length.

tributary downstream of the study area, the peak of the Chinook and summer chum salmon spawning runs typically occurred during mid–late July in 2000–2009 (ADF&G 2010). And in the South Fork Koyukuk River during 1996 (the only season in which a weir was successfully operated), the peak of the Chinook salmon spawning run occurred during July 3–9, and the summer chum run peaked during July 20–26 (Wiswar 1997). Sockeye salmon have also been reported from Henshaw Creek during late July–early August (Berkbigler and Elkin 2006). Pink salmon have not been reported from the study area, but if present, they would likely be found on the spawning grounds during August.

August 4–23 was probably too early to observe most spawning coho and fall chum salmon. During 2000–2008, small numbers of fall chum salmon were counted at the lower Chandalar River sonar throughout August, with the peak of the run beginning during late August or early September (ADF&G 2010). During 1996, the fall chum salmon run in the South Fork Koyukuk River peaked during August 23–26 (Wiswar 1997). Coho salmon, if they occur in the study area, would likely begin to arrive on the spawning grounds in late August.

Anadromous sheefish, broad whitefish, humpback whitefish, and least cisco commonly occur in the upper Koyukuk lowlands (Andersen 2007, Brown et al. 2007, Brown 2009). However, because of the location and timing of our fieldwork, we did not expect to find many anadromous whitefishes. Throughout the summer feeding period, whitefishes are dispersed basinwide primarily in lowland lakes and sloughs (Andersen 2007, Brown 2009). The spawning migration begins in mid-August and peaks in September. Spawning occurs during late September and October at gravel-substrate sites in the Alatna (all 4 species), Kanuti (humpback whitefish and least cisco), and South Fork Koyukuk (humpback whitefish) rivers (Brown 2009). Our sampling occurred in flowing waters rather than lakes, and most of our study area was in the mountains rather than lowlands. In order to more effectively catalog anadromous whitefish habitats, we would need to sample lowland lakes and sloughs during the summer feeding period, and/or gravel-substrate rivers during the fall spawning period.

## **TARGET STREAMS**

We defined 3 sets of candidate target streams based on upstream drainage area, including 50-sq km (wadeable) and 200- and 1500-sq km (nonwadeable) streams. From these 3 sets, we selected a prioritized set of target streams, as described below.

### **50-sq km target streams**

According to the methods of Buckwalter et al. (2010), we selected as target streams and ranked all 118 non-AWC-listed 50-sq km target streams in the study area. Per the request of ADF&G Div. of Habitat, Fairbanks, 1 additional stream (Mailbox Creek—Middle Fork Koyukuk River tributary), which did not meet the 50 sq km minimum drainage area, was added.

### **200-sq km target streams**

According to the methods of Buckwalter et al. (2010), we selected as target streams and ranked all 35 non-AWC-listed 200-sq km streams in the study area.

### **1500-sq km target streams**

We selected as target streams all six 1500-sq km streams in the study area, including the John, North Fork Koyukuk, Middle Fork Koyukuk, South Fork Koyukuk, North Fork Chandalar rivers and Your Creek. Three of them were already listed in the AWC at the point where the stream's

drainage area first exceeded 1500-sq km, and 3 were not. We included the 3 AWC-listed 1500-sq km target streams in order to add additional anadromous species and life stages to the AWC, and to document the complete fish assemblage occurring in these streams.

## **FISH-COLLECTION REACHES**

According to the methods of Buckwalter et al. (2010), at each 50- and 200-sq km target stream, the crew leader selected a fish-collection reach location during slow, low-level helicopter reconnaissance. Fish-collection reach locations for the 1500-sq km target streams were selected in the office prior to fieldwork according to the methods of Buckwalter et al. (2010) for Jet-Boat Team fish-collection reaches. We selected 1 reach on each of the six 1500-sq km target streams listed above, and, to expand our sampling in large rivers as time allowed, we added 4 more reaches farther downstream in the John, Middle Fork Koyukuk, Middle Fork Chandalar, and Chandalar (mainstem) rivers.

### **Reach length**

From a fish-inventory we conducted during August 2009 in western Alaska (middle Kuskokwim and eastern Norton Sound drainages) using the same standard fish-sampling protocols and equipment, we estimated that sampling a reach having a length equal to 40 wetted channel widths (CW) is sufficient to detect within 1 species of the true species richness 90% of the time in wadeable Alaskan streams (Daniel Reed, Biometrician, ADF&G, Nome, Alaska, unpublished data, July 2010). So, at each wadeable stream reach, we sampled a standard reach length of 40 wetted channel widths (CW), with a minimum reach length of 150 m and a maximum of 300 m. A 40-CW reach is consistent with other studies on coldwater fish in wadeable streams (e.g., Patton et al. 2000, Reynolds et al. 2003, Temple and Pearsons 2007).

Recent analysis of prior (2007–2009) AFFI fish collections indicated that single-pass electrofishing in a 40-CW reach typically underestimates true species richness in nonwadeable streams of Western Alaska (Daniel Reed, Biometrician, ADF&G, Nome, Alaska, unpublished data, July 2010). Therefore, to better ensure that all common species of the extant fish assemblage were detected in nonwadeable streams, we sampled a minimum reach length of 100 CW (or as much as we could sample in one day) and we continued to collect data (as described under Objective 3 Task 1) to develop and assess sampling-sufficiency recommendations for nonwadeable streams (see the *Objective 3—Sampling Sufficiency* section under the *Data Analysis* heading, below). Other electrofishing reach-length recommendations for presence of coldwater fish in nonwadeable rivers range from 30–40 (Maret and Ott 2003) to 85 CW (Hughes et al. 2002).

## **WAYPOINTS AND STATIONS**

At each study site, we marked a waypoint<sup>5</sup> at the habitat transect using a handheld, consumer-grade GPS receiver (Garmin GPSMAP 60CSx). We refer to this point location as the Station. If fish-sampling was attempted, we also marked additional GPS waypoints at the upstream and downstream ends of the fish-collection reach. If a fish-collection reach was established in the absence of a habitat transect (e.g., when we aerially-observed an aggregation of adult fish spread throughout a stream segment), we refer to the upstream terminus of the fish-collection reach as the Station. We also established a Station at sites with no habitat transect and no fish-collection reach—such as: target streams lacking a suitable landing zone; target streams deemed unlikely

<sup>5</sup> To minimize GPS error when marking waypoints, we used the waypoint-averaging mode (10 s).

to support anadromous fish use; target streams deemed to be inaccessible or nonwadeable; waterfalls or other definite migratory barriers (Appendix B3); or other features of interest.

We assigned a unique 5-character alphanumeric identifier (Station ID) to identify each study site. The first 2 characters of the Station ID identified the sequential survey day (e.g., 01, 02, ...). The third character represented the team making the observation. For this project, 2 teams, designated Teams A and B, sampled nonwadeable streams by cataraft. A third team, Team C, sampled 50-sq km streams on foot. The fourth and fifth characters identified the sequential site number visited on a given survey day (e.g., 01, 02, ...; resets to 01 daily). For example, Station ID “04A05” represented the fifth site visited by Team A on their fourth field day.

The entire project was assigned the unique Project Code, "FSK10". The combination of Project Code and Station ID ensured a universally-unique identifier for the records associated with each Station. See Table 1 for a list of geographic information variables recorded at each study site.

## FISH-COLLECTION METHODS

According to protocols modified slightly from Buckwalter et al. (2010) as detailed in Appendix A1 (wadeable streams) and Appendix A2 (nonwadeable streams), we sampled the fish assemblage in each reach by single-pass electrofishing, supplemented occasionally with other methods (i.e., visual observations, angling, dip net, and minnow trap). On the 2 catarafts, we set up the electrodes differently than Buckwalter et al. (2010) (see Figure 3). We used the same 2 spider-array electrodes suspended off the bow in the same way as Buckwalter et al. (2010), but, rather than wiring 1 as an anode and the other as a cathode, in this project we wired both as anodes. For the cathode, we bolted 18 braided stainless-steel dropper cables (38-in long; 3/16-in diameter) to the forward platform.

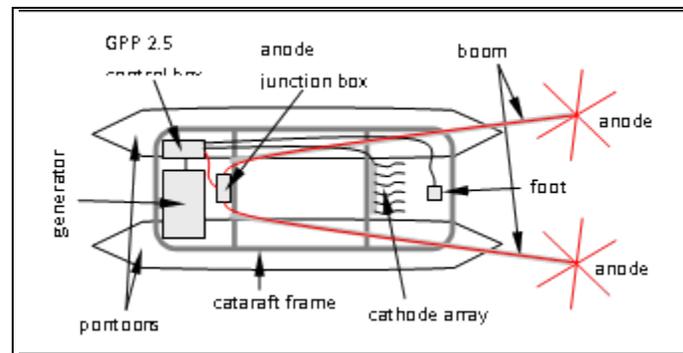


Figure 3.—Cataraft electrofishing system schematic.

On behalf of Andres Lopez (Curator of Fishes, University of Alaska Museum, Fairbanks), we retained (in 10% formalin solution) 50 individually-tagged voucher specimens from 11 sites (Appendix I1), along with a right-side pectoral fin clip (in a uniquely-numbered vial with 95% ethanol—one clip per vial) from each specimen, including: longnose sucker (4); burbot (11); round whitefish (12), slimy sculpin (12), least cisco (1), Dolly Varden (6), and lake chub (4). We also retained (in vials with silica beads) a right-side pelvic fin clip from each Dolly Varden collected and delivered them to Penelope Crane (USFWS Conservation Genetics Laboratory, Anchorage, Alaska) for genetic analysis. We clipped a total of 61 Dolly Varden, including up to 12 per site from 10 sites (Appendix I2). See Table 1 for a list of variables associated with fish-collection events and fish catch that were recorded at each study site.

## AQUATIC AND RIPARIAN HABITAT ASSESSMENT

At each site where fish collection was attempted, we established a habitat transect according to the methods of Buckwalter et al. (2010) and measured a suite of habitat variables describing water quality, channel dimensions, stream flow, and riparian vegetation. Table 1 lists the variables that were typically recorded at each habitat transect, along with any associated instruments, measurement units and precision (continuous variables), and domain (list of possible values of categorical variables). Methods for aquatic and riparian habitat assessment were according to Buckwalter et al. (2010), with the following exceptions:

- In a 5-CW (up to 100 m maximum) stream section centered on the habitat transect, we visually estimated substrate embeddedness (Appendix B4) in (or as close to as possible) the thalweg.
- We measured channel width and thalweg depth at the bankfull (BF) level<sup>6</sup>, rather than ordinary-high water (OHW) level. We also assessed riparian vegetation starting at the bankfull, rather than OHW, level.
- We estimated the entrenchment-ratio<sup>7</sup> category in the vicinity of the habitat transect.
- We did not visually-estimate thalweg velocity. Instead, at sites where the thalweg was wadeable at the habitat transect, and the wetted depth was <0.9 m, we measured thalweg head depth using a transparent velocity head rod (TVHR), then converted head depth to mean water-column velocity according to the methods of Fonstad et al. (2005). If a TVHR could not be used, we estimated thalweg velocity by timing the passage of a whole orange during a 6-meter-long float in the thalweg beginning at the habitat transect. In nonwadeable streams where neither a TVHR nor an orange could be used, we estimated thalweg (surface) velocity as the maximum sustained GPS ground speed of the boat drifting in the thalweg.
- We did not measure stream discharge.
- Each morning after marking the first GPS waypoint of the day, we took a photo of the GPS screen showing the GPS date and time to provide the information needed to accurately associate photos with the correct Station and also to geotag each photo with GPS data.

<sup>6</sup> The bankfull level is defined as the water level at which a stream begins to flow onto the floodplain. However, since the floodplain may be narrow or undetectable in incised streams, and because downcutting or channelization may result in the channel being disconnected from its former floodplain, observers should always look for additional indicators when identifying bankfull level. Other than the presence of an active floodplain, the principal indicators of bankfull level (Leopold 1994) are: top of point bar; change in vegetation (e.g., bare gravel to herbs; alders above bankfull level); topographic break (vertical stream bank to horizontal floodplain; horizontal bar surface to vertical bank); change in substrate size; or flood-deposition debris. BFW is the width of the water surface perpendicular to the direction of flow at bankfull discharge.

<sup>7</sup> Entrenchment ratio is defined (Rosgen 1994) as flood-prone width divided by bankfull width. Flood-prone width is the width of the floodplain measured at a water level (i.e., depth) of twice the maximum (i.e., thalweg) depth at bankfull discharge.

Table 1.–List of variables collected during fieldwork.

Variable name	Equipment	Units/Domain	Precision	Comment
<b>Geographic information</b>				
Project Code & Station ID	-	text	-	5-digit alphanumeric—see Waypoints and Visits heading in text.
Station location	consumer-grade GPS unit (e.g. Garmin GPSmap 60CSx or 76S)	decimal degrees: latitude (DD.DDDDD); longitude (-DDD.DDDDD)	0.00001 degrees	
Upper end of reach				
Lower end of reach		m	1 m	
Geodetic datum		Text	-	Default is NAD83.
Water-body name	Water-body name from USGS topo map	text	-	
Geographic comments	-	text	-	Describes location of study site in relation to adjacent long-term or permanent geographic features
Observers	-	list of field staff	-	
Date/time	field notebook computer	mm/dd/yyyy hh:mm:ss	1 s	Value input automatically from computer's clock when data entry is begun
Camera counter	-	sequential integers	-	List of photo filenames (last 3 digits only) associated with each station
Visit comments	-	text	-	Physical and biological conditions at the station during the visit—focus on ephemeral conditions, such as weather or stream conditions, or the dynamics of riparian conditions, that may help explain other recorded observations
Wildlife comments	-	text	-	Anecdotal wildlife observations, particularly those that relate to fish.
<b>Water quality</b>				
Water temperature	YSI 556 meter	°C	0.01 °C	Sample thalweg
pH		pH units	0.01 pH units	Sample thalweg
Dissolved oxygen		mg/L	0.01 mg/L	Sample thalweg
Conductivity		µS/cm	1 µS/cm	Ambient conductivity (not temperature corrected). Sample thalweg
Turbidity	LaMotte 2020e turbidimeter	NTU	1 NTU	Sample thalweg
Water color	-	see Appendix B4	-	
Transparency	Secchi tube	Average of disappearance and reappearance depths (cm)	0.1 cm	Team C only

-continued-

Table 1.–Page 2 of 4.

Variable name	Equipment	Units/Domain	Precision	Comment	
<b>Channel morphology</b>					
Channel width (wetted and BF)	30-m fiberglass tape	m	0.1 m	In wadeable channels < 30 m wide	
	laser range finder (Bushnell Yardage Pro)	m	1 m	In nonwadeable channels, or where width > 30 m	
Thalweg depth (wetted and BF)	handheld sonar (HawkEye Digital Sonar) and clinometer (to find the BF level)	m	0.1 m	For nonwadeable channels	
	graduated rod	m	0.01 m	All teams—wadeable channels	
Stream gradient	clinometer (Sokkia 5x magnifying abney level with clinometer, or Suunto PM-5)	%	0.1%	Water surface angle between consistent channel features near habitat transect.	
Substrate composition	-	see Appendix B4	-	3 most dominant substrate classes within scoured portion of streambed in a 5-CW (<100 m) section centered on habitat transect.	
Embeddedness category	Visual estimate	see Appendix B4	-	Estimated embeddedness of gravel, cobble, and boulder particles in, or as near to as possible, the thalweg in a 5-CW (<100 m) section centered on the habitat transect.	
Entrenchment category	ratio	Visual estimate or laser range finder (floodprone width), and see channel width (BF)	1.0–1.4=entrenched; 1.41–2.2=moderately-entrenched; >2.2=slightly-entrenched	-	Entrenchment ratio (Rosgen 1994) = flood-prone width ÷ BF width. Flood-prone width is the width of the floodplain measured at a water level of twice the thalweg BF depth.
Channel type	see Channel width, Thalweg depth and Stream gradient	Rosgen (1994) level-II channel types, plus the following: Lake/Pond; Slough; Beaver pond complex; Wetland; or No defined channel	-	To be determined in the office following fieldwork based on BF width and BF depth (width-to-depth ratio), gradient, entrenchment ratio, dominant substrate, and estimated sinuosity values.	
<b>Stream flow</b>					
Stream stage	-	see Appendix B4	-	Water level relative to BF stage.	
48-hour precipitation	-	none/trace, moderate, heavy	-		

-continued-

Table 1.–Page 3 of 4.

Variable name	Equipment	Units/Domain	Precision	Comment
<b>Stream flow (continued)</b>				
Thalweg velocity	Transparent velocity-head rod (TVHR)	Head depth (mm)→mean water column velocity (m/s)	1 mm (0.1 m/s)	Wadeable streams, depth <0.9 m
	Whole orange, fiberglass tape, stopwatch	m/s	0.1 m/s	Wadeable streams (alternate). Timed orange float through a 6-m length.
	consumer-grade GPS unit (Garmin GPSmap 60CSx or 76S)	m/s	0.1 m/s	Nonwadeable streams—maximum sustained GPS velocity of boat drifting in thalweg.
Meter type	-	TVHR, orange, or GPS	-	
<b>Riparian vegetation communities</b>				
Riparian vegetation composition	-	Viereck et al. (1992) vegetation communities	-	Dominant vegetation community recorded in 8 zones (4 zones on each bank): 0-5 m (from OHW); 5-10 m; 10-20 m; 20-30 m
Canopy height	graduated rod (< 1.5 m); clinometer & range finder (> 1.5 m)	m	0.1 m (< 1.5 m); 0.5 m (>1.5 m)	Recorded for each of the 8 zones described above
Disturbance	-	Disturbance classes (Appendix B6)	-	
<b>Fish-collection events</b>				
Channel	-	main-, side-, or off-channel	-	Channel type of fish-collection event
Fish-collection method	-	backpack electrofisher, boat electrofisher, visual observations (ground, boat, or helicopter), dipnet, angling, none	-	
Waveform	electrofisher setting	DC-pulsed; DC-unpulsed	-	
Voltage		V	1 V	(LR-24 only)
Range		Low or High	-	(GPP 2.5 only)
Percent of range		0–100 %	Continuous	(GPP 2.5 only)
Frequency		pulses per second (pps)	1 pps	
Duty cycle		%	1%	(LR-24 only)
Current	electrofisher output meter	A	0.01 A (LR-24); 0.1 A (GPP 2.5)	Peak current (LR-24); average current (GPP 2.5)
Power	electrofisher output meter	W	1 W	Peak power (LR-24 only)
Electrofisher on-time	electrofisher timer	s	1 s	
Efficiency	-	excellent, good, fair, poor	-	Perceived electrofishing efficiency, relative to optimal conditions.

-continued-

Table 1.–Page 4 of 4.

Variable name	Equipment	Units/Domain	Precision	Comment
<b>Catch</b>				
Reach length	GPS (trip computer mode, or track)	m	1 m	Indicate actual length of fish-collection reach, measured by GPS.
Species	-	list of Alaskan freshwater fish species	-	
Life stage	-	see Appendix B1	-	
Life history	-	anadromous, freshwater-resident, marine, unknown, N/A	-	
Suspect spawning	-	yes, no	-	
Barrier	-	see Appendix B3	-	
Fork length	fish measuring board	mm	1 mm	
Sex	-	male, female, blank (if sex was not determined)	-	
Anomalies	-	see Appendix B2	-	
Retained	-	Checkbox (Y/N)	-	Indicate each individual fish retained.
Tag No.	-	10-digit alphanumeric text	-	For retained specimens, indicate the tag number affixed to each fish.
Vial No.	-	10-digit alphanumeric text	-	If a tissue sample was taken, indicate the vial number.
Photo No.	Digital camera	3-digit positive integer	1	For each fish photographed, indicate the photo number (last 3 digits of the photo filename) for each photo taken. May use comma or hyphen to separate non-sequential photo numbers or indicate a range of photo numbers.
Individual comments	fish	text	-	Comments pertaining to an individual fish (e.g., sampling injuries or mortalities, unusual features or behavior)
Additional counts	-	integer--no. of fish	1 fish	
Estimated	-	yes, no	-	Indicates whether the no. of additional fish recorded above was an estimate or a direct count
Species-life-stage comments	-	text	-	Comments pertaining to an entire group of fish of the same species and life stage

## DATA ANALYSIS

### Stream-size groups

In order to compare fish occurrence and distributions of habitat variables across stream sizes, we grouped the reaches sampled based on drainage area (sq km) upstream of the habitat transect as follows: wadeable (Small) streams,  $\leq 100$  sq km; nonwadeable streams,  $> 100$  sq km. For most of the data summaries and tables in the Results section and appendices, we further subdivided the nonwadeable streams into Medium (100–500 sq km) and Large ( $> 500$  sq km) streams.

Typically, reaches sampled in 50-sq km target streams were categorized as Small, 200-sq km target streams as Medium, and 1500-sq km target streams as Large streams. However, in 5 of the 96 reaches sampled from the set of 50-sq km target streams, the reach was located farther downstream where the drainage area exceeded 100 sq km, so these 5 reaches were actually classified as Medium instead of Small streams for the purpose of data analysis. In other words, in order to find a location meeting the specified criteria for a suitable fish-collection reach (e.g., a reach where the crew leader anticipated anadromous fish could be present), in these 50-sq km target streams, the crew leader selected a fish-collection reach draining  $> 100$  sq km. Likewise, 7 of the 33 reaches sampled from 200-sq km target streams were located farther downstream where the drainage area exceeded 500-sq km, so these 7 reaches were classified as Large instead of Medium streams.

### Graphical summaries of frequency distributions

We created a variety of graphs (Appendix G1) to display frequency distributions of categorical variables. We created side-by-side box plots<sup>8</sup> to graphically display the distributions of selected numeric habitat variables and visualize how distributions of each variable differ within stream-size (Appendix G2) and species-occurrence (Appendix G4) groups. Likewise, we created frequency histograms to visualize how fish fork length distributions varied between species and among stream-size groups (Appendix G3). We derived catch per unit effort (CPUE) for Species A as the total number of fish of Species A collected divided by the total electrofisher on time (hours) at sites where Species A was collected and created box plots summarizing CPUE for each species, within stream-size groups (Appendix G5).

### Supplemental data analyses

When we examined side-by-side plots of numeric variables grouped by stream size (Appendix G2 and Appendix G3) and species occurrence (species found vs. not found, Appendix G4), it appeared there were some variables having distributions that differed among groups. So we ran 2-tailed randomization tests (Manley 1997) to test for differences in medians of numeric variables between stream-size groups (Small vs. Medium, Small vs. Large, and Medium vs. Large streams; 100,000 simulations each—Appendix H1 and Appendix H2) and species-occurrence groups (100,000 simulations for wadeable streams and 10,000 simulations for nonwadeable streams, Appendix H3). For most species, the sample sizes (i.e., number of reaches where the species was found or not found) in nonwadeable streams were not adequate to further subdivide the nonwadeable streams into Medium and Large sub-groups, so we did not subdivide the nonwadeable streams for Appendix G4 and Appendix H3.

<sup>8</sup> The box plots in this report display the median (50<sup>th</sup> percentile) as a black dot (●), and the 1st (25<sup>th</sup> percentile) and 3rd (75<sup>th</sup> percentile) quartiles as the lower and upper ends of the box. The ends of the whiskers represent the lowest value still within 1.5 IQR (interquartile range, i.e., the difference between the 3<sup>rd</sup> and 1<sup>st</sup> quartiles) of the 1<sup>st</sup> quartile, and the highest value still within 1.5 IQR of the 3<sup>rd</sup> quartile. Outliers (values beyond 1.5 IQR) are represented as open circles.

We also examined the data to detect evidence that pairs of fish species either tended to be associated or that they demonstrated a tendency to not occur at the same sites within stream-size groups (wadeable or nonwadeable reaches). We constructed contingency tables (2x2) for each pair of species to test the null hypothesis that the occurrence of species A at a site was independent of the occurrence of species B at a site. Fisher's Exact Test was used to evaluate the null hypothesis for each pair of species because contingency table cell counts were frequently small (<5) and expected values for cell counts were frequently < 1.0 (Agresti 1990). Regardless of the significance of test results, nominal positive or negative association between each pair of species was determined by examining marginal values for each contingency table.

### Objective 3—Sampling Sufficiency

True species richness (*TSR*) was estimated for each nonwadeable fish-collection reach where sampling-sufficiency data were collected, and compared to observed species richness (*SR*), the total number of species found in a reach. For a site *i*, where data were collected over a series of  $n_i$  subreaches, *TSR* and *SR* were compared at the conclusion of each subreach beginning with the 4<sup>th</sup> subreach and continuing to the  $n_i$ th subreach.

A Horvitz-Thompson estimator (Cochran 1977) was used to estimate *TSR*. For each observed species *s* in *SR* in the sample of  $n_i$  subreaches for site *i*, the probability that this species was detected in one subreach was estimated:

$$\hat{p}_{s,i} = \frac{n_{s,i}}{n_i} \quad (1)$$

where  $n_{s,i}$  is the number of subreaches  $n_i$  where species *s* was detected. We then calculated the probability that the species would not have been detected by sampling  $n_i$  subreaches:

$$1 - \hat{p}_s = (1 - \hat{p}_{s,i})^{n_i} \quad (2)$$

from which we can directly calculate  $\hat{p}_s$ , and estimate the probability that the species can be detected at site *i* with  $n_i$  sampled subreaches. The Horvitz-Thompson estimate of *TSR* was calculated as a sum across all detected species:

$$TSR_{H-T} = \sum_{j=1}^{SR} \frac{1}{\hat{p}_s} \quad (3)$$

The analytical formulae presented in Cochran (1977) for estimating the sampling variance of the Horvitz-Thompson estimator when  $p_s$  is estimated (not known with certainty) are not stable for small sample sizes. We are in the process of evaluating a bootstrap approach (Efron and Tibshirani 1993) for estimating variance using the type of data collected in this project.

To evaluate stopping rules for sampling sufficiency for nonwadable streams and rivers, we combined data from this experiment with our 2007 results from the upper Kuskokwim River (unpublished), 2008 results from the lower Yukon River (Buckwalter et al. 2010), 2009 results from the middle Kuskokwim River (Kirsch et al. *In prep*), and 2009 results from eastern Norton Sound (Kirsch et al. 2011). Two types of stopping rules were evaluated: fixed and adaptive.

Fixed stopping rules were evaluated for stream sampling where data are recorded after completion of sampling of the entire reach. Stopping rules of 80, 100, 120, and 140 wetted widths (8, 10, 12, and 14 subreaches) were considered.

The estimate  $TSR_{H-T}$  rounded to the nearest integer was used to indicate total species richness for each reach sampled. Observed  $SR$  at each stopping point was subtracted from the estimate of species richness for the entire reach to estimate the number of species undetected. The proportion of reaches, along with cumulative proportions, where an estimated 0, 1, 2, ...5 species were missed was calculated. Only those reaches where 9 or more subreaches were sampled were used to estimate the number of undetected species per reach when evaluating stopping sampling at 8 subreaches. Those reaches where 11 or more subreaches were sampled were used to estimate undetected species when evaluating stopping at 10 subreaches, and to provide an additional evaluation for stopping at 8. Reaches with 13 or more subreaches sampled were used to evaluate stopping at 12 subreaches, and to provide additional evaluations for stopping at 10 and 8 subreaches. Reaches with 15 or more subreaches sampled were used to evaluate stopping at 14 subreaches, and to provide additional evaluations for stopping at 12, 10 and 8 subreaches.

Adaptive stopping rules were evaluated for stream sampling where data are recorded after completion of sampling of each subreach (10 wetted widths), and the series of data recorded for all subreaches is used to determine if additional sampling is necessary at that reach after sampling a minimum number of subreaches. Adaptive stopping rules had two criteria. First, a minimum number of subreaches were required to be sampled before sampling could be terminated. Minimums evaluated were 6, 8, 10, 12, and 14 subreaches. Second, sampling would be continued unless no new species were detected in the last 4 or 6 subreaches sampled. Adaptive stopping rules were evaluated using methods similar to those described above for fixed stopping rules. Observed species richness at a stopping point was subtracted from the estimated true species richness for the entire reach to estimate the number of species undetected.

Using data tabulated for fixed stopping rules described above, contingency table analyses (Agresti 1990) were used to look for evidence of differences between regions in application of stopping decision rules. Three contingency tables were analyzed based on the following data sources: all reaches with 9+ subreaches sampled using a stopping rule of 8 subreaches; all reaches with 11+ subreaches sampled using a stopping rule of 10; and all reaches with 13+ subreaches sampled using a stopping rule of 12 subreaches. Data were categorized into 4 geographic areas (upper + middle Kuskokwim, middle Yukon, eastern Norton Sound, and upper Koyukuk and Chandalar streams) by estimated number of species not detected (0, 1, and 2+). We tested the null hypothesis that the distribution of numbers of species missed was independent of geographic area. Rejection of the null hypothesis would be evidence that different stopping rules need to be considered for the different geographic areas in the data set.

To check whether drainage area matters in application of stopping rules for nonwadeable streams, the Kolmogorov-Smirnov (KS) test (Conover 1980) was used to look for differences in drainage area between reaches where 1 or fewer vs. 2 or more species were undetected. The data examined were from 67 reaches with 9+ subreaches sampled. For each reach, the difference between estimated  $TSR$  and observed species richness after sampling 8 subreaches was calculated and rounded to the nearest integer. Reaches were then categorized as reaches where 0 or 1 species were missed or as reaches where 2 or more species were missed. The cumulative distribution of drainage area was compared between these two categories of reaches using the KS test. Detection of significant differences between distributions would be evidence that different stopping rules need to be considered for different drainage areas.

## RESULTS

All field data was recorded in the AFFID, and AWC nominations were submitted by September 30, 2011. As a result of the 17 AWC nominations generated by this project, a total stream distance of 130 km of previously-unlisted Chinook and chum salmon habitat was added to the AWC (Figure 4 and Appendix E1). Additional anadromous species or life stages were documented in 3 previously-cataloged streams. Station reports and digital photos are available on the AFFI interactive mapping website at <http://www.adfg.alaska.gov/index.cfm?adfg=ffinventory.interactive>, and are also included in Appendix J of this report. We created maps to display study-site locations and species found (Appendix C) and fish distribution, by species (Appendix D).

We attempted to collect fish at a total of 139 reaches, including 96 reaches in 50-sq km target streams, 33 reaches in 200-sq km target streams, and 10 reaches in 1500-sq km target streams. Single-pass electrofishing was the primary fish-collection method at 138 (99%) of them. All 96 reaches on 50-sq km target streams were sampled using a backpack electrofisher (Smith-Root LR-24). Thirty of the 33 reaches on 200-sq km target streams were sampled using a cataraft-mounted, generator-powered electrofisher (Smith-Root GPP 2.5). Two of them were sampled by backpack electrofisher, and 1 reach on Funchion Creek (see Station ID 20A01) was sampled by minnow traps, angling, dip net, and visual observations instead of electrofishing. All 10 reaches on 1500-sq km target streams were also sampled using a cataraft-mounted, generator-powered electrofisher (Smith-Root GPP 2.5)

We sampled 93 of the set of 119 (78%) 50-sq km target streams. We sampled 1 reach on each 50-sq km target stream visited, except 2 reaches were sampled on 3 of them. The remaining 26 that we did not sample were relatively low ranking (in terms of the distance that could be added to the AWC) or were deemed by the Team-C crew leader as unlikely to support anadromous fish.

We started with a set of thirty-five 200-sq km target streams, which was reduced to 33 in the field. After helicopter reconnaissance, 2 pairs of adjacent 200-sq km targets streams were combined into 2 new target streams by sampling downstream of their confluence where the depth was sufficient to float our catarafts. We sampled 31 of these 33 (94%) target streams—the remaining 2 were too shallow for our catarafts. We sampled 1 reach on each target stream visited, except 2 reaches were sampled on 2 of them. We sampled all 6 of the 1500-sq km target streams, including 2 reaches on 4 of them and 1 reach on the other 2.

For the 139 reaches we sampled, reach length (determined as a multiple of wetted channel width) varied from 150 m (the minimum reach length in wadeable streams) to 9,600 m. Of the 99 reaches we sampled on foot, 11 were in the wetted-width range ( $\leq 3.75$  m) requiring a 150-m long reach, 59 were within the range (3.75–7.5 m) calling for a 40-CW-long reach, and 29 were in the range ( $\geq 7.5$  m) calling for a 300-m-long reach. In the 40 reaches sampled by raft, we sampled as many subreaches (each 10 CW in length) as needed to meet Objective 3. Therefore, reach length was variable in reaches sampled by raft, ranging from 60 to 200 CW.

We found at least 1 fish at 127 (91%) of the 139 reaches, including fish representing 6 families and 11 species (Table 2), 6 of which were members of the salmonid family (salmon, trout, char, whitefishes, or grayling). We found salmonids at 115 (82%) of the 139 reaches, followed by cottids (slimy sculpin) at 71 (51%) reaches and catostomids (longnose sucker) at 14 (10%) reaches. We found at least 1 anadromous fish at 19 (14%) of the 139 reaches. 2 species (Arctic grayling and slimy sculpin) were each found in  $>50\%$  of the sampled reaches; conversely, the remaining 9 species were each reported from  $<25\%$  of the 139 reaches. We found no fish at 10

Small-stream reaches and 2 Medium-stream reaches (Big Creek, see Station ID 06B01 and Lake Creek [Squaw Lake outlet stream], see Station ID 09C03).

Table 2 lists the number of reaches in which each fish species was found, grouped by stream size. In the group of Large streams, we found 10 of the 11 fish species (all but Dolly Varden) identified during this project. We also found a total of 10 species (all but least cisco) in the group of Medium streams. In the group of Small streams, we found only 8 species (all but lake chub, least cisco, and chum salmon).

Across all stream sizes, we found Arctic grayling at more reaches than any other species. We found Arctic grayling in 68 of the 91 (75%) Small-stream reaches, followed by slimy sculpin in 41 (45%). We found Arctic grayling in 23 of the 31 (74%) Medium-stream reaches, followed by slimy sculpin in 21 (68%). And we found Arctic grayling in 16 of the 17 (94%) Large-stream reaches, followed by round whitefish in 11 (65%). For a complete list of species-occurrence frequencies by stream size, see Table 2.

Table 2.–List of fish species found.

Family	Scientific name	Common name	Stream size			
			Small (n =91)	Medium (n =31)	Large (n =17)	Total (n =139)
Cyprinidae	<i>Couesius plumbeus</i>	lake chub	0	1	2	3
Catostomidae	<i>Catostomus catostomus</i>	longnose sucker	1	5	8	14
Esocidae	<i>Esox lucius</i>	northern pike	4	1	3	8
Salmonidae	<i>Coregonus sardinella</i>	least cisco	0	0	1	1
	<i>Prosopium cylindraceum</i>	round whitefish	12	11	11	34
	<i>Thymallus arcticus</i>	Arctic grayling	68	23	16	107
	<i>Oncorhynchus keta</i>	chum salmon	0	2	2	4
	<i>O. tshawytscha</i>	Chinook salmon	7	4	4	15
	<i>Salvelinus malma</i>	Dolly Varden	12	1	0	13
Gadidae	<i>Lota lota</i>	burbot	2	4	7	13
Cottidae	<i>Cottus cognatus</i>	slimy sculpin	41	21	9	71
-	-	no fish found	10	2	0	12

Appendix F1 summarizes fish occurrence by life stage. Only *juvenile* least cisco and Chinook salmon, and *adult* chum salmon life stages were found (no other life stages were found for these species). Round whitefish, slimy sculpin, and Arctic grayling were the only species for which both juveniles and adults were reported from all 3 stream-size groups. No juvenile longnose suckers were collected from Small streams. Adult Dolly Varden were found only in Small streams, and adult burbot were found only in Large streams.

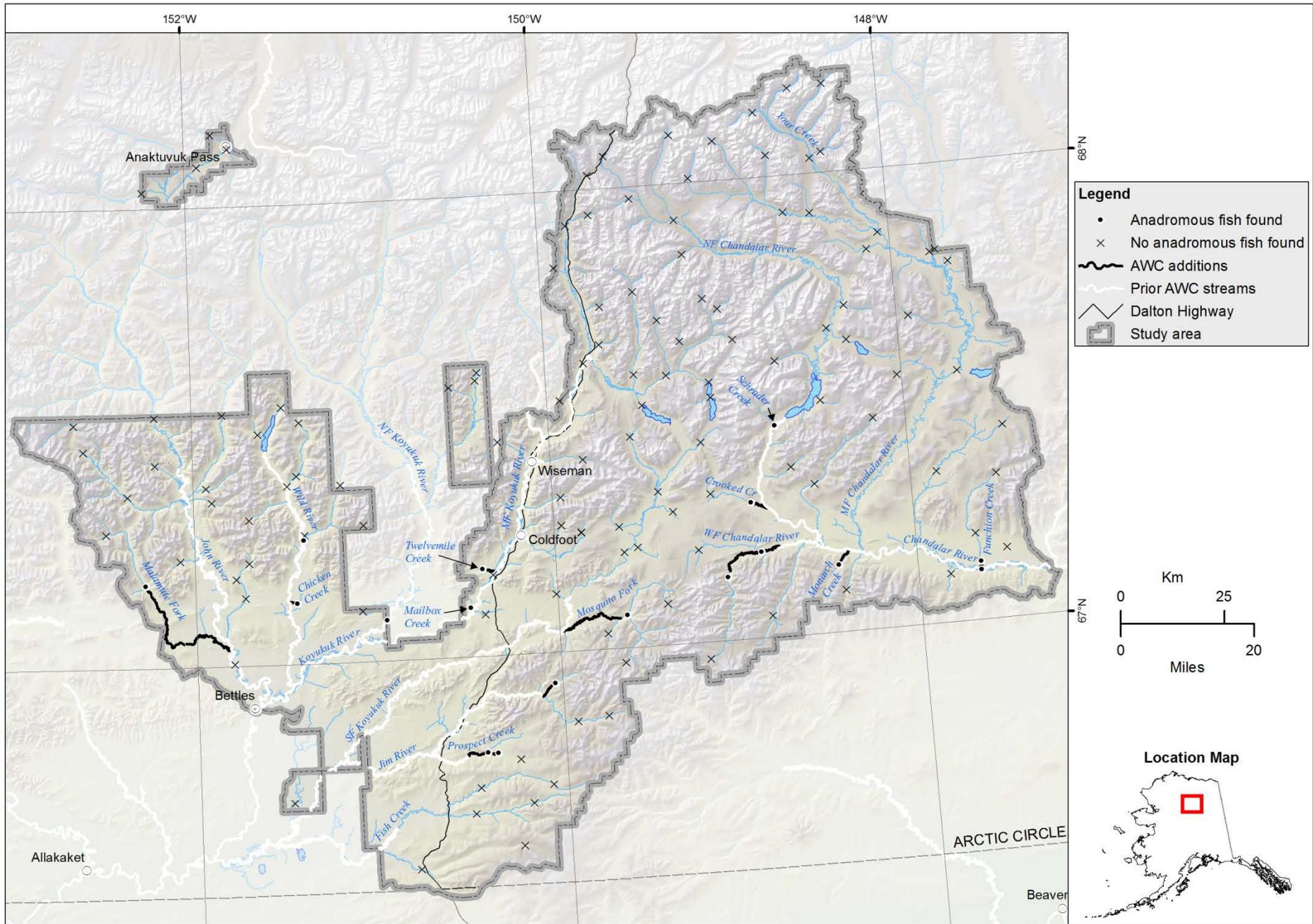


Figure 4.—Map of new or extended AWC water bodies resulting from this project.

Appendix G1 shows frequency distributions of dominant riparian vegetation communities (*sensu* Viereck et al. 1992). Close to the stream bank across Small, Medium, and Large stream sizes, shrub types (especially closed willow shrub) were the most prevalent riparian-vegetation communities. Farther (beyond 5–20 m) away from the channel, white and black spruce forest types dominated. *Low* willow shrub communities appeared to be more prevalent in riparian areas associated with Small and Medium streams than in Large streams, where *tall* willow and alder-willow communities were most common.

Appendix G1 also shows frequency distributions of water-color, dominant substrate, embeddedness, and Rosgen (1994) channel types. The water-color category we identified most frequently in Small (90%) and Medium (84%) streams was "Clear". However, most Large streams we sampled were "Muddy" (47%), followed by "Clear" (35%). In 1 Medium (Glacier River, Station ID 16b01) and 3 Large (2 Your Creek tributaries, Station IDs 02A01 and 03A01, and the Middle Fork Chandalar River, 10B01) streams, we observed a turquoise or milky color typical of glacial origin. However, the Middle Fork Chandalar River is probably the only one of these drainages with any glaciers remaining. In the others, the source of the glacial color we observed is unknown.

"Cobble" was the dominant substrate class we identified most frequently in Small (47%) and Medium (52%) stream reaches; however, "Gravel" occurred most frequently in Large stream reaches (65%). "Boulder" occurred as the dominant substrate in 16% of the Small stream reaches we sampled, but not in any Medium or Large stream reaches. The proportion of "Gravel"- and "Sand"-dominated reaches appeared to be positively related to upstream drainage area.

Substrate embeddedness ranged from negligible to very high, and generally increased with stream size. Embeddedness was "Negligible" in 62% of Small-stream reaches, but was "Moderate" to "Very high" in 53% of Large-stream reaches.

In the reaches we sampled, the most prevalent level-I Rosgen (1994) channel type across all stream sizes was "C", followed by "B" in Small streams and "D" in Medium and Large streams.

Overall CPUE was 66 fish per hour of electrofisher on-time in Small streams, 41 fish/h in Medium streams, and 19 fish/h in Large streams. CPUE also decreased from Small to Large streams when calculated separately for each species (Appendix G5). Across all 3 stream sizes, CPUE was highest for Arctic grayling, Chinook salmon, and slimy sculpin. In Small streams, CPUE for Dolly Varden was similar to that of slimy sculpin.

## **SUPPLEMENTAL DATA ANALYSES**

In Appendix G2, side-by-side box plots show distributions of selected numeric habitat variables, grouped by stream size. For each variable, Appendix H1 lists up to 3 *p*-values from randomization tests for a difference in the medians for each pair of stream-size groups. Low ( $\leq 0.05$ ) *p*-values suggest the medians differ among stream-size groups. Median water temperature, pH, turbidity, conductivity, thalweg velocity, and channel width and depth all tended to increase from Small to Large streams. For pH, turbidity, conductivity, and thalweg velocity, Medium streams did not differ significantly from Small streams. However, for elevation and stream gradient, Medium streams were more similar to Large streams. The median dissolved oxygen level did not differ significantly between stream sizes, but dissolved oxygen appeared to be more variable in Small streams than in the Medium or Large streams sampled.

Frequency histograms of fish fork lengths (mm), along with the number of species found per electrofished reach, grouped by stream size, are shown in Appendix G3. For each species, and for the number of species found, Appendix H2 lists up to 3 *p*-values from randomization tests for a difference in the medians for each pair of stream-size groups. Low ( $\leq 0.05$ ) *p*-values suggest the medians differ among stream-size groups. The number of species found in each reach ranged from 0 to 7 and decreased from Large (mean = 3.7, median = 4) to Medium (mean = 2.4, median = 2) to Small (mean = 1.6, median = 2) streams. We also found some differences (see Appendix H2) in median fish length between stream sizes:

- The median length of round whitefish in our catch appeared to be lower in Large vs. Medium streams. Round whitefish length distributions (Appendix G3) appear similar across the 3 stream-size groups, except for the <125-mm length range, which was limited in our catch mainly to Large streams.
- The median length of Arctic grayling in our catch appeared to be greater in Large vs. Medium and Small streams. Although the range of Arctic grayling lengths was similar across the 3 stream-size groups, in Small and Medium streams, our Arctic grayling catch included a greater proportion of smaller fish.
- The median length of juvenile Chinook salmon in our catch appeared to be lower in Large vs. Small and Medium streams. However, the catch in Large streams was heavily influenced by a sample collected from a single reach (Chandalar River—Station ID 07A01) having a relatively large number of small (<60 mm) Chinook salmon.
- The median length, as well as maximum length, of slimy sculpin in our catch was significantly greater in Small streams than in Medium or Large streams.

In Appendix G4, paired box plots show distributions of selected numeric habitat variables from groups of sites where a given fish species was found versus not found, grouped by stream size. Appendix H3 lists *p*-values from randomization tests to detect a significant difference in the median values for these populations. Low ( $\leq 0.05$ ) *p*-values suggest the medians differ.

Appendix H4 lists *p*-values from contingency-table analyses for apparent relationships (association or avoidance) between fish species found at electrofished sites, grouped by stream size. Low ( $\leq 0.05$ ) *p*-values suggest that, either an interspecific relationship occurs, or the given species may have similar (or differing) habitat preferences.

## FISH-DISTRIBUTION PATTERNS

Our inspection of species occurrence maps (Appendix D), paired boxed plots of habitat variables (Appendix G4), results of tests for a difference in the median of habitat variables between groups of sites where each species was found versus not found (Appendix H3), and results of contingency-table analyses for co-occurrence of fishes (Appendix H4), suggested the following fish-distribution patterns occurred in the study area during August:

We found **lake chub** only in the Koyukuk River drainage in 1 Medium (Allen River—Station ID 19b01, which was the largest of the Medium-sized stream reaches we sampled) and 2 Large streams (John River—Station ID 14A01, and Middle Fork Koyukuk River—Station ID 15B01). Although the sample size was very low, nonwadeable streams where lake chub were found appeared to have higher *wetted width*, *conductivity*, *turbidity*, and *catchment area*, than where lake chub were not found. We did not find lake chub where *elevation* was >389 m (1276 ft), *stream gradient* >0.5%, or *wetted width* <29 m (95 ft).

We found **longnose sucker** infrequently in Small and Medium streams, and in about half the Large-stream reaches sampled. We found them throughout the study area, except not in the South Fork Koyukuk River drainage (but we did not sample any reaches in the lower South Fork Koyukuk mainstem). In nonwadeable streams where we found longnose sucker, *thalweg depth*, *catchment area*, *turbidity*, and *wetted width* appeared to be greater than where we did not find them. Contingency-table analyses suggested that longnose sucker and slimy sculpin tended not to co-occur in nonwadeable streams.

We found **northern pike** in or near Large rivers or lakes in the Koyukuk and Chandalar drainages, but not in the South Fork Koyukuk (but we did not sample any reaches in the lower South Fork Koyukuk mainstem). In both wadeable and nonwadeable streams where we found northern pike, *water temperature* appeared to be greater, and *stream gradient* and *elevation* less, than where we did not find them. In wadeable streams where we found northern pike, *wetted width*, *thalweg velocity*, *catchment area*, and *thalweg depth* also appeared to be less than where we did not find them. In nonwadeable streams where we found northern pike, *catchment area*, *wetted width*, and *thalweg depth* appeared to be greater, and *dissolved oxygen* less, than where none was found. We did not find northern pike where *elevation* was >569 m (1867 ft), *water temperature* <7.7°C (46°F), or *stream gradient* >1%.

We found a single 75-mm **least cisco** in the North Fork Chandalar River about 10 miles upstream of Chandalar Lake (Station ID 10A01). We sent this specimen to the University of Alaska Museum in Fairbanks (Appendix I1).

**Round whitefish** were widespread in Small–Large streams. In wadeable streams where we found round whitefish, *elevation* and *turbidity* appeared to be higher than at sites where none was found. And in nonwadeable streams where we found round whitefish, *catchment area* appeared to be greater than where none was found. Contingency-table analysis suggested possible association between round whitefish and burbot in nonwadeable streams.

**Arctic grayling** were very widespread in Small–Large streams. In Small streams where we found Arctic grayling, median *thalweg depth* appeared to be greater than at sites where none was found. We found Arctic grayling in some unusually high-gradient (e.g., up to 4% in Moore Creek, Station ID 20C02), fast (e.g., *thalweg velocity* up to 2.0 m/s [6.6 ft/s] in Suckik Creek, Station ID 16C04) mountain streams. In the only Large stream (lower John River, Station ID 14A01) where we did not find Arctic grayling, *elevation* (206 m [676 ft]), *dissolved oxygen* (9.68 mg/L), and *gradient* (0.3%) were the lowest of all the Large streams sampled, and *water temperature* (13°C [55°F]) was the highest.

We found **chum salmon** (adults and carcasses) at 2 Medium and 2 Large stream reaches in the Koyukuk River and Chandalar River drainages. We did not find chum salmon in the South Fork Koyukuk River drainage, but we did not sample any reaches in the lower South Fork Koyukuk mainstem where chum salmon were already listed in the AWC. In streams where we found chum salmon, *dissolved oxygen* appeared to be higher than where chum salmon were not found. We did not find chum salmon at *elevations* >330 m (1083 ft).

We found (juvenile) **Chinook salmon** in Small–Large streams in the Koyukuk River, South Fork Koyukuk River, and Chandalar River drainages. In both wadeable and nonwadeable streams where we found Chinook salmon, median *conductivity* appeared to be less than where we did not find them. Furthermore, in wadeable streams where we found Chinook salmon, median *elevation* appeared to be lower, and *catchment area* greater, than where Chinook salmon were

not found. We did not find Chinook salmon in reaches where *elevation* was >577 m (1893 ft) or *stream gradient* >1.5%.

We found **Dolly Varden** only in mountain streams of the Koyukuk River drainage, including 1 Medium (1 fish only) and 12 Small stream reaches. In the Small streams where we found Dolly Varden, *catchment area* and *water temperature* appeared lower, and *thalweg velocity* higher, than in streams where we did not find Dolly Varden. We did not find Dolly Varden where *elevation* was >733 m (2405 ft) or < 288 m (945 ft). Contingency-table analysis suggested possible avoidance between Dolly Varden and slimy sculpin in Small streams.

We found **burbot** infrequently and scattered throughout the study area in Small–Large streams. In nonwadeable streams where we found burbot, *thalweg depth* and *velocity* appeared to be greater, and *dissolved oxygen* less, than where burbot were not found. We did not find burbot where *water temperature* was <6.4°C (43°F) or *elevation* >701 m (2300 ft). Contingency-table analysis suggested possible association between burbot and round whitefish in nonwadeable streams.

**Slimy sculpin** were very widespread in Small–Large streams. In Small streams where we found slimy sculpin, *water temperature* and *catchment area* appeared greater, and *elevation*, *stream gradient*, *dissolved oxygen*, and *thalweg velocity* less, than where slimy sculpin were not found. We did not find slimy sculpin where *water temperature* was <5.3°C (42°F). Contingency-table analysis suggested possible avoidance between slimy sculpin and longnose sucker in nonwadeable streams, and between slimy sculpin and Dolly Varden in wadeable streams, as well as possible association between slimy sculpin and Chinook salmon in wadeable streams.

In the 10 Small streams where we electrofished but found **no fish**, median *elevation* appeared to be greater than where we found fish. We found fish in all 56 electrofished reaches below an elevation of 508 m (1667 ft).

### OBJECTIVE 3–SAMPLING SUFFICIENCY

Estimates of total species richness,  $TSR_{H-T}$  (Cochran 1977), were calculated for 39 reaches sampled in nonwadeable streams during the 2010 field season (Table 3).

Total species richness appeared likely to have been achieved in 17 of the 39 reaches sampled, including 1 reach where 0 species were detected when 15 subreaches were sampled. In the other 16 reaches, 1 to 5 species were observed in 10 to 20 subreaches sampled.

In 21 of the 39 reaches sampled, estimates of  $TSR_{H-T}$  suggested that the estimated number of species missed during sampling was between 0.50 and 1.50. In these 21 reaches, the number of subreaches sampled varied from 6 to 20, and the number of species detected varied from 12 to 7.

In one reach, the estimated number of species missed was between 1.50 and 2.50. Five species were observed in 13 subreaches sampled.

To evaluate both fixed and adaptive stopping rules for nonwadeable streams in Alaska, these 2010 results were combined with 4 other data sets collected during 2007–2009 (Buckwalter et al. 2010, Kirsch et al. 2011, Kirsch et al. *In prep*, and an unpublished data set from our 2007 fish inventory in the upper Kuskokwim River basin). When examining the distributions of the estimated numbers of species undetected using fixed stopping rules, we detected no significant evidence to indicate that different stopping rules were necessary for the different geographic areas. No differences between geographic areas were detected using reaches with 9+ subreaches sampled and a stopping rule of 8 ( $\chi^2 = 6.32$ ,  $p = 0.39$ ), with 11+ subreaches sampled and a

stopping rule of 10 ( $\chi^2 = 10.06, p = 0.12$ ), or with 13+ subreaches sampled and a stopping rule of 12 ( $\chi^2 = 9.30, p = 0.16$ ).

When using the KS test to compare the distributions between reaches where 1 or fewer vs. 2 or more species were undetected, we found significant evidence that reaches should be stratified by drainage area ( $D = 0.349, p = 0.045$ ). After stratifying sampled reaches into those draining up to 300 km<sup>2</sup> and those draining greater than 300 km<sup>2</sup>, we detected evidence that further stratification was required of the stratum containing reaches draining the larger areas ( $D = 0.411, p = 0.075$ ). As a result, we evaluated stopping rules for nonwadeable streams for reaches in 3 strata: reaches draining  $\leq 300$  km<sup>2</sup>; reaches draining  $> 300$  km<sup>2</sup> and  $\leq 1500$  km<sup>2</sup>; and reaches draining  $> 1500$  km<sup>2</sup>.

When evaluating fixed stopping rules for nonwadeable streams in Alaska draining  $\leq 300$  km<sup>2</sup>, we found that a minimum of 100 stream widths (10 subreaches) should be sampled per reach to provide an estimated 90% probability of failing to detect no more than 1 of the species occurring in each reach (Table 4). Sampling 80 stream widths provides only a 57% chance of failing to detect no more than 1 species, based on estimates of species richness from reaches where 130+ stream widths were sampled.

When evaluating fixed stopping rules for nonwadeable streams in Alaska draining  $> 300$  km<sup>2</sup> and  $\leq 1500$  km<sup>2</sup>, we found that sampling a minimum of 120 stream widths (12 subreaches) would provide an estimated 78% probability of failing to detect no more than 1 of the species occurring in each reach (Table 4). We were not able to identify a sampling intensity that would provide our target 90% chance of failing to detect no more than 1 species. Our data indicate that the required sampling effort would be in excess of 140 stream widths (14 subreaches).

When evaluating fixed stopping rules for nonwadeable streams in Alaska draining  $> 1500$  km<sup>2</sup>, we found that sampling a minimum of 80 stream widths (8 subreaches) would likely be adequate to provide an estimated 90% probability of failing to detect no more than 1 of the species occurring in each reach (Table 4).

When considering adaptive stopping rules for nonwadeable streams in Alaska draining  $\leq 300$  km<sup>2</sup>, we found that sampling a minimum of 8 subreaches and stopping only after no new species are detected in the last 4 subreaches provides an estimated 90% probability that no more than one species will be undetected in that reach (Table 4).

When considering adaptive stopping rules for nonwadeable streams in Alaska draining  $> 300$  km<sup>2</sup> and  $\leq 1500$  km<sup>2</sup>, we found that sampling a minimum of 12 subreaches and stopping only after no new species are detected in the last 4 or 6 subreaches provides an estimated 75% probability that no more than one species will be undetected in that reach (Table 4). We were not able to identify an adaptive strategy that would provide our target 90% chance of failing to detect no more than 1 species.

When considering adaptive stopping rules for nonwadeable streams in Alaska draining  $> 1500$  km<sup>2</sup>, we found that sampling a minimum of 6 subreaches and stopping only after no new species are detected in the last 4 subreaches provides an estimated 90% probability that no more than one species will be undetected in that reach (Table 4).

Table 3.—Summary of sampling-sufficiency data analysis for reaches sampled in nonwadeable streams in the upper Koyukuk River and Chandalar River basins in 2010.

Reach ID	Subreaches Sampled	$SR^a$	Subreach when $SR$ first observed	$TSR_{H,T}^b$	$TSR_{H,T}$ minus $SR$
FSK1015B01	6	3	4	3.70	0.70
FSK1020b01	8	1	2	1.52	0.52
FSK1017b01	8	2	8	2.63	0.63
FSK1014A01	9	2	3	2.65	0.65
FSK1001B01	10	2	2	2.15	0.15
FSK1003A01	10	4	4	4.01	0.01
FSK1010B01	10	4	10	4.55	0.55
FSK1019A01	10	4	4	4.78	0.78
FSK1010A01	10	6	5	7.34	1.34
FSK1007A01	10	7	6	7.69	0.69
FSK1012A01	11	2	3	2.15	0.15
FSK1007B01	11	3	6	3.12	0.12
FSK1014B01	11	3	2	3.03	0.03
FSK1006A01	11	4	6	4.12	0.12
FSK1012B01	11	4	6	4.25	0.25
FSK1013A01	12	2	6	2.54	0.54
FSK1002B01	12	3	10	4.09	1.09
FSK1009B01	12	3	4	3.00	0.00
FSK1011A01	12	3	6	4.09	1.09
FSK1011B01	12	3	6	3.04	0.04
FSK1013B01	12	4	9	4.58	0.58
FSK1017A01	12	4	6	4.71	0.71
FSK1016A01	13	1	2	1.13	0.13
FSK1015A01	13	2	7	2.55	0.55
FSK1003B01	13	3	12	4.13	1.13
FSK1002A01	13	5	8	7.18	2.18
FSK1008A01	14	3	9	3.55	0.55
FSK1004A01	14	4	7	4.30	0.30
FSK1006B01	15	0	1	Inf	NA
FSK1018b01	15	2	5	2.17	0.17
FSK1005A01	15	3	12	3.60	0.60
FSK1018A01	15	3	9	3.68	0.68
FSK1009A01	15	5	8	5.26	0.26
FSK1008B01	16	2	6	2.00	0.00
FSK1016b01	16	2	9	2.17	0.17
FSK1020b02	16	4	15	4.69	0.69
FSK1005B01	18	3	12	3.57	0.57
FSK1004B01	20	2	8	2.14	0.14
FSK1019b01	20	3	12	4.26	1.26

<sup>a</sup> observed species richness—the total number of species found in a reach.

<sup>b</sup> Horvitz-Thompson estimate (Cochran 1977) of the true species richness in a reach.

Table 4.– Estimated number of undetected species per reach for nonwadeable reaches draining 0–300 sq. km, when sampling is stopped after 80, 100, 120, and 140 stream widths.

Source data <sup>a</sup>	Estimated # of undetected species	Stopping after 80 stream widths		Stopping after 100 stream widths		Stopping after 120 stream widths		Stopping after 140 stream widths	
		%	cumulative %	%	cumulative %	%	cumulative %	%	cumulative %
Reaches where 90+ stream widths (9+ subreaches) were sampled (n=32)	0	53.1%	53.1%						
	1	31.3%	84.4%						
	2	15.6%	100.0%						
	3	0.0%	100.0%						
	4	0.0%	100.0%						
Reaches where 110+ stream widths (11+ subreaches) were sampled (n=20)	0	50.0%	50.0%	50.0%	50.0%				
	1	30.0%	80.0%	40.0%	90.0%				
	2	20.0%	100.0%	10.0%	100.0%				
	3	0.0%	100.0%	0.0%	100.0%				
	4	0.0%	100.0%	0.0%	100.0%				
Reaches where 130+ stream widths (13+ subreaches) were sampled (n=11)	0	45.5%	45.5%	45.5%	45.5%	45.5%	45.5%		
	1	27.3%	72.7%	45.5%	90.9%	54.5%	100.0%		
	2	27.3%	100.0%	9.1%	100.0%	0.0%	100.0%		
	3	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%		
	4	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%		
Reaches where 150+ stream widths (15+ subreaches) were sampled (n=7)	0	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%	42.9%
	1	14.3%	57.1%	42.9%	85.7%	57.1%	100.0%	57.1%	100.0%
	2	42.9%	100.0%	14.3%	100.0%	0.0%	100.0%	0.0%	100.0%
	3	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
	4	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
	5	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%

<sup>a</sup> Streams included in this analysis were located in the upper Koyukuk River and Chandalar River basins (this study) and portions of the Kuskokwim River, lower Yukon River, and eastern Norton Sound basins (sampled during 2007–2009; see Buckwalter et al. 2010, Kirsch et al. 2011, Kirsch et al. *In prep*, and an unpublished data set from our 2007 fish inventory in the upper Kuskokwim River basin).

Table 5.– Estimated number of undetected species per reach for nonwadeable reaches draining 301–1500 sq. km, when sampling is stopped after 80, 100, 120, and 140 stream widths.

Source data <sup>a</sup>	Estimated # of undetected species	Stopping after 80 stream widths		Stopping after 100 stream widths		Stopping after 120 stream widths		Stopping after 140 stream widths	
		%	cumulative %	%	cumulative %	%	cumulative %	%	cumulative %
Reaches where 90+ stream widths (9+ subreaches) were sampled (n=25)	0	24.0%	24.0%						
	1	16.0%	40.0%						
	2	40.0%	80.0%						
	3	20.0%	100.0%						
	4	0.0%	100.0%						
Reaches where 110+ stream widths (11+ subreaches) were sampled (n=21)	0	23.8%	23.8%	28.6%	28.6%				
	1	9.5%	33.3%	33.3%	61.9%				
	2	42.9%	76.2%	28.6%	90.5%				
	3	23.8%	100.0%	9.5%	100.0%				
	4	0.0%	100.0%	0.0%	100.0%				
Reaches where 130+ stream widths (13+ subreaches) were sampled (n=14)	0	28.6%	28.6%	35.7%	35.7%	35.7%	35.7%		
	1	7.1%	35.7%	14.3%	50.0%	42.9%	78.6%		
	2	42.9%	78.6%	35.7%	85.7%	14.3%	92.9%		
	3	21.4%	100.0%	14.3%	100.0%	7.1%	100.0%		
	4	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%		
Reaches where 150+ stream widths (15+ subreaches) were sampled (n=9)	0	22.2%	22.2%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
	1	11.1%	33.3%	11.1%	44.4%	44.4%	77.8%	44.4%	77.8%
	2	44.4%	77.8%	44.4%	88.9%	11.1%	88.9%	22.2%	100.0%
	3	22.2%	100.0%	11.1%	100.0%	11.1%	100.0%	0.0%	100.0%
	4	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%
	5	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%	0.0%	100.0%

<sup>a</sup> Streams included in this analysis were located in the upper Koyukuk River and Chandalar River basins (this study) and portions of the Kuskokwim River, lower Yukon River, and eastern Norton Sound basins (sampled during 2007–2009; see Buckwalter et al. 2010, Kirsch et al. 2011, Kirsch et al. *In prep*, and an unpublished data set from our 2007 fish inventory in the upper Kuskokwim River basin).

Table 6.—Estimated number of undetected species per reach for nonwadeable reaches draining >1500 sq. km, when sampling is stopped after 80, 100, 120, and 140 stream widths.

Source data <sup>a</sup>	Estimated # of undetected species	Stopping after 80 stream widths		Stopping after 100 stream widths		Stopping after 120 stream widths		Stopping after 140 stream widths	
		%	cumulative %	%	cumulative %	%	cumulative %	%	cumulative %
Reaches where 90+ stream widths (9+ subreaches) were sampled (n=10)	0	30.0%	30.0%						
	1	60.0%	90.0%						
	2	0.0%	90.0%						
	3	0.0%	90.0%						
	4	0.0%	90.0%						
Reaches where 110+ stream widths (11+ subreaches) were sampled (n=4)	5	10.0%	100.0%						
	0	50.0%	50.0%	50.0%	50.0%				
	1	25.0%	75.0%	25.0%	75.0%				
	2	0.0%	75.0%	0.0%	75.0%				
	3	0.0%	75.0%	0.0%	75.0%				
Reaches where 130+ stream widths (13+ subreaches) were sampled (n=2)	4	0.0%	75.0%	25.0%	100.0%				
	5	25.0%	100.0%	0.0%	100.0%				
	0	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		
	1	0.0%	50.0%	0.0%	50.0%	0.0%	50.0%		
	2	0.0%	50.0%	0.0%	50.0%	50.0%	100.0%		
Reaches where 150+ stream widths (15+ subreaches) were sampled (n=0)	3	0.0%	50.0%	0.0%	50.0%	0.0%	100.0%		
	4	0.0%	50.0%	50.0%	100.0%	0.0%	100.0%		
	5	50.0%	100.0%	0.0%	100.0%	0.0%	100.0%		
	0	-	-	-	-	-	-	-	-
	1	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	
3	-	-	-	-	-	-	-	-	
4	-	-	-	-	-	-	-	-	
5	-	-	-	-	-	-	-	-	

<sup>a</sup> Streams included in this analysis were located in the upper Koyukuk River and Chandalar River basins (this study) and portions of the Kuskokwim River, lower Yukon River, and eastern Norton Sound basins (sampled during 2007–2009; see Buckwalter et al. 2010, Kirsch et al. 2011, Kirsch et al. *In prep*, and an unpublished data set from our 2007 fish inventory in the upper Kuskokwim River basin).

Table 7.—Estimated number of undetected species per reach, for reaches draining 0–300 sq. km, when sampling is stopped after sampling a minimum number of subreaches and finding no new species in the last 4 or 6 subreaches.

Minimum number of subreaches sampled	Estimated # of undetected species	Stop after no new species in last 4 subreaches		Stop after no new species in last 6 subreaches	
		%	cumulative %	%	cumulative %
6	0	47.2%	47.2%	55.6%	55.6%
	1	25.0%	72.2%	29.6%	85.2%
	2	16.7%	88.9%	11.1%	96.3%
	3	11.1%	100.0%	3.7%	100.0%
	4	0.0%	100.0%	0.0%	100.0%
	5	0.0%	100.0%	0.0%	100.0%
		<i>n</i> =36		<i>n</i> =27	
8	0	56.7%	56.7%	60.0%	60.0%
	1	33.3%	90.0%	32.0%	92.0%
	2	10.0%	100.0%	8.0%	100.0%
	3	0.0%	100.0%	0.0%	100.0%
	4	0.0%	100.0%	0.0%	100.0%
	5	0.0%	100.0%	0.0%	100.0%
		<i>n</i> =30		<i>n</i> =25	
10	0	50.0%	50.0%	47.1%	47.1%
	1	40.0%	90.0%	47.1%	94.1%
	2	10.0%	100.0%	5.9%	100.0%
	3	0.0%	100.0%	0.0%	100.0%
	4	0.0%	100.0%	0.0%	100.0%
	5	0.0%	100.0%	0.0%	100.0%
		<i>n</i> =20		<i>n</i> =17	
12	0	45.5%	45.5%	40.0%	40.0%
	1	54.5%	100.0%	60.0%	100.0%
	2	0.0%	100.0%	0.0%	100.0%
	3	0.0%	100.0%	0.0%	100.0%
	4	0.0%	100.0%	0.0%	100.0%
	5	0.0%	100.0%	0.0%	100.0%
		<i>n</i> =11		<i>n</i> =10	

*Note:* Source data were those reaches where at least 1 additional subreach was sampled after the minimum number of subreaches was met. Streams included in this analysis were located in the upper Koyukuk River and Chandalar River basins (this study) and portions of the Kuskokwim River, lower Yukon River, and eastern Norton Sound basins (sampled during 2007–2009; see Buckwalter et al. 2010, Kirsch et al. 2011, Kirsch et al. *In prep*, and an unpublished data set from our 2007 fish inventory in the upper Kuskokwim River basin).

Table 8.—Estimated number of undetected species per reach, for reaches draining 301–1500 sq. km, when sampling is stopped after sampling a minimum number of subreaches and finding no new species in the last 4 or 6 subreaches.

Minimum number of subreaches sampled	Estimated # of undetected species	Stop after no new species in last 4 subreaches		Stop after no new species in last 6 subreaches	
		%	cumulative %	%	cumulative %
6	0	20.0%	20.0%	25.0%	25.0%
	1	16.0%	36.0%	12.5%	37.5%
	2	36.0%	72.0%	43.8%	81.3%
	3	20.0%	92.0%	6.3%	87.5%
	4	8.0%	100.0%	12.5%	100.0%
	5	0.0%	100.0%	0.0%	100.0%
		n=25		n=16	
8	0	26.1%	26.1%	33.3%	33.3%
	1	13.0%	39.1%	13.3%	46.7%
	2	39.1%	78.3%	40.0%	86.7%
	3	21.7%	100.0%	13.3%	100.0%
	4	0.0%	100.0%	0.0%	100.0%
	5	0.0%	100.0%	0.0%	100.0%
		n=23		n=15	
10	0	35.3%	35.3%	45.5%	45.5%
	1	17.6%	52.9%	9.1%	54.5%
	2	35.3%	88.2%	36.4%	90.9%
	3	11.8%	100.0%	9.1%	100.0%
	4	0.0%	100.0%	0.0%	100.0%
	5	0.0%	100.0%	0.0%	100.0%
		n=17		n=11	
12	0	41.7%	41.7%	50.0%	50.0%
	1	33.3%	75.0%	25.0%	75.0%
	2	16.7%	91.7%	12.5%	87.5%
	3	8.3%	100.0%	12.5%	100.0%
	4	0.0%	100.0%	0.0%	100.0%
	5	0.0%	100.0%	0.0%	100.0%
		n=12		n=8	

*Note:* Source data were those reaches where at least 1 additional subreach was sampled after the minimum number of subreaches was met. Streams included in this analysis were located in the upper Koyukuk River and Chandalar River basins (this study) and portions of the Kuskokwim River, lower Yukon River, and eastern Norton Sound basins (sampled during 2007–2009; see Buckwalter et al. 2010, Kirsch et al. 2011, Kirsch et al. *In prep*, and an unpublished data set from our 2007 fish inventory in the upper Kuskokwim River basin).

Table 9.—Estimated number of undetected species per reach, for reaches draining >1500 sq. km, when sampling is stopped after sampling a minimum number of subreaches and finding no new species in the last 4 or 6 subreaches.

Minimum number of subreaches sampled	Estimated # of undetected species	Stop after no new species in last 4 subreaches		Stop after no new species in last 6 subreaches	
		%	cumulative %	%	cumulative %
6	0	30.0%	30.0%	33.3%	33.3%
	1	60.0%	90.0%	66.7%	100.0%
	2	0.0%	90.0%	0.0%	100.0%
	3	0.0%	90.0%	0.0%	100.0%
	4	0.0%	90.0%	0.0%	100.0%
	5	10.0%	100.0%	0.0%	100.0%
		n=10		n=6	
8	0	33.3%	33.3%	33.3%	33.3%
	1	66.7%	100.0%	66.7%	100.0%
	2	0.0%	100.0%	0.0%	100.0%
	3	0.0%	100.0%	0.0%	100.0%
	4	0.0%	100.0%	0.0%	100.0%
	5	0.0%	100.0%	0.0%	100.0%
		n=9		n=6	
10	0	50.0%	50.0%	50.0%	50.0%
	1	50.0%	100.0%	50.0%	100.0%
	2	0.0%	100.0%	0.0%	100.0%
	3	0.0%	100.0%	0.0%	100.0%
	4	0.0%	100.0%	0.0%	100.0%
	5	0.0%	100.0%	0.0%	100.0%
		n=2		n=2	
12	0	100.0%	100.0%	100.0%	100.0%
	1	0.0%	100.0%	0.0%	100.0%
	2	0.0%	100.0%	0.0%	100.0%
	3	0.0%	100.0%	0.0%	100.0%
	4	0.0%	100.0%	0.0%	100.0%
	5	0.0%	100.0%	0.0%	100.0%
		n=1		n=1	

*Note:* Source data were those reaches where at least 1 additional subreach was sampled after the minimum number of subreaches was met. Streams included in this analysis were located in the upper Koyukuk River and Chandalar River basins (this study) and portions of the Kuskokwim River, lower Yukon River, and eastern Norton Sound basins (sampled during 2007–2009; see Buckwalter et al. 2010, Kirsch et al. 2011, Kirsch et al. *In prep*, and an unpublished data set from our 2007 fish inventory in the upper Kuskokwim River basin).

## DISCUSSION

By completing a systematic inventory of stream fish assemblages, we substantially increased AWC coverage in the study area. We also provided a snapshot of baseline conditions (i.e., fish assemblage composition and aquatic and riparian habitat characteristics) at many streams for which there was little or no prior information.

Overall, fish occurrence in this study was generally consistent with prior studies. As expected for coldwater streams, salmonids and sculpins dominated our catch. And, as expected for high-latitude and high-elevation streams, species richness was very low. We typically found a greater number of fish species in Large (median of 4 species) streams than in Medium or Small streams (median of 2 species).

We detected 10 of the 12 fish species previously documented in the study area. The 2 species we failed to detect (humpback whitefish and lake trout) were previously reported only from lakes—since we only sampled streams, it is not surprising that we did not find these 2 species. We found 2 species, lake chub and least cisco, whose presence had not been previously confirmed in the study area, although both were previously mentioned as possibly occurring.

We found Chinook salmon rearing in lower Mailbox Creek (Station ID 18C05), a Middle Fork Koyukuk River tributary. Mailbox Creek had a wetted width of just 1.6 m (5.2 ft) and thalweg depth of 0.3 m (1.0 ft), which is almost certainly too small to support spawning Chinook salmon. Therefore, Mailbox Creek appears to provide an example of Chinook salmon rearing in a non-natal stream, as has been demonstrated elsewhere in the Yukon River basin (e.g., Daum and Flannery 2009). The possibility of Chinook salmon rearing in non-natal streams should be considered when evaluating fish-habitat permit applications.

We found Dolly Varden in 11 mountain streams throughout the upper Koyukuk River drainage, but not in the South Fork Koyukuk River or Chandalar River drainages (Appendix D9). Previous studies confirm this pattern. Netsch (1975) also found Dolly Varden in the Koyukuk River drainage, but not in the South Fork Koyukuk River drainage. And Craig and Wells (1975) did not find any Dolly Varden in the (East Fork) Chandalar River. The causes of this pattern are not clear, but may be related to differences in elevation and terrain among these drainages.

### OBJECTIVE 3—SAMPLING SUFFICIENCY

Our objective was to develop stopping rules for single-pass electrofishing in nonwadeable Alaskan streams to guide fish-inventory field crews in estimating when a sufficient length of stream has been sampled to document the presence of all common fish species occurring in the reach at the time of sampling. Other investigators have recommended reach lengths of 30–40 (Maret and Ott 2003) to 85 stream widths (Hughes et al. 2002) when electrofishing for coldwater fish in nonwadeable streams. Analysis of our prior (2007–2009) AFFI fish collections in nonwadeable streams of western Alaska indicated that a 40-CW reach typically underestimates true species richness (Daniel Reed, Biometrician, ADF&G, Nome, Alaska, unpublished data, July 2010).

Our analyses of data collected during 2007–2010 indicated that a recommended minimum reach length for nonwadeable streams in Alaska should not be independent of the drainage area of a reach. While a reach length equivalent to 10 wetted widths appears to be adequate to provide a 90% chance that the number of undetected species is no greater than 1 per reach for reaches draining  $\leq 300 \text{ km}^2$  and reaches draining  $>1500 \text{ km}^2$ , we have no similar recommendation for

streams draining 301 to 1500 km<sup>2</sup> other than to suggest the minimum exceeds 14 wetted widths. Similarly, when considering adaptive stopping rules, we have no good recommendations for reaches draining 301 to 1500 km<sup>2</sup>.

The drainage area breakpoints indicated by our use of the KS test (300 and 1500 km<sup>2</sup>) are a result of an ad hoc analysis of a relatively small data set, so may not be ecologically ideal points for stratifying reaches based on drainage area. However, these points will serve to guide future sampling recommendations and investigations of sampling sufficiency until preferable points are identified. The ad hoc analysis clearly indicates that drainage areas of reaches need be considered when evaluating sampling sufficiency.

It is critical to note that all of our tabled results of observed species and estimated TSR are germane only to species that occur in streams during the summer and that are consistently vulnerable to the sampling gear we typically use, namely single-pass, pulsed-DC electrofishing. All of Alaska's freshwater fishes can be effectively sampled using electrofishing, but capture efficiency varies among species and between habitats. Many factors, acting alone or cumulatively, affect electrofishing efficiency. Some examples follow: 1) Electrofishing is size selective—with all else being equal, smaller fish are less vulnerable; 2) Electrofishing is primarily a shallow-water (< 2 m) activity—species that remain in deep water are less vulnerable; 3) Larval lamprey characteristically dwell in substrates, so they are likely less vulnerable to our electrofishing effort, which focuses on species that remain in the water column or on the stream bottom; 4) Northern pike may be able to detect an electrical field when they are still outside the effective radius for electrofishing and thus avoid capture (Novotny and Priegel 1974); 5) Sculpins tend to remain on the stream bottom, so they can be difficult to see or collect, especially in deeper or more turbid water. Thus, some fish species and life stages may occur in sampled reaches, but are less likely to be detected due to their size, physiology, or habitat preferences. As a result, our estimated TSR may be lower than the true species richness that could have been measured more accurately using a combination of gear types and alternate methods to target the variety of fishes in each unique habitat type.

Additional data from nonwadeable streams collected at the subreach level from different geographic areas would be highly desirable to further evaluate sampling sufficiency stopping rules and consistency between geographic areas. More data collected at the subreach level is also necessary for wadeable streams. Data necessary to evaluate potential stopping rules for field sampling needs to be in excess of the amount necessary to adequately sample for species richness. An additional, non-trivial, advantage of sampling at the subreach level is that the more detailed data provide the opportunity to estimate total species richness for a reach, allowing an ongoing assessment of quality control.

## RECOMMENDATIONS:

1. We did not sample 26 of 119 50-sq km target streams and 2 of 33 200-sq km target streams in the study area. We do not expect that anadromous fish use most of the unsampled target streams. However, the following unsampled streams should be considered for future anadromous-cataloging work:

Stream name	Latitude <sup>a</sup>	Longitude
<b>200-sq km target streams</b>		
Trail Creek	67.094	-148.749
Kollutarak Creek	68.093	-152.030
<b>50-sq km target streams</b>		
Unnamed Jim River tributary	66.862	-150.707
Unnamed John River tributary	67.008	-151.857
Eagle Creek	67.544	-152.242
Harriet Creek	67.020	-151.137
Prospect Creek (north fork)	66.822	-150.249
Unnamed John River tributary	67.130	-151.983
Granite Creek	67.029	-149.965

<sup>a</sup> Coordinates represent the location where the upstream drainage area first reaches 50 sq km or 200 sq km, or where the stream enters the study area.

2. Check for the presence of anadromous fish (especially chum and Chinook salmon) in the lower **Middle Fork Chandalar River** downstream of Ackerman Lake.
3. Based on our findings, additional **Chinook salmon rearing areas** may be found in the lower reaches of small non-natal tributaries to large rivers supporting Chinook salmon that are <2000 ft above sea level and have moderate (0.5–1.5%) gradient, such as Mailbox Creek (Station ID 18C05).
4. We recommend that additional **Chinook salmon spawning** sites be located and added to the AWC in the vicinity of streams where we found juveniles, particularly in the following drainages: Middle Fork Koyukuk River; Prospect Creek above the Dalton Highway; Mosquito Fork (South Fork Koyukuk); North Fork Chandalar River up to Chandalar Lake, and farther up the West Fork Chandalar River. Likewise, we suspect, but did not confirm, that **chum salmon spawn** in the lower John, Malamute Fork John, Wild, Middle Fork Koyukuk, and Chandalar (including the mainstem above the East Fork, as well as the lower reaches of the Middle Fork and North Fork) rivers.
5. We recommend further investigation into the occurrence and causes of the **low outlier pH readings** we measured in Big Creek (Station IDs 09C05—pH 3.46 and 06B01—pH 4.12) and Marion Creek (Station ID 10C07—pH 4.6). Exclusive of these low pH readings, it was also unusual that **no fish** were detected in these reaches. The low pH reading in Fish Creek (Station ID 19C01—pH 3.85), in which we found a normal Arctic grayling—slimy sculpin community, was probably inaccurate due to the extremely-low ambient electrical conductivity (16 µS/cm) of this stream.
6. We recommend further investigation of the fish community in Squaw Lake and Lake Creek (Squaw Lake outlet—Station ID 09C03). Although the pH level was not outside of normal range during our visit to Lake Creek, we were surprised to find **no fish** in what appeared to be excellent grayling habitat. Lake and Big creeks were the only Medium-sized streams where we found no fish.

7. More fish-collection data at the subreach level is needed from both wadeable and nonwadeable streams to test and refine sampling-sufficiency (reach-length) recommendations. A minimum of ten 10-CW subreaches should be sampled, with additional subreaches sampled as necessary until no new species are collected in the last 6 consecutive subreaches. More data from nonwadeable streams draining at least 1500 sq km and wadeable streams is especially needed. Observations are also needed from other Alaskan regions (i.e., Southcentral, Southwest, Southeast, and North Slope).

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## **APPENDIX A. FIELD PROTOCOLS**

Appendix A1.—Electrofishing protocol for wadeable streams.

The objective is to detect all the common fish species found in the reach. Fish collection should be completed within 30 minutes with a cumulative electrofishing time of *at least* 300 s. The procedure to collect fish with a backpack electrofisher (Smith-Root LR-24) is presented below.

**Procedures to collect fish at wadeable sites.** (adapted from McCormick and Hughes 1998).

1. Establish the habitat transect (Station) in a straight, representative, non-pool (preferably glide or run) channel unit, mark the first GPS waypoint at the Station, and complete habitat characterization and data entry.
2. Measure wetted channel width (CW, to the nearest 0.1 m) at the station. The minimum fish-collection-reach length is 40 CW, or 150 m, whichever is greater. The maximum reach length for wadeable streams is 300 m.
3. The 2-person electrofishing team will typically begin electrofishing at the station and work their way upstream the predetermined reach length while collecting fish. If the downstream end of the reach does not coincide with the Station, the team will mark a second GPS waypoint at the downstream end of the reach. A handheld, consumer-grade GPS unit in trip computer mode, range finder, hip chain, or other similarly-accurate method, will be used to measure the reach length as they work their way upstream. At the upstream end of the reach, the team will mark a third GPS waypoint. If walking upstream from the Station is not practicable (e.g., due to dense riparian vegetation), the team may walk downstream, staying near a bank, the required total reach length, then begin electrofishing and work their way back up to the Station. In this case, the team will measure the curvilinear length of the channel while walking downstream on the bank, but will avoid walking in the channel or otherwise startling fish. The location of the fish collection reach in relation to the station location should be noted in the database.
4. Both crewmembers must wear leak-free chest waders with wading belt snugly fastened, wading shoes that fit properly, electrically-insulated gloves, and polarized sunglasses (preferably with amber lenses). A hat with a brim may also be helpful in reducing glare.
5. Make sure the electrofisher battery is securely fastened-in. Check electrical connections (battery, anode, cathode). Replace the battery cover securely.
6. Try-on the backpack unit, and make any adjustments to the suspension system to achieve a comfortable fit, with the unit snug against the operator's back and resting above the hip bones. If necessary, untangle and route the cathode (rat tail) and anode cables.
7. With both electrodes out of the water and clear of each other and both operators, turn the unit on and confirm the system is ready. Reset the timer to zero.
8. To use a smooth-DC waveform (preferred):
  - a. Set the waveform to smooth DC, and select the initial voltage setting according to the ambient (not temperature-compensated) water conductivity—see Appendix A3.

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- b. Ensure that all non-target organisms are clear of the water, and begin fishing when both crewmembers are ready.
  - c. Closely observe the fishes’ response and attempt to maximize capture-prone responses (i.e, taxis or forced swimming) and minimize responses associated with elevated trauma (i.e., immobilization, bruising, spinal deformities, or recovery period exceeding 15 seconds). Try to capture fish before they approach near to the electrodes, and remove fish quickly from the electric field.
  - d. If fish exhibit symptoms of trauma, decrease the voltage by 50 V, press the Enter key, and try again. If fish are unresponsive, increase the voltage by 50 V, press the Enter key and try again.
  - e. If fish are still not showing capture-prone responses, or if it is necessary to extend battery life, switch to a pulsed-DC waveform.
9. To use a pulsed-DC waveform:
- a. Select initial voltage setting according to the ambient (not temperature-compensated) water conductivity—see Appendix A3.
  - b. Set initial pulse frequency to 30 pulses-per-second (pps).
  - c. Set duty cycle to achieve a pulse width of 2 ms, according to the following table:

Frequency (pps)	Duty cycle (%)	
	2 ms	4 ms
30	6	12
35	7	14
40	8	16
45	9	18
50	10	20
60	12	24

- d. If electrofishing is unsuccessful:
  - i. Increase the voltage by 50 V, press the enter key and try again. Stop increasing voltage when fish exhibit a forced response (twitch).
  - ii. If fish twitch, but are not showing taxis (induced movement of the fish toward the anode), increase the duty cycle to achieve a pulse width of 4 ms, according to the table in Step 9.c. Press the Enter key and try again. If necessary, repeat this step, increasing duty cycle by 10% increments until fish show taxis. If the duty cycle is increased to maximum, and taxis is still not achieved, proceed to Step iii.
  - iii. Increase the frequency by 10 pps, and press the Enter key. Adjust the duty cycle to achieve a pulse width of 2 ms for the new frequency setting (see Step 9.c), and try again. Repeat Step ii after each frequency increase. Avoid frequencies >60 pps.

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10. Beginning at the downstream end of the sampling reach, the electrofishing team will fish in an upstream direction, zigzagging across the channel from bank to bank in order to sample all habitat types. Depress the switch and sweep the anode slowly from side to side in the water. Electrofish intermittently to avoid herding fish, especially in glides or long pools. After electrofishing continuously for up to 5 s, quietly advance upstream approximately 2–4 m before resuming electrofishing. Alternatively, it can be effective to intentionally herd fish out of open water into shallow water or confined areas, where they are less likely to escape.
11. Attempt to sample the variety of habitats (deep and shallow, fast and slow, complex and simple, warmer and colder) present throughout the reach. Be sure to sample available cover (e.g., large substrate elements, large wood, debris piles, undercut banks, aquatic macrophyte beds, overhanging vegetation). Move the anode near confined cover with the power off, then depress the switch and slowly sweep the anode away from the cover to draw fish out into open. Do not attempt to sample in or near pools greater than waist-deep, or where velocity is too fast to safely wade. Always move slowly and carefully to avoid startling fish and to minimize risk of falling.
12. The netter follows downstream of the electrofisher operator, collecting fish with a dip net with a non-conductive (e.g. fiberglass or wood) handle and placing them into a 5-gallon bucket with stream water for later processing. Try to net all fish seen. When this is not feasible (e.g., in highly-productive systems), try to collect a representative sample of the fish assemblage (e.g., not just large game fish). Pay special attention to netting small and benthic fish, as well as fish that respond differently to the electric field—not just the big fish that move to the surface. Particularly when visibility is obscured by turbidity, debris, or vegetation, the netter should keep the dip net in the water downstream of the anode. The dip net opening should be near vertical, perpendicular to the current, with the dip net frame in contact with the substrate. The distance between the anode and the dip net is related to the current velocity: the faster the current, the greater the distance between the anode and dip net. In fast water, the net should remain several meters downstream of the anode.
13. Refresh the water in the bucket periodically to minimize physiological stress prior to measuring fish. If fish in the live well begin to show signs of excessive stress (e.g., rapid gill ventilation, gaping, gulping air, loss of equilibrium, excessive mucus), stop electrofishing and process them (Appendix A4). Also process large fish (> 300 mm) immediately and record species, life stage, life history, length, sex, and external anomalies in a notebook for future transfer to the database.
14. Record in the database the final, or most successful, electrofisher output settings (waveform, voltage, frequency, duty cycle, electrofisher on-time, and typical peak current and power), sampling efficiency (poor, fair, good, excellent), and distance sampled, along with fish observations, including fish collected while electrofishing, as well as any additional fish observed within the reach, but not collected. If conditions prevent safe or effective electrofishing within a reach, the conditions, and their effect on sampling efficiency, should be noted in the Sampling Event tab in the database, and the length of stream that was actually sampled should be noted in Sampling Event comments.

Appendix A2.–Electrofishing protocol for nonwadeable streams.

The objective is to detect all the common fish species found in the reach. The procedure to sample with a generator-powered boat electrofisher unit (Smith-Root GPP 2.5) is presented below.

**Procedures to collect fish by boat electrofishing.** (adapted from McCormick and Hughes 2000)

Onshore at launch site

1. Check generator oil and fill tank with gas (wipe up any spillage).
2. Attach electrodes to boat, and connect their cables to the corresponding outlet on the control box. If the fishing site is distant, keep electrodes and anode poles in boat.
3. Connect generator and pulsator (control box).
4. Confirm that all gear for the day is in the boat.
5. Put on a life jacket. Wear polarized sunglasses to aid vision.

At sample reach

1. Establish the habitat transect (Station) in a straight, representative, non-pool (preferably glide or run) channel unit, mark the first GPS waypoint at the Station, and complete habitat characterization and data entry.
2. Measure wetted channel width (CW, in meters) at the station—multiply by 10—this is the length of a single subreach. The minimum fish-collection-reach length is 10 subreaches, plus any additional subreaches necessary until no new species are detected in the last 6 consecutive subreaches (or as much as can be sampled in a day). Record fish observations and electrofisher settings separately for each subreach under a unique sampling-event code.
3. Check all electrical connections and suspend the electrodes in the water. The wetted surface area of the cathode(s) should be greater than that of the anode(s). Fill live well and put on dry electrically-insulated gloves. Verify that all electrical switches are off, that all non-target organisms are clear of the water or 2 boat lengths away, and that both crewmembers are clear of the water and electrodes and ready to begin electrofishing. Reset the timer on the electrofisher control box to zero at the start of each subreach.
4. If ambient conductivity is  $<300 \mu\text{S}/\text{cm}$ , set the Range dial to High. If ambient conductivity is  $>300 \mu\text{S}/\text{cm}$ , set the Range dial to Low. Switch the Mode dial to DC (**Caution! The position of this switch should not be changed when the foot switch is engaged!**) and select an initial frequency of 30 pulses-per-second (pps) and an initial Percent of Range (POR) setting of 10%.
5. Start the generator and depress the foot pedal to begin electrofishing. Increase POR as needed to elicit a capture-prone response [i.e, taxis (induced movement of the fish toward the anode) or forced swimming] from fish, while minimizing responses associated with elevated trauma (i.e., immobilization, branding, spinal deformities, or recovery period exceeding 15 seconds).

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*Note:* Where water conductivity is high (>300  $\mu\text{S}/\text{cm}$ ), avoid using POR settings in excess of 60%, which will simply increase duty cycle, but not peak voltage, and may overload the generator (Martinez and Kolz 2009). If the generator sounds labored, decrease POR and/or switch from High to Low range.

6. If fish taxis cannot be achieved, increase frequency to 60 pps, return the POR dial to 10%, and repeat Step 5.
7. Select the riverbank for fishing (river-left for odd-numbered target streams, river-right for even), and stay along the selected bank through the entire reach, to the degree it is safely navigable. Position the boat so the bow is angled downstream and toward the bank. While drifting downstream, use oars (cataraft) to maneuver laterally in the channel to avoid obstacles and position the anode(s) into habitats providing cover for fish. Most effort should occur near the bank, where most fish are expected to occur, and at depths less than 3 m wherever possible. However, all habitat types should be sampled, so zig-zag between the thalweg and the bank to allocate some sampling effort to a variety of habitats throughout the channel.

With electrical current off, maneuver the boat so the anode(s) approach near to fish-cover elements (e.g., large substrate elements, large wood, debris piles, undercut banks, aquatic macrophyte beds, overhanging vegetation), then begin electrofishing as the boat is slowly backed away from the cover. Electrofish intermittently to avoid herding fish, especially in glides or long pools. After electrofishing continuously for a duration of up to 10 s, drift quietly for 5–10 m before resuming electrofishing. Alternatively, it can be effective to intentionally herd fish out of open water into shallow water or confined areas, where they are less likely to escape. Do not place the boat in danger in order to fish particular habitats. Cut the generator and stow the gear before negotiating hazards.

8. The netter uses a dip net with non-conductive (e.g. fiberglass or wood) handle to retrieve fish, which are then deposited into a livewell for later processing. Try to capture fish before they approach near to the electrodes, and remove fish quickly from the electric field. Try to net all fish seen. When this is not feasible (e.g., in highly-productive systems), try to collect a representative sample of the fish assemblage (e.g., not just large game fish). Pay special attention to netting small and benthic fish, as well as fish that respond differently to the electric field—not just the big fish that move to the surface. If benthic fish are being missed, hold the net behind the anode just above the bottom so some are collected.
9. Change the water in the livewell periodically to minimize stress prior to processing. If fish in the live well begin to show signs of excessive stress (e.g., rapid gill ventilation, gaping, gulping air, loss of equilibrium, excessive mucus), stop electrofishing, tie-off or land the boat on shore, and process them. This should only be necessary on very warm days, in long reaches, or if very large numbers of fish are collected. Electrofishing may also need to cease at times to immediately process and release large fish. If fish are processed and released prior to the end of a reach (or between subreaches), be sure to release them upriver, or preferably near the opposite bank, to reduce the likelihood of recapturing them.

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10. Using a GPS unit in trip computer mode to monitor distance traveled, continue sampling downstream to the end of the subreach. At the end of the subreach, process the fish according to Appendix A4.
11. Record in the database the final, or most successful, electrofisher output settings (mode, range, POR, pulse frequency, current, electrofisher on-time, and duty cycle and power, if known), sampling efficiency (poor, fair, good, excellent), and reach length sampled, along with fish observations, including fish collected while electrofishing, as well as any additional fish observed within the reach, but not collected. If conditions prevent safe or effective electrofishing within a reach, the conditions, and their effect on sampling efficiency, should be noted in the Sampling Event tab in the database, and the length of stream that was actually sampled should be noted.
12. Be sure the station visit information is completely entered before leaving the site.

Appendix A3.–Recommended target voltage for standardized backpack electrofishing (constant power transfer) for predominantly juvenile salmonids in cold waters at various ambient water conductivities.

Ambient conductivity ( $\mu\text{S}/\text{cm}$ )	Target voltage		Ambient conductivity ( $\mu\text{S}/\text{cm}$ )	Target voltage	
	pulsed DC <sup>a</sup>	Smooth DC		pulsed DC	Smooth DC
20	1155	490	170	306	130
30	834	354	180	299	127
40	674	286	190	294	125
50	577	245	200	289	123
60	513	218	210	284	121
70	467	199	220	280	119
80	433	184	230	276	117
90	406	173	240	273	116
100	385	163	250	269	115
110	367	156	260	266	113
120	353	150	270	264	112
130	340	145	280	261	111
140	330	140	290	259	110
150	321	136	300	257	109
160	313	133			

*Note:* Target voltage values were calculated for a Smith-Root LR-24 backpack electrofisher fitted with a standard Smith-Root rat-tail cathode (a 10-ft length of braided, 3/16-in stainless-steel cable with the connected end insulated with a 6-ft length of neoprene) and a single anode pole having a standard Smith-Root 11-inch-diameter 3/8-in stainless-steel anode ring, and are optimized for capturing juvenile salmonids in cold, wadeable flowing waters with predominantly rocky substrates. These target voltages may not be optimal for electrofishing systems having a different internal resistance (i.e., different electrofishing system, electrode type, or if electrodes are heavily corroded), if targeting different fish species/life stages, or when electrofishing in nonwadeable waters or over predominantly fine substrates.

We prepared this power-standardization table based on the power-transfer theory for electrofishing (Kolz 1989), using water ambient conductivity measurements and metered electrofisher output values (peak voltage and current) selected while electrofishing to maximize capture-prone responses (taxis and forced swimming) and minimize responses associated with elevated trauma (immobilization, branding, spinal deformities, or recovery period exceeding 15 seconds) in target fish. We assumed fish conductivity = 100  $\mu\text{S}/\text{cm}$ .

*This table provides a starting voltage setting for standardized backpack electrofishing. While electrofishing, always monitor the response of target and non-target organisms, and fine-tune electrofisher operations and settings as recommended in the user's manual to achieve the desired response.*

<sup>a</sup> 30 pulses per second, 12% duty cycle (4 mS pulse width)

Appendix A4.–Procedure to process collected fish.

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1. Anesthetize collected fish with CO<sub>2</sub>:
  - a. Add 2 buffered CO<sub>2</sub>-producing tablets (e.g. Alka Seltzer) to a bucket containing about 4 L of stream water.
  - b. Place a batch of fish in the bucket (Note: only a few fish should be anesthetized at a time to avoid prolonged sedation).
  - c. Leave fish in the bucket until the desired level of sedation is achieved (about 2 to 5 minutes). Determining CO<sub>2</sub> dosage in the field can be difficult, because, by the time the fish have responded to the sedation, the concentration of CO<sub>2</sub> may be too high. If the concentration is too high (onset of sedation is rapid), the fish should be moved to native water or processed immediately.
2. Remove 1 fish at a time from the sedation bucket and place on a length-measuring tube (FL ≤ 250 mm) or board (FL ≥ 250 mm).
3. Identify all collected fish to species (Appendix B5), life stage (Appendix B1), and life history (anadromous, resident, marine/estuarine, unknown) and measure fork length to the nearest mm. Refer primarily to Pollard et al. 1997 to identify unknown salmoninae (salmon, trout, or char) and to Mecklenburg et al. 2002 for all other species. Also refer to photos of known specimens for confirmation. Check each fish for external anomalies (Appendix B2). Document any definite fish passage barriers (Appendix B3) found in or adjacent to the reach. Immediately after identification and measurement, place fish in a second bucket of fresh stream water for recovery.
4. Take a representative photo of each anadromous species and life stage, as well as of any rare or unusual fish, fish with anomalies, or fish where ID was uncertain. Record the photo number(s) associated with each fish in the database.
5. Take a fin clip from each Dolly Varden to be retained (see below) and from additional species requested by UAF. Follow the appropriate instructions for taking fin clips (USFWS instructions for Dolly Varden, UAF instructions for other species). Record the fin clip vial number in the database.
6. Retain the following specimens:
  - a. Species unknown: up to 5 (from each site) individual fish of each species and life stage that cannot be confidently identified in the field;
  - b. UAF Museum: requested voucher specimens (see UAF instructions);
  - c. Juvenile coho salmon: up to 5 from each site;
  - d. Optionally-anadromous fishes for otolith study: up to 12 large (> 300 mm, except for Dolly Varden, which may be any size) individuals from each study site where they are collected of each of the following species: Dolly Varden; humpback and broad whitefish; sheefish; and least and Bering cisco.

Euthanize (by a blow to the head, or an overdose of CO<sub>2</sub>) all specimens to be retained. Tag any retained fish with a unique tag number, and record the tag number in the database. For UAF, each fish must be individually tagged. For all other retained specimens, fish of the same species and life stage that were all collected from the same reach may be retained as a

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group with a single unique tag for the group. Any juvenile coho salmon and specimens retained for the otolith study must be frozen. All other specimens should be stored in 10% formalin solution. For specimens >200 mm, make an incision through the belly wall before placing in formalin. Keep specimens cool (e.g., in fresh stream water) until they can be put in formalin or frozen. **CAUTION! MINIMIZE THE CHANCE OF ATTRACTING WILDLIFE BY KEEPING RETAINED FISH INSIDE A COVERED COOLER OR HEAVY DUTY PLASTIC BAG. NEVER LEAVE SPECIMENS UNATTENDED IN THE FIELD.**

7. While 1 crewmember processes fish, the other will enter fish observations into the appropriate fields in the database.
  8. Release fish to still water in the fish collection reach. If additional contiguous fish collection will be conducted, release fish downstream (Headwaters Team) or upstream (Cataract Teams), and/or along the opposite bank, to avoid their recapture.
  9. Record the species, life stage, life history, and count, along with any comments indicating average size, behavior, anomalies, etc., of any additional fish that were observed, but not collected (e.g., visually-observed adults).
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## **APPENDIX B. LOOKUP TABLES**

Appendix B1.–Fish life-stage classes and threshold fork-length values.

Descriptions of fish life-stage classes.

Code	Name	Description
FXE	fixed egg	Eggs adhering to or buried within a substrate.
PLE	planktonic egg	Non-adherent, buoyant or nearly so, eggs drifting with currents.
FXA	alevin	Pre-emergent sac-fry within the interstices of the substrate.
PLL	planktonic larvae	Hatched juveniles drifting with currents and with no, or poorly, developed volitional swimming capabilities.
JUV	juvenile	Sexually immature free-swimming fish.
SMT	smolt	Juvenile anadromous fish on first emigration from fresh to marine water.
JOA	juvenile/adult	Free swimming fish whose sexual maturity is not determined.
ADT	adult	Fish at, or approaching sexual maturity.
ASP	adult spawning	Adults observed in the act of spawning.
KLT	kelt	Post-spawning iteroparous anadromous fish in freshwater prior to return to marine water.
CAR	carcass	Post-spawning adult carcass.
NAP	not applicable	No fish observed or general information record only.
NRD	not recorded	Life stage not recorded.

Fork-length threshold values (mm) used to assign fish to selected life-stage classes.

Species	Life stage		
	Juvenile	Juvenile-or-adult	Adult
lamprey-undefined	-	-	-
longnose sucker	<188	188–348	>348
northern pike	<330	330–448	>448
Alaska blackfish	<42	42–113	>113
broad whitefish	<343	343–448	>448
humpback whitefish	<280	280–363	>363
least cisco	<199	199–318	>318
round whitefish	<199	199–318	>318
inconnu (sheefish)	<586	586–648	>648
Arctic grayling	<190	190–328	>328
pink salmon	-	-	-
chum salmon	-	-	-
coho salmon	-	-	-
sockeye salmon	-	-	-
Chinook salmon	-	-	-
Dolly Varden	<83	83–	-
burbot	<280	280–498	>498
slimy sculpin	<51	51–68	>68

*Note:* A hyphen or missing value indicates that we assigned individual fish to the indicated life stage based only on examination of morphological indicators of sexual maturity, not based on fork-length threshold values.

Appendix B2.–Fish-anomaly classes.

Code	Name	Description
AB	Absent	Absent eye, fin, tail.
BK	Blackening	Tail or whole body with darkened pigmentation.
BL	Blisters	In mouth, just under skin.
BS	Extensive black spot	Small black cysts (dots) all over the fins and body.
CO	Copepod	A parasitic infection characterized by a worm-like copepod embedded in the flesh of the fish; body extends out and leaves a sore/discoloration at base, may be in mouth gills, fins, or anywhere on body.
CY	Cysts	Fluid-filled swellings; may be either small or large dots.
DE	Deformities	Skeletal anomalies of the head, spine, and body shape; amphibians may have extra tails, limbs, toes.
EF	Eroded fins	Appear as reductions or substantial fraying of fin surface area.
EG	Eroded gills	Gill filaments eroded from tip.
EX	Exophthalmia	Bulging of the eye.
FA	Fin anomalies	Abnormal thickenings or irregularities of rays
FU	Fungus	May appear as filamentous or "fuzzy" growth on the fins, eyes, or body.
GR	Grubs	White or yellow worms embedded in muscle or fins.
HM	Hemorrhaging	Red spots on mouth, body, fins, fin bases, eyes, and gills.
IC	Ich	White spots on the fins, skin or gills.
LE	Lesions	Open sores or exposed tissue; raised, granular, or warty outgrowths.
LI	Lice	Scale-like, mobile arthropods.
MU	Mucus	Thick and excessive on skin or gill, or as long cast from vent.
NO	None	No anomalies present.
OT	Other	Anomalies or parasites not specified.
SA	Scale anomalies	Missing patches, abnormal thickenings, granular skin
SO	Shortened operculum	Leaves a portion of the gill chamber uncovered
TU	Tumors	Areas of irregular cell growth which are firm and cannot be easily broken open when pinched. (Masses caused by parasites can usually be opened easily.)
WR	Leeches	Annelid worms which have anterior and posterior suckers. They may attach anywhere on the body.

Source: McCormick and Hughes 1998.

Appendix B3.–Fish-passage barrier classes.

Code	Name	Description
EBD	Ephemerally Fixed, Beaver Dam	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling, to be blocked by a beaver dam. Used where the location of the barrier to movement is known within 100 m.
EDJ	Ephemerally Fixed, Debris Jam	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling, to be blocked by a debris jam. This category is restricted to small scale (<10 m) features that do not dramatically alter the overall channel type. Larger mass-wasting created barriers fall in the EGD category. Used where the location of the ultimate barrier to movement is known within 100 m.
EGD	Ephemerally Fixed, Hydro-Geomorphically Dynamic	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling, to be blocked by current hydrological or geomorphic conditions but where evidence indicates that these landscape-scale conditions are in flux over brief (decades) geologic time. Used in areas of recent or ongoing geomorphic alteration (e.g., glacial advance or retreat, mass wasting, tectonic movements, dynamic channel formation). Used where the location of the barrier to movement is within 100 m.
ELF	Ephemerally Fixed, Low Flow	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling, to be blocked by low stream flow, but where evidence indicates that at higher stream flow, fish could ascend further up the channel. Used where the location of the barrier to movement is known within 100 m.
EOT	Ephemerally Fixed, Other	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling, to be blocked by a non-permanent barrier other than those listed immediately above. Used where the location of the ultimate barrier to movement is known within 100 m.
ESS	Ephemerally Fixed, Spring Source	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling or on-site analysis, to be blocked by the emergence of ground water from an unconfined substrate. Compare to GSL. Used where the location of the barrier to movement is known within 100 m.
GLK	Geologically Fixed, Lake Shore	Where the upstream movements of a given species appear, based on sufficient sampling or on-site analysis, to be limited by the perimeter of a geologically-stable lake shore. Used where the location of the barrier to movement is known within 100 m.
GOT	Geologically Fixed, Other	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling or on site analysis, to be blocked by a geologically fixed barrier other than those listed immediately above. Used where the location of the ultimate barrier to movement is known within 100 m.
GSL	Geologically Fixed, Stream Limit	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling or on-site analysis, to be limited to the presence of surface water, and where that presence of surface water appears to be fixed in space and stable in time (compare to ELF). Spring-fed headwall pools are examples. Used where the location of the barrier to movement is known within 100 m.

-continued-

Appendix B3.–Page 2 of 2.

Code	Name	Description
GWG	Geologically Fixed, Waterfall/High Gradient	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling or on-site analysis, to be blocked by a waterfall, cascade, or other similar geologically fixed barrier. Used where the location of the barrier to movement is known within 100 m.
HCU	Human, Culvert	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling, to be blocked by a culvert through a road bed, a railroad bed, a runway, or through any other type of fill. This code includes culverts of all materials (e.g., metal, plastic, wood) and shapes (e.g., round, arched, bottomless) Used where the location of the barrier to movement is known within 100 m.
HDB	Human, Debris	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling, to be blocked by debris placed or deposited in the stream as the direct result of human activities but where that material was not intentionally placed to impound, filter, or divert stream flow. Examples include woody debris from logging activities, and debris flows from failed road prisms. Used where the location of the barrier to movement is known within 100 m.
HDM	Human, Dam	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling, to be blocked by a dam, weir, head gate, or other cross channel structure that impounds, filters, or diverts stream flow. This code includes structures of all materials (e.g., earth, concrete, rip rap, metal, wood). Used where the location of the barrier to movement is known within 100 m.
HOT	Human, Other	Where the upstream movements of a given species appear, based on sufficient upstream and downstream sampling, to be blocked by a human-created structure other than those listed immediately above. Used where the location of the barrier to movement is known within 100 m.
NAP	Not applicable	No fish observed. See downstream stations.
NON	None	No barrier exists at survey station.
SBU	Specific Barrier Unknown	Where a given species is collected at a downstream station and not at an upstream station but where no specific barrier is known between the 2 stations. Used where the distributional limits are not known within 100 m.
UNK	Unknown	No information exists upstream of a sample station. Often where a species is collected at a station and no additional sampling or survey occurs upstream.

Appendix B4.–Water color, substrate, and stream-stage classes.

Water-color classes.

Code	Description	Definition
CLR	Clear	Transparent water, or nearly so.
FER	Ferric	Rust- (orange) stained.
GHT	Glacial, High Turbidity	High turbidity waters (visibility $\leq$ 30 cm (12 in) typical of streams originating directly from glaciers (e.g., Matanuska River).
GLT	Glacial, Low Turbidity	Low turbidity waters (visibility $>$ 30 cm) typical of systems with large lakes (settling basins) below glacial discharge (e.g., Kenai River). These waters are frequently turquoise-colored.
HUM	Humic	Tea-colored water (tannic)
MUD	Muddy	Dark water with high suspended particulate load.

Substrate classes.

Code	Name	Intermediate-axis dimensions
BED	Bedrock	$>$ 4,096 mm. Solid rock—few or no discrete particles
BLD	Boulder	256–4,096 mm
CBL	Cobble	64–256 mm
GRV	Gravel	2–64 mm
SND	Sand	0.0625–2 mm
SCL	Silt/Clay	$\leq$ 0.0625 mm
ORG	Organic	Incompletely-decomposed organic material

*Source:* adapted (Bedrock and Organic classes added) from Cummins (1962), which is based on the Wentworth (1922) scale.

Stream-stage classes.

Code	Description
DNC	Dry, no defined channel
DDC	Dry, defined channel
LDF	Low, intermittent surface flow
LCF	Low, continuous surface flow
MED	Medium
HIH	High
WNC	Wet, no defined channel

-continued-

Embeddedness classes.

Code	Level of embeddedness <sup>a</sup>	Description
NEG	Negligible	Gravel, cobble, and boulder particles have <5% of their height covered by fine sediment <sup>b</sup> .
LOW	Low	Gravel, cobble, and boulder particles have 5-25% of their height covered by fine sediment.
MOD	Moderate	Gravel, cobble, and boulder particles have 25-50% of their height covered by fine sediment.
HIH	High	Gravel, cobble, and boulder particles have 50-75% of their height covered by fine sediment.
VHI	Very high	Gravel, cobble, and boulder particles have >75% of their height covered by fine sediment.

<sup>a</sup> Embeddedness (*sensu* Armantrout 1998): Degree that gravel and larger sizes of particles (boulders, cobble, or rubble) are surrounded or covered by fine sediment (e.g., less than 2 mm).

<sup>b</sup> <2 mm, i.e., sand, silt, or clay.

*Note:* If the dominant substrate type is sand, silt, or clay, the level of embeddedness will be rated as Very high. If the dominant substrate type is bedrock, the level of embeddedness will be rated as Negligible.

*Source:* modified from Bain (1999), which was adapted from Platts et al. 1983.

Appendix B5.–Fish species codes.

Code	Common name	Scientific name	Code	Common name	Scientific name
ACI	sturgeon-unspecified	<i>Acipenser</i> sp.	SCO	coho salmon	<i>Oncorhynchus kisutch</i>
ATG	green sturgeon	<i>Acipenser medirostris</i>	SPI	pink salmon	<i>Oncorhynchus gorbuscha</i>
ATW	white sturgeon	<i>Acipenser transmontanus</i>	SSE	sockeye salmon	<i>Oncorhynchus nerka</i>
CAC	Arctic char	<i>Salvelinus alpinus</i>	TCT	cutthroat trout	<i>Oncorhynchus clarkii</i>
CBT	brook trout	<i>Salvelinus fontinalis</i>	TRB	rainbow trout	<i>Oncorhynchus mykiss</i>
CDV	Dolly Varden	<i>Salvelinus malma</i>	TRT	trout-unspecified	iteroparous <i>Oncorhynchus</i> sp.
CHR	char-unspecified	<i>Salvelinus</i> sp.	UCR	coastrange sculpin	<i>Cottus aleuticus</i>
CLK	lake trout	<i>Salvelinus namaycush</i>	UFH	fourhorn sculpin	<i>Myoxocephalus quadricornis</i>
DAL	Alaska blackfish	<i>Dallia pectoralis</i>	ULP	sculpin-unspecified	Cottidae
ERC	trout-perch	<i>Percopsis omiscomaycus</i>	UPR	prickly sculpin	<i>Cottus asper</i>
FAR	Arctic flounder	<i>Pleuronectes glacialis</i>	UPS	Pacific staghorn sculpin	<i>Leptocottus armatus</i>
FLN	righteye flounders-unspecified	Pleuronectidae	USH	sharpnose sculpin	<i>Clinocottus acuticeps</i>
FST	starry flounder	<i>Platichthys stellatus</i>	USL	slimy sculpin	<i>Cottus cognatus</i>
GAD	cod-unspecified	Gadidae	WAK	Alaska whitefish	<i>Coregonus nelsonii</i>
GAR	Arctic cod	<i>Boreogadus saida</i>	WAR	Arctic cisco	<i>Coregonus autumnalis</i>
GBR	burbot	<i>Lota lota</i>	WBC	Bering cisco	<i>Coregonus laurettae</i>
GPA	Pacific cod	<i>Gadus macrocephalus</i>	WBD	broad whitefish	<i>Coregonus nasus</i>
GRA	Arctic grayling	<i>Thymallus arcticus</i>	WHB	humpback whitefish	<i>Coregonus pidschian</i>
GSA	saffron cod	<i>Eleginus gracilis</i>	WHC	humpback whitefish complex	<i>C. clupeaformis</i> / <i>C. nelsonii</i> / <i>C. pidschian</i>
HAM	American shad	<i>Alosa sapidissima</i>	WHF	whitefish-unspecified	Coregoninae
HER	herrings-unspecified	Clupeidae	WIN	inconnu (sheefish)	<i>Stenodus leucichthys</i>
HPA	Pacific herring	<i>Clupea pallasii</i>	WLC	least cisco	<i>Coregonus sardinella</i>
IDA	salmonid, unspecified	Salmonidae	WLK	lake whitefish	<i>Coregonus clupeaformis</i>
KNS	ninespine stickleback	<i>Pungitius pungitius</i>	WPG	pygmy whitefish	<i>Prosopium coulteri</i>
KSB	stickleback-unspecified	Gasterosteidae	WRN	round whitefish	<i>Prosopium cylindraceum</i>
KTS	threespine stickleback	<i>Gasterosteus aculeatus</i>	YMA	shiner perch	<i>Cymatogaster aggregata</i>
LAC	Arctic-Alaskan brook lamprey paired species	<i>L. camtschatica</i> / <i>L. alaskense</i>	YYP	yellow perch	<i>Perca flavescens</i>
LAK	Alaskan brook lamprey	<i>Lampetra alaskense</i>	QQQ	other species not listed	-
LAR	Arctic lamprey	<i>Lampetra camtschatica</i>	VVV	no collection effort	-
LMO	Atlantic salmon	<i>Salmo salar</i>	XXX	no fish collected or observed	-
LMP	lamprey-unspecified	<i>Lampetra</i> sp.	ZZZ	general fish observation, no species information	-
LPC	Pacific lamprey	<i>Lampetra tridentata</i>			
LRV	American river lamprey	<i>Lampetra ayresii</i>			
LWB	western brook lamprey	<i>Lampetra richardsoni</i>			
MIN	lake chub	<i>Couesius plumbeus</i>			
NOS	longnose sucker	<i>Catostomus catostomus</i>			
OEU	eulachon	<i>Thaleichthys pacificus</i>			
OLS	longfin smelt	<i>Spirinchus thaleichthys</i>			
OPS	pond smelt	<i>Hypomesus olidus</i>			
ORM	rainbow smelt	<i>Osmerus mordax</i>			
OSM	smelt-unspecified	Osmeridae			
OSS	surf smelt	<i>Hypomesus pretiosus</i>			
PIK	northern pike	<i>Esox lucius</i>			
SAM	Pacific salmon-unspecified	semelparous <i>Oncorhynchus</i> sp.			
SCK	Chinook salmon	<i>Oncorhynchus tshawytscha</i>			
SCM	chum salmon	<i>Oncorhynchus keta</i>			

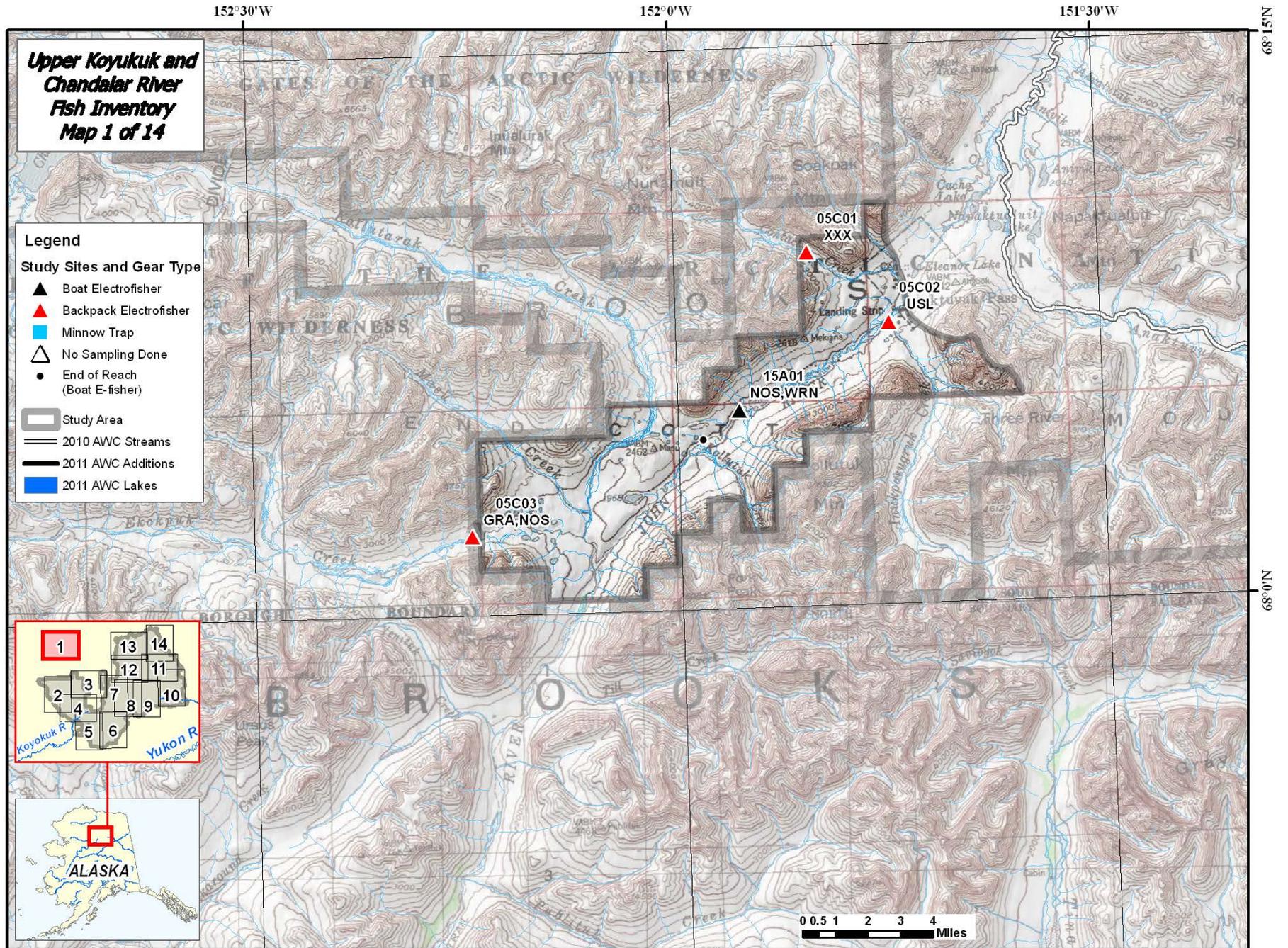
Appendix B6.–Vegetation disturbance classes.

Code	Description
A	Anthropogenic Disturbance
AA	Unique
AA1	Timber Harvest
AA1a	0-1 year post-harvest
AA1b	1-5 year post-harvest
AA1c	10-20 year post-harvest
AA1d	20+ year post-harvest
AA2	Construction
AA2a	0-1 year post-construction
AA2b	1-5 year post-construction
AA2c	10-20 year post-construction
AA2d	20+ year post-construction
AA3	Enhancement/Restoration
AA3a	Bank Stabilization
AA3b	Riparian Thinning
AA3c	Fisheries Related
AA3d	Rip-Rap
AB	Repeated Seasonal
AB1	Foot Traffic
AB1a	Anglers
AB1b	Non-anglers
AB2	Vehicle Traffic
AB2a	Non-Recreational (road vehicle)
AB2b	Recreational (ATV, snowmachine)
AC	Permanent
AC1	Pervious Surfaces
AC1a	Urban/Commercial Landscaping
AC1b	Agricultural
AC1c	Gravel
AC1d	Other
AC2	Impervious Surfaces
AC2a	Parking Area
AC2b	Paved Trail/Walkway
AC2c	Concrete Wall/Abutment
N	Natural Disturbance
NA	Water/Flood
NA1	Slumping/Undercutting
NA1a	Wood Inputs
NA1b	Sediment Inputs

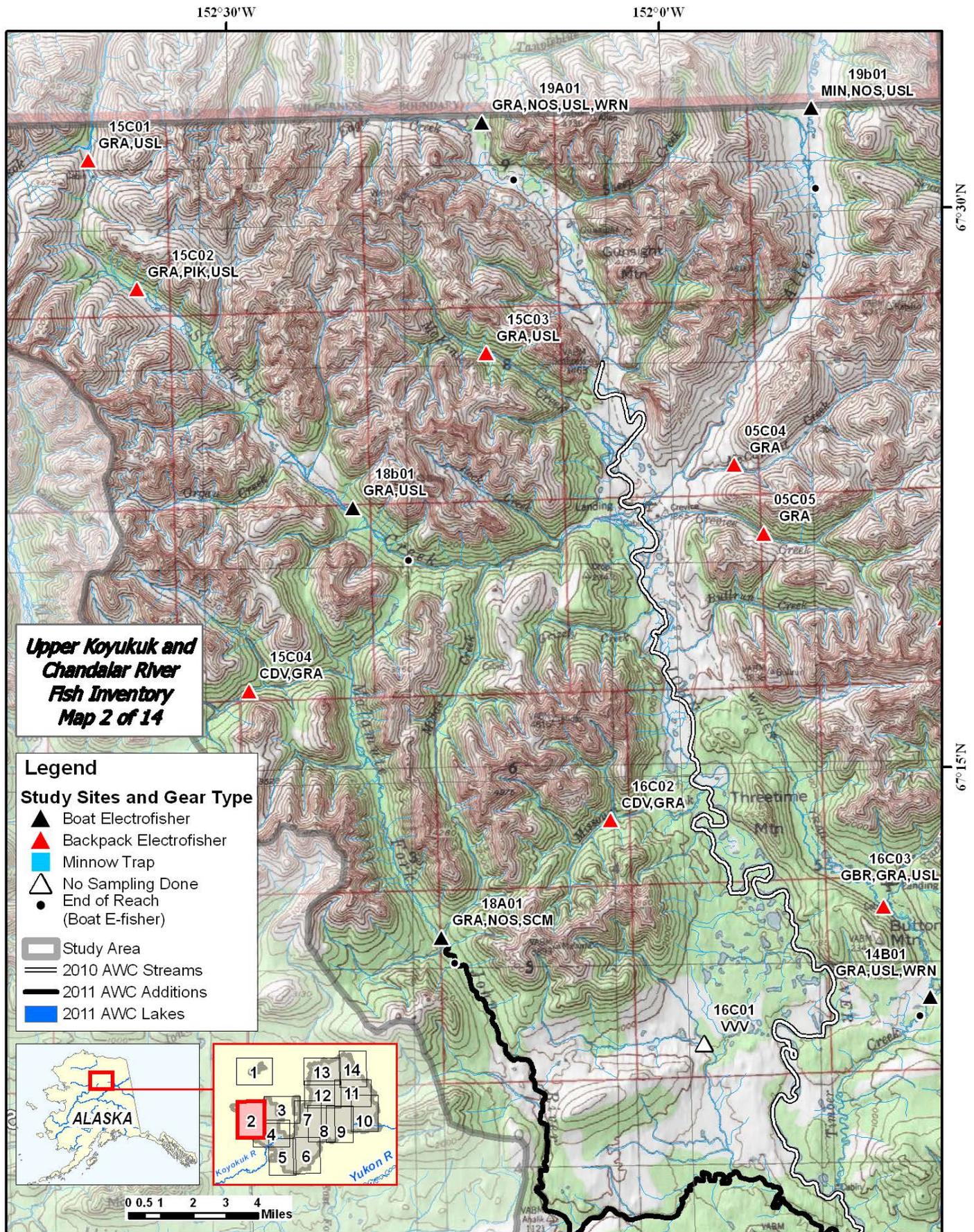
Code	Description
NA2	Sediment deposition from tributary
NB	Windthrow
NC	Glacial Retreat
ND	Fire
NE	Mass Wasting
NE1	Avalanche
NE2	Landslide
NE3	Debris Torrent
NE4	Natural Tree Mortality



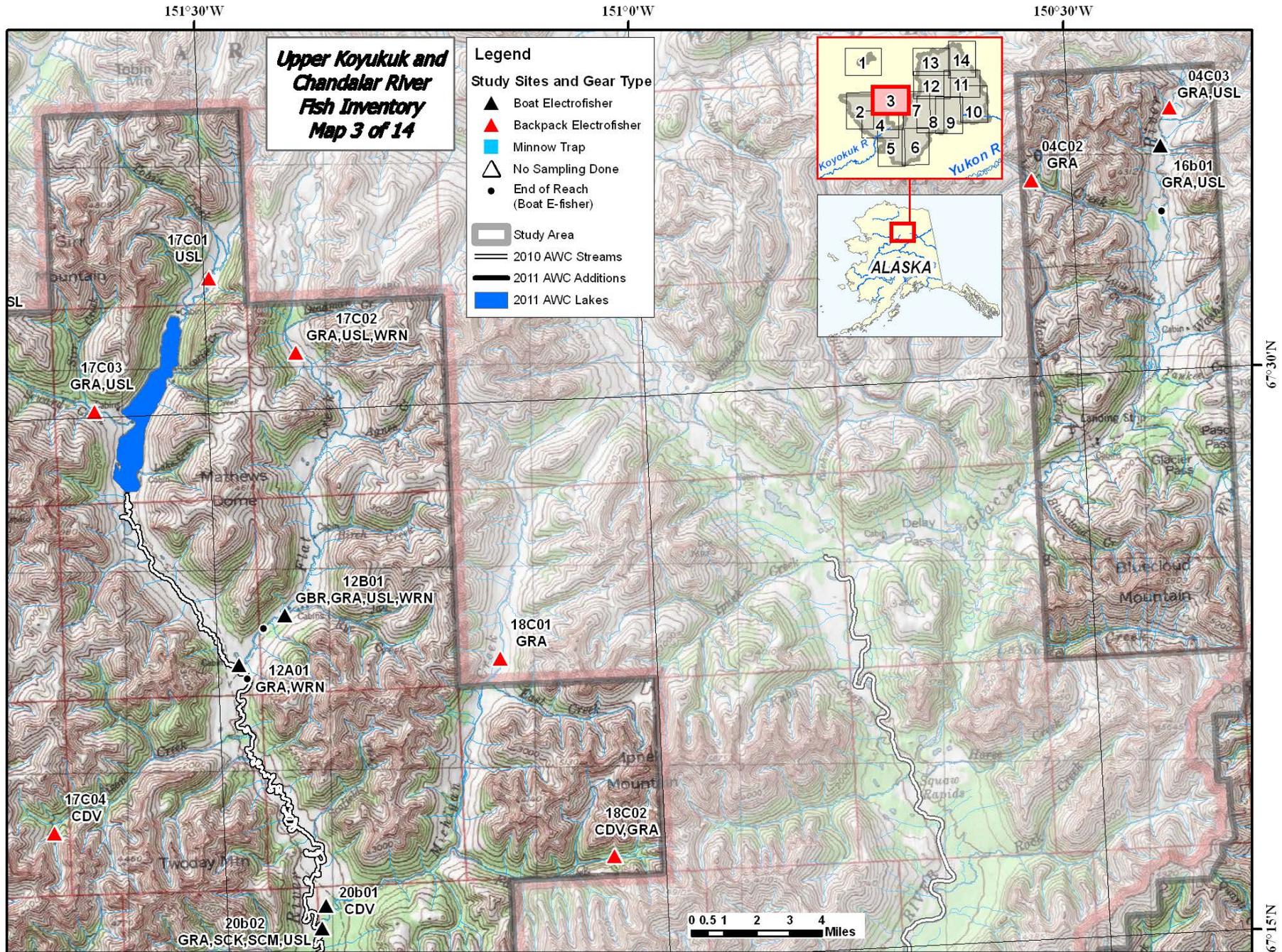
## **APPENDIX C. STUDY-SITE MAPS**

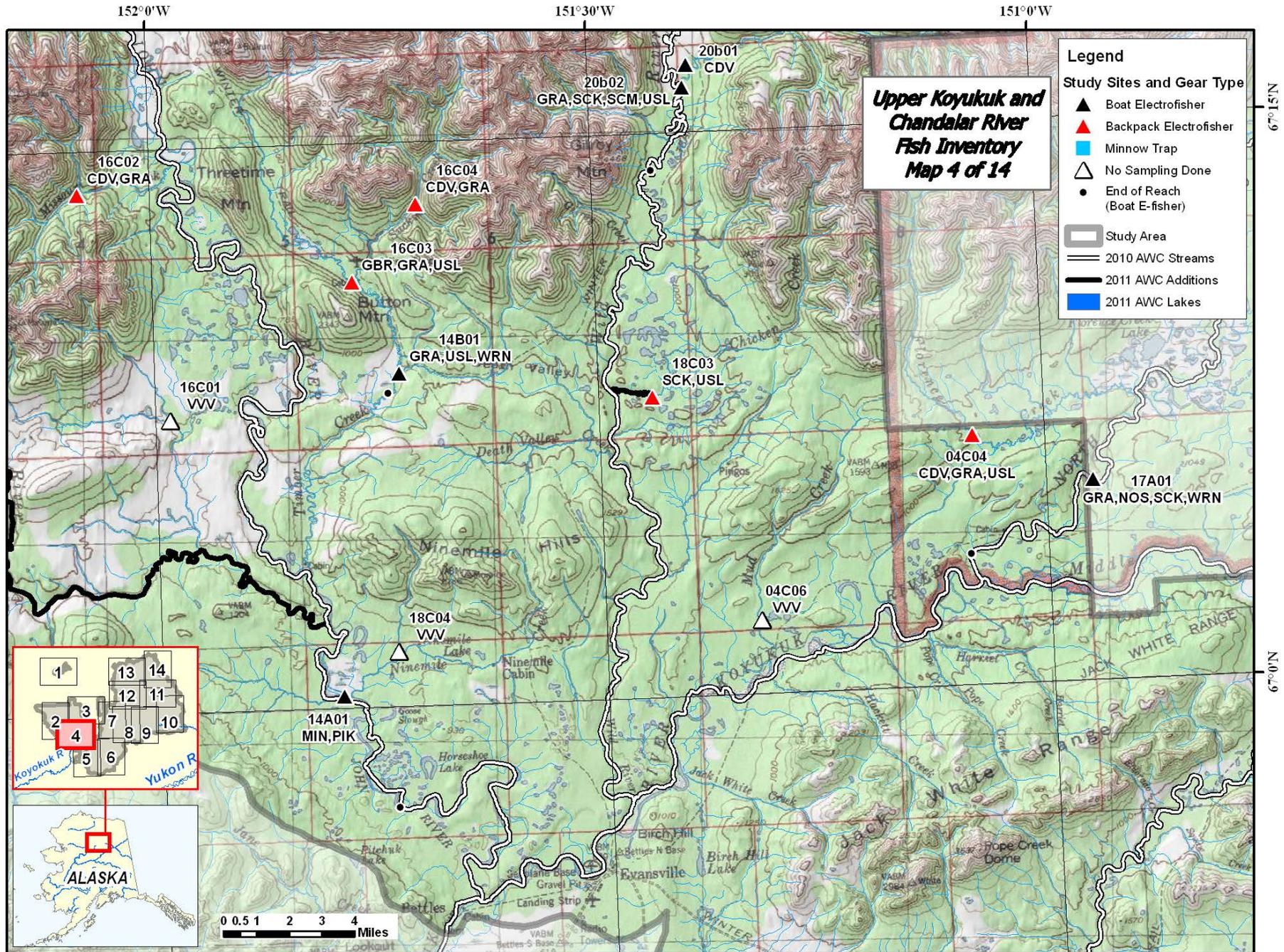


Appendix C1.—Study-site maps.



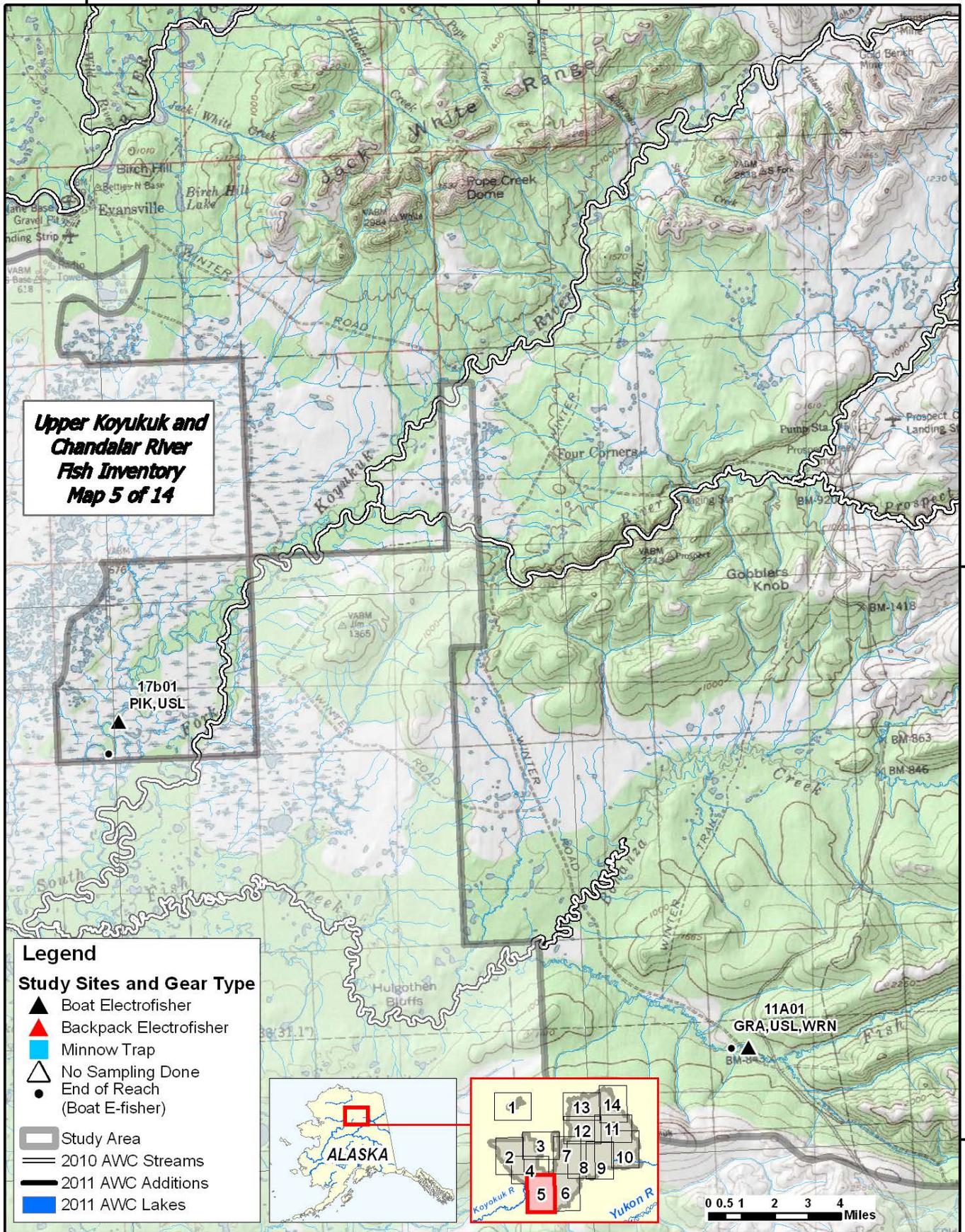
Appendix C1.–Page 2 of 14.

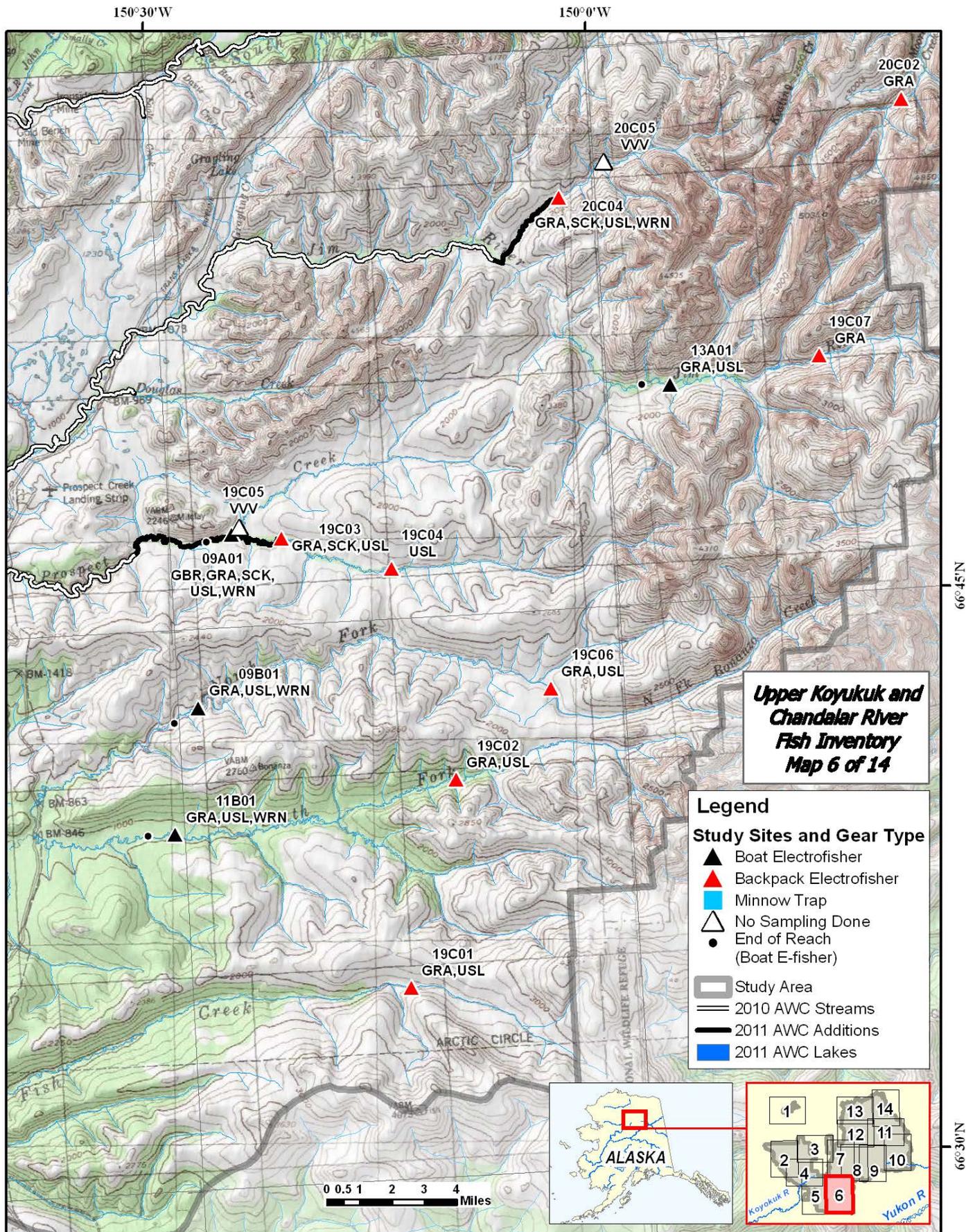




151°30'W

151°0'W





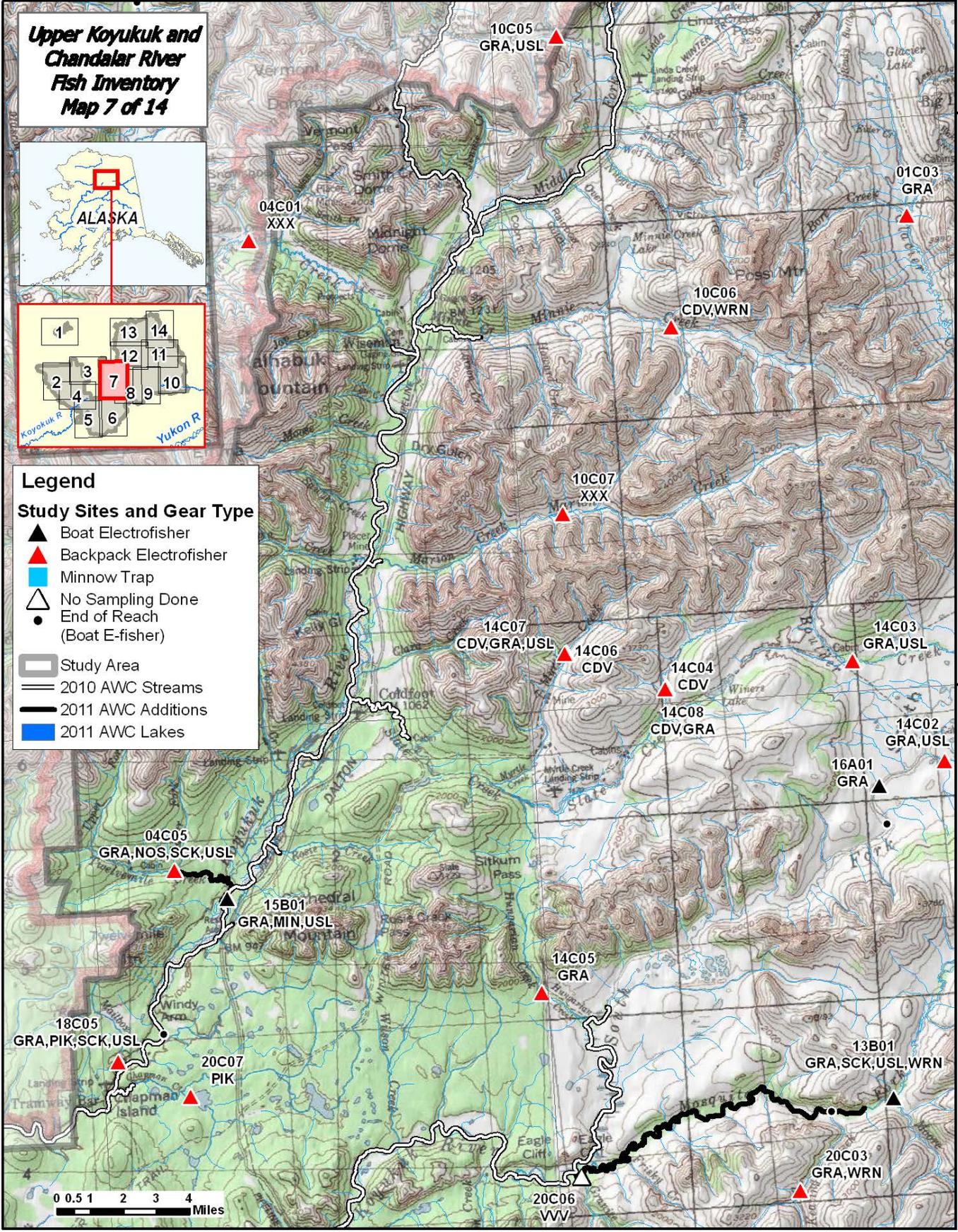
### Upper Koyukuk and Chandalar River Fish Inventory Map 7 of 14



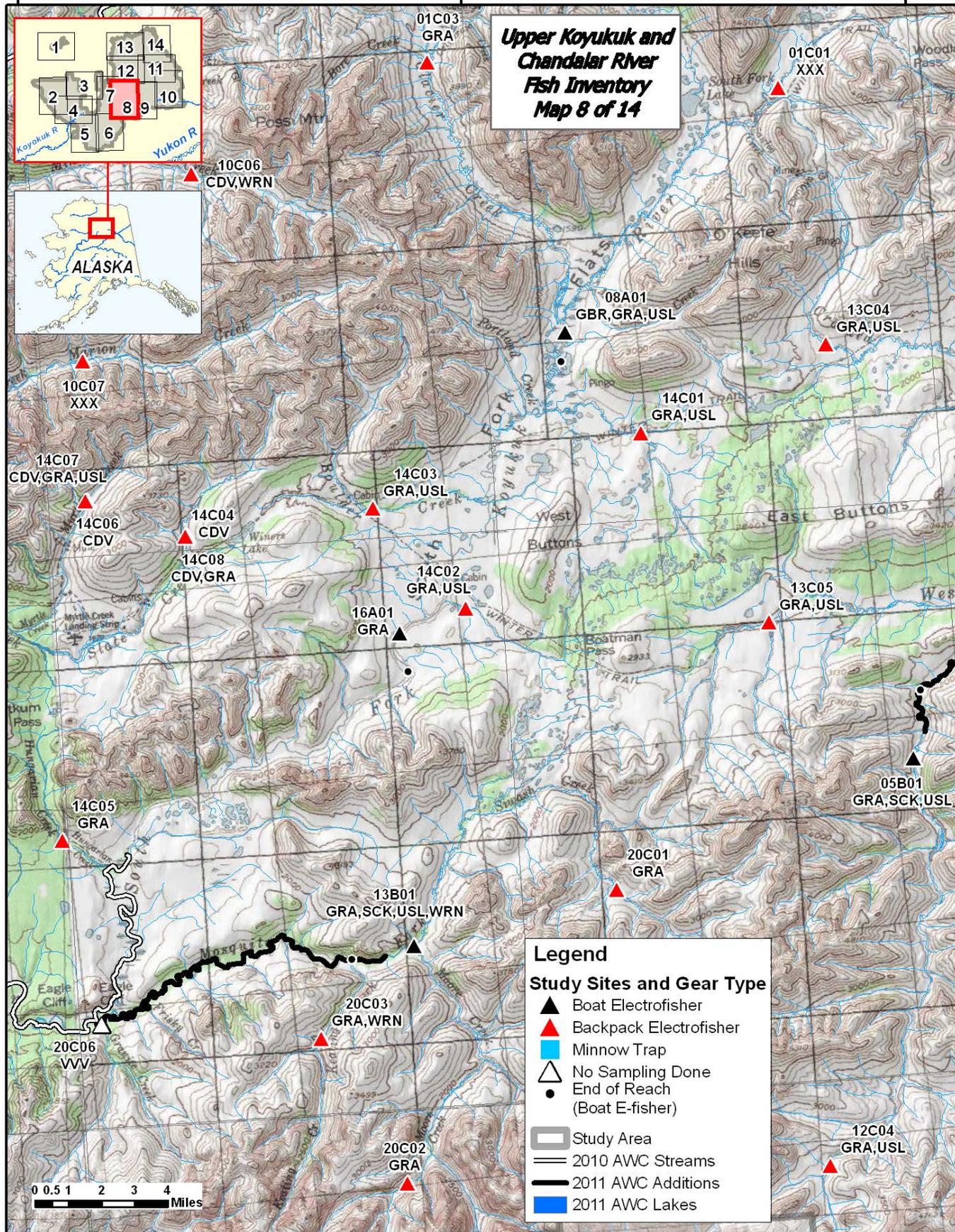
**Legend**

**Study Sites and Gear Type**

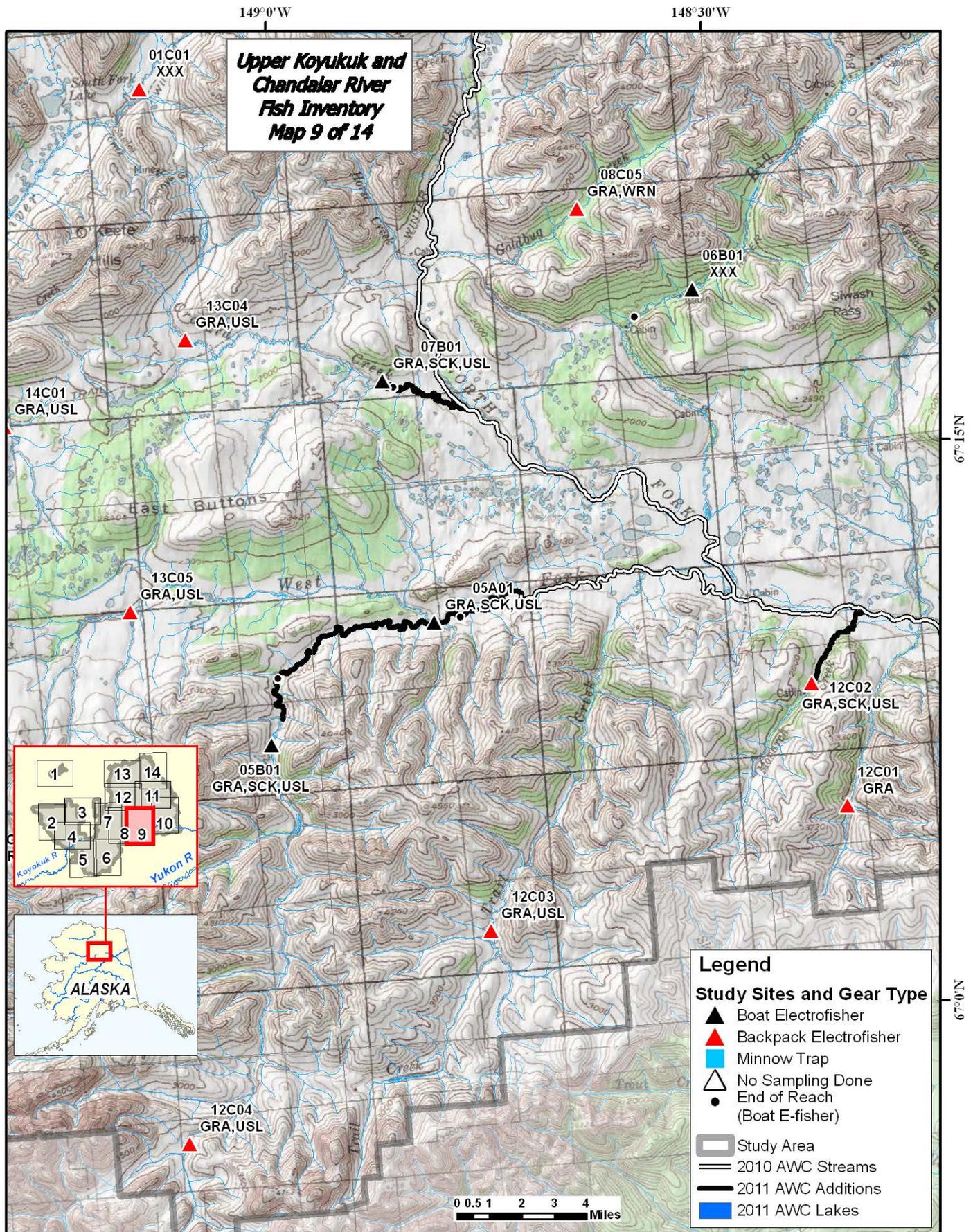
- ▲ Boat Electrofisher
- ▲ Backpack Electrofisher
- Minnow Trap
- △ No Sampling Done
- End of Reach (Boat E-fisher)
- ▭ Study Area
- 2010 AWC Streams
- 2011 AWC Additions
- 2011 AWC Lakes



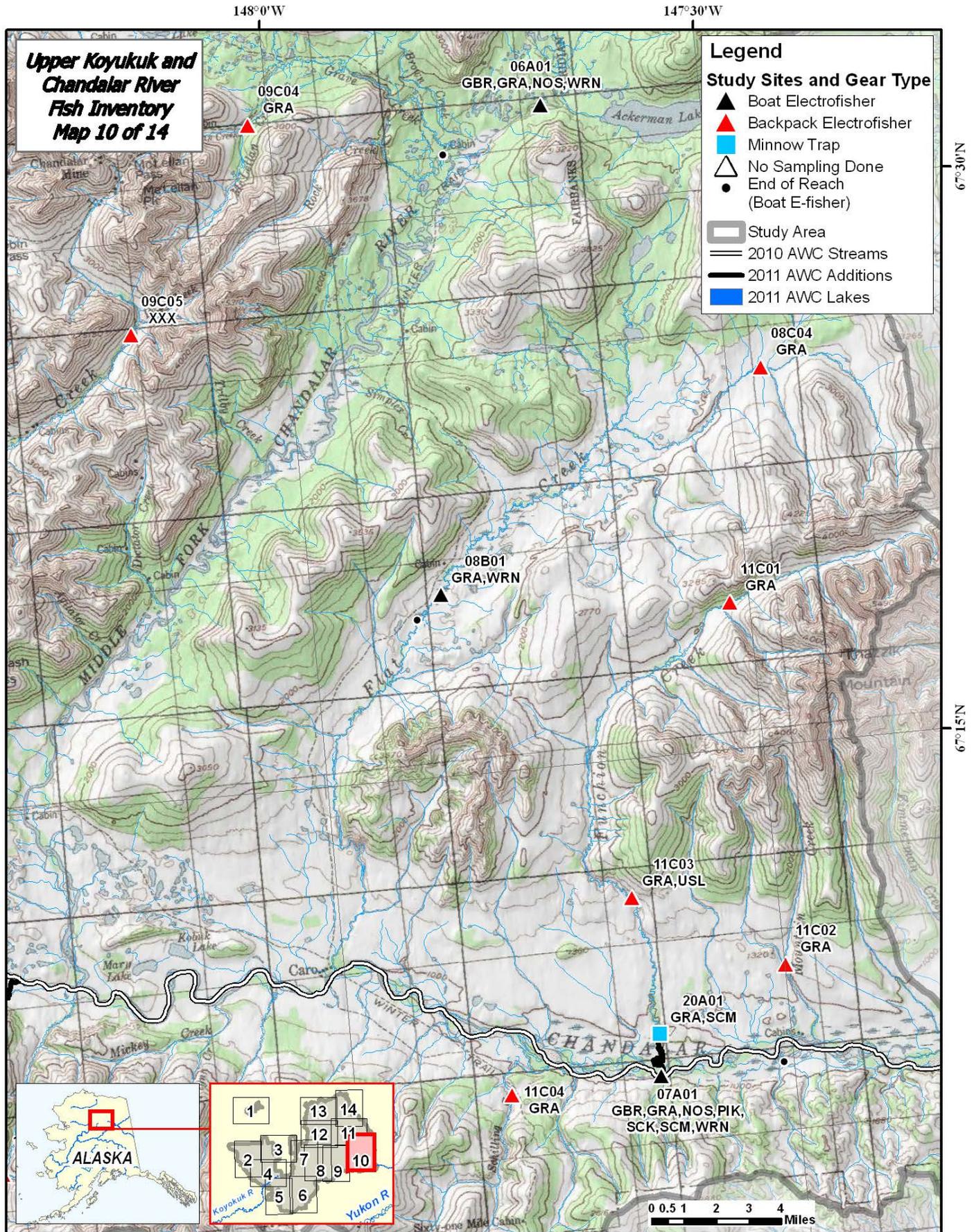
Appendix C1.–Page 7 of 14.

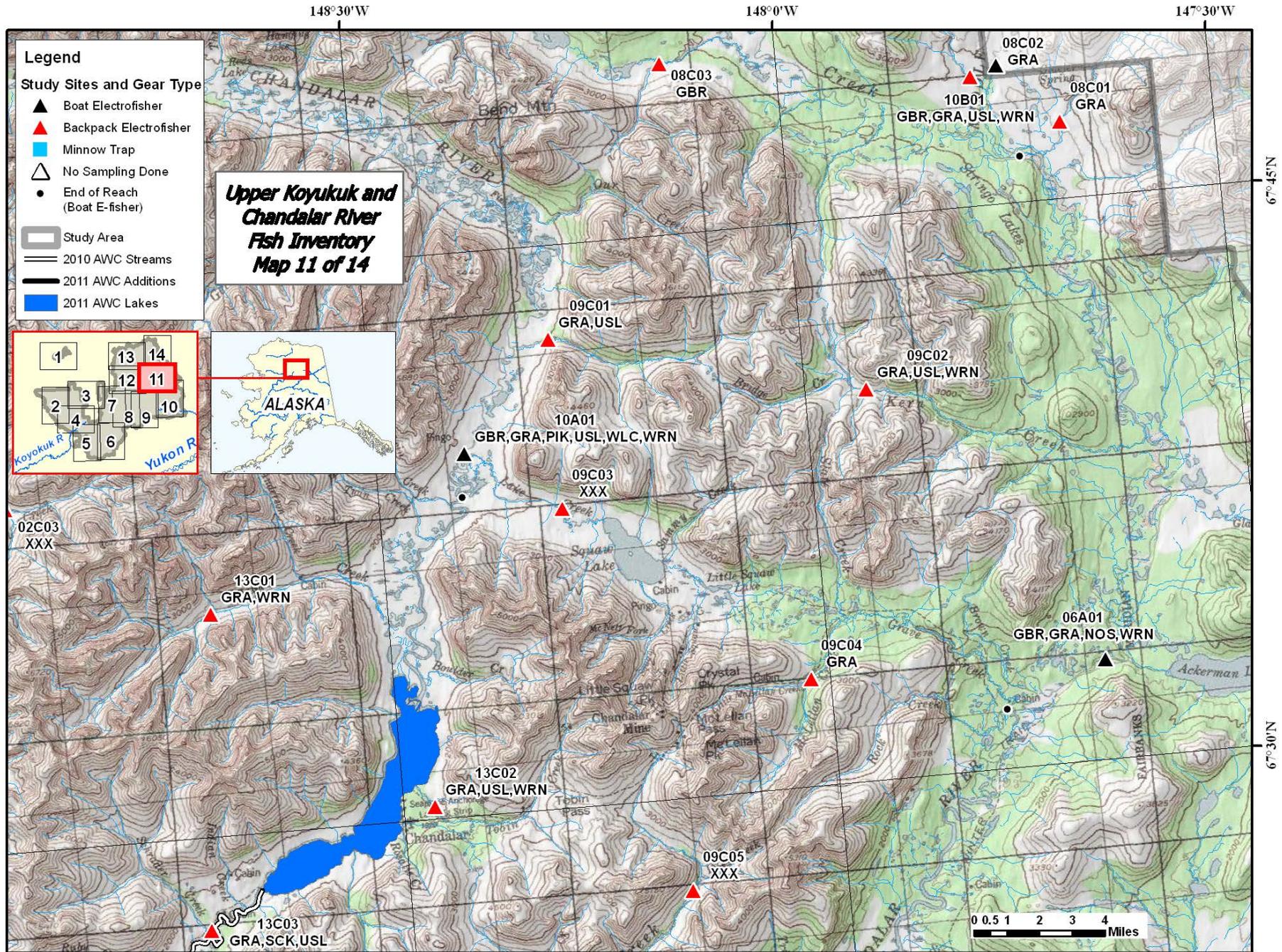


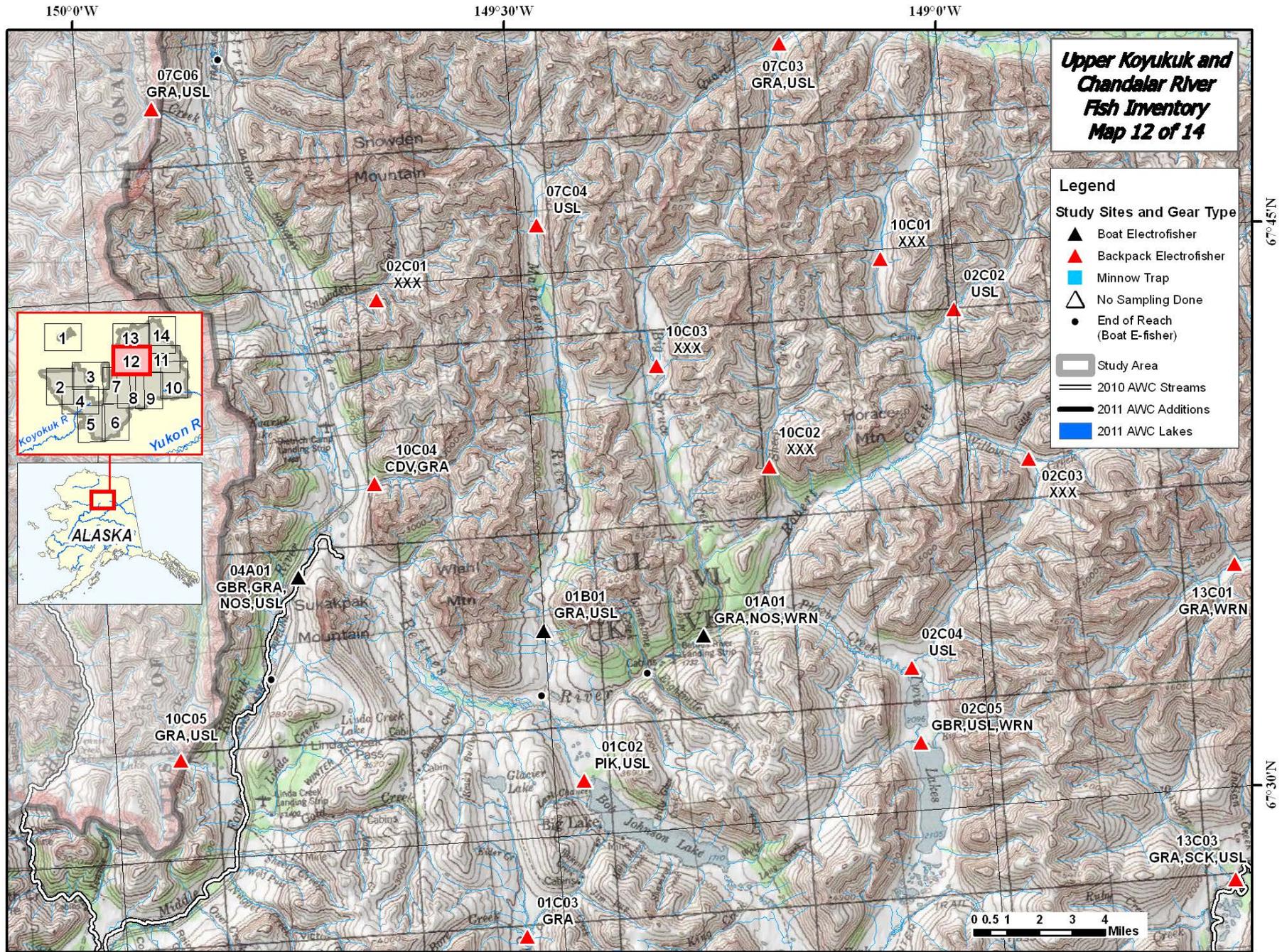
Appendix C1.–Page 8 of 14.

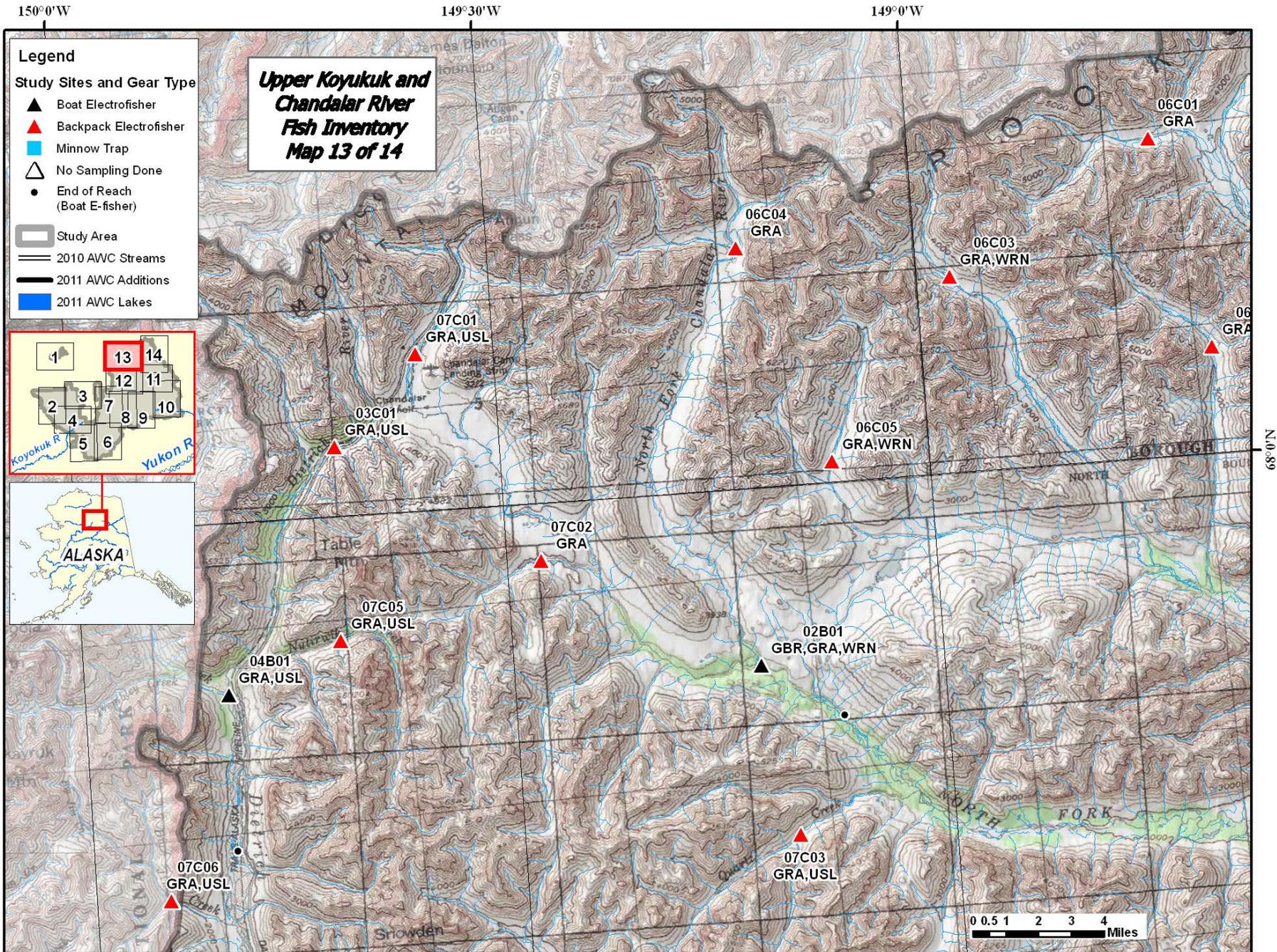


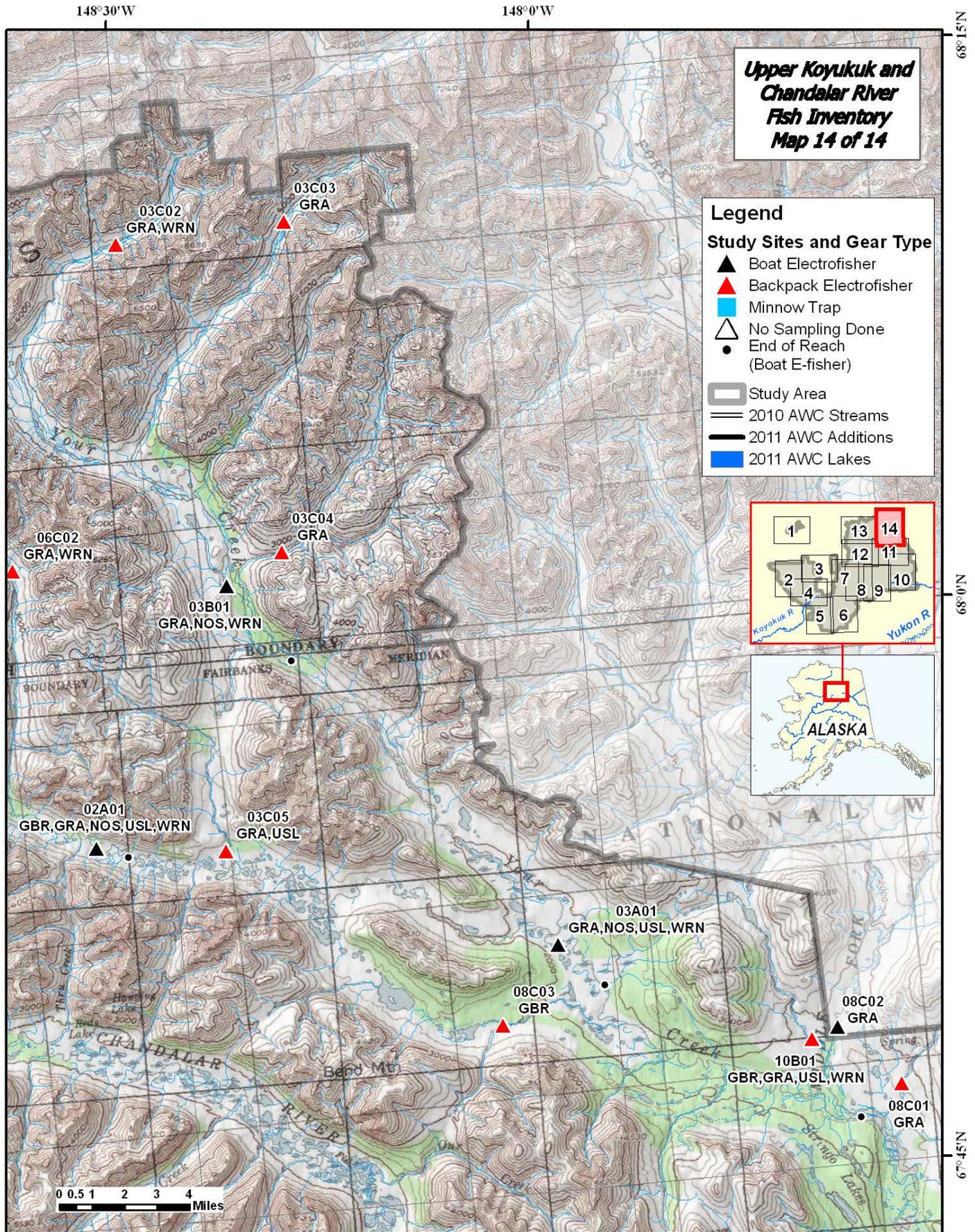
Appendix C1.–Page 9 of 14.







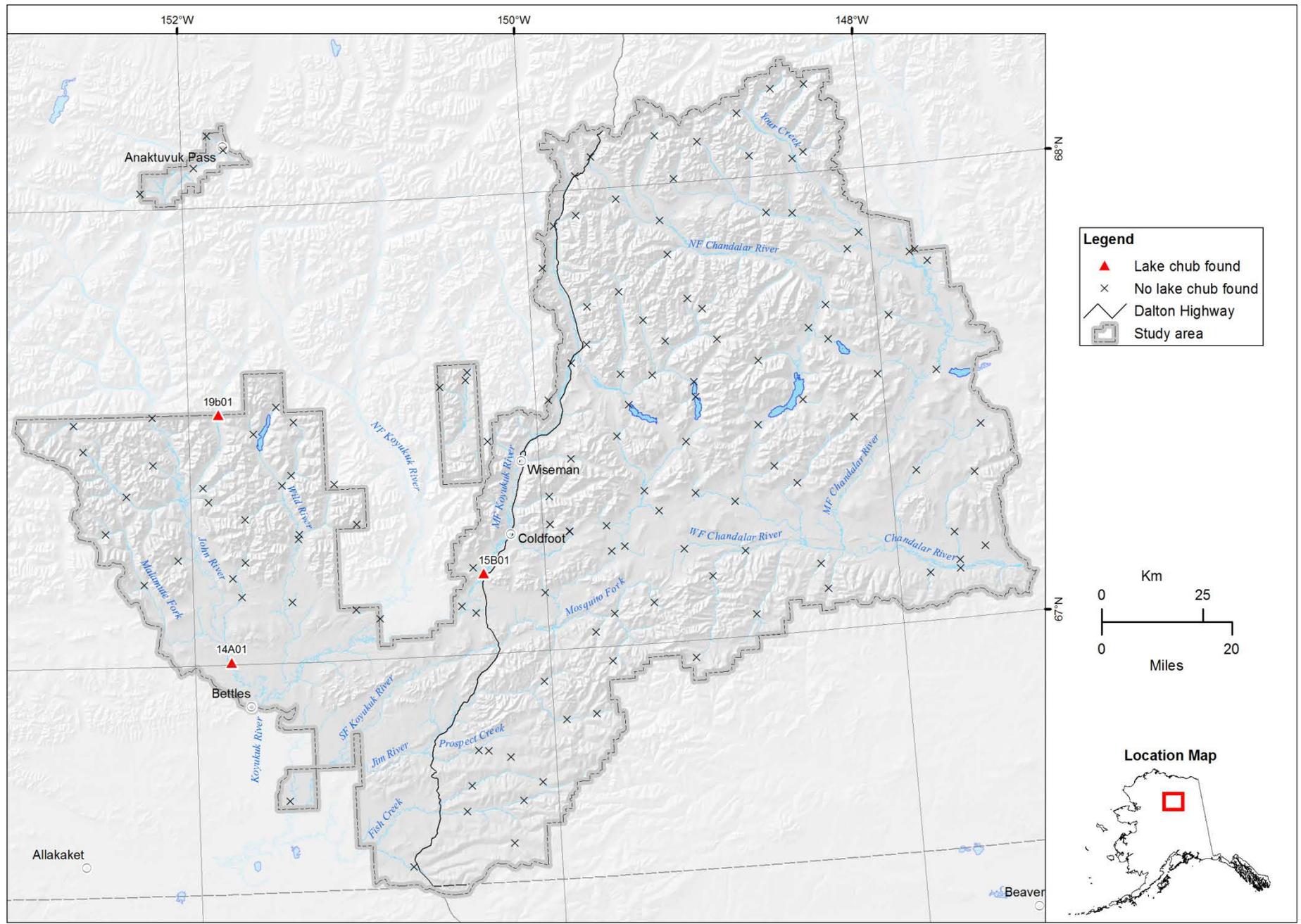




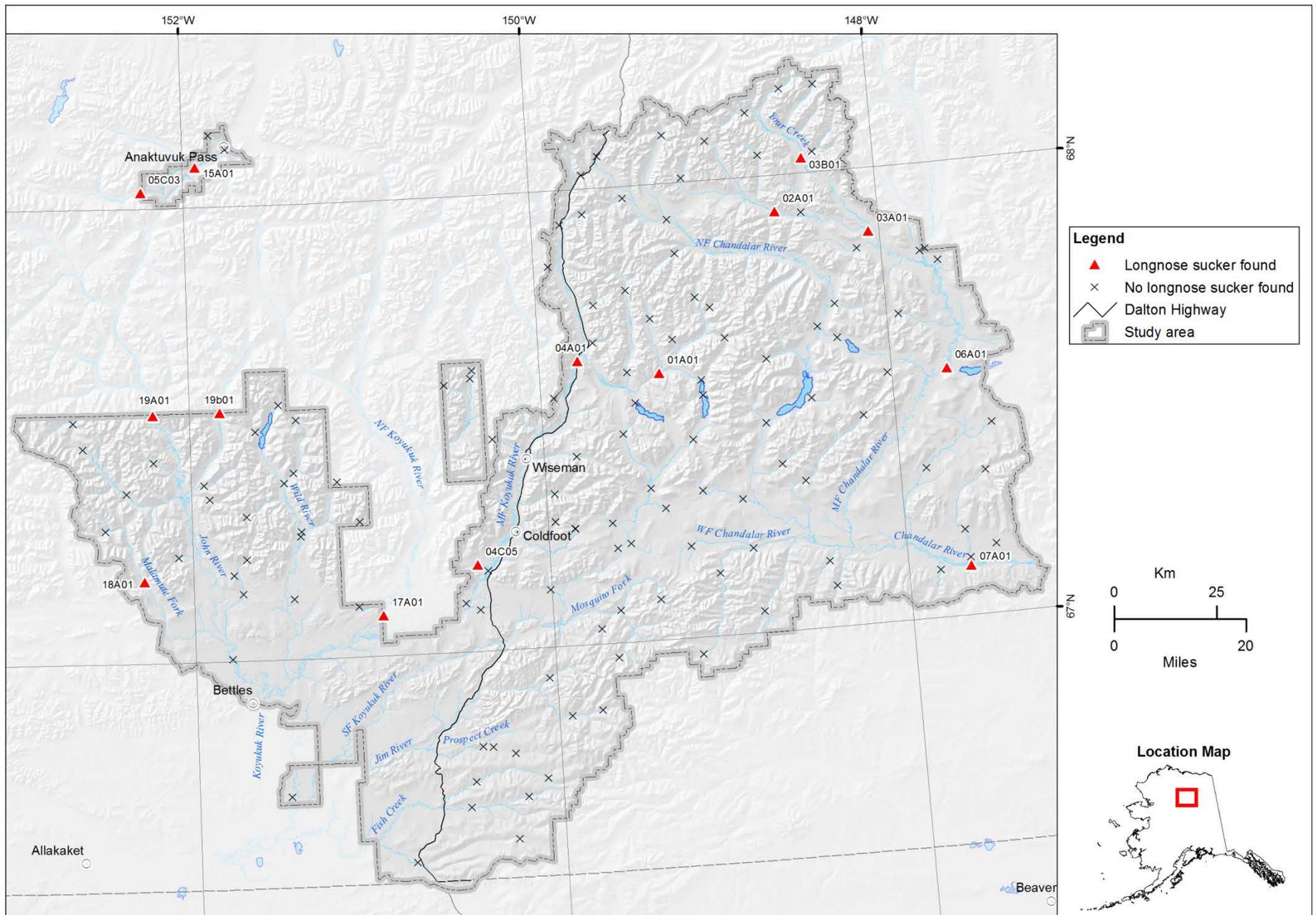
Appendix C1.—Page 14 of 14.



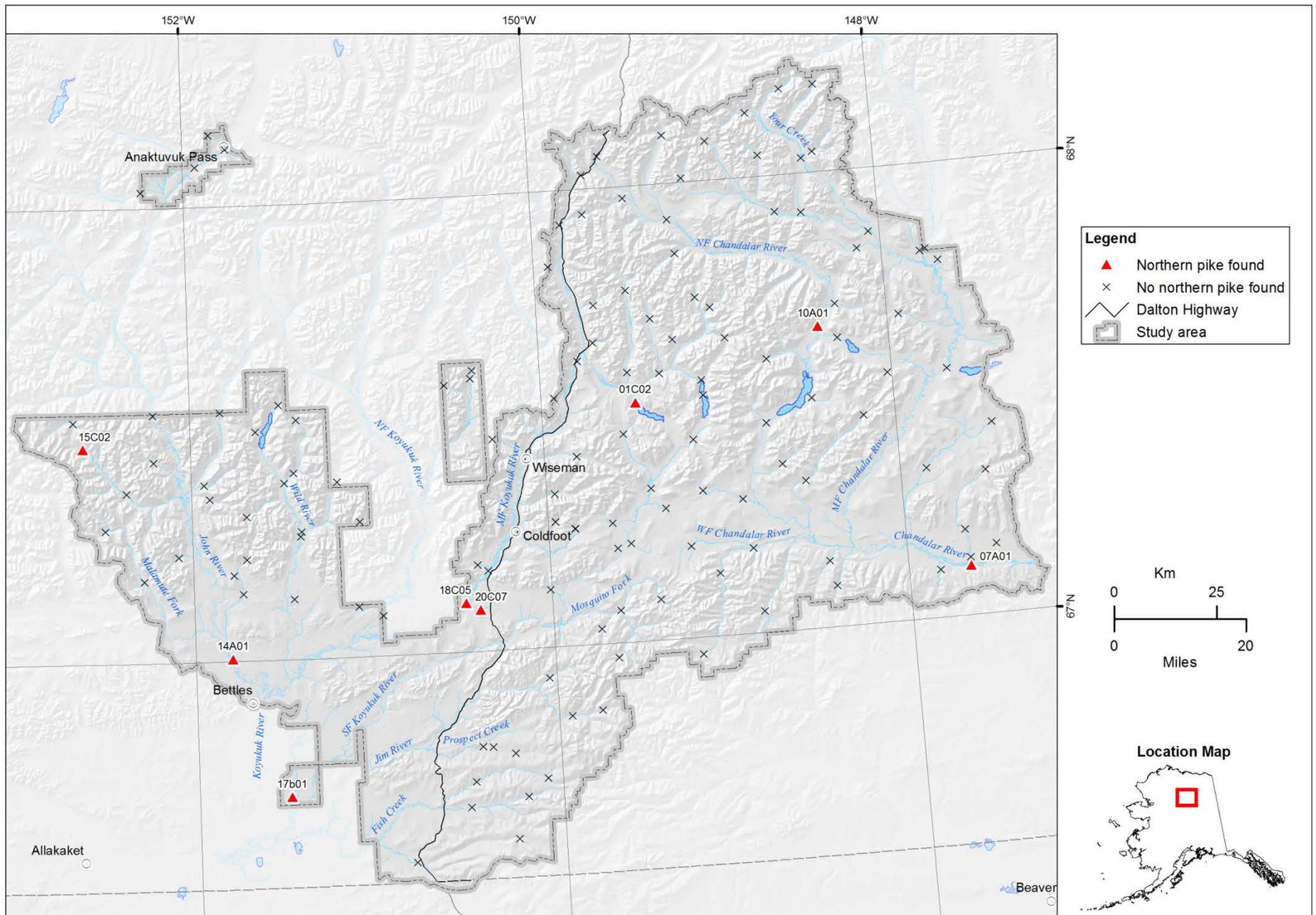
## **APPENDIX D. SPECIES-OCCURRENCE MAPS**



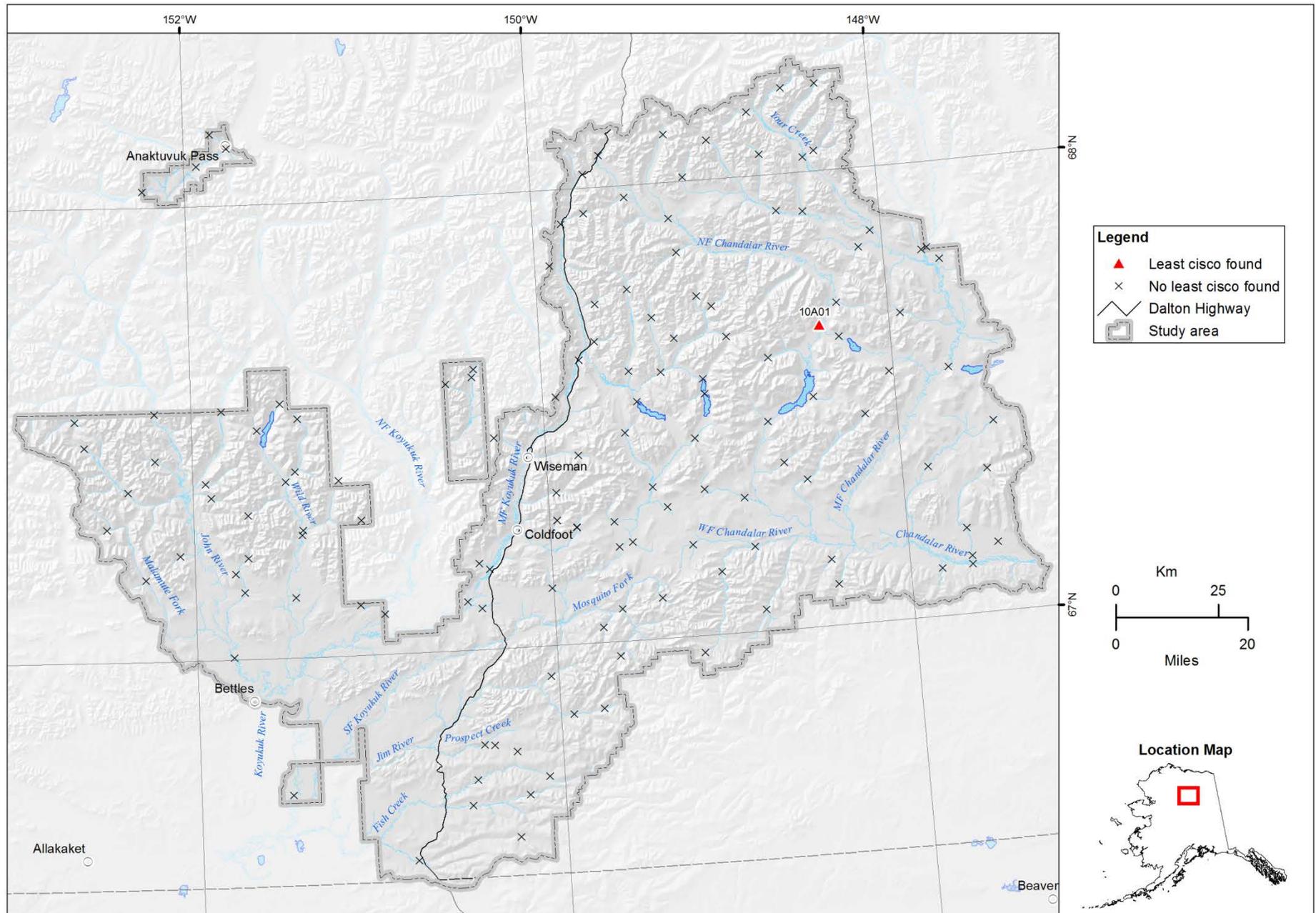
Appendix D1.—Lake chub collections.



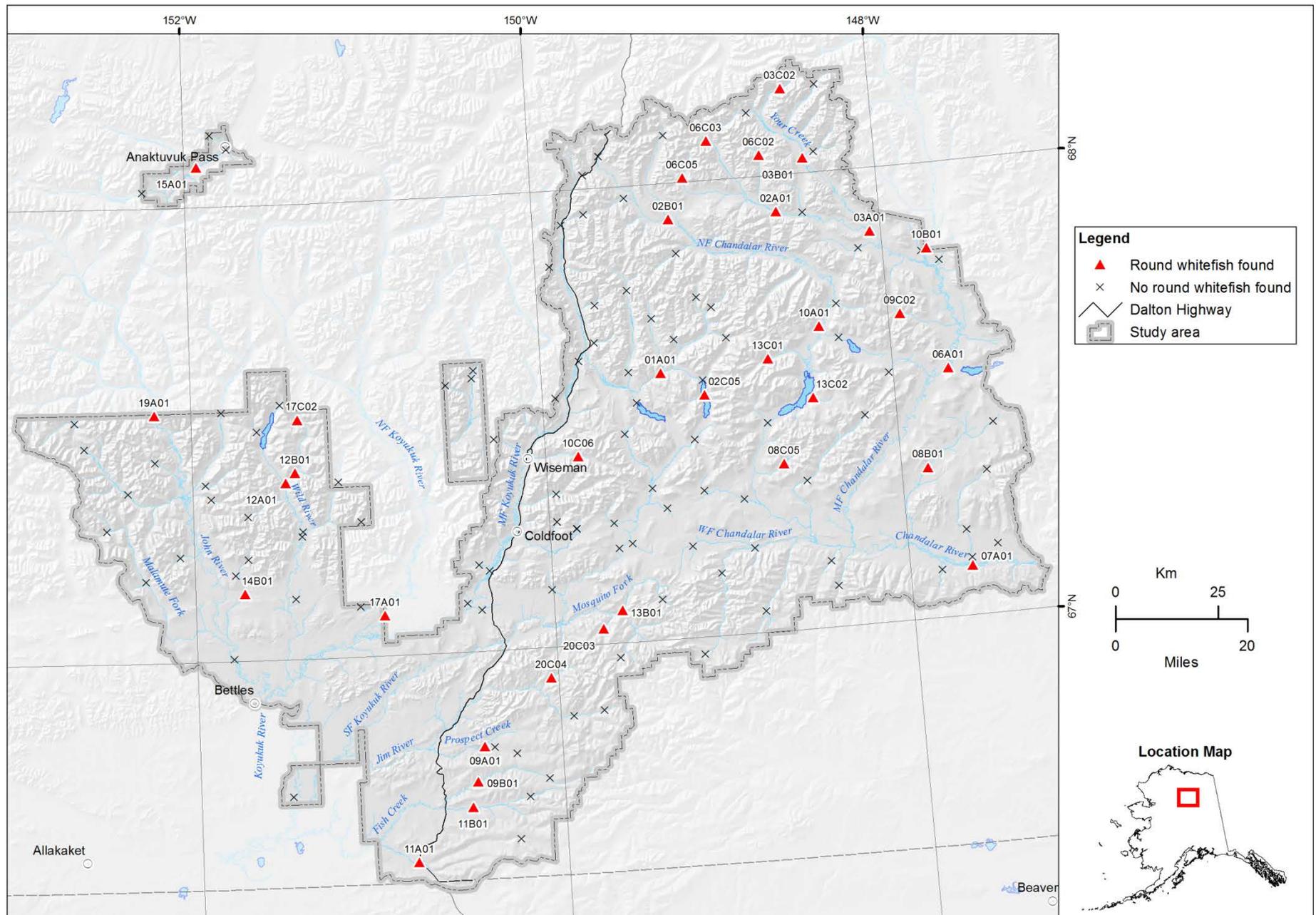
Appendix D2.—Longnose sucker collections.



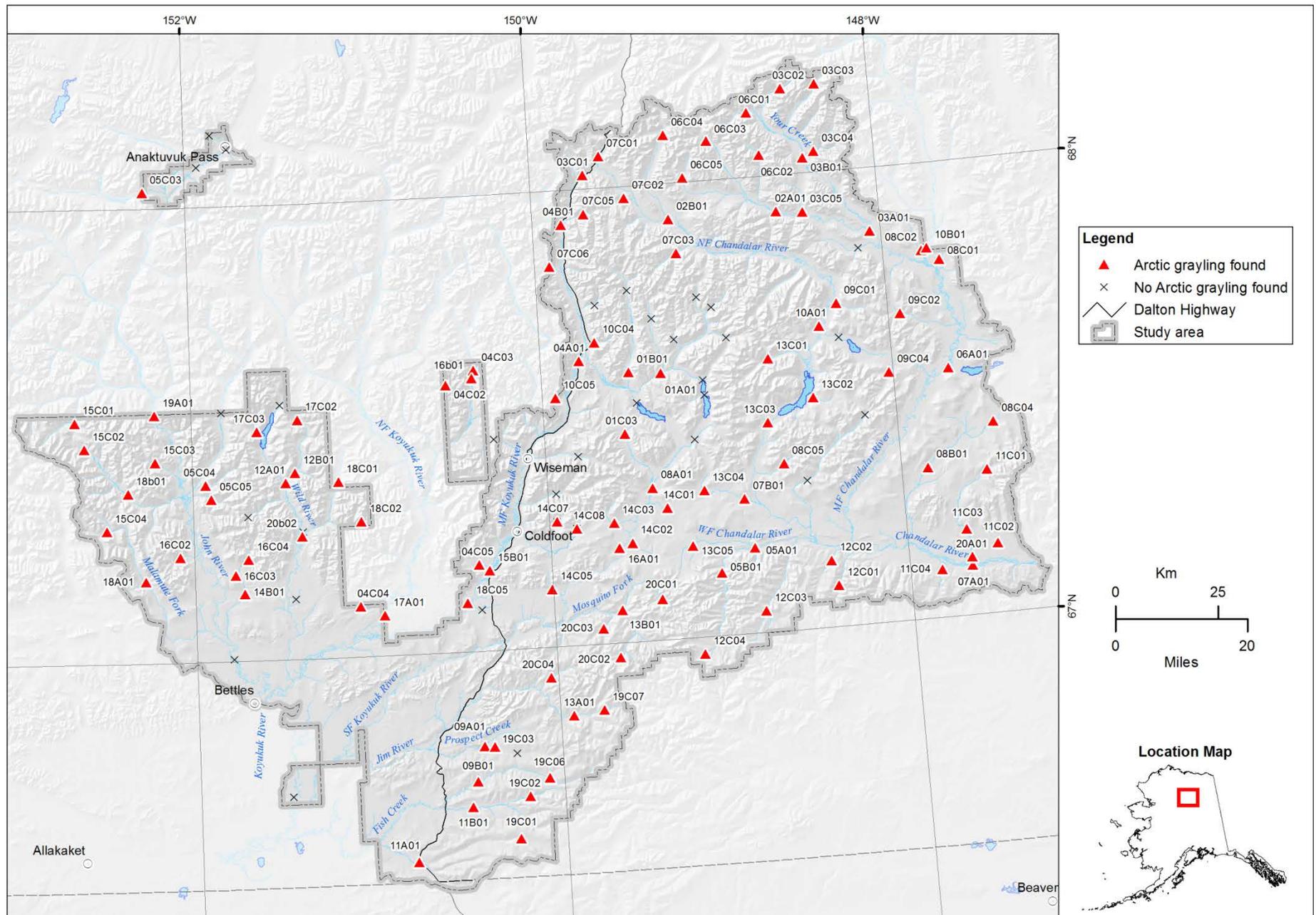
Appendix D3.—Northern pike collections.



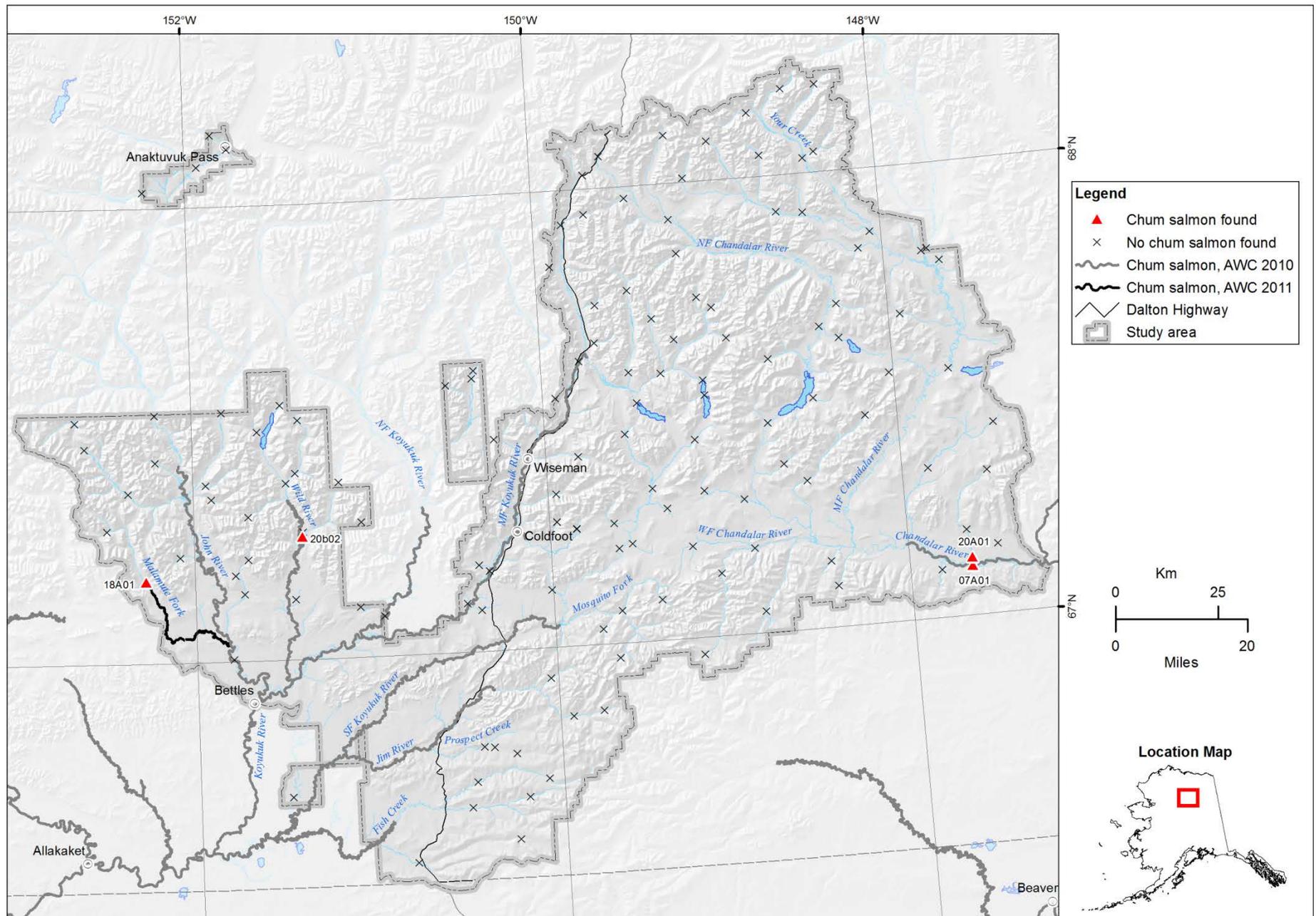
Appendix D4.–Least cisco collections.



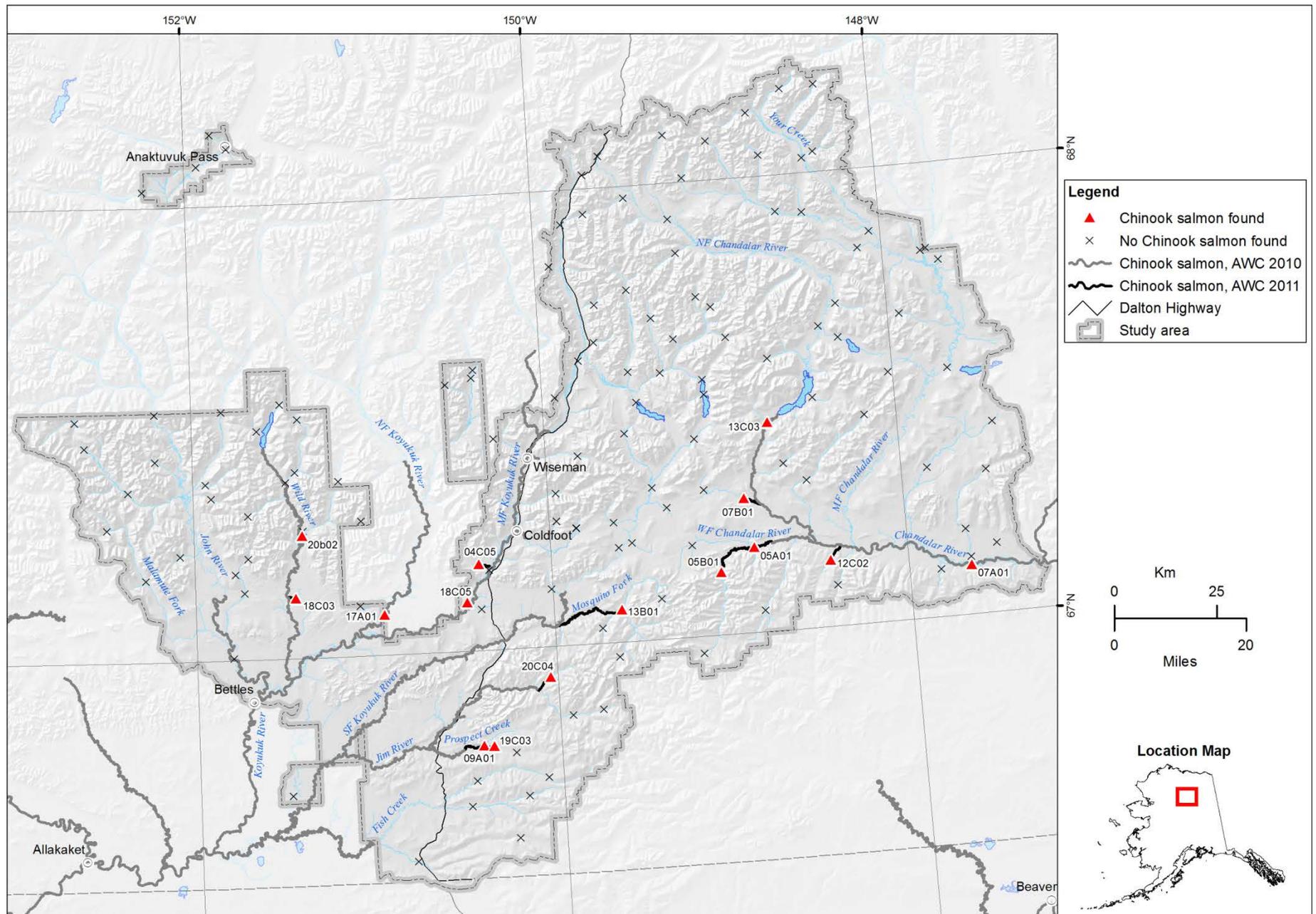
Appendix D5.–Round whitefish collections.



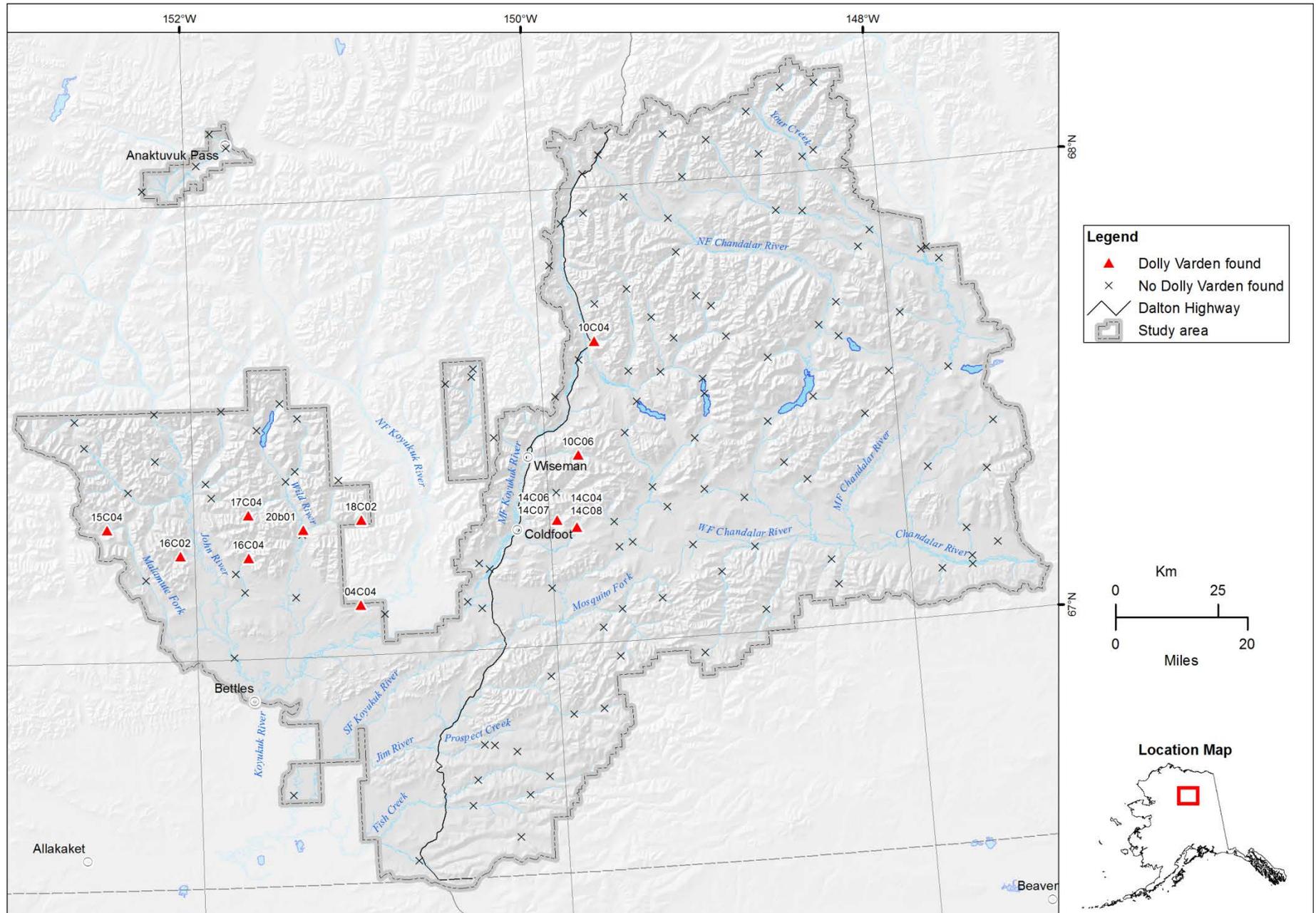
Appendix D6.—Arctic grayling collections.



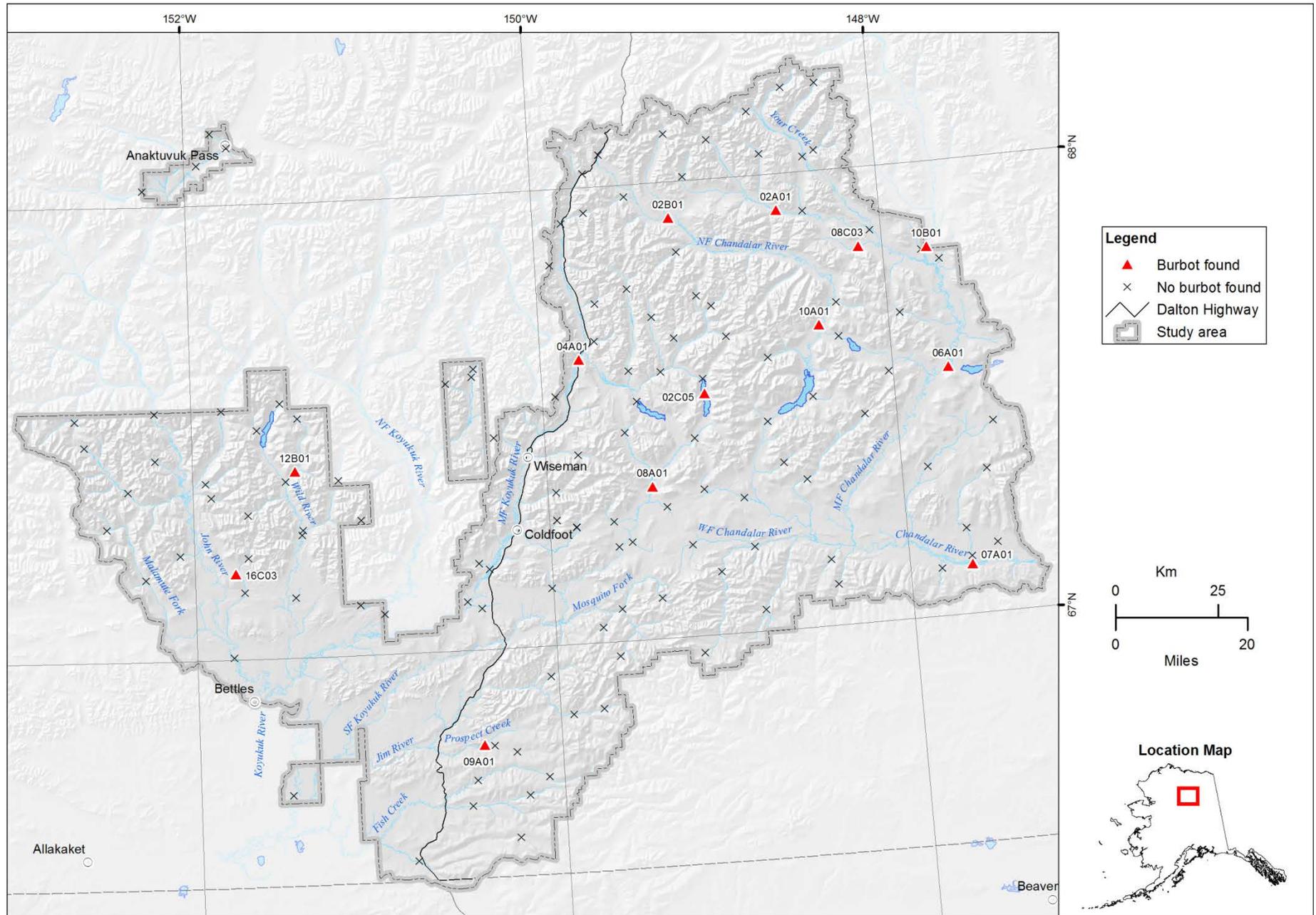
Appendix D7.—Chum salmon collections.



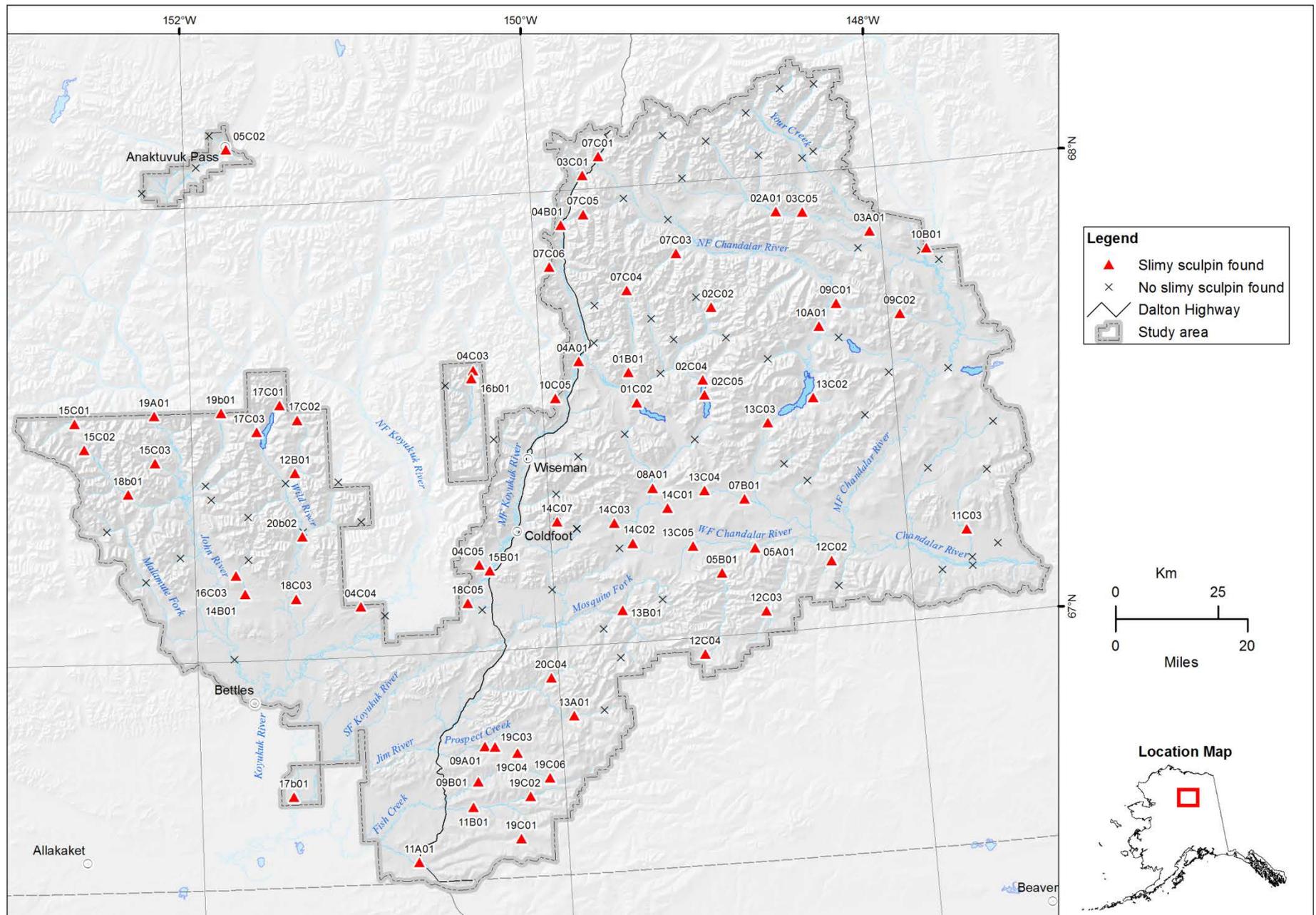
Appendix D8.—Chinook salmon collections.



Appendix D9.—Dolly Varden collections.



Appendix D10.—Burbot collections.



Appendix D11.—Slimy sculpin collections.

**APPENDIX E. SUMMARY OF ANADROMOUS WATERS  
CATALOG NOMINATIONS**

Appendix E1.–Summary of Anadromous Waters Catalog (AWC) nominations.

Station ID	Nomination number	AWC stream code 334-40-11000-	Quad	Stream name	New/Extended waterbody	AWC species added <sup>a</sup>	Backup species <sup>a</sup>
04C05	10-844	2125-3912-4089	Wiseman A-1	Twelvemile Creek	Y	Kr	
05A01	10-838	2925-3350-4391	Chandalar A-4	West Fork Chandalar River	Y	Kr	
05B01	10-839	2925-3350-4391-5021	Chandalar A-5		Y	Kr	
07A01	10-836	2925	Chandalar A-2	Chandalar River	N	Kr	CHp
07B01	10-842	2925-3350-4421	Chandalar B-4	Crooked Creek	Y	Kr	
09A01	10-850	2125-3740-4080-5030	Bettles D-1	Prospect Creek	Y	Kr	
12C02	10-837	2925-3350-4371	Chandalar A-3	Monarch Creek	Y	Kr	
13B01	10-840	2125-3740-4330	Chandalar A-6	Mosquito Fork	Y	Kr	
13C03	10-841	2925-3350-4451	Chandalar B-4	Schrader Creek	Y	Kr	
17A01	10-845	2125-3911	Wiseman A-2	North Fork Koyukuk River	N	Kr	
18A01	10-847	2125-3841-4041	Wiseman A-5	Malamute Fork John River	Y	CHs	
18C03	10-846	2125-3871-4020	Wiseman A-3	Chicken Creek	Y	Kr	
18C05	10-843	2125-3912-4059	Wiseman A-1	Mailbox Creek	Y	Kr	
19C03	10-849	2125-3740-4080-5030-6032	Bettles D-1		Y	Kr	
20A01	10-835	2925-3270	Chandalar A-2	Funchion Creek	Y	CHp	
20b02	10-848	2125-3871	Wiseman B-3	Wild River	N	Kr	CHp
20C04	10-889	2125-3740-4080-5071	Bettles D-1		Y	Kr	

<sup>a</sup> AWC species codes: Kr = Chinook salmon rearing; CHp = chum salmon present; CHs = chum salmon spawning.

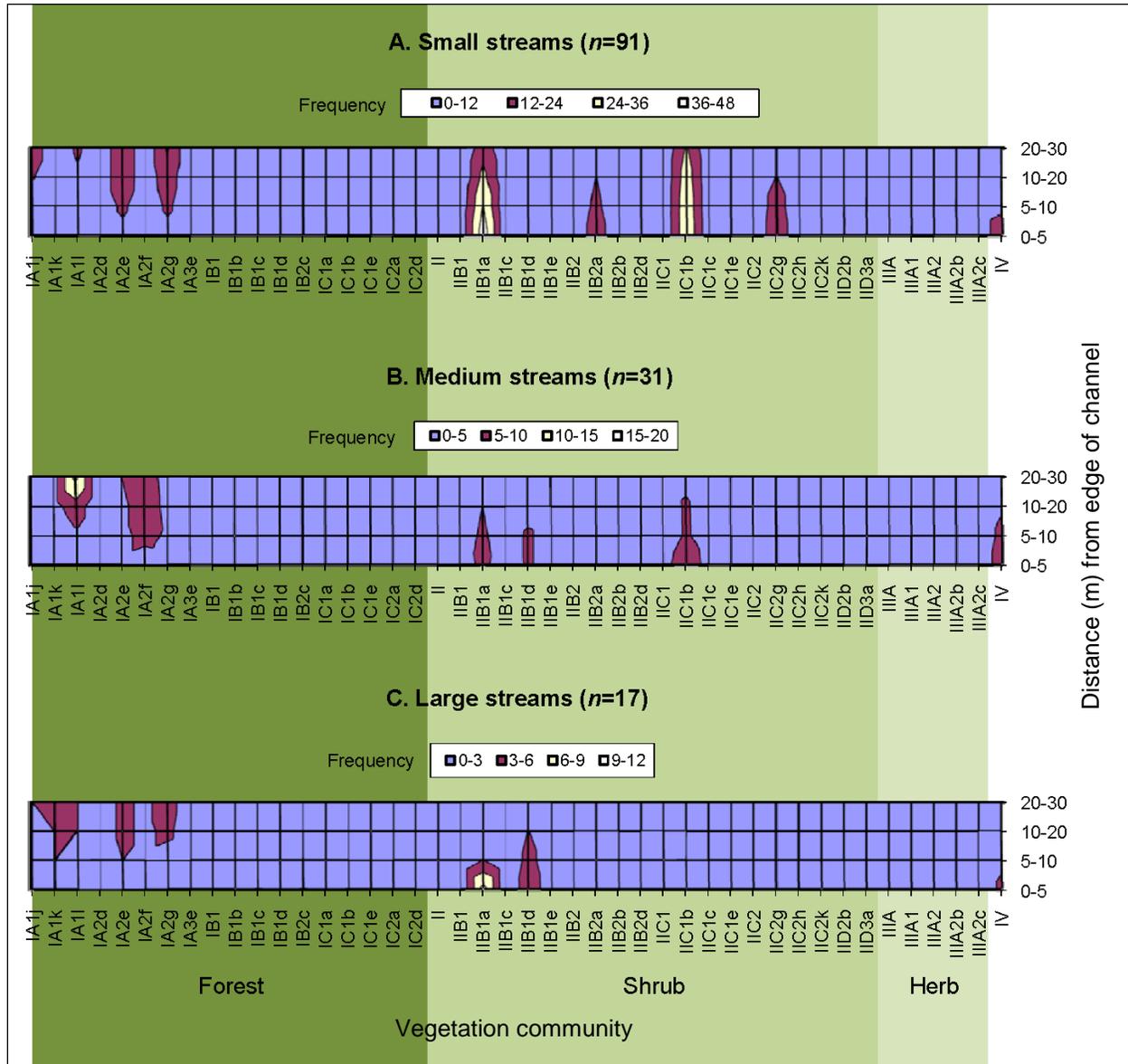
**APPENDIX F. OCCURRENCE OF FISH SPECIES AND LIFE STAGES, BY STREAM SIZE**

Appendix F1.—Occurrence (no. of reaches) of fish species and life stages, by stream size.

Common name	Scientific name	Life stage	Small streams (n=91)	Medium streams (n=31)	Large streams (n=17)	Total (n=139)
lake chub	<i>Couesius plumbeus</i>	juvenile/adult		1	2	3
longnose sucker	<i>Catostomus catostomus</i>	juvenile		1	2	3
		juvenile/adult		2	6	8
northern pike	<i>Esox lucius</i>	adult	1	3	5	9
		juvenile	3		2	5
		juvenile/adult	2	1	2	5
least cisco	<i>Coregonus sardinella</i>	juvenile			1	1
round whitefish	<i>Prosopium cylindraceum</i>	juvenile	3	2	5	10
		juvenile/adult	7	6	8	21
		adult	4	7	7	18
Arctic grayling	<i>Thymallus arcticus</i>	juvenile	50	19	12	81
		juvenile/adult	49	20	12	81
		adult	18	14	12	44
chum salmon	<i>Oncorhynchus keta</i>	adult			2	2
		adult spawning		1		1
		carcass		1		1
Chinook salmon	<i>O. tshawytscha</i>	juvenile	7	4	4	15
Dolly Varden	<i>Salvelinus malma</i>	juvenile	4	1		5
		juvenile/adult	10			10
		adult	5			5
burbot	<i>Lota lota</i>	juvenile	1	4	2	7
		juvenile/adult	1		4	5
		adult			3	3
slimy sculpin	<i>Cottus cognatus</i>	juvenile	12	13	4	29
		juvenile/adult	31	16	8	55
		adult	33	12	2	47
no fish found	N/A	N/A	10	2		12

**APPENDIX G. GRAPHICAL SUMMARIES OF FISH AND  
HABITAT VARIABLES**

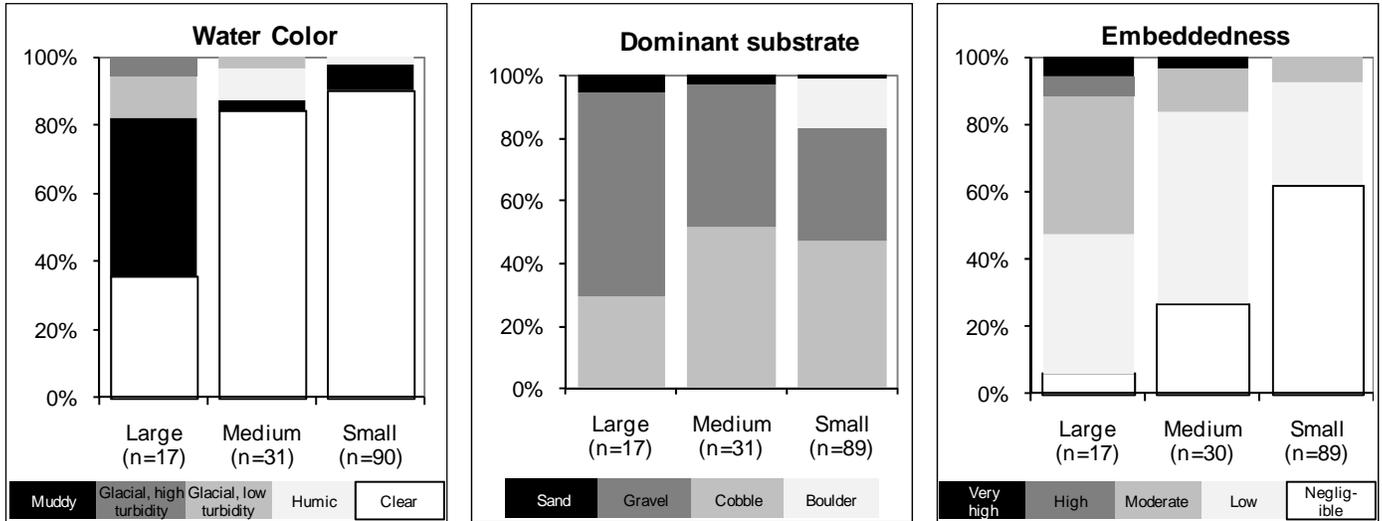
**Occurrence of dominant riparian vegetation communities at fish-collection reaches.**



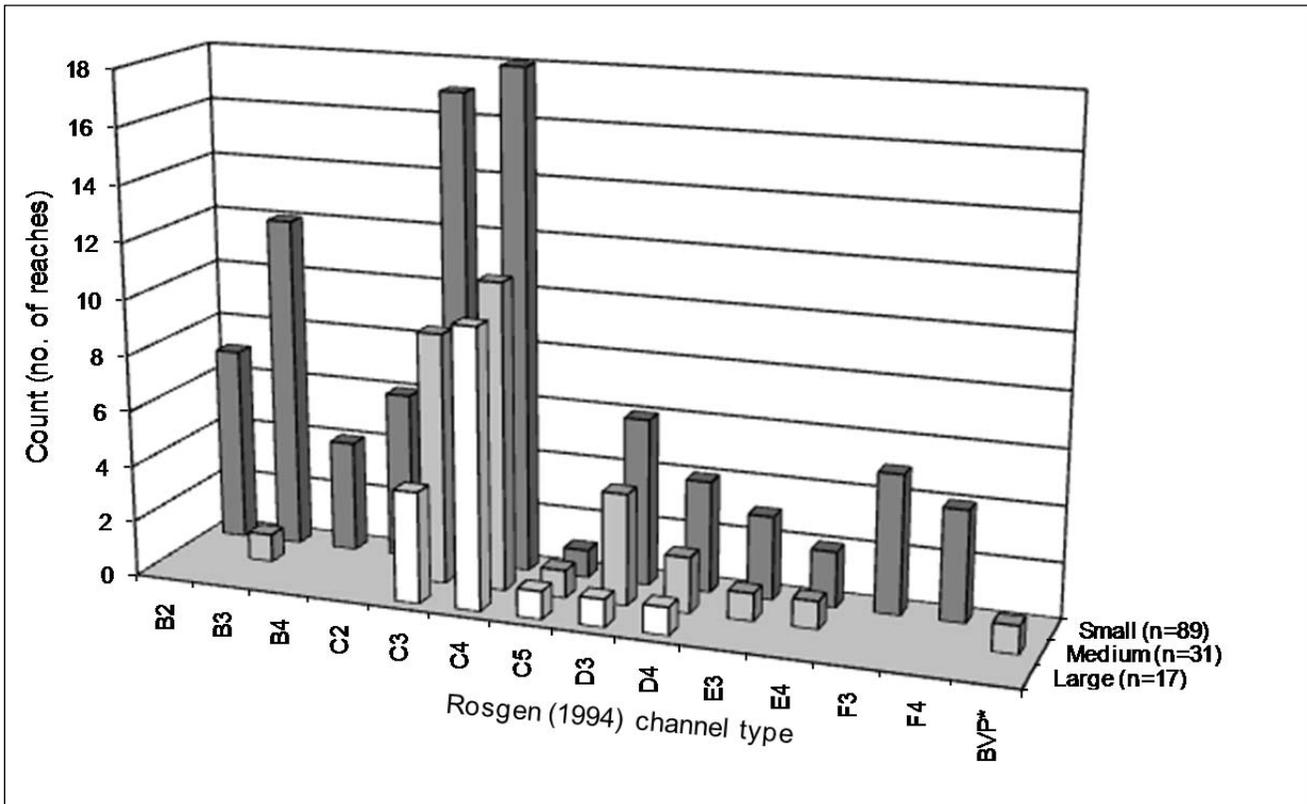
Note: Level-IV vegetation communities (Viereck et al. 1992) we observed are shown along the X-axis. Along the Y-axis, vegetation communities are grouped into 4 zones according to their distance (m) from the edge the of the stream channel. The count of each vegetation community type is represented by shading. Vegetation communities along both stream banks are included—so, for each fish-collection reach, there are 2 vegetation community counts per zone.

-continued-

**Occurrence of water-color, substrate, embeddedness, and Rosgen channel types**



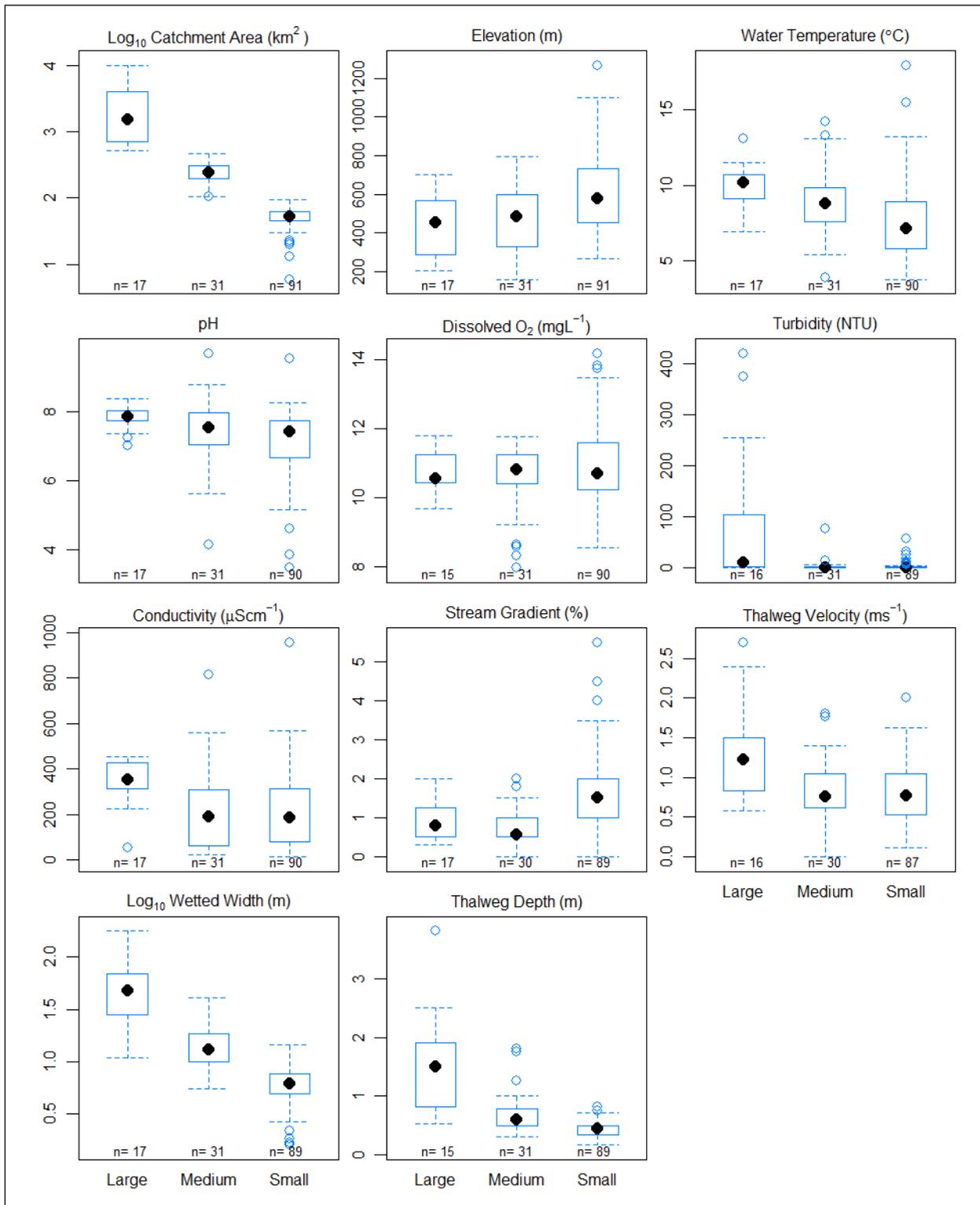
Note: Variables are grouped along the X-axis by stream-size.



Note: Level-II Rosgen (1994) channel type (X-axis) of fish-collection reaches, grouped by stream size (Y-axis). Bar height (Z-axis) represents the count of fish-collection reaches.

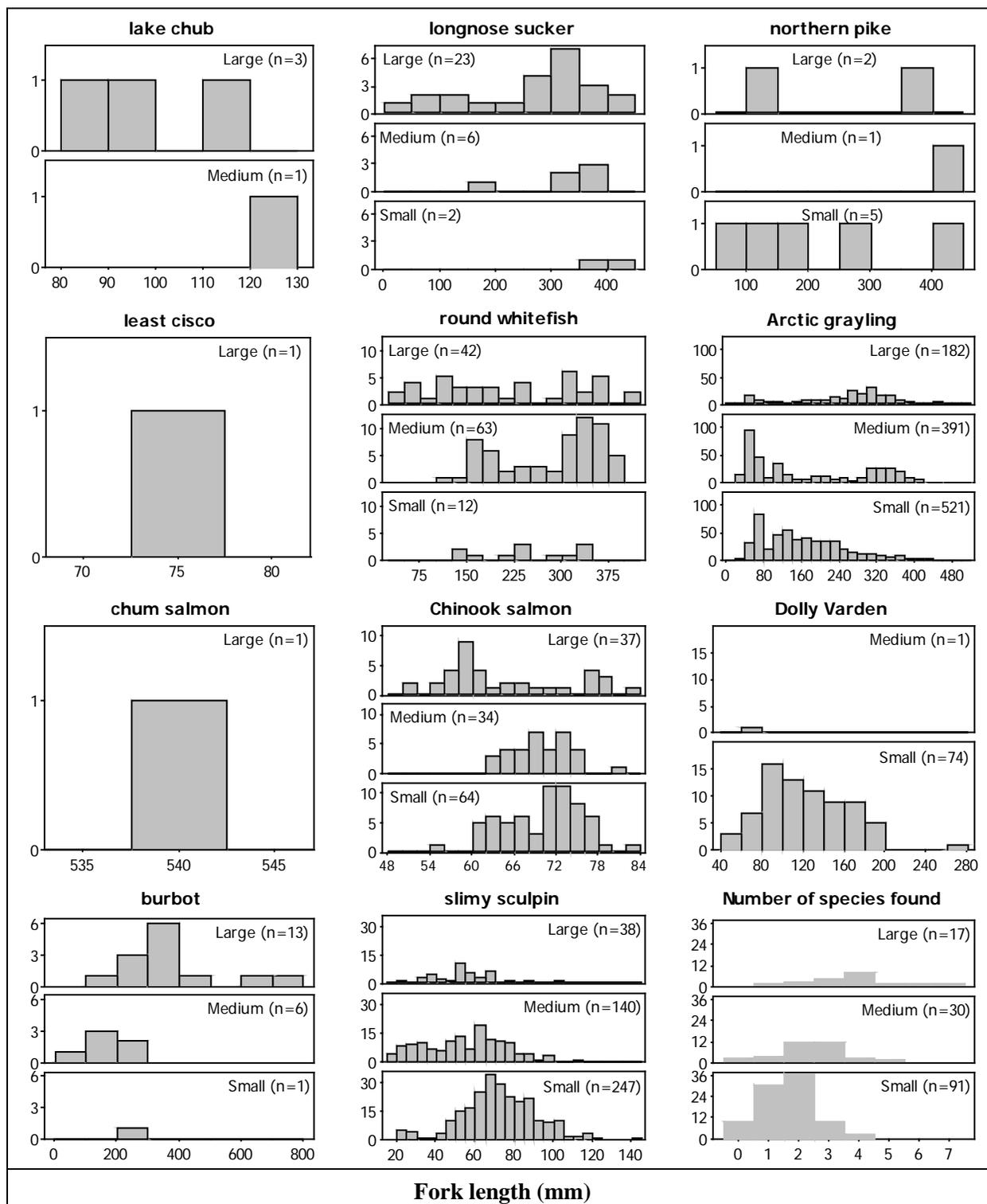
\* "BVP" = beaver pond (not a Rosgen channel type).

Appendix G2.–Box plots of selected numeric habitat variable distributions, grouped by stream size.



Note: Stream-size categories are based on drainage area (sq km) upstream of each station (i.e., catchment area). Small streams, ≤100 sq km; Medium streams, 100–500 sq km; Large streams, > 500 sq km.

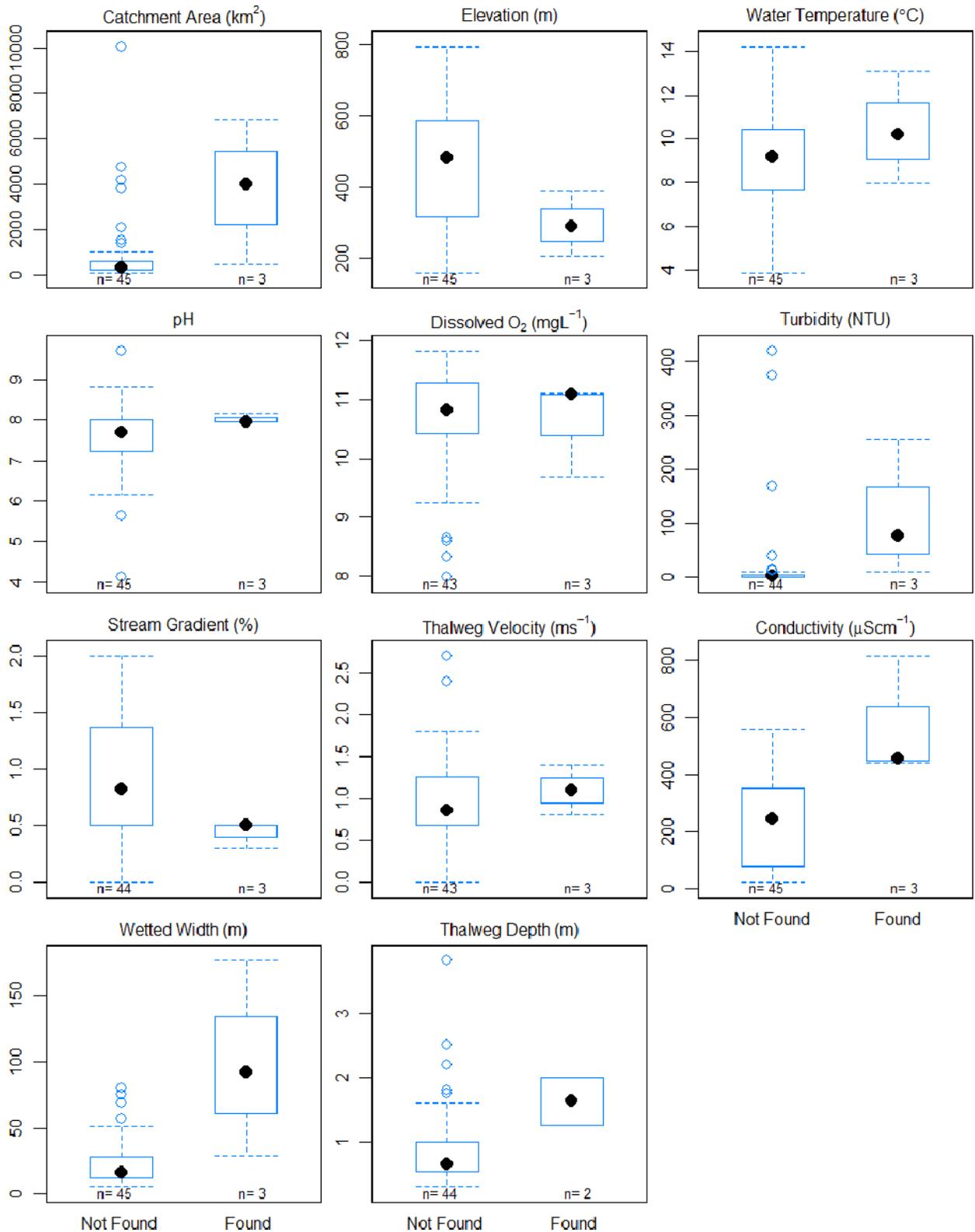
Appendix G3.—Frequency histograms of fork lengths of all fish measured, and the number of species found per site, grouped by stream size.



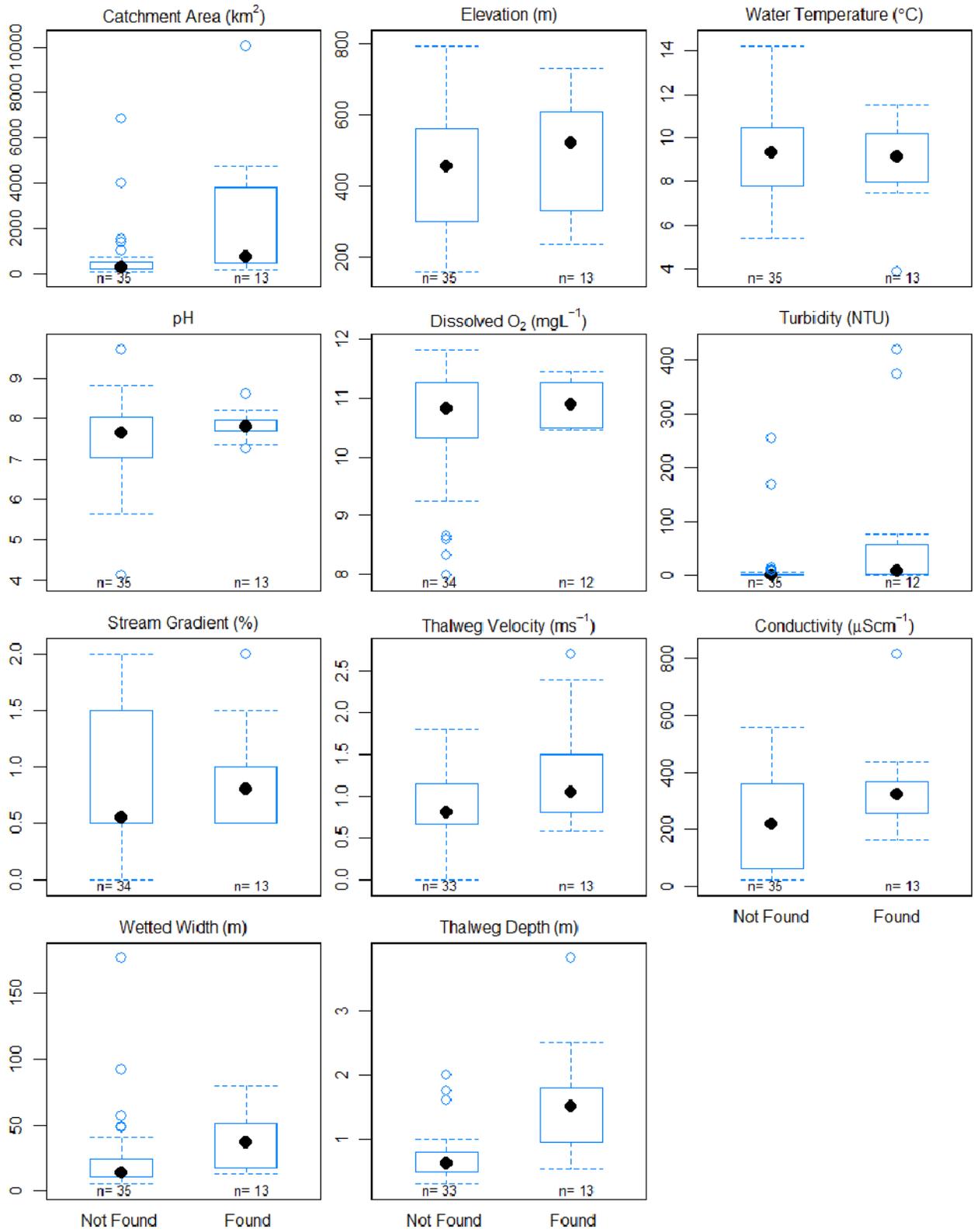
Note: Stream-size categories are based on drainage area (sq km) upstream of each station (i.e., catchment area). Small streams, <100 sq km; Medium streams, 100–500 sq km; Large streams, >500 sq km. Individual fish lengths from all reaches within each stream-size category were pooled.

Appendix G4.–Paired box plots of continuous habitat variable distributions grouped by stream size and species occurrence.

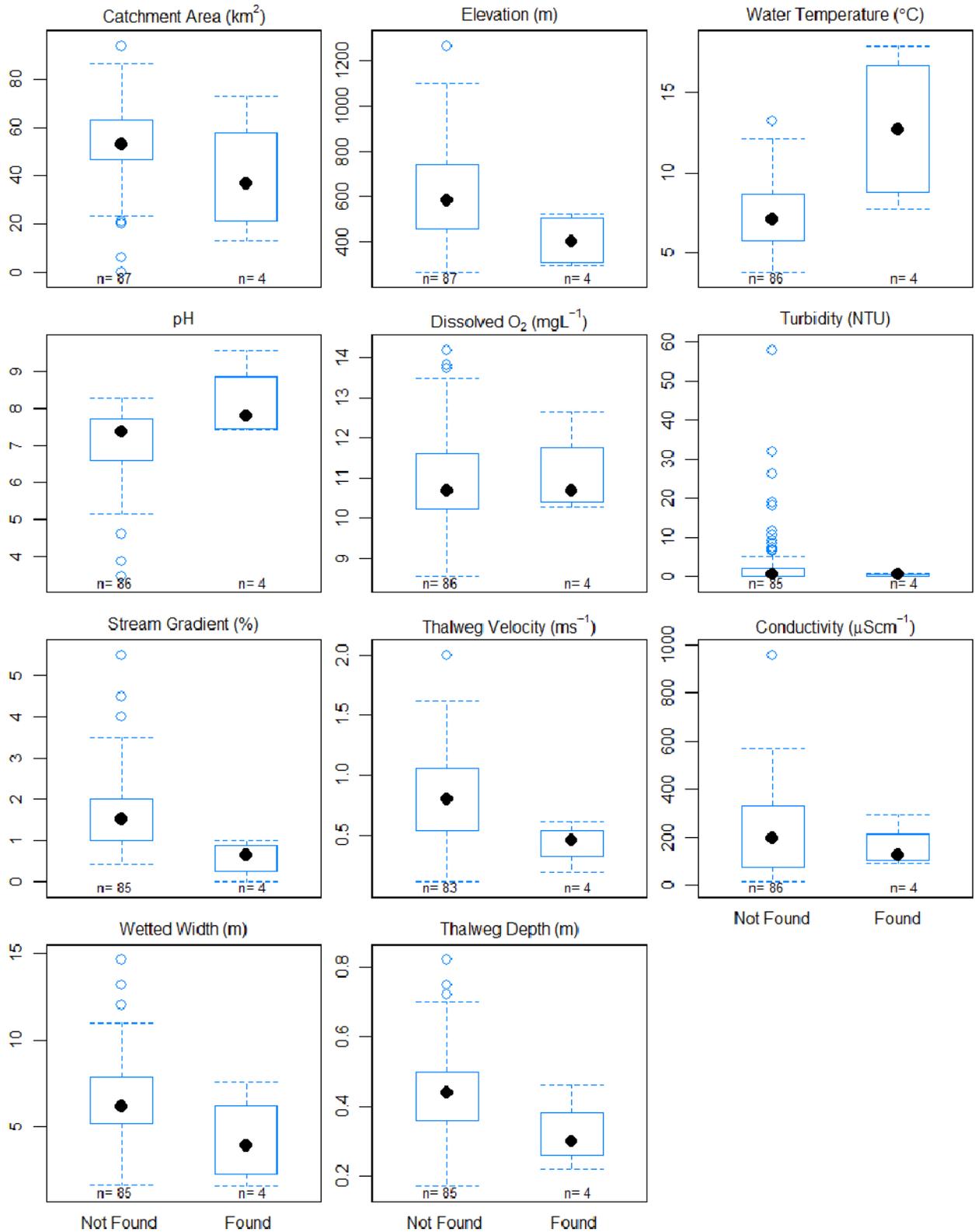
lake chub - Nonwadeable Streams (>100 km<sup>2</sup>)



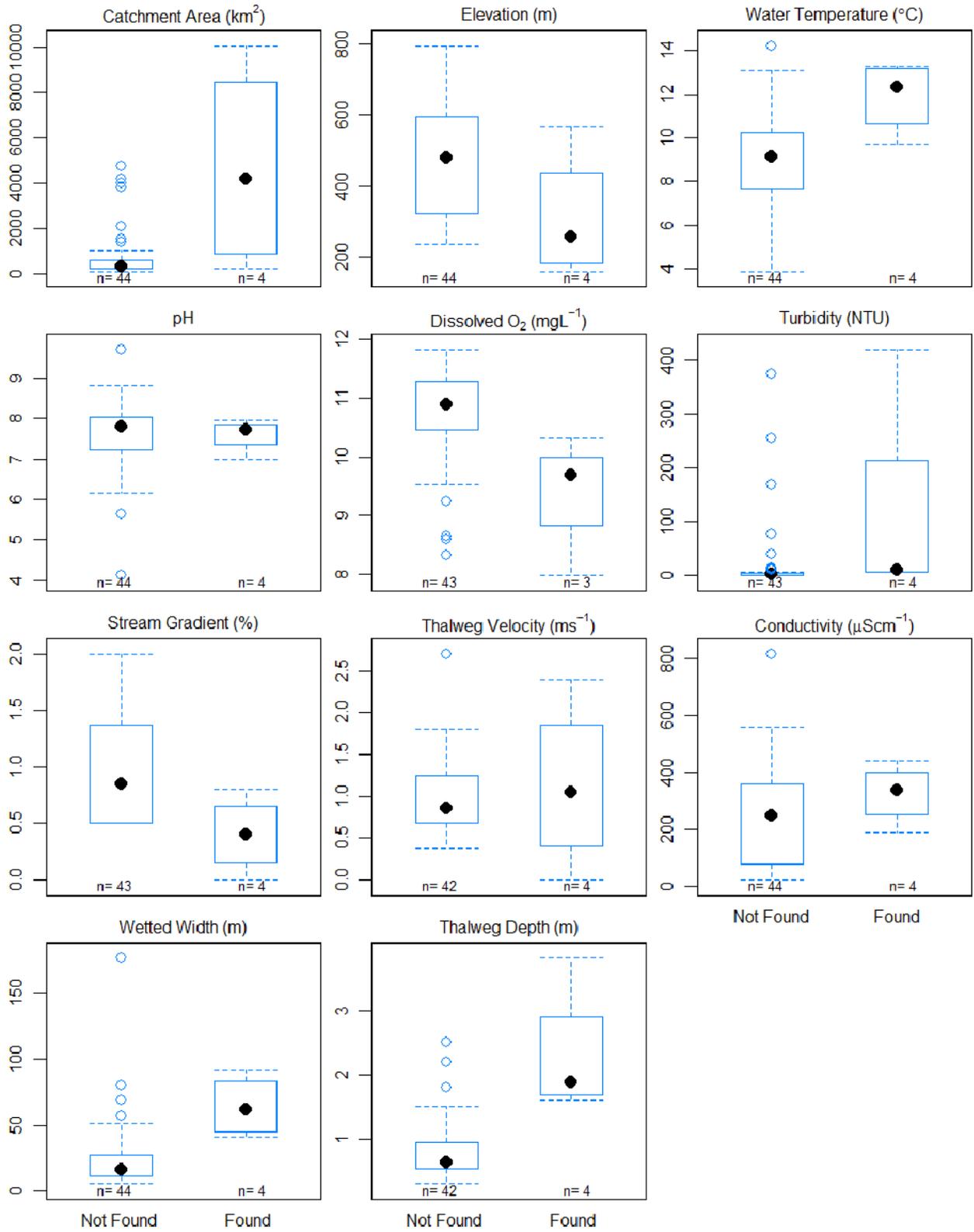
### longnose sucker - Nonwadeable Streams (>100 km<sup>2</sup>)



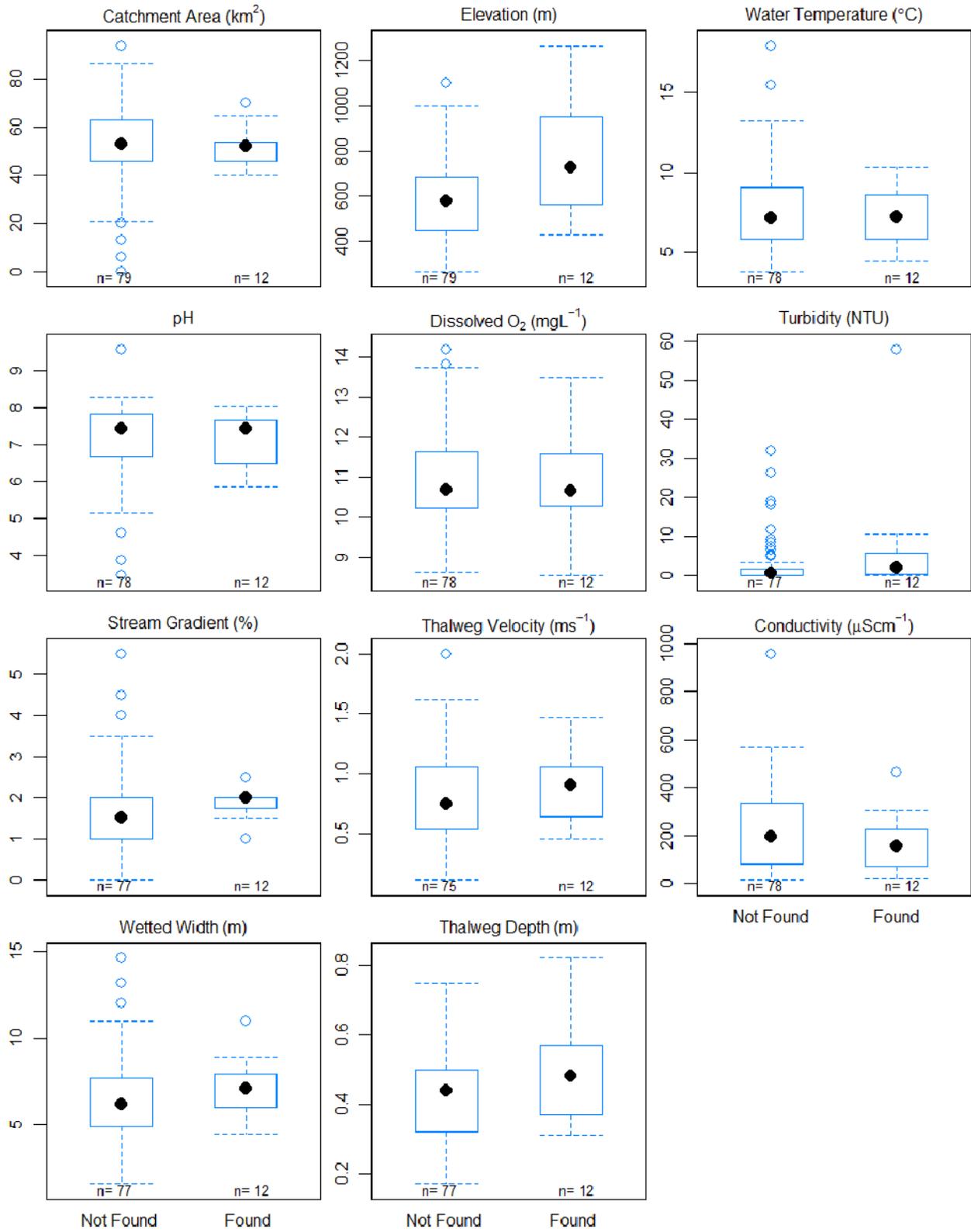
### northern pike - Small Streams (<100 km<sup>2</sup>)



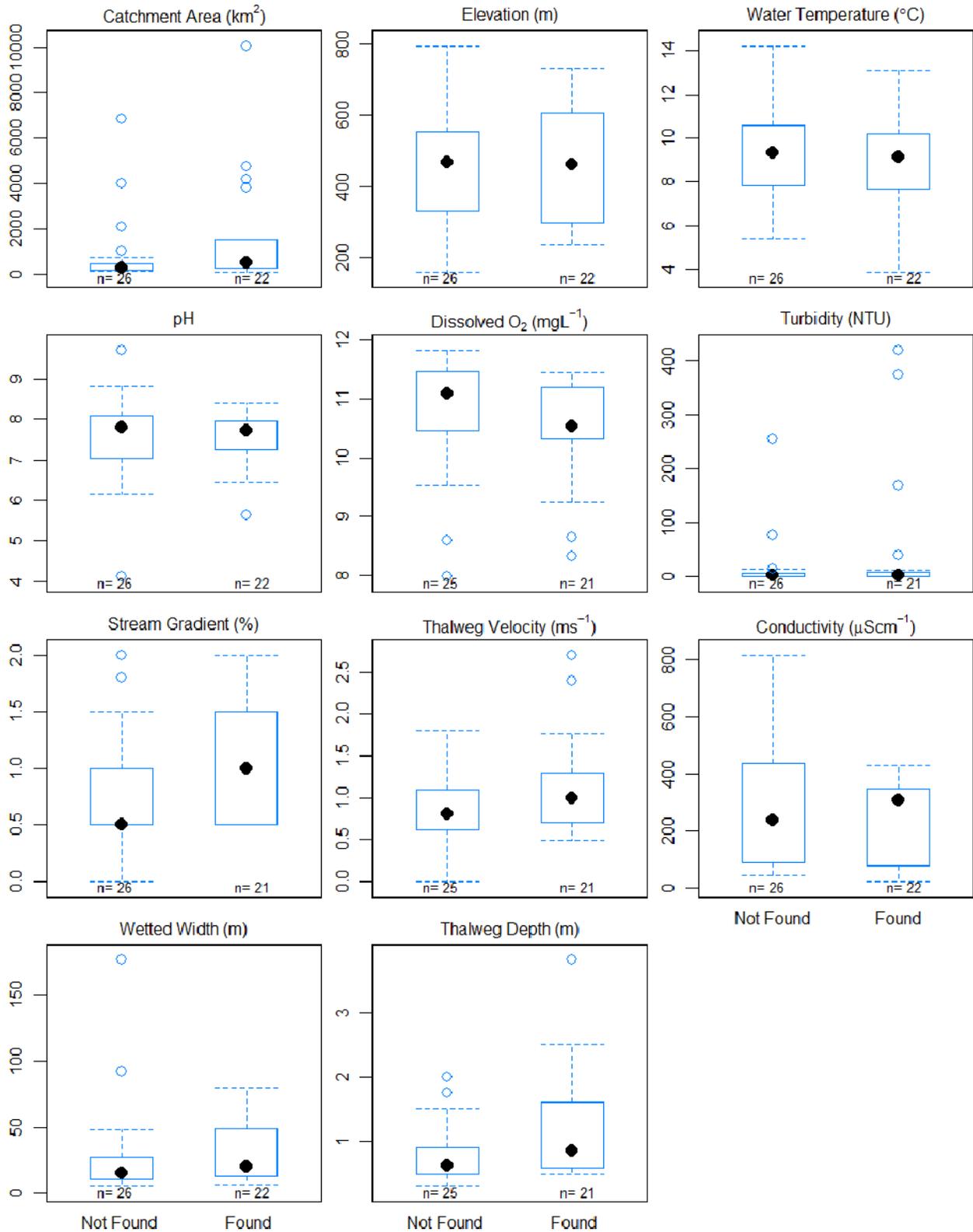
northern pike - Nonwadeable Streams (>100 km<sup>2</sup>)



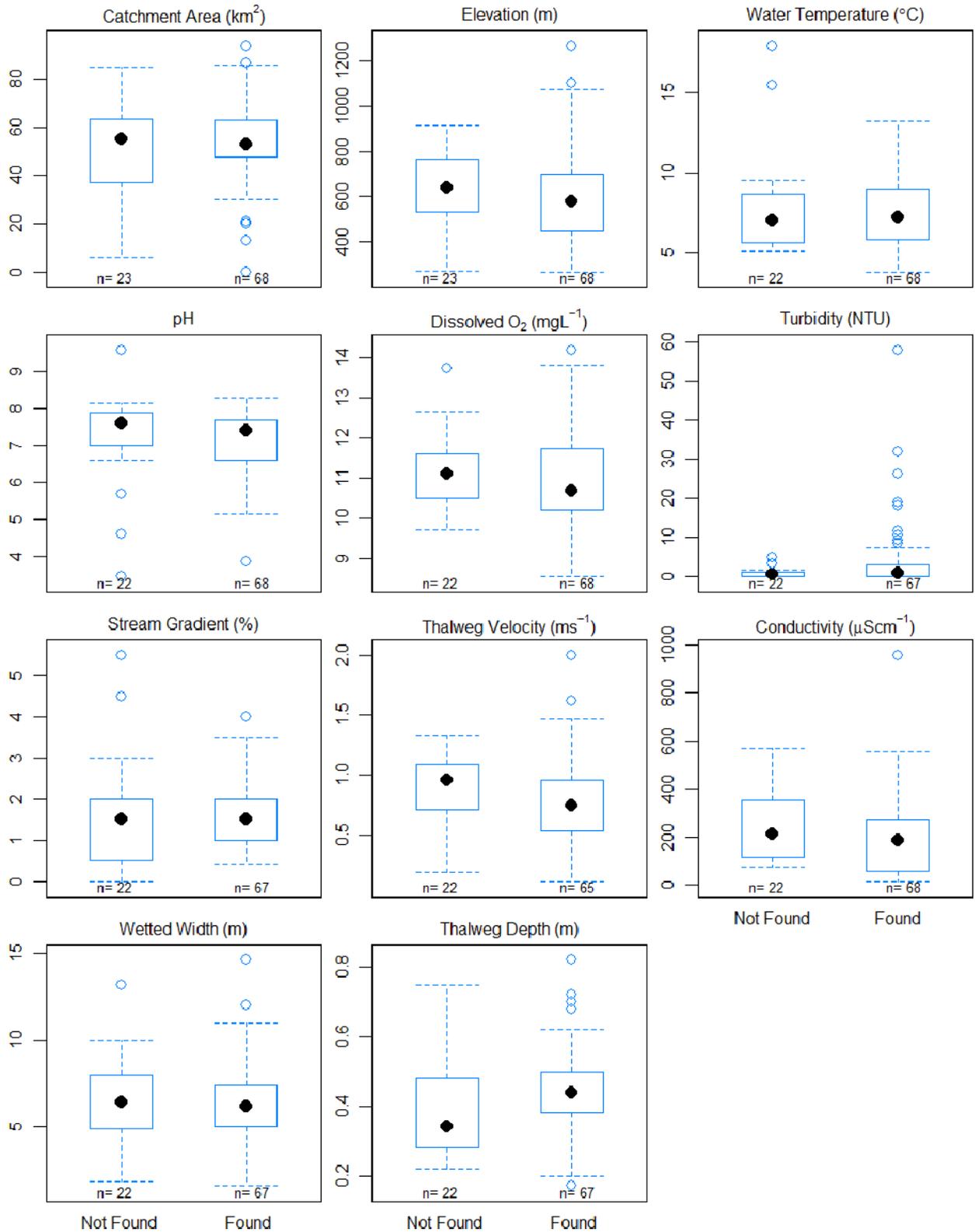
round whitefish - Small Streams (<100 km<sup>2</sup>)



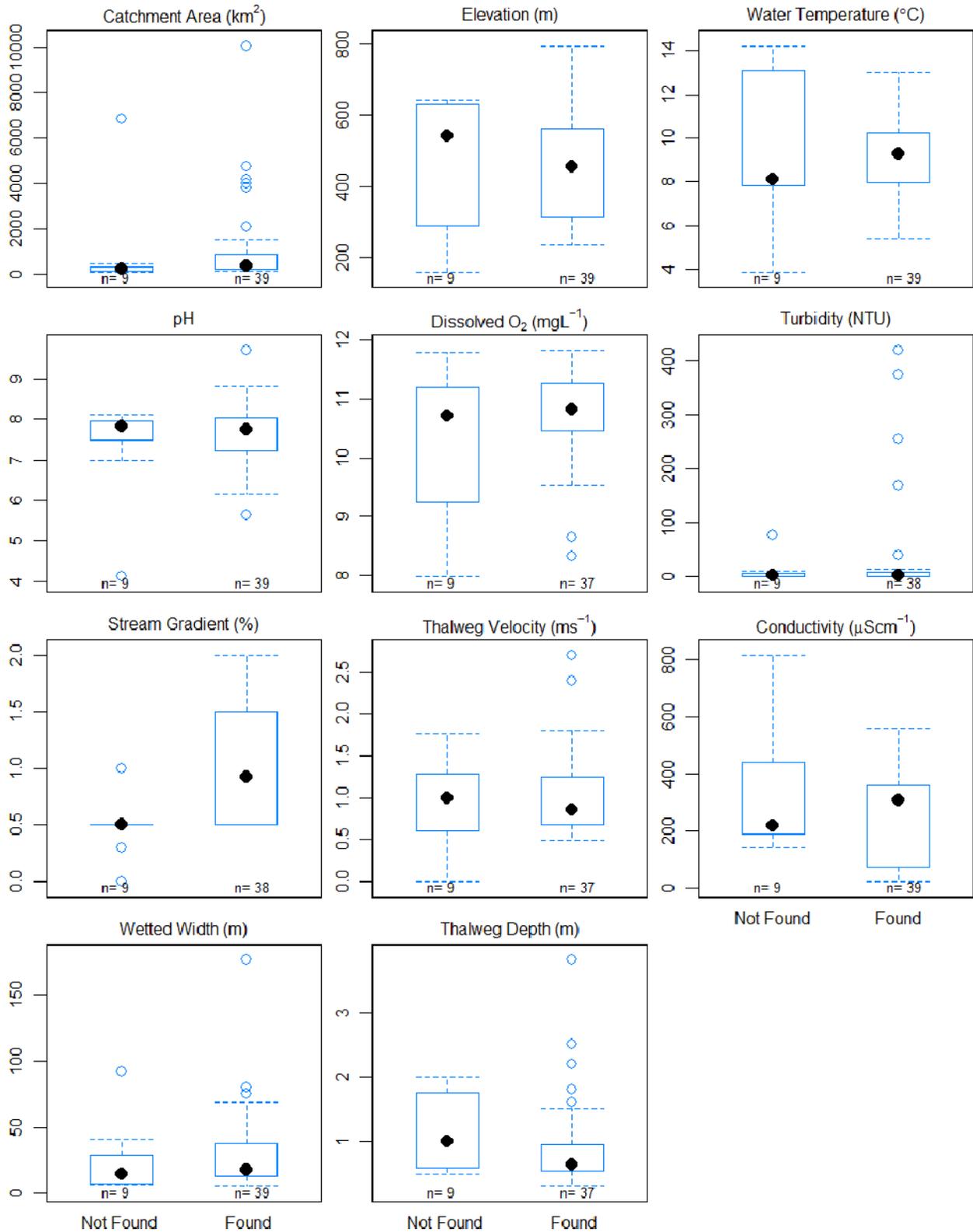
round whitefish - Nonwadeable Streams (>100 km<sup>2</sup>)



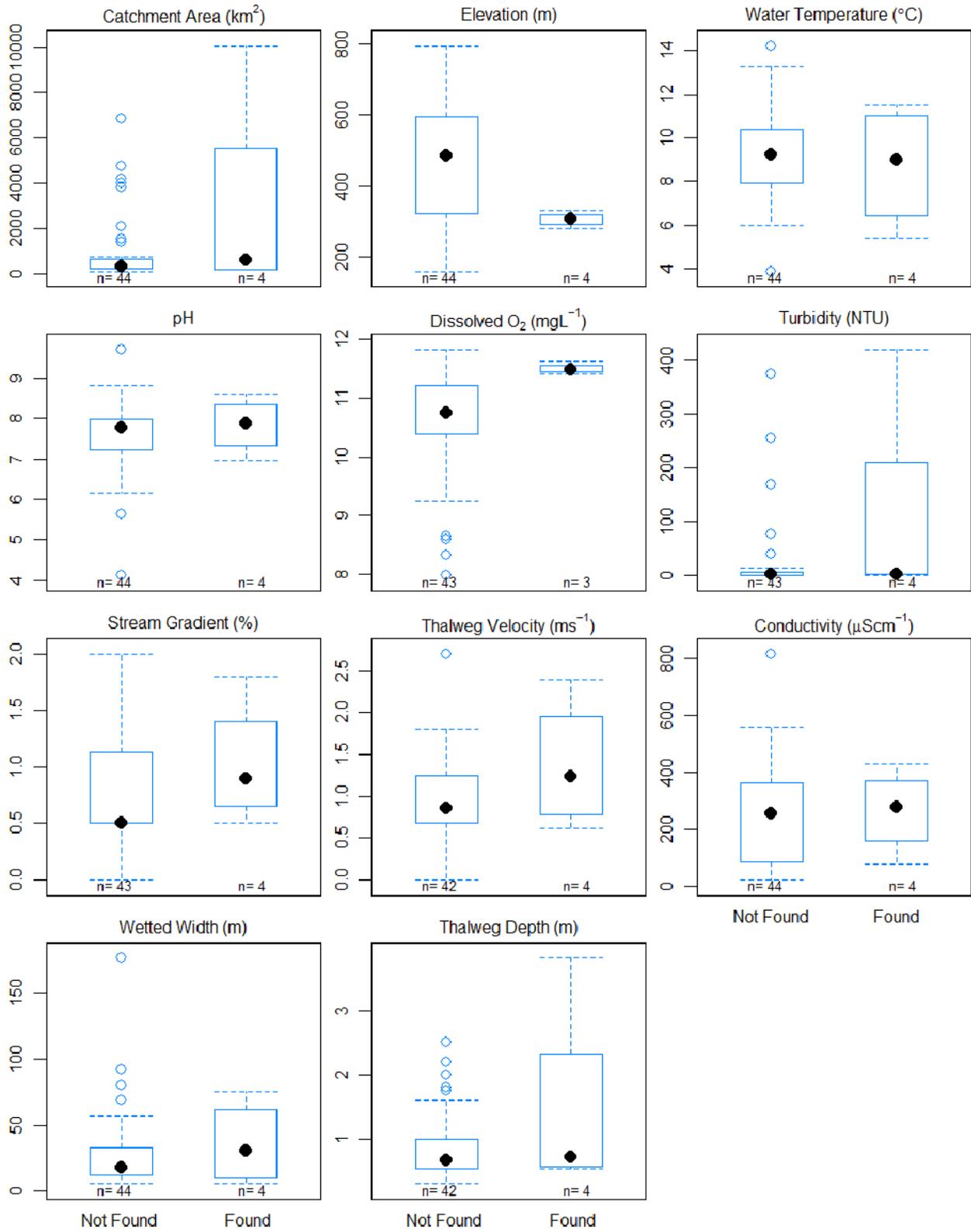
### Arctic grayling - Small Streams (<100 km<sup>2</sup>)



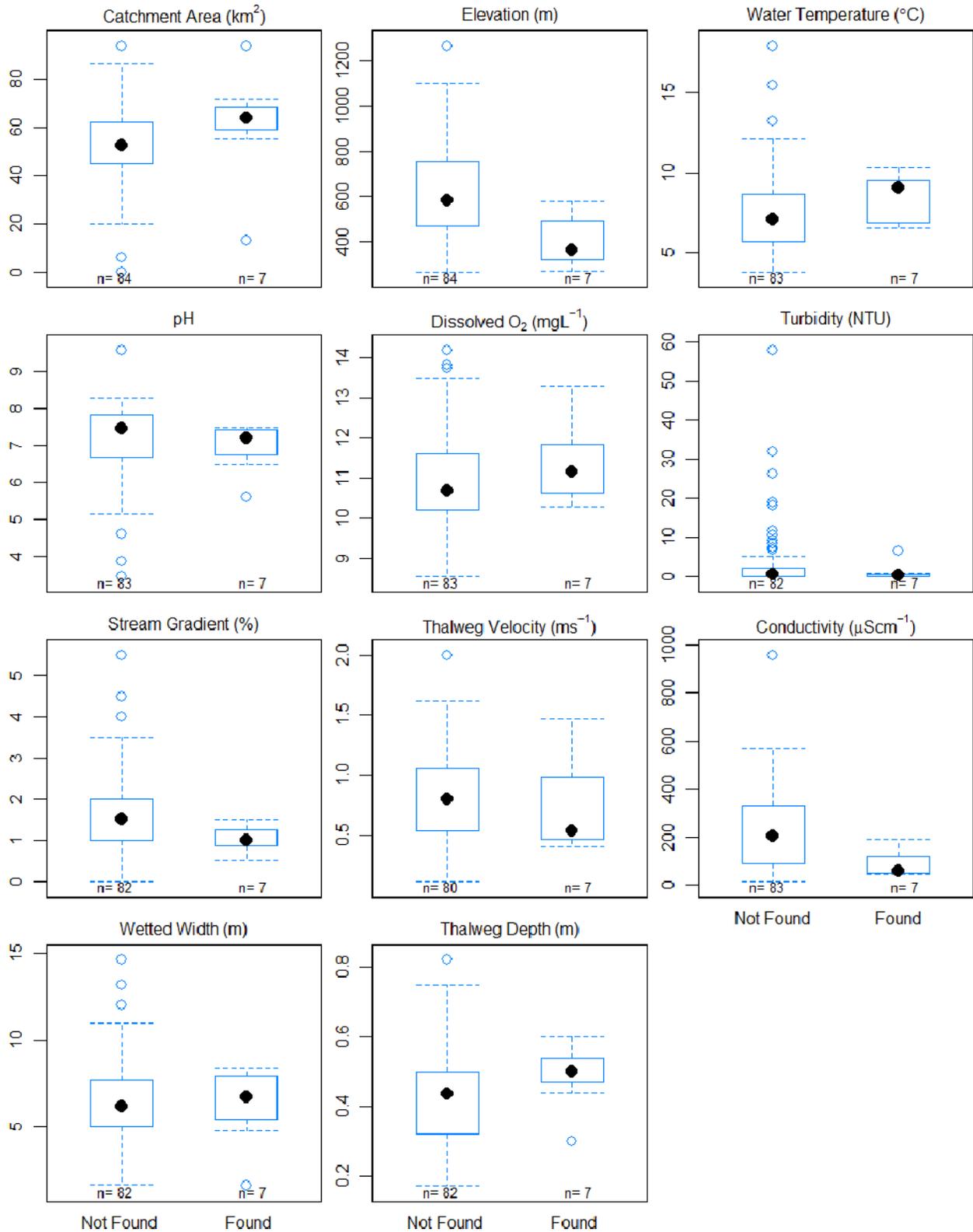
### Arctic grayling - Nonwadeable Streams (>100 km<sup>2</sup>)



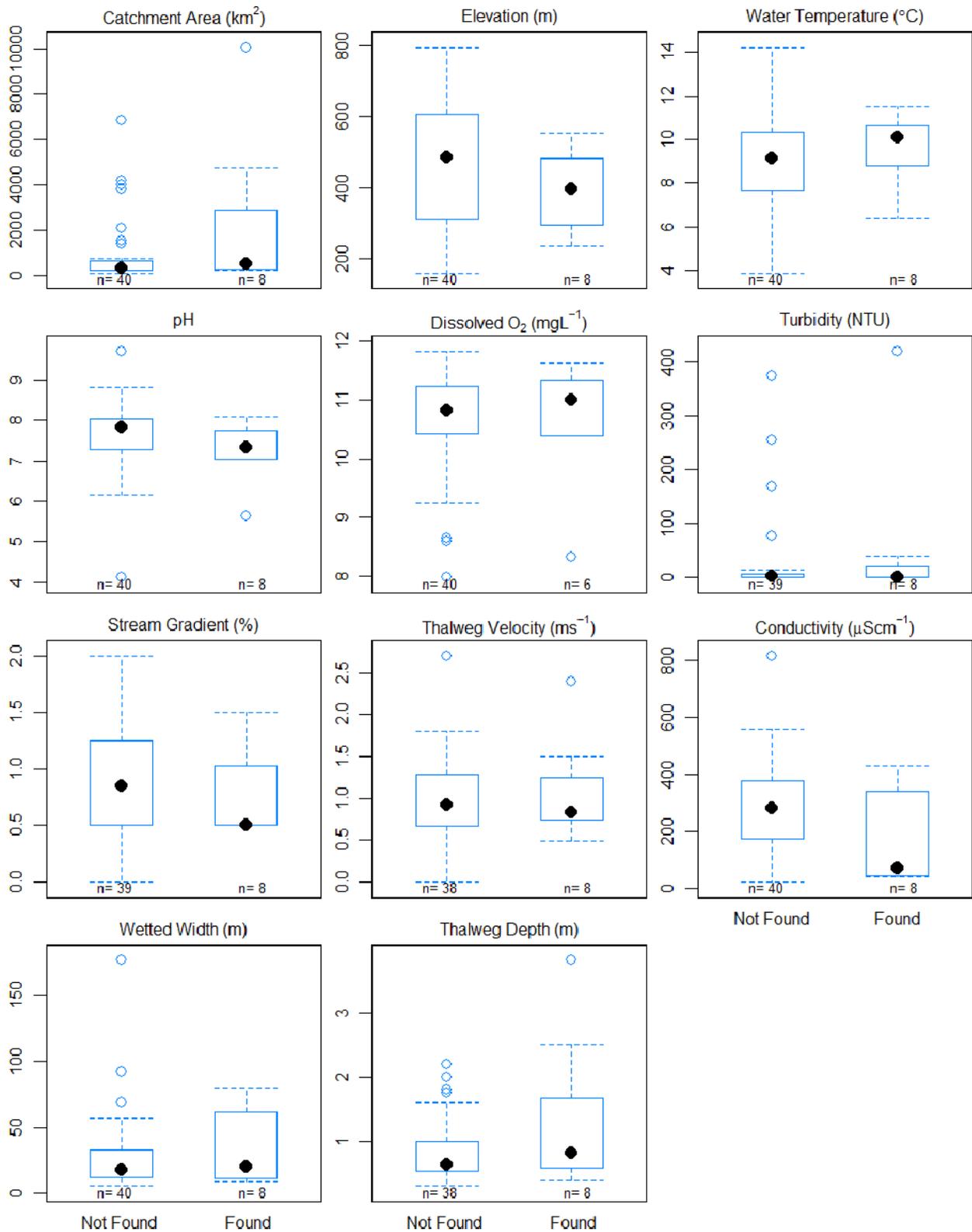
### chum salmon - Nonwadeable Streams (>100 km<sup>2</sup>)



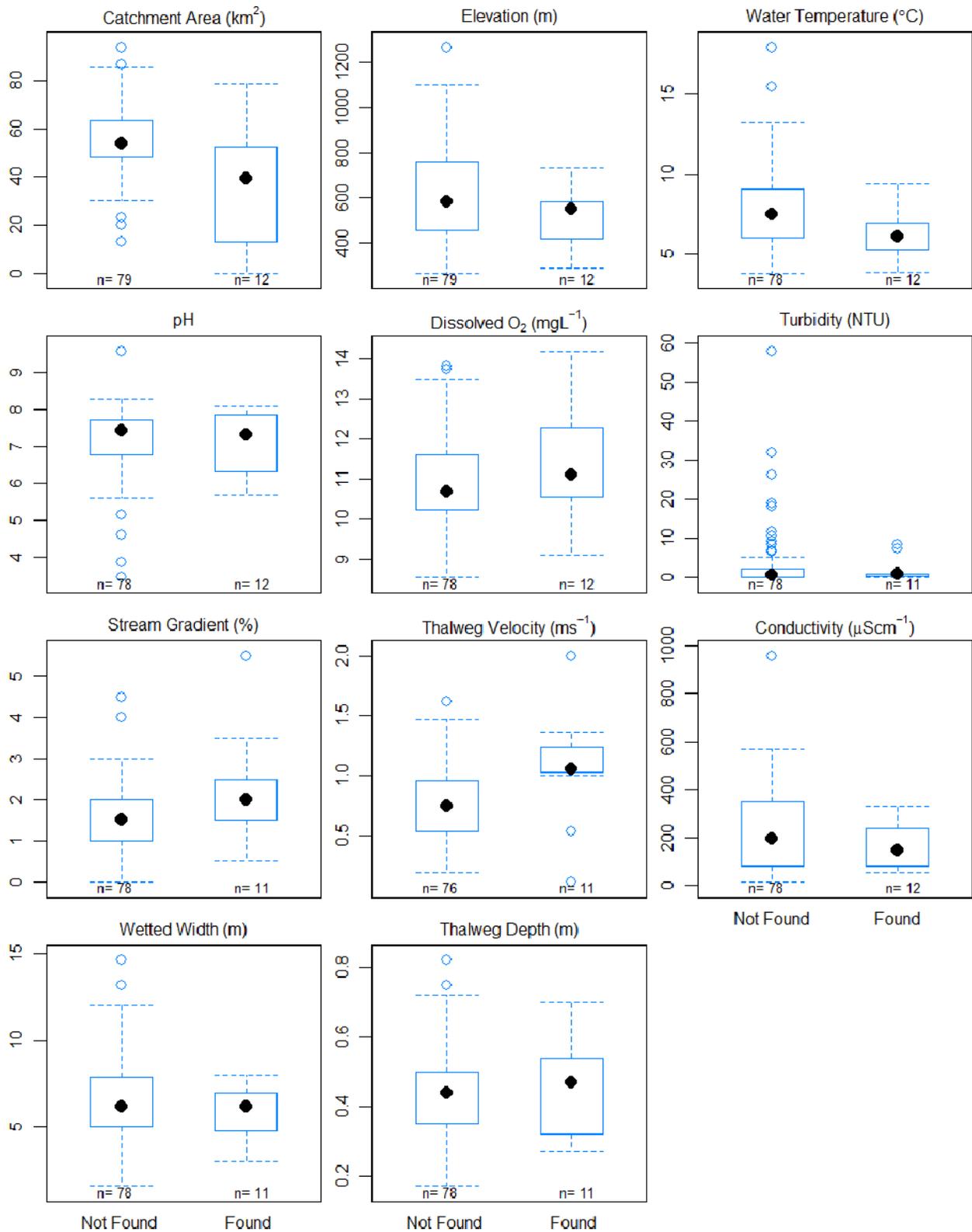
### Chinook salmon - Small Streams (<100 km<sup>2</sup>)



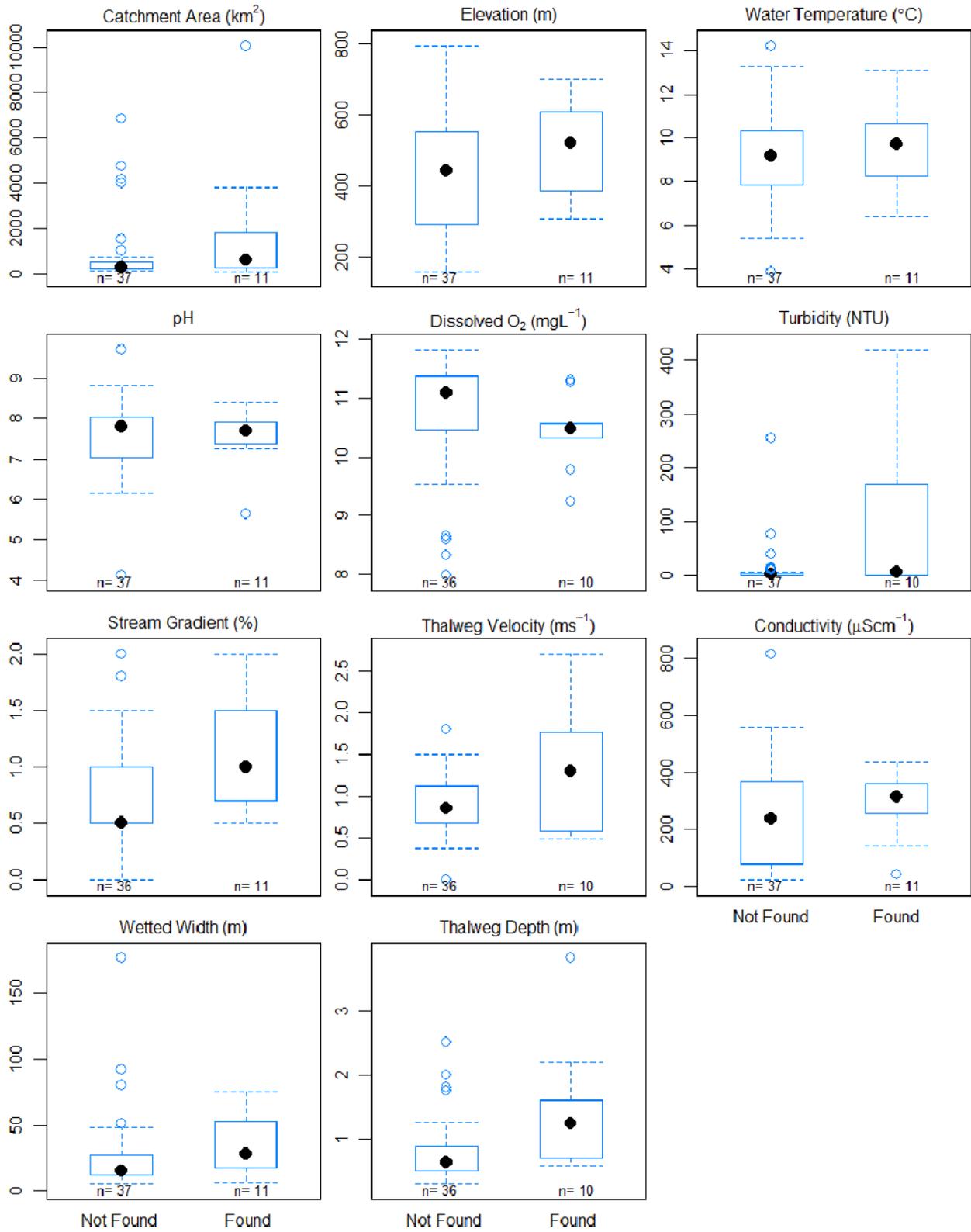
### Chinook salmon - Nonwadeable Streams (>100 km<sup>2</sup>)



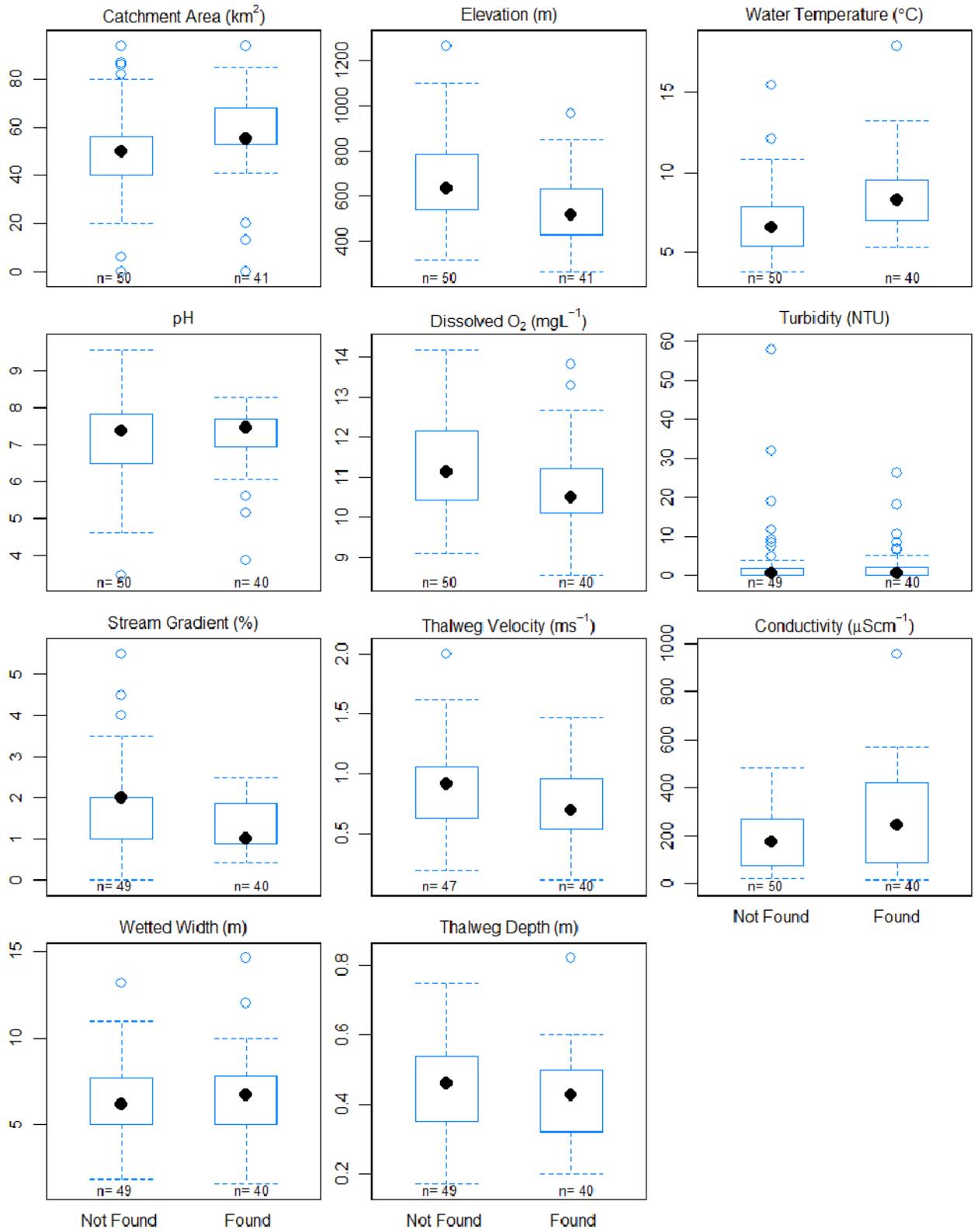
### Dolly Varden - Small Streams (<100 km<sup>2</sup>)



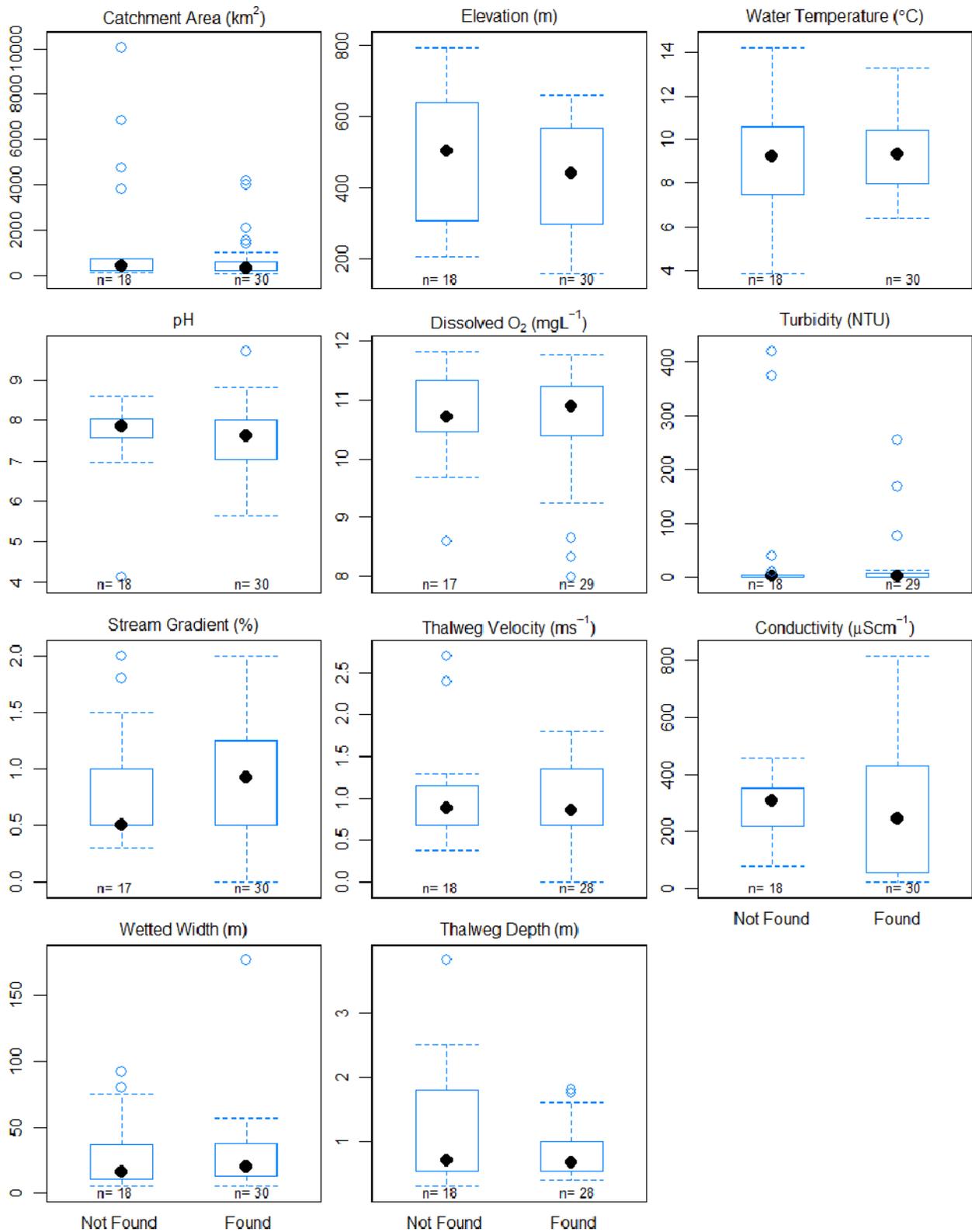
### burbot - Nonwadeable Streams (>100 km<sup>2</sup>)



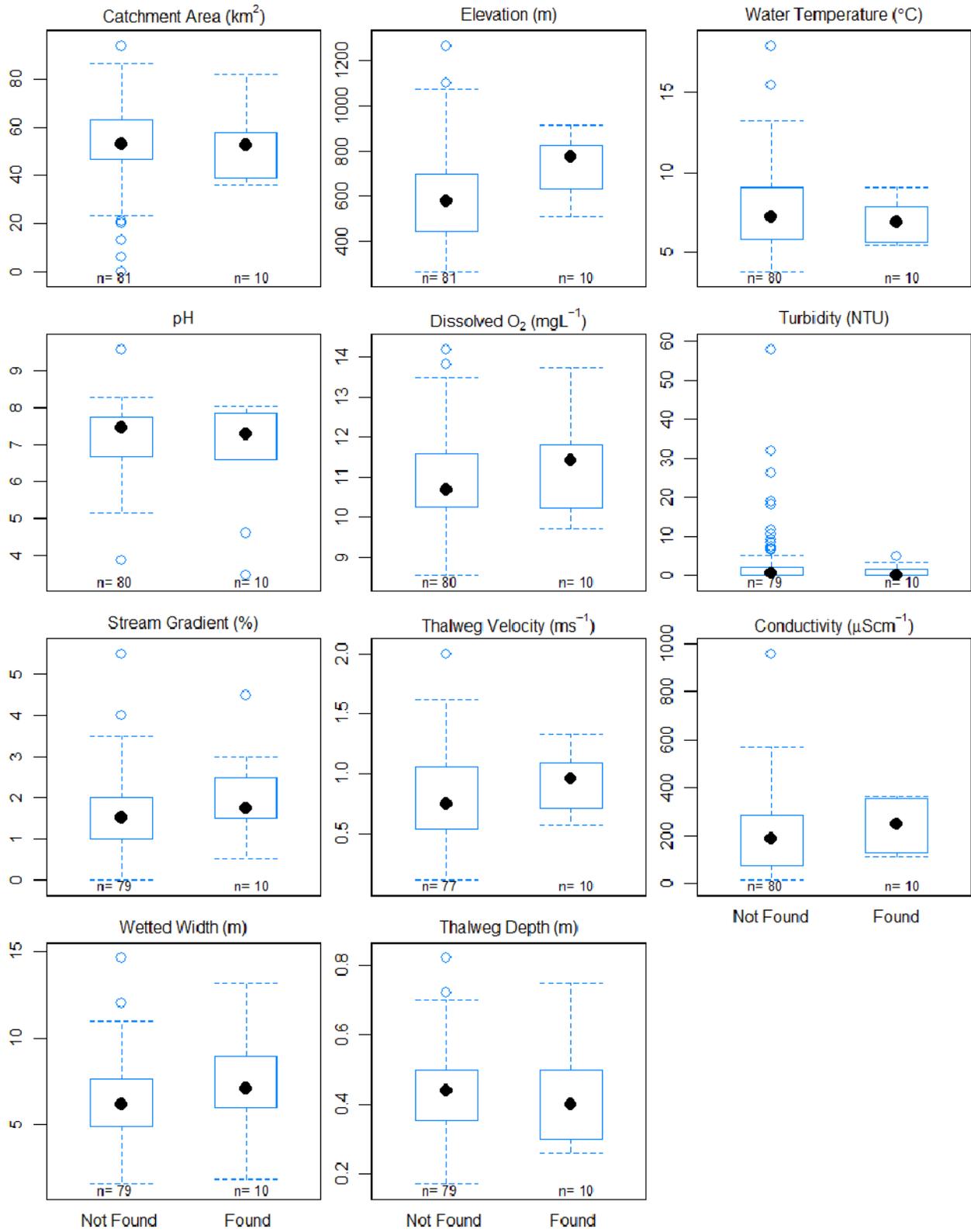
### slimy sculpin - Small Streams (<100 km<sup>2</sup>)



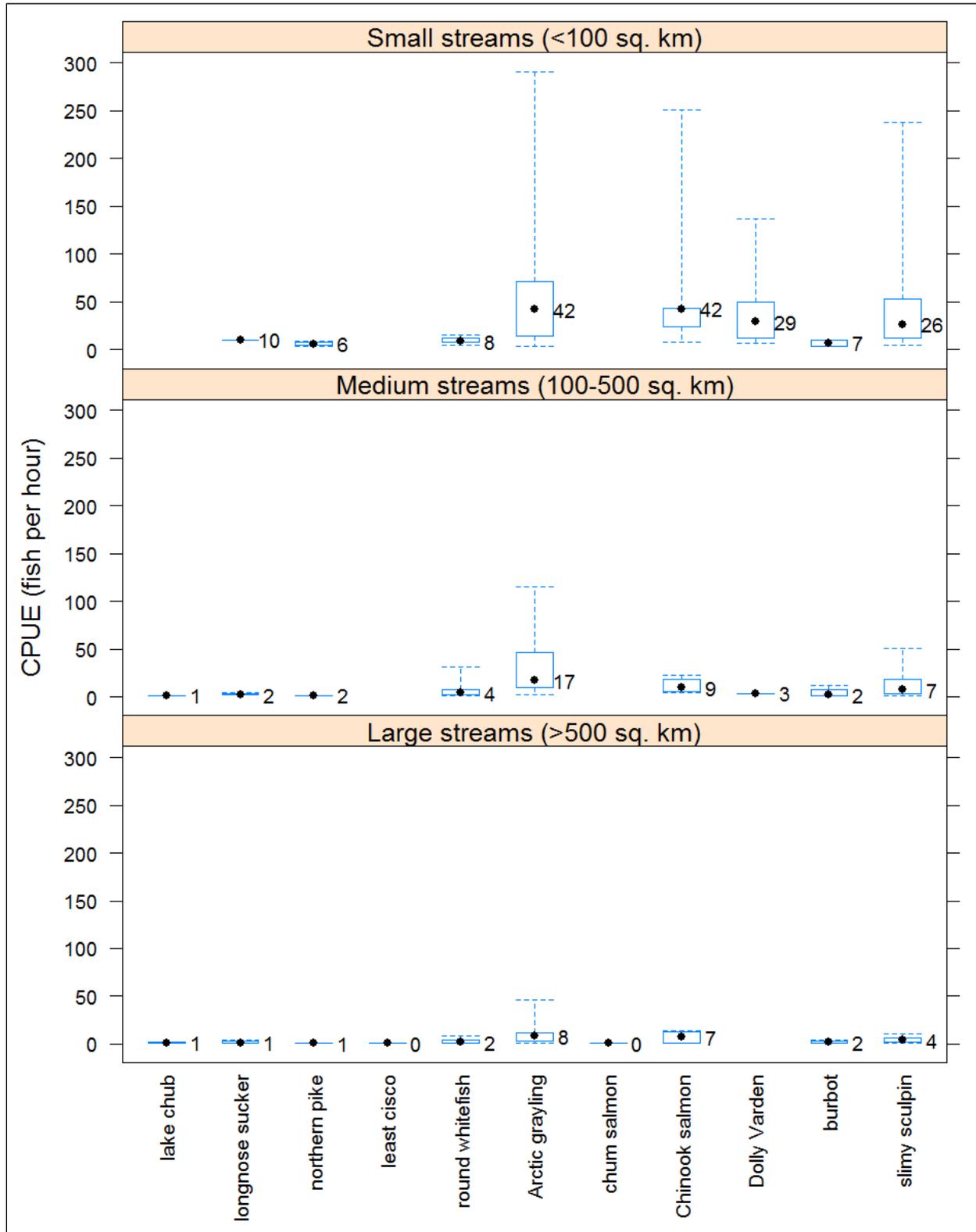
### slimy sculpin - Nonwadeable Streams (>100 km<sup>2</sup>)



no fish found - Small Streams (<100 km<sup>2</sup>)



Appendix G5.–Box plots of electrofishing catch per unit effort, grouped by stream size.



Note: We derived a CPUE value (number of fish collected per hour of electrofisher on time) by species for each reach. Then we plotted the CPUE values grouped by species and stream size. Only CPUE values from reaches where the given species was found were included in the plots. The median is labeled on each box plot.

## **APPENDIX H. SUPPLEMENTAL DATA ANALYSIS**

Appendix H1.–Table of *p*-values from randomization tests for differences in the median of selected numeric habitat variables between stream-size groups.

Stream-size pair	water temp.	pH	dissolved oxygen	turbidity	conductivity	stream gradient	thalweg velocity	channel width	thalweg depth	elevation
Large - Medium	0.015	0.042	~	< <b>0.001</b>	< <b>0.001</b>	~	<b>0.003</b>	< <b>0.001</b>	< <b>0.001</b>	~
Large - Small	< <b>0.001</b>	<b>0.002</b>	~	< <b>0.001</b>	<b>0.001</b>	0.008	< <b>0.001</b>	< <b>0.001</b>	< <b>0.001</b>	0.024
Medium - Small	<b>0.003</b>	~	~	~	~	< <b>0.001</b>	~	< <b>0.001</b>	< <b>0.001</b>	0.024

*Note:* Low *p*-values ( $\leq 0.05$ ) suggest the given habitat variable differs among the given stream-size groups. Very low *p*-values ( $\leq 0.005$ ), in bold, strongly suggest a difference. Grey shading behind a *p*-value indicates the median for the larger stream-size group was less than the median for the smaller stream-size group. No shading indicates the median for the larger stream-size group was greater than for the smaller stream-size group. “~” indicates the *p*-value was  $> 0.05$ .

Appendix H2.—Table of *p*-values from randomization tests for differences in the median of fish fork-lengths, and number of species found, between stream-size groups.

Stream-size pair	round whitefish	Arctic grayling	Juvenile Chinook salmon	slimy sculpin	no. of species
Large - Medium	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	~	<b>&lt;0.001</b>
Large - Small	~	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>	<b>&lt;0.001</b>
Medium - Small	~	<b>0.004</b>	~	<b>&lt;0.001</b>	~

*Note:* We only tested species that were found in at least 3 reaches and of which we measured at least 10 fish per stream-size group.

“~” indicates the *p*-value was > 0.05.

Low *p*-values ( $\leq 0.05$ ) suggest the given habitat variable differs among the given stream-size groups. Very low *p*-values ( $\leq 0.005$ ), in bold, strongly suggest a difference. Grey shading behind a *p*-value indicates the median for the larger stream-size group was less than the median for the smaller stream-size group. No shading indicates the median for the larger stream-size group was greater than for the smaller stream-size group.

Appendix H3.—Table of *p*-values from randomization tests for differences in the median of selected numeric habitat variables between groups of sites where each fish species was found versus not found, grouped by stream size.

Species	Catchment area	Elevation	Water temp	pH	Dissolved oxygen	Turbidity	Conductivity	Stream gradient	Thalweg velocity	Wetted width	Thalweg depth
<b>Wadeable (&lt;100 km<sup>2</sup>) streams</b>											
longnose sucker	-	-	-	-	-	-	-	-	-	-	-
northern pike	0.032	0.028	<0.001	~	~	~	~	0.024	0.021	0.015	0.035
Arctic grayling	~	~	~	~	~	~	~	~	~	~	0.007
round whitefish	~	0.021	~	~	~	0.025	~	~	~	~	~
Chinook salmon	0.033	0.006	~	~	~	~	0.011	~	~	~	~
Dolly Varden	0.001	~	0.028	~	~	~	~	~	0.025	~	~
burbot	-	-	-	-	-	-	-	-	-	-	-
slimy sculpin	0.007	0.001	<0.001	~	0.010	~	~	0.004	0.013	~	~
no fish found	~	0.006	~	~	~	~	~	~	~	~	~
<b>Nonwadeable (&gt;100 km<sup>2</sup>) streams</b>											
lake chub	0.020	~	~	~	~	0.020	0.017	~	~	0.002	~
longnose sucker	0.004	~	~	~	~	0.005	~	~	~	0.009	0.002
northern pike	0.002	0.005	0.004	~	0.044	~	~	0.001	~	0.007	0.007
least cisco	-	-	-	-	-	-	-	-	-	-	-
round whitefish	0.025	~	~	~	~	~	~	~	~	~	~
Arctic grayling	~	~	~	~	~	~	~	~	~	~	~
chum salmon	~	~	~	~	0.026	~	~	~	~	~	~
Chinook salmon	~	~	~	~	~	~	0.025	~	~	~	~
Dolly Varden	-	-	-	-	-	-	-	-	-	-	-
burbot	~	~	~	~	0.039	~	~	~	0.015	~	0.011
slimy sculpin	~	~	~	~	~	~	~	~	~	~	~
no fish found	-	-	-	-	-	-	-	-	-	-	-

Note: Low *p*-values ( $\leq 0.05$ ) suggest the given habitat variable differs between sites where the species was found versus not found. Very low *p*-values ( $\leq 0.005$ ), in bold, strongly suggest a difference. Grey shading behind a *p*-value indicates the median for sites where the species was found was less than the median for sites where the species was not found. No shading behind a *p*-value indicates the median for sites where the species was found was greater. “~” indicates the *p*-value was  $> 0.05$ . “-” indicates insufficient sample size ( $< 3$  reaches from where the species was found/not found).

Appendix H4.—Table of *p*-values for contingency-table analyses for co-occurrence of selected species at electrofished reaches.

Species <sup>a</sup>	MIN	NOS	PIK	WRN	GRA	SCM	SCK	CDV	GBR	USL
<b>Wadeable reaches (<math>\leq 100 \text{ km}^2</math>; <math>n = 81</math> reaches)</b>										
<i>n</i>	0	1	4	12	68	0	7	12	2	41
PIK			N/A	-	-		-	-	-	-
WRN			-	N/A	-		-	-	-	-
GRA			-	-	N/A		-	-	-	-
SCK			-	-	-		N/A	-	-	0.012
CDV			-	-	-		-	N/A	-	0.013
GBR			-	-	-		-	-	N/A	-
USL			-	-	-		0.012	0.013	-	N/A
<b>Nonwadeable reaches (<math>&gt;100 \text{ km}^2</math>; <math>n = 45</math> reaches)</b>										
<i>n</i>	3	13	4	22	38	3	8	1	11	30
MIN	N/A	-	-	-	-	-	-	-	-	-
NOS	-	N/A	-	-	-	-	-	-	-	0.016
PIK	-	-	N/A	-	-	-	-	-	-	-
WRN	-	-	-	N/A	-	-	-	-	0.016	-
GRA	-	-	-	-	N/A	-	-	-	-	-
SCM	-	-	-	-	-	N/A	-	-	-	-
SCK	-	-	-	-	-	-	N/A	-	-	-
GBR	-	-	-	0.016	-	-	-	-	N/A	-
USL	-	0.016	-	-	-	-	-	-	-	N/A

<sup>a</sup> Species codes: CDV = Dolly Varden; GBR = burbot; GRA = Arctic grayling; MIN = lake chub; NOS = longnose sucker; PIK = northern pike; SCK = Chinook salmon; SCM = chum salmon; USL = slimy sculpin; WRN = round whitefish.

Note: *p* values are based on Fisher's Exact Test. Low *p* values ( $\leq 0.05$ ) suggest an interspecific relationship (either association or avoidance) occurs. Grey shading behind a *p* value indicates possible avoidance. No shading behind a *p* value indicates possible association. "--" indicates the *p* value was  $>0.05$  (i.e., not significant). Blank cells indicate sample size (number of sites where the species was found) was  $\leq 1$ .



**APPENDIX I. DISPOSITION OF FISH VOUCHER SPECIMENS  
AND FIN CLIPS**

Appendix II.—Fish voucher specimens and fin clips sent to University of Alaska Museum, Fairbanks.

Station ID	Date collected	Species	Fish tag number	Fin-clip vial number	Fin clipped
FSK1001C02	8/4/2010	slimy sculpin	T000323	156482	rt. pectoral fin
FSK1001C02	8/4/2010	slimy sculpin	T000324	156483	rt. pectoral fin
FSK1001C02	8/4/2010	slimy sculpin	T000325	156484	rt. pectoral fin
FSK1001C02	8/4/2010	slimy sculpin	T000326	156485	rt. pectoral fin
FSK1001C02	8/4/2010	slimy sculpin	T000327	156486	rt. pectoral fin
FSK1001C02	8/4/2010	slimy sculpin	T000328	156487	rt. pectoral fin
FSK1001C02	8/4/2010	slimy sculpin	T000329	156488	rt. pectoral fin
FSK1001C02	8/4/2010	slimy sculpin	T000330	156489	rt. pectoral fin
FSK1001C02	8/4/2010	slimy sculpin	T000331	156490	rt. pectoral fin
FSK1001C02	8/4/2010	slimy sculpin	T000332	156491	rt. pectoral fin
FSK1001C02	8/4/2010	slimy sculpin	T000333	156492	rt. pectoral fin
FSK1001C02	8/4/2010	slimy sculpin	T000334	156493	rt. pectoral fin
FSK1002C05	8/5/2010	burbot	T000335	156494	rt. pectoral fin
FSK1002C05	8/5/2010	burbot	T000336	156495	rt. pectoral fin
FSK1002C05	8/5/2010	round whitefish	T000337	156496	rt. pectoral fin
FSK1006A01	8/9/2010	burbot	T000339	156498	rt. pectoral fin
FSK1006A01	8/9/2010	burbot	T000343	156502	rt. pectoral fin
FSK1006A01	8/9/2010	burbot	T000344	156503	rt. pectoral fin
FSK1006A01	8/9/2010	longnose sucker	T000350	156509	rt. pectoral fin
FSK1006A01	8/9/2010	longnose sucker	T000353	156512	rt. pectoral fin
FSK1006A01	8/9/2010	round whitefish	T000322	156481	rt. pelvic fin
FSK1006A01	8/9/2010	round whitefish	T000338	156497	rt. pelvic fin
FSK1006A01	8/9/2010	round whitefish	T000340	156499	rt. pelvic fin
FSK1006A01	8/9/2010	round whitefish	T000341	156500	rt. pelvic fin
FSK1006A01	8/9/2010	round whitefish	T000342	156501	rt. pelvic fin
FSK1006A01	8/9/2010	round whitefish	T000345	156504	rt. pelvic fin
FSK1006A01	8/9/2010	round whitefish	T000346	156505	rt. pelvic fin
FSK1006A01	8/9/2010	round whitefish	T000347	156506	rt. pelvic fin
FSK1006A01	8/9/2010	round whitefish	T000348	156507	rt. pelvic fin
FSK1006A01	8/9/2010	round whitefish	T000352	156511	rt. pelvic fin
FSK1006A01	8/9/2010	round whitefish	T000354	156513	caudal fin
FSK1007A01	8/10/2010	burbot	T000302	156461	rt. pectoral fin
FSK1007A01	8/10/2010	burbot	T000303	156462	rt. pectoral fin
FSK1007A01	8/10/2010	burbot	T000321	156480	rt. pectoral fin
FSK1007A01	8/10/2010	burbot	T000351	156510	rt. pectoral fin
FSK1007A01	8/10/2010	longnose sucker	T000301	156511	rt. pectoral fin
FSK1007A01	8/10/2010	longnose sucker	T000349	156508	rt. pectoral fin
FSK1008A01	8/11/2010	burbot	T000320	156463	rt. pectoral fin
FSK1009A01	8/12/2010	burbot	T000305	156464	rt. pectoral fin
FSK1010A01	8/13/2010	least cisco	T000306	156465	rt. pectoral fin
FSK1014A01	8/17/2010	lake chub	T000307	156466	rt. pectoral fin
FSK1014A01	8/17/2010	lake chub	T000308	156467	rt. pectoral fin
FSK1014C07	8/17/2010	Dolly Varden	T000309	156468	rt. pectoral fin
FSK1014C07	8/17/2010	Dolly Varden	T000310	156469	rt. pectoral fin
FSK1014C07	8/17/2010	Dolly Varden	T000311	156470	rt. pectoral fin
FSK1014C07	8/17/2010	Dolly Varden	T000312	156471	rt. pectoral fin
FSK1014C07	8/17/2010	Dolly Varden	T000313	156472	rt. pectoral fin
FSK1014C07	8/17/2010	Dolly Varden	T000314	156473	rt. pectoral fin
FSK1015B01	8/18/2010	lake chub	T000315	156474	rt. pectoral fin
FSK1019B01	8/21/2010	lake chub	T000317	156476	rt. pectoral fin

Appendix I2.–Dolly Varden fin clips sent to USFWS Conservation Genetics Lab, Anchorage.

Station ID	Date collected	Number of fish clipped	Fin-clip vial numbers
FSK1004C04	8/7/2010	1	1
FSK1010C04	8/13/2010	6	2-7
FSK1010C06	8/13/2010	2	8-9
FSK1014C04	8/17/2010	12	10-21
FSK1014C07	8/17/2010	12	22-33
FSK1015C04	8/18/2010	5	34-38
FSK1016C02	8/19/2010	7	39-45
FSK1016C04	8/19/2010	2	46-47
FSK1017C04	8/20/2010	9	48-56
FSK1018C02	8/21/2010	5	57-61
Total		61	

*Note:* The right pelvic fin was clipped.



## **APPENDIX J. STATION REPORTS AND PHOTO**

**Station Info**

Observers: Joe Buckwalter, John Burr

Date/Time: 08/04/2010 12:39 PM

Station	Latitude	Longitude	Sample	Latitude	Longitude	Latitude	Longitude
Coordinates	67.58490	-149.31767	Coordinates	67.58490	-149.31767	67.56989	-149.38531

Elevation NED (m)(ft): 551 1808

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-5

Legal Description (MTRS): F032N008W22

Waterbody Name: Bettles River

Anadromous Waters Catalog Number:

Geographic Comments: Between Mule and Big Spruce creeks. Dirt airstrip near left bank at center of reach.

Visit Comments: crystal-clear water; turbidity meter had a dead battery.

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 10.91 DO (mg/L): 10.47 DO (%): Conductivity (µS/cm): 347 pH: 7.87

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.96 3.15

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 720 Embeddedness: Negligible

Channel Dimensions (m):	Bank Full	Wetted	Dominant Substrate:	Gravel
Width	41.0	37.0	Subdominant Substrate 1:	Cobble
Thalweg Depth	1.79	0.54	Subdominant Substrate 2:	Sands

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	0.8	Open Black Spruce Forest	4
5 - 10	Open Black Spruce Forest	6	Open Black Spruce Forest	4
10 - 20	Open Black Spruce Forest	6	Open Black Spruce Forest	4
20 - 30	Open Black Spruce Forest	6	Open Black Spruce Forest	4

**Key To Fish Sampling Methods**

Estimated reach length (m): 3700 Total Electrofishing Time (s): 2376

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 18 Fish Measured: 3 Fork Lengths (mm) Min: 341 Max: 360 Mean: 352 Median: 350

Sampling Method (No. of fish): BEF (3) VOB (15)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 5 Fish Measured: 5 Fork Lengths (mm) Min: 234 Max: 324 Mean: 275 Median: 279

Sampling Method (No. of fish): BEF (5)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 4 Fish Measured: 2 Fork Lengths (mm) Min: 97 Max: 139 Mean: 118 Median: 118

Sampling Method (No. of fish): BEF (2) VOB (2)

Comments:

Species: longnose sucker

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 294 Max: 294 Mean: 294 Median: 294

Sampling Method (No. of fish): BEF (1)

Comments:

**Species:** round whitefish                      **Life Stage:** adult                      **Life History:** Resident  
**Total Fish Count:** 1      **Fish Measured:** 1      **Fork Lengths (mm) Min:** 337      **Max:** 337      **Mean:** 337      **Median:** 337  
**Sampling Method (No. of fish):** BEF (1)  
**Comments:**

---

### Instruments

**Stream Gradient:** handheld optical clinometer

**Channel Depths:** graduated wading rod

**Stream Velocity:** transparent velocity head rod

**Channel Widths:** handheld laser rangefinder

**Turbidity:**

**Electrofisher:** Smith-Root GPP 2.5

**Water Quality:** YSI 556

**Transparency:**



FSK1001A010002.jp



FSK1001A010003.jp



FSK1001A010007.jp

FSK1001A010008.jp



**Station Info****Observers:** Ryan Snow, Joe Giefer**Date/Time:** 08/04/2010 11:56 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.59185	-149.50067	<b>Coordinates</b>	67.59185	-149.50067	/	67.56324 -149.50779

**Elevation NED (m)(ft):** 536 1759**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar C-5**Legal Description (MTRS):** F032N009W14**Waterbody Name:** Mathews River**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Braided channel. DO was initially recorded as %Sat, then converted to mg/L assuming water temp = 10.5 C and atmospheric pressure = 735 mm Hg (estimated). Very low stream gradient.**Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 10.57 **DO (mg/L):** 10.89 **DO (%):** **Conductivity (µS/cm):** 496 **pH:** 8.25**Water Color:** Clear **Turbidity (NTU):** 0.41 **Thalweg Velocity (m/s)(ft/s):** 0.85 2.79**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 197 **Embeddedness:** Moderate**Channel Dimensions (m):** **Bank Full** **Wetted** **Dominant Substrate:** Cobble**Width** 180.0 22.0 **Subdominant Substrate 1:** Gravel**Thalweg Depth** 2.50 0.65 **Subdominant Substrate 2:** Sands**Rosgen Class:** D3 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Unvegetated	0	Unvegetated	0
5 - 10	Unvegetated	0	Unvegetated	0
10 - 20	Open Low Scrub	0.75	Open Low Scrub	0.75
20 - 30	Closed Black Spruce-White Spruce Forest	11	Closed Black Spruce-White Spruce Forest	11

**Key To Fish Sampling Methods****Estimated reach length (m):** 3600 **Total Electrofishing Time (s):** 1215

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations****Species:** Arctic grayling**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 2 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 239 **Max:** 242 **Mean:** 240 **Median:** 240**Sampling Method (No. of fish):** BEF (2)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 2 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 100 **Max:** 101 **Mean:** 100 **Median:** 100**Sampling Method (No. of fish):** BEF (2)**Comments:****Species:** slimy sculpin**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:****Sampling Method (No. of fish):** VOB (1)**Comments:****Species:** slimy sculpin**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 52 **Max:** 52 **Mean:** 52 **Median:** 52**Sampling Method (No. of fish):** BEF (1)**Comments:**

**Instruments**

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root GPP 2.5

**Transparency:**



FSK1001B010001.jp



FSK1001B010003.jp



FSK1001B010008.jp



FSK1001B010009.jp



FSK1001B010011.jp



FSK1001B010012.jp

**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/04/2010 10:15 AM

Station	Latitude	Longitude	Sample	Latitude	Longitude	Latitude	Longitude
Coordinates	67.43404	-149.14988	Coordinates	67.43466	-149.14996	67.43393	-149.14961

Elevation NED (m)(ft): 632 2073

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-5

Legal Description (MTRS): F030N007W08

Waterbody Name: South Fork Koyukuk River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.09 DO (mg/L): 11.60 DO (%): Conductivity (µS/cm): 110 pH: 7.00

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.57 1.87

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 36 Embeddedness: Low

Channel Dimensions (m):	Bank Full	Wetted	Dominant Substrate:
Width	3.7	1.9	Gravel
Thalweg Depth	1.08	0.32	Subdominant Substrate 1: Sands
			Subdominant Substrate 2: Silt/Sand

Rosgen Class: E4 Low gradient, meandering riffle/pool stream with low width/depth ratio and little deposition. Very efficient and stable. High meander width ratio.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
5 - 10	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
10 - 20	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
20 - 30	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2

**Key To Fish Sampling Methods**

Estimated reach length (m): 190

(PEF) Portable Electrofisher

**Fish Observations**

No Fish Found

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1001C010002.jp



FSK1001C010003.jp



FSK1001C010004.jp

FSK1001C010005.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/04/2010 1:58 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.52476	-149.46852	<b>Coordinates</b>	67.52425	-149.46559	67.52477	-149.46865

Elevation NED (m)(ft): 522 1713

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-5

Legal Description (MTRS): F031N009W12

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 17.92 DO (mg/L): 10.50 DO (%): Conductivity (µS/cm): 290 pH: 8.13

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.45 1.48

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 73 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	5.6	4.9	<b>Subdominant Substrate 1:</b> Sands
<b>Thalweg Depth</b>	0.90	0.46	<b>Subdominant Substrate 2:</b> Cobble

Rosgen Class: E4 Low gradient, meandering riffle/pool stream with low width/depth ratio and little deposition. Very efficient and stable. High meander width ratio.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Open Black Spruce-White Spruce Forest	7	Open Black Spruce-White Spruce Forest	7
5 - 10	Open Black Spruce-White Spruce Forest	7	Open Black Spruce-White Spruce Forest	7
10 - 20	Open Black Spruce-White Spruce Forest	5	Open Black Spruce-White Spruce Forest	5
20 - 30	Open Black Spruce-White Spruce Forest	5	Open Black Spruce-White Spruce Forest	5

**Key To Fish Sampling Methods**

Estimated reach length (m): 180

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: northern pike

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (1)

Comments:

Species: northern pike

Life Stage: juvenile

Life History: Resident

Total Fish Count: 3 Fish Measured: 2 Fork Lengths (mm) Min: 95 Max: 175 Mean: 135 Median: 135

Sampling Method (No. of fish): PEF (2) VOG (1)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 9 Fish Measured: 9 Fork Lengths (mm) Min: 50 Max: 65 Mean: 55 Median: 57

Sampling Method (No. of fish): PEF (9)

Comments: Eleven slimy sculpin were kept as specimens (Tag ID: T000324-000334) and fin clipped (Vial #: 156483-15649)

Species: slimy sculpin

Life Stage: juvenile

Life History: Resident

Total Fish Count: 11 Fish Measured: 11 Fork Lengths (mm) Min: 21 Max: 49 Mean: 41 Median: 35

Sampling Method (No. of fish): PEF (11)

Comments: Eleven slimy sculpin were kept as specimens (Tag ID: T000324-T000334) and fin clipped (Vial #: 156483-156)

**Instruments**

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofischer:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1001C020008.jp



FSK1001C020009.jp



FSK1001C020010.jp



FSK1001C020011.jp

**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/04/2010 4:02 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.45580	-149.54246	<b>Coordinates</b>	67.45659	-149.54286	67.45570	-149.54246

Elevation NED (m)(ft): 579 1900

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-6

Legal Description (MTRS): F030N009W03

Waterbody Name: Glacier Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 12.11 DO (mg/L): 10.58 DO (%): Conductivity (µS/cm): 407 pH: 7.83

Water Color: Clear Turbidity (NTU): 0.37 Thalweg Velocity (m/s)(ft/s): 0.40 1.31

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 80 Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	22.3	4.8	<b>Gravel</b>
<b>Thalweg Depth</b>	1.20	0.44	<b>Subdominant Substrate 1: Sands</b>
			<b>Subdominant Substrate 2: Cobble</b>

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open Tall Willow Shrub	2	Open White Spruce Forest	14
5 - 10	Open Tall Willow Shrub	2	Closed White Spruce Forest	14
10 - 20	Closed White Spruce Forest	16	Closed White Spruce Forest	14
20 - 30	Closed White Spruce Forest	16	Closed White Spruce Forest	14

**Key To Fish Sampling Methods**

Estimated reach length (m): 200

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 350 Max: 350 Mean: 350 Median: 350

Sampling Method (No. of fish): PEF (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 19 Fish Measured: 1 Fork Lengths (mm) Min: 320 Max: 320 Mean: 320 Median: 320

Sampling Method (No. of fish): PEF (1) VOG (18)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1001C030013.jp



FSK1001C030014.jp



FSK1001C030015.jp



FSK1001C030016.jp

**Station Info**

Observers: Joe Buckwalter, John Burr

Date/Time: 08/05/2010 12:58 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.92049	-148.58995	<b>Coordinates</b>	67.92049	-148.58995	/	67.91547 -148.55302

Elevation NED (m)(ft): 658 2159

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar D-4

Legal Description (MTRS): F036N005W25

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments: Too deep to wade and for TVHR. Turbidity meter not working.

Wildlife Comments: Bear tracks

**Water Quality \ Stream Flow**

Water Temp (C): 9.11 DO (mg/L): 10.49 DO (%): Conductivity (µS/cm): 257 pH: 7.36

Water Color: Glacial, Low Turbidit Turbidity (NTU): Thalweg Velocity (m/s)(ft/s): 0.58 1.90

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 548 Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>	Gravel
<b>Width</b>	69.0	23.0	<b>Subdominant Substrate 1:</b>	Sands
<b>Thalweg Depth</b>	3.50	1.50	<b>Subdominant Substrate 2:</b>	Cobble

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Shrub Birch-Willow Shrub	1	Closed Tall Shrub Birch-Willow Shrub	2
5 - 10	Closed Low Shrub Birch-Willow Shrub	1	Closed Tall Shrub Birch-Willow Shrub	2
10 - 20	Closed Low Shrub Birch-Willow Shrub	1	Closed Tall Shrub Birch-Willow Shrub	2
20 - 30	Closed Low Shrub Birch-Willow Shrub	1	Closed Tall Shrub Birch-Willow Shrub	2

**Key To Fish Sampling Methods**

Estimated reach length (m): 3100 Total Electrofishing Time (s): 3526

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: burbot

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOB (1)

Comments: ~300mm

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 12 Fish Measured: 8 Fork Lengths (mm) Min: 342 Max: 369 Mean: 356 Median: 355

Sampling Method (No. of fish): BEF (12)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 43 Fish Measured: 29 Fork Lengths (mm) Min: 250 Max: 328 Mean: 294 Median: 289

Sampling Method (No. of fish): BEF (29) VOB (14)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 4 Fish Measured: 4 Fork Lengths (mm) Min: 42 Max: 83 Mean: 54 Median: 62

Sampling Method (No. of fish): BEF (4)

Comments:

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<b>Species:</b> longnose sucker	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 309 <b>Max:</b> 309 <b>Mean:</b> 309 <b>Median:</b> 309
<b>Sampling Method (No. of fish):</b> BEF (1)		
<b>Comments:</b>		
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> adult	<b>Life History:</b> Resident
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 87 <b>Max:</b> 87 <b>Mean:</b> 87 <b>Median:</b> 87
<b>Sampling Method (No. of fish):</b> BEF (1)		
<b>Comments:</b>		
<b>Species:</b> round whitefish	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 279 <b>Max:</b> 279 <b>Mean:</b> 279 <b>Median:</b> 279
<b>Sampling Method (No. of fish):</b> BEF (1)		
<b>Comments:</b>		

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### Instruments

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> handheld sonar depth finder
<b>Stream Velocity:</b> GPS Float	<b>Channel Widths:</b> handheld laser rangefinder
<b>Turbidity:</b>	<b>Electrofisher:</b> Smith-Root GPP 2.5
<b>Water Quality:</b> YSI 556	<b>Transparency:</b>



FSK1002A010011.jp



FSK1002A010012.jp



FSK1002A010013.jp



**Station Info**

Observers: Ryan Snow, Joe Giefer

Date/Time: 08/05/2010 10:03 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.92123	-149.21310	<b>Coordinates</b>	67.92123	-149.21310	67.89688	-149.12008

Elevation NED (m)(ft): 701 2300

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar D-5

Legal Description (MTRS): F036N007W30

Waterbody Name: North Fork Chandalar River

Anadromous Waters Catalog Number:

Geographic Comments: The river runs through a shallow valley.

Visit Comments:

Wildlife Comments: moose and bear tracks along reach

**Water Quality \ Stream Flow**

Water Temp (C): 10.56 DO (mg/L): 10.40 DO (%): Conductivity (µS/cm): 399 pH: 8.39

Water Color: Clear Turbidity (NTU): 0.49 Thalweg Velocity (m/s)(ft/s): 1.30 4.26

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 570 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>	Gravel
<b>Width</b>	128.0	28.0	<b>Subdominant Substrate 1:</b>	Sands
<b>Thalweg Depth</b>	2.42	0.62	<b>Subdominant Substrate 2:</b>	Cobble

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Scrub	1.2	Closed Low Scrub	1.2
5 - 10	Closed Low Scrub	1.2	Closed Low Scrub	1.2
10 - 20	Open Black Spruce-White Spruce Forest	11	Open Black Spruce-White Spruce Forest	12
20 - 30	Open Black Spruce-White Spruce Forest	12	Open Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 5800 Total Electrofishing Time (s): 2462

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: burbot

Life Stage: adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 1 Fork Lengths (mm) Min: 711 Max: 711 Mean: 711 Median: 711

Sampling Method (No. of fish): VOB (2)

Comments:

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 7 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOB (7)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 6 Fish Measured: 6 Fork Lengths (mm) Min: 241 Max: 324 Mean: 285 Median: 282

Sampling Method (No. of fish): BEF (6)

Comments:

Species: round whitefish

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 358 Max: 358 Mean: 358 Median: 358

Sampling Method (No. of fish): BEF (1)

Comments:

**Instruments**

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** Orange Float

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root GPP 2.5

**Transparency:**



FSK1002B010014.jp



FSK1002B010015.jp



FSK1002B010016.jp



FSK1002B010017.jp



FSK1002B010019.jp



FSK1002B010020.jp



FSK1002B010022.jp



FSK1002B010023.jp

**Station Info**

Observers: Jonathan Kirsch, Daniel Reed

Date/Time: 08/05/2010 6:26 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.74326	-148.66785	<b>Coordinates</b>	67.74326	-149.66786	67.74612	-148.65800

Elevation NED (m)(ft): 917 3009

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-6

Legal Description (MTRS): F034N009W30

Waterbody Name: Geroe Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 8.08 DO (mg/L): 10.68 DO (%): Conductivity (µS/cm): 148 pH: 7.23

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.96 3.15

**Stream Channel**

Stream Gradient (%): 4.5 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 63 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	58.0	13.2	<b>Subdominant Substrate 1:</b> Boulder
<b>Thalweg Depth</b>	1.70	0.30	<b>Subdominant Substrate 2:</b> Gravel

Rosgen Class: B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Open Tall Willow Shrub	2	Open Tall Willow Shrub	2
5 - 10	Open Tall Willow Shrub	1.5	Open Tall Willow Shrub	2
10 - 20	Open Low Willow Shrub	0.5	Open Low Willow Shrub	0.5
20 - 30	Open Low Willow Shrub	0.5	Willow Dwarf Shrub Tundra	0.2

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

**Fish Observations**

No Fish Found

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1002C010019.jp



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**Station Info**

Observers: Jonathan Kirsch, Daniel Reed

Date/Time: 08/05/2010 7:11 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.72134	-149.00311	<b>Coordinates</b>	67.72134	-149.00311	/ 67.72030	-149.01057

Elevation NED (m)(ft): 763 2503

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-5

Legal Description (MTRS): F034N006W31

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 8.63	<b>DO (mg/L):</b> 11.25	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 422	<b>pH:</b> 8.07
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.00		<b>Thalweg Velocity (m/s)(ft/s):</b> 1.14 3.74	

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Entrenched

Catchment Area(sq. km): 64 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	38.0	7.2	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.80	0.26	<b>Subdominant Substrate 2:</b> Boulder

Rosgen Class: F4 Entrenched meandering riffle/pool channel on low gradients with high width/depth ratio.

**Riparian Vegetation Communities (Viereck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b>Left Bank Vegetation Type</b>	<b>Right Bank Vegetation Type</b>	
<b>0 - 5</b> Unvegetated	0 Unvegetated	0
<b>5 - 10</b> Open Low Willow Shrub	1 Willow Dwarf Shrub Tundra	0.2
<b>10 - 20</b> Willow Dwarf Shrub Tundra	0.2 Willow Dwarf Shrub Tundra	0.2
<b>20 - 30</b> Willow Dwarf Shrub Tundra	0.2 Willow Dwarf Shrub Tundra	0.2

**Key To Fish Sampling Methods**

Estimated reach length (m): 400

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

<b>Species:</b> slimy sculpin	<b>Life Stage:</b> adult	<b>Life History:</b> Resident
<b>Total Fish Count:</b> 6	<b>Fish Measured:</b> 6	<b>Fork Lengths (mm) Min:</b> 80
		<b>Max:</b> 96
		<b>Mean:</b> 90
		<b>Median:</b> 88
<b>Sampling Method (No. of fish):</b> PEF (6)		

Comments:

<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident
<b>Total Fish Count:</b> 12	<b>Fish Measured:</b> 2	<b>Fork Lengths (mm) Min:</b> 65
		<b>Max:</b> 65
		<b>Mean:</b> 65
		<b>Median:</b> 65
<b>Sampling Method (No. of fish):</b> PEF (2) VOG (10)		

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1002C020023.jp



FSK1002C020024.jp



FSK1002C020025.jp



**Station Info**

Observers: Jonathan Kirsch, Daniel Reed

Date/Time: 08/05/2010 7:27 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.65246	-148.92980	<b>Coordinates</b>	67.65246	-148.92980	/	67.65401 -148.93154

Elevation NED (m)(ft): 858 2815

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-4

Legal Description (MTRS): F033N006W28

Waterbody Name: Willow Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.08 DO (mg/L): 9.90 DO (%): Conductivity (µS/cm): 361 pH: 7.36

Water Color: Clear Turbidity (NTU): 0.08 Thalweg Velocity (m/s)(ft/s): 0.83 2.72

**Stream Channel**

Stream Gradient (%): 3 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 36 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	33.0	8.0	<b>Cobble</b>
<b>Thalweg Depth</b>	1.40	0.36	<b>Subdominant Substrate 1:</b>
			<b>Gravel</b>
			<b>Subdominant Substrate 2:</b>
			<b>Boulder</b>

Rosgen Class: B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Open Low Willow Shrub	0.5	Open Tall Willow Shrub	1.5
5 - 10	Closed Low Willow Shrub	0.5	Closed Low Willow Shrub	0.5
10 - 20	Closed Low Willow Shrub	0.5	Closed Low Willow Shrub	0.5
20 - 30	Bluejoint-Shrub	0.2	Bluejoint-Shrub	0.2

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

**Fish Observations**

No Fish Found

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1002C030029.jp



FSK1002C030030.jp



**Station Info****Observers:** Jonathan Kirsch, Daniel Reed**Date/Time:** 08/05/2010 7:43 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.56383	-149.08214	<b>Coordinates</b>	67.56383	-149.08214	/	67.56420 -149.08696

**Elevation NED (m)(ft):** 647 2123**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar C-5**Legal Description (MTRS):** F032N007W27**Waterbody Name:****Anadromous Waters Catalog Number:****Geographic Comments:** Unnamed tributary of Pheobe Creek.**Visit Comments:****Wildlife Comments:****Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 8.98	<b>DO (mg/L):</b> 10.50	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 244	<b>pH:</b> 7.58
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 1.08		<b>Thalweg Velocity (m/s)(ft/s):</b> 1.22 4.00	

**Stream Channel****Stream Gradient (%):** 1.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 55 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	31.0	6.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.50	0.26	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2.5	Open Low Willow Shrub	1
5 - 10	Closed Tall Willow Shrub	2.5	Willow Dwarf Shrub Tundra	0.5
10 - 20	Closed Tall Willow Shrub	2	Willow Dwarf Shrub Tundra	0.2
20 - 30	Closed Tall Willow Shrub	2	Willow Dwarf Shrub Tundra	0.2

**Key To Fish Sampling Methods****Estimated reach length (m):** 240

(PEF) Portable Electrofisher

**Fish Observations****Species:** slimy sculpin**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 3 **Fish Measured:** 3 **Fork Lengths (mm) Min:** 55 **Max:** 67 **Mean:** 62 **Median:** 61**Sampling Method (No. of fish):** PEF (3)**Comments:****Instruments****Stream Gradient:** handheld optical clinometer**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** handheld laser rangefinder**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



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FSK1002C040034.jp



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**Station Info**

Observers: Jonathan Kirsch, Daniel Reed

Date/Time: 08/05/2010 7:50 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.53103	-149.07788	<b>Coordinates</b>	67.53050	-149.07810	67.53123	-149.08029

Elevation NED (m)(ft): 641 2103

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-5

Legal Description (MTRS): F031N007W10

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 13.10 DO (mg/L): 9.24 DO (%): Conductivity (µS/cm): 140 pH: 7.48

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 1.77 5.81

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 104 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	16.0	7.0	<b>Gravel</b>
<b>Thalweg Depth</b>	2.00	1.00	<b>Subdominant Substrate 1:</b>
			<b>Sands</b>
			<b>Subdominant Substrate 2:</b>
			<b>Cobble</b>

Rosgen Class: E4 Low gradient, meandering riffle/pool stream with low width/depth ratio and little deposition. Very efficient and stable. High meander width ratio.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	3	Willow Dwarf Shrub Tundra	0.5
5 - 10	Willow Dwarf Shrub Tundra	0.5	Willow Dwarf Shrub Tundra	0.5
10 - 20	Willow Dwarf Shrub Tundra	0.5	Willow Dwarf Shrub Tundra	0.5
20 - 30	Willow Dwarf Shrub Tundra	0.5	Willow Dwarf Shrub Tundra	0.5

**Key To Fish Sampling Methods**

Estimated reach length (m): 260

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: burbot

Life Stage: juvenile

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 181 Max: 192 Mean: 186 Median: 186

Sampling Method (No. of fish): PEF (2)

Comments: Two burbot were kept as specimens (Tag ID: T000335, T000336) and fin clipped (Vial #: 156494, 156495).

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 21 Fish Measured: 1 Fork Lengths (mm) Min: 54 Max: 54 Mean: 54 Median: 54

Sampling Method (No. of fish): PEF (1) VOG (20)

Comments:

Species: slimy sculpin

Life Stage: juvenile

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 32 Max: 48 Mean: 38 Median: 40

Sampling Method (No. of fish): PEF (3)

Comments:

Species: round whitefish

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 16 Fish Measured: 1 Fork Lengths (mm) Min: 234 Max: 234 Mean: 234 Median: 234

Sampling Method (No. of fish): PEF (1) VOG (15)

Comments: One round whitefish was kept as a specimen (Tag ID: T000337) and fin clipped (Vial #: 156496).

**Instruments**

**Stream Gradient:** handheld optical clinometer  
**Stream Velocity:** transparent velocity head rod  
**Turbidity:** LaMotte 2020e turbidimeter  
**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod  
**Channel Widths:** handheld laser rangefinder  
**Electrofisher:** Smith-Root LR-24  
**Transparency:** secchi tube



FSK1002C050038.jp



FSK1002C050039.jp



FSK1002C050040.jp



**Station Info**

Observers: Joe Buckwalter, John Burr

Date/Time: 08/06/2010 10:46 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.85983	-148.06143	<b>Coordinates</b>	67.85983	-148.06143	/	67.84046 -148.01085

Elevation NED (m)(ft): 605 1985

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar D-3

Legal Description (MTRS): F035N002W17

Waterbody Name: Your Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 10.18 DO (mg/L): 11.12 DO (%): Conductivity (µS/cm): 321 pH: 7.80

Water Color: Glacial, Low Turbidit Turbidity (NTU): 5.90 Thalweg Velocity (m/s)(ft/s): 1.40 4.59

**Stream Channel**

Stream Gradient (%): 0.85 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): ##### Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	93.0	51.0	<b>Gravel</b>
<b>Thalweg Depth</b>	2.20	1.00	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Sands</b>

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	1.5	Open Black Spruce-White Spruce Forest	7.7
5 - 10	Closed Tall Willow Shrub	1.5	Open Black Spruce-White Spruce Forest	7.7
10 - 20	Closed Tall Willow Shrub	1.5	Open Black Spruce-White Spruce Forest	7.7
20 - 30	Closed Tall Willow Shrub	1.5	Open Black Spruce-White Spruce Forest	7.7

**Key To Fish Sampling Methods**

Estimated reach length (m): 5400 Total Electrofishing Time (s): 5063

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 345 Max: 382 Mean: 360 Median: 363

Sampling Method (No. of fish): BEF (3)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 72 Fish Measured: 29 Fork Lengths (mm) Min: 211 Max: 328 Mean: 275 Median: 269

Sampling Method (No. of fish): BEF (57) VOB (15)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 51 Max: 51 Mean: 51 Median: 51

Sampling Method (No. of fish): BEF (1)

Comments:

Species: longnose sucker

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 368 Max: 368 Mean: 368 Median: 368

Sampling Method (No. of fish): BEF (1)

Comments:

**Species:** longnose sucker                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 5    **Fish Measured:** 5    **Fork Lengths (mm)** **Min:** 281    **Max:** 327    **Mean:** 306    **Median:** 304  
**Sampling Method (No. of fish):** BEF (5)  
**Comments:**

**Species:** slimy sculpin                      **Life Stage:** adult                      **Life History:** Resident  
**Total Fish Count:** 2    **Fish Measured:** 2    **Fork Lengths (mm)** **Min:** 76    **Max:** 100    **Mean:** 88    **Median:** 88  
**Sampling Method (No. of fish):** BEF (2)  
**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 5    **Fish Measured:** 2    **Fork Lengths (mm)** **Min:** 64    **Max:** 66    **Mean:** 65    **Median:** 65  
**Sampling Method (No. of fish):** BEF (2) VOB (3)  
**Comments:**

**Species:** round whitefish                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 5    **Fish Measured:** 4    **Fork Lengths (mm)** **Min:** 246    **Max:** 306    **Mean:** 290    **Median:** 276  
**Sampling Method (No. of fish):** BEF (4) VOB (1)  
**Comments:**

**Species:** round whitefish                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 3    **Fish Measured:** 3    **Fork Lengths (mm)** **Min:** 55    **Max:** 187    **Mean:** 119    **Median:** 121  
**Sampling Method (No. of fish):** BEF (3)  
**Comments:**

**Instruments**

**Stream Gradient:** handheld optical clinometer                      **Channel Depths:** handheld sonar depth finder  
**Stream Velocity:** GPS Float                      **Channel Widths:** handheld laser rangefinder  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root GPP 2.5  
**Water Quality:** YSI 556                      **Transparency:**



FSK1003A010017.jp



FSK1003A010018.jp



FSK1003A010023.jp



**Station Info****Observers:** Ryan Snow, Joe Giefer**Date/Time:** 08/06/2010 1:01 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.03294	-148.41229	<b>Coordinates</b>	68.03294	-148.41229	/	67.99718 -148.34360

**Elevation NED (m)(ft):** 730 2395**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Philip Smith Mts A-3**Legal Description (MTRS):** U016S016E27**Waterbody Name:** Your Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Lots of riffles--poor visibility. Very low stream gradient. Had to drag the boat through extensive shallow riffles, which could not be sampled effectively and were therefore excluded from the subreach length.**Wildlife Comments:** Loon floating down the river.**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 9.14	<b>DO (mg/L):</b> 10.69	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 307	<b>pH:</b> 8.20
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 1.59		<b>Thalweg Velocity (m/s)(ft/s):</b> 1.05 3.44	

**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 459 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	160.0	18.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.20	0.88	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** D3 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Unvegetated	0	Closed Tall Scrub	1
5 - 10	Unvegetated	0	Closed Tall Scrub	1.2
10 - 20	Unvegetated	0	Closed Broadleaf Forest	1.5
20 - 30	Closed Low Willow Shrub	1	Closed Broadleaf Forest	5.5

**Key To Fish Sampling Methods****Estimated reach length (m):** 6300 **Total Electrofishing Time (s):** 2167

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

**Species:** Arctic grayling **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 2 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 334 **Max:** 334 **Mean:** 334 **Median:** 334  
**Sampling Method (No. of fish):** BEF (1) VOB (1)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 2 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 295 **Max:** 305 **Mean:** 300 **Median:** 300  
**Sampling Method (No. of fish):** BEF (2)

**Comments:**

**Species:** longnose sucker **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 305 **Max:** 305 **Mean:** 305 **Median:** 305  
**Sampling Method (No. of fish):** BEF (1)

**Comments:**

**Species:** round whitefish **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 309 **Max:** 309 **Mean:** 309 **Median:** 309  
**Sampling Method (No. of fish):** BEF (1)

**Comments:**

**Instruments**

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root GPP 2.5

**Transparency:**



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FSK1003B010025.jp



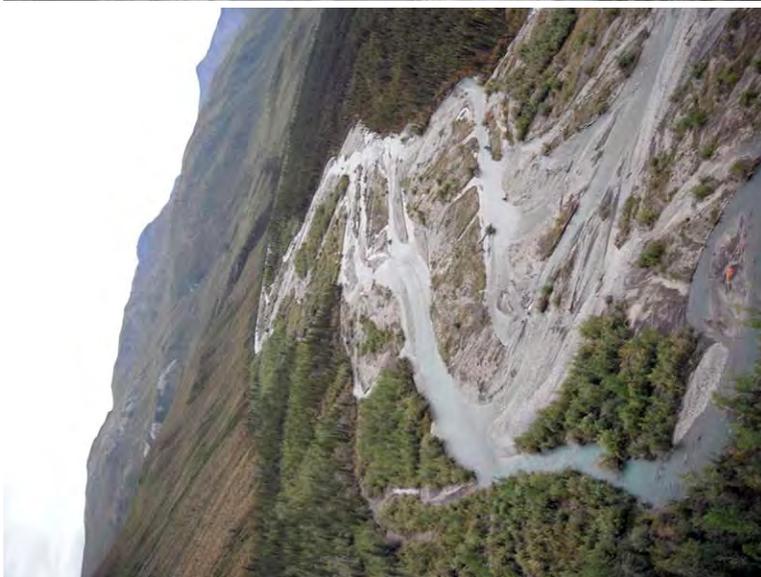
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FSK1003B010027.jp



FSK1003B010028.jp



FSK1003B010029.jp

**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/06/2010 7:48 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.03052	-149.69239	<b>Coordinates</b>	68.03083	-149.69137	/	68.02999 -149.69506

Elevation NED (m)(ft): 747 2451

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Philip Smith Mts A-5

Legal Description (MTRS): U016S011E30

Waterbody Name: Dietrich River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments: moved site off of trib (no habitat) and sampled mainstem

Wildlife Comments:

**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 6.50	<b>DO (mg/L):</b> 11.65	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 337	<b>pH:</b> 7.91
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.60		<b>Thalweg Velocity (m/s)(ft/s):</b> 1.40 4.59	

**Stream Channel**

Stream Gradient (%): 2.5 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 47 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	42.0	5.5	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.80	0.46	<b>Subdominant Substrate 2:</b> Boulder

Rosgen Class: B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Unvegetated	0	Open Low Willow Shrub	1
5 - 10	Open Black Spruce-White Spruce Forest	15	Open Black Spruce-White Spruce Forest	15
10 - 20	Open Black Spruce-White Spruce Forest	20	Open Black Spruce-White Spruce Forest	15
20 - 30	Open Black Spruce-White Spruce Forest	20	Open Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 220

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 17 Fish Measured: 2 Fork Lengths (mm) Min: 220 Max: 230 Mean: 225 Median: 225  
 Sampling Method (No. of fish): PEF (2) VOG (15)

Comments:

Species: Arctic grayling Life Stage: juvenile Life History: Resident  
 Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 91 Max: 150 Mean: 120 Median: 120  
 Sampling Method (No. of fish): PEF (2)

Comments:

Species: slimy sculpin Life Stage: adult Life History: Resident  
 Total Fish Count: 4 Fish Measured: 4 Fork Lengths (mm) Min: 85 Max: 97 Mean: 92 Median: 91  
 Sampling Method (No. of fish): PEF (4)

Comments:

**Instruments**

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



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FSK1003C010045.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/06/2010 8:06 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.18939	-148.50905	<b>Coordinates</b>	68.18944	-148.50888	/	68.18835 -148.51408

Elevation NED (m)(ft): 1075 3527

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Philip Smith Mts A-3

Legal Description (MTRS): U014S016E31

Waterbody Name: Your Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.96 DO (mg/L): 11.40 DO (%): Conductivity (µS/cm): 305 pH: 8.02

Water Color: Clear Turbidity (NTU): 0.25 Thalweg Velocity (m/s)(ft/s): 0.45 1.48

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 51 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	90.0	6.2	<b>Gravel</b>
<b>Thalweg Depth</b>	1.70	0.38	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Boulder</b>

Rosgen Class: D4 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Unvegetated	2	Open Low Willow Shrub	1
5 - 10	Closed Low Willow Shrub	2	Closed Low Willow Shrub	1
10 - 20	Closed Low Willow Shrub	2	Closed Low Willow Shrub	2
20 - 30	Closed Low Willow Shrub	2	Closed Low Willow Shrub	1

**Key To Fish Sampling Methods**

Estimated reach length (m): 248

(ANG) Angling

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 12 Fish Measured: 2 Fork Lengths (mm) Min: 190 Max: 210 Mean: 200 Median: 200

Sampling Method (No. of fish): ANG (2) VOG (10)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 5 Fish Measured: 5 Fork Lengths (mm) Min: 116 Max: 180 Mean: 142 Median: 148

Sampling Method (No. of fish): ANG (2) PEF (3)

Comments:

Species: round whitefish

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 245 Max: 245 Mean: 245 Median: 245

Sampling Method (No. of fish): PEF (1)

Comments:

**Instruments**

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

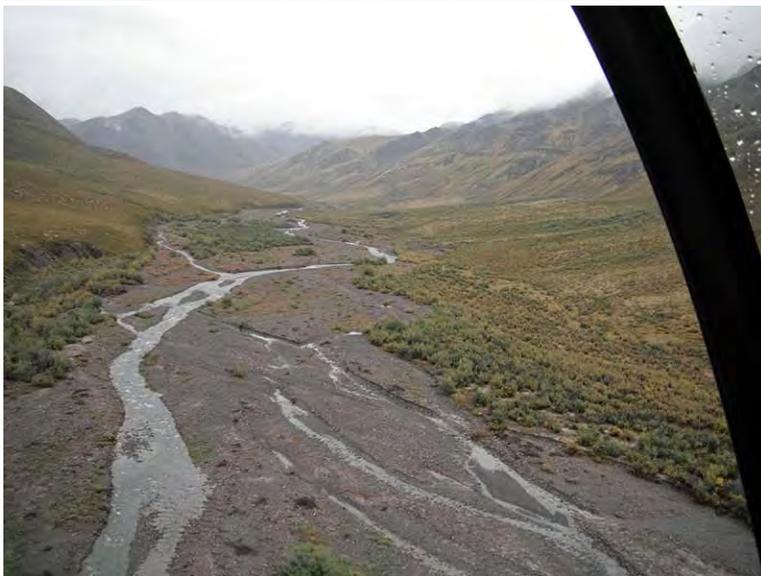
**Transparency:** secchi tube



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FSK1003C020050.jp



FSK1003C020051.jp

**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/06/2010 8:21 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.19308	-148.30869	<b>Coordinates</b>	68.19342	-148.30818	/	68.19141 -148.31015

Elevation NED (m)(ft): 1101 3612

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Philip Smith Mts A-3

Legal Description (MTRS): U014S017E31

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.26 DO (mg/L): 11.12 DO (%): Conductivity (µS/cm): 219 pH: 7.62

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.68 2.23

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 41 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	93.0	6.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.52	0.42	<b>Subdominant Substrate 2:</b> Boulder

Rosgen Class: D3 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open Low Willow Shrub	0.5	Closed Low Willow Shrub	1.5
5 - 10	Open Low Willow Shrub	2	Willow Dwarf Shrub Tundra	0.3
10 - 20	Willow Dwarf Shrub Tundra	2	Willow Dwarf Shrub Tundra	0.3
20 - 30	Willow Dwarf Shrub Tundra	2	Willow Dwarf Shrub Tundra	0.3

**Key To Fish Sampling Methods**

Estimated reach length (m): 240

(ANG) Angling

(PEF) Portable Electrofisher

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 210 Max: 230 Mean: 220 Median: 220

Sampling Method (No. of fish): ANG (2)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/06/2010 8:32 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.04568	-148.34546	<b>Coordinates</b>	68.04591	-148.34377	68.04502	-148.34876

Elevation NED (m)(ft): 794 2605

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Philip Smith Mts A-3

Legal Description (MTRS): U016S016E24

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.34 DO (mg/L): 10.82 DO (%): Conductivity (µS/cm): 352 pH: 7.96

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.49 1.61

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Entrenched

Catchment Area(sq. km): 105 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	60.0	8.0	<b>Cobble</b>
<b>Thalweg Depth</b>	1.50	0.31	<b>Subdominant Substrate 1:</b>
			<b>Boulder</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: D3 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open Tall Willow Shrub	3	Open Black Spruce-White Spruce Forest	15
5 - 10	Open Tall Willow Shrub	3	Open Black Spruce-White Spruce Forest	15
10 - 20	Open Tall Willow Shrub	3	Open Black Spruce-White Spruce Forest	15
20 - 30	Open Tall Willow Shrub	3	Closed Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 15 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (15)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

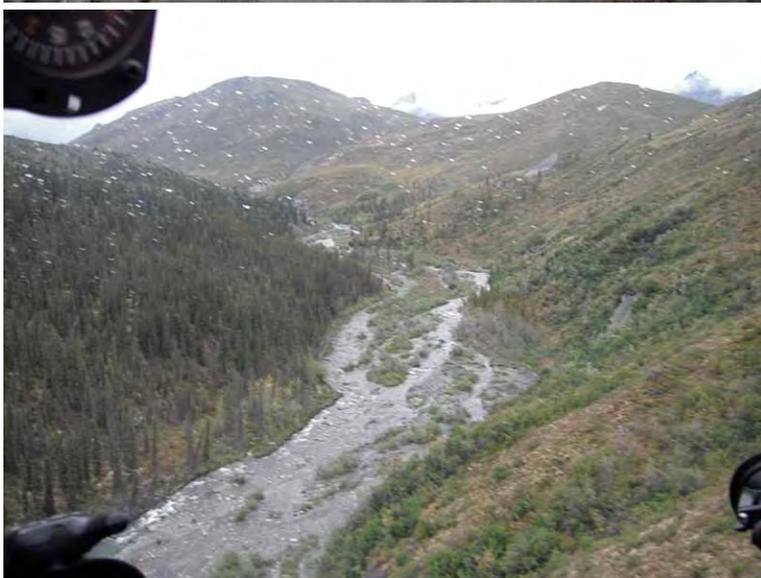
Transparency: secchi tube



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FSK1003C040061.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/06/2010 8:42 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.91454	-148.43934	<b>Coordinates</b>	67.91464	-148.43893	/	67.91346 -148.44107

Elevation NED (m)(ft): 656 2152

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar D-3

Legal Description (MTRS): F036N004W27

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 11.02 DO (mg/L): 9.26 DO (%): Conductivity (µS/cm): 434 pH: 7.59

Water Color: Clear Turbidity (NTU): 0.96 Thalweg Velocity (m/s)(ft/s): 0.45 1.48

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 60 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	15.0	4.0	<b>Cobble</b>
<b>Thalweg Depth</b>	1.12	0.50	<b>Subdominant Substrate 1:</b>
			<b>Gravel</b>
			<b>Subdominant Substrate 2:</b>
			<b>Sands</b>

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Unvegetated	0	Closed Low Willow Shrub	1.5
5 - 10	Open Low Willow Shrub	2	Closed Low Willow Shrub	1.5
10 - 20	Open Tall Willow Shrub	3	Closed Low Willow Shrub	1.5
20 - 30	Open Tall Willow Shrub	3	Open Black Spruce Forest	10

**Key To Fish Sampling Methods**

Estimated reach length (m): 160

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 10 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (10)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 95 Max: 95 Mean: 95 Median: 95

Sampling Method (No. of fish): PEF (1)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 2 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (2)

Comments:

## Instruments

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1003C050063.jp



FSK1003C050064.jp



FSK1003C050065.jp



**Station Info****Observers:** Joe Buckwalter, Daniel Reed**Date/Time:** 08/07/2010 11:37 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.62347	-149.77702	<b>Coordinates</b>	67.62272	-149.77774	67.57803	-149.81611

**Elevation NED (m)(ft):** 415 1362**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar C-6**Legal Description (MTRS):** F032N010W04**Waterbody Name:** Middle Fork Koyukuk River**Anadromous Waters Catalog Number:****Geographic Comments:** First single channel below Bettles River confluence.**Visit Comments:** Dan saw a suspected Chinook salmon adult from the helicopter downstream of the reach.**Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 10.67 **DO (mg/L):** 10.57 **DO (%):** **Conductivity (µS/cm):** 435 **pH:** 7.78**Water Color:** Muddy **Turbidity (NTU):** 10.70 **Thalweg Velocity (m/s)(ft/s):** 1.70 5.58**Stream Channel****Stream Gradient (%):** 1.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** ##### **Embeddedness:** Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	190.0	38.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	2.70	1.50	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** D3 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from Bank (m)</b>	<b>Left Bank Vegetation Type</b>	<b>Canopy Height(m)</b>	<b>Right Bank Vegetation Type</b>	<b>Canopy Height(m)</b>
0 - 5	Closed Tall Alder-Willow Shrub	4	Closed Tall Alder-Willow Shrub	9
5 - 10	Closed Tall Alder-Willow Shrub	4	Closed Tall Alder-Willow Shrub	9
10 - 20	Closed Tall Alder-Willow Shrub	4	Closed Balsam Poplar-White Spruce Forest	9
20 - 30	Open Black Spruce-White Spruce Forest	7	Closed Balsam Poplar-White Spruce Forest	9

**Key To Fish Sampling Methods****Estimated reach length (m):** 6400 **Total Electrofishing Time (s):** 5383

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations****Species:** burbot**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 2 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:****Sampling Method (No. of fish):** VOB (2)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 2 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 215 **Max:** 215 **Mean:** 215 **Median:** 215**Sampling Method (No. of fish):** BEF (1) VOB (1)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 109 **Max:** 109 **Mean:** 109 **Median:** 109**Sampling Method (No. of fish):** BEF (1)**Comments:****Species:** longnose sucker**Life Stage:** adult**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:****Sampling Method (No. of fish):** VOB (1)**Comments:** ~ 400mm

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<b>Species:</b> longnose sucker	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 2	<b>Fish Measured:</b> 2	<b>Fork Lengths (mm) Min:</b> 204	<b>Max:</b> 322	<b>Mean:</b> 263	<b>Median:</b> 263	
<b>Sampling Method (No. of fish):</b> BEF (1) VOB (1)						
<b>Comments:</b>						
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 19	<b>Fish Measured:</b> 6	<b>Fork Lengths (mm) Min:</b> 53	<b>Max:</b> 68	<b>Mean:</b> 61	<b>Median:</b> 60	
<b>Sampling Method (No. of fish):</b> BEF (6) VOB (13)						
<b>Comments:</b>						
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 2	<b>Fish Measured:</b> 2	<b>Fork Lengths (mm) Min:</b> 37	<b>Max:</b> 39	<b>Mean:</b> 38	<b>Median:</b> 38	
<b>Sampling Method (No. of fish):</b> BEF (2)						
<b>Comments:</b>						
<b>Species:</b> general fish observation, no s	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Unknown				
<b>Total Fish Count:</b> 4	<b>Fish Measured:</b>	<b>Fork Lengths (mm) Min:</b>	<b>Max:</b>	<b>Mean:</b>	<b>Median:</b>	
<b>Sampling Method (No. of fish):</b> VOB (4)						
<b>Comments:</b>						

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### Instruments

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> handheld sonar depth finder
<b>Stream Velocity:</b> GPS Float	<b>Channel Widths:</b> handheld laser rangefinder
<b>Turbidity:</b> LaMotte 2020e turbidimeter	<b>Electrofischer:</b> Smith-Root GPP 2.5
<b>Water Quality:</b> YSI 556	<b>Transparency:</b>



FSK1004A010025.jp



FSK1004A010026.jp



FSK1004A010027.jp



FSK1004A010028.jp



FSK1004A010029.jp



FSK1004A010030.jp

**Station Info****Observers:** Ryan Snow, Joe Giefer**Date/Time:** 08/07/2010 9:50 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.92405	-149.83267	<b>Coordinates</b>	67.92405	-149.83267	/	67.85460 -149.83302

**Elevation NED (m)(ft):** 585 1919**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar D-6**Legal Description (MTRS):** F036N010W21**Waterbody Name:** Dietrich River**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Wide extremely braided channel. Very low stream gradient.**Wildlife Comments:** Small moose tracks were seen.**Water Quality \ Stream Flow****Water Temp (C):** 6.96 **DO (mg/L):** 11.47 **DO (%):** **Conductivity (µS/cm):** 430 **pH:** 8.80**Water Color:** Clear **Turbidity (NTU):** 14.20 **Thalweg Velocity (m/s)(ft/s):** 1.80 5.90**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 467 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	245.0	27.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.83	0.65	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** D4 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b>Left Bank Vegetation Type</b>	<b>Right Bank Vegetation Type</b>	
<b>0 - 5</b> Unvegetated	0 Unvegetated	0
<b>5 - 10</b> Closed Tall Scrub	9 Unvegetated	0
<b>10 - 20</b> Closed Black Spruce-White Spruce Forest	21 Unvegetated	0
<b>20 - 30</b> Closed Black Spruce-White Spruce Forest	21 Unvegetated	0

**Key To Fish Sampling Methods****Estimated reach length (m):** 8200 **Total Electrofishing Time (s):** 3110

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations****Species:** Arctic grayling**Life Stage:** adult**Life History:** Resident**Total Fish Count:** 4 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:****Sampling Method (No. of fish):** VOB (4)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 2 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 195 **Max:** 196 **Mean:** 195 **Median:** 195**Sampling Method (No. of fish):** BEF (2)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 2 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 185 **Max:** 188 **Mean:** 186 **Median:** 186**Sampling Method (No. of fish):** BEF (2)**Comments:****Species:** slimy sculpin**Life Stage:** adult**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:****Sampling Method (No. of fish):** VOB (1)**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 1      **Fish Measured:** 1      **Fork Lengths (mm) Min:** 61      **Max:** 61      **Mean:** 61      **Median:** 61  
**Sampling Method (No. of fish):** BEF (1)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer

**Channel Depths:** graduated wading rod

**Stream Velocity:** GPS Float

**Channel Widths:** handheld laser rangefinder

**Turbidity:** LaMotte 2020e turbidimeter

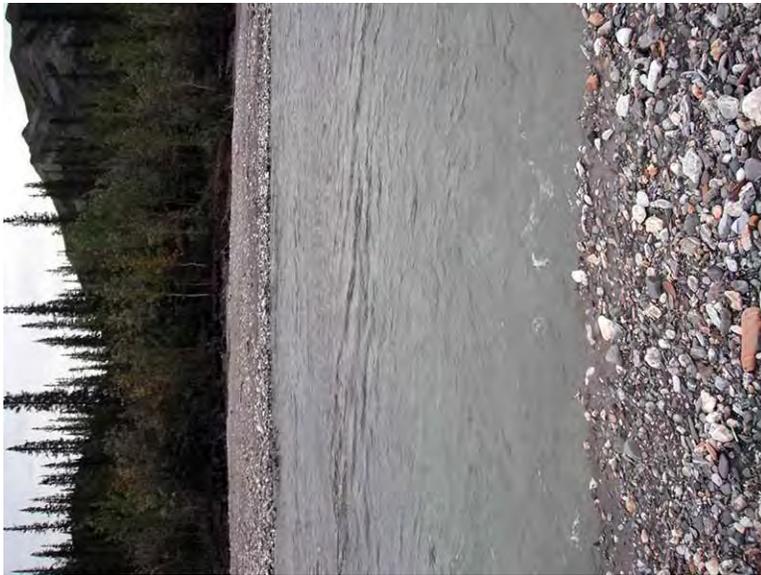
**Electrofisher:** Smith-Root GPP 2.5

**Water Quality:** YSI 556

**Transparency:**



FSK1004B010031.jp



FSK1004B010032.jp



FSK1004B010033.jp



FSK1004B010035.jp



FSK1004B010036.jp

**Station Info****Observers:** Jonathan Kirsch, Mary Simmering**Date/Time:** 08/07/2010 8:45 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.46298	-150.28587	<b>Coordinates</b>	67.46297	-150.28639	67.46256	-150.28184

**Elevation NED (m)(ft):** 508 1667**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman B-1**Legal Description (MTRS):** F031N012W32**Waterbody Name:** Wiseman Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:****Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 6.61 **DO (mg/L):** 9.72 **DO (%):** **Conductivity (µS/cm):** 354 **pH:** 6.59**Water Color:** Clear **Turbidity (NTU):** 4.92 **Thalweg Velocity (m/s)(ft/s):** 0.71 2.33**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 56 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	32.0	6.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.40	0.26	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b><u>Left Bank Vegetation Type</u></b>	<b><u>Right Bank Vegetation Type</u></b>	
<b>0 - 5</b> Open Low Willow Shrub	1.5 Closed Low Willow Shrub	2
<b>5 - 10</b> Open Low Willow Shrub	1.5 Closed Low Willow Shrub	2
<b>10 - 20</b> Open Black Spruce-White Spruce Forest	5 Closed Low Willow Shrub	2
<b>20 - 30</b> Open Black Spruce-White Spruce Forest	5 Closed Low Willow Shrub	2

**Key To Fish Sampling Methods****Estimated reach length (m):** 240

(PEF) Portable Electrofisher

**Fish Observations**

No Fish Found

**Instruments****Stream Gradient:** handheld abney level**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** handheld laser rangefinder**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



FSK1004C010068.jp



FSK1004C010069.jp



FSK1004C010070.jp



FSK1004C010071.jp

**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/07/2010 8:53 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.58726	-150.54374	<b>Coordinates</b>	67.58726	-150.54484	/ 67.58617	-150.54106

Elevation NED (m)(ft): 552 1811

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman C-2

Legal Description (MTRS): F032N013W19

Waterbody Name: Swede Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 5.82 DO (mg/L): 12.40 DO (%): Conductivity (µS/cm): 467 pH: 8.12

Water Color: Clear Turbidity (NTU): 2.93 Thalweg Velocity (m/s)(ft/s): 0.74 2.43

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Entrenched

Catchment Area(sq. km): 50 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	18.0	5.5	<b>Gravel</b>
<b>Thalweg Depth</b>	1.70	0.40	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Boulder</b>

Rosgen Class: F4 Entrenched meandering riffle/pool channel on low gradients with high width/depth ratio.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open Tall Willow Shrub	1.5	Open Low Willow Shrub	1
5 - 10	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
10 - 20	Open Black Spruce-White Spruce Forest	4	Open Black Spruce-White Spruce Forest	3
20 - 30	Open Black Spruce-White Spruce Forest	4	Open Black Spruce-White Spruce Forest	3

**Key To Fish Sampling Methods**

Estimated reach length (m): 220

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 5 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (5)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 152 Max: 165 Mean: 158 Median: 158

Sampling Method (No. of fish): PEF (3)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1004C020073.jp



FSK1004C020074.jp



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**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/07/2010 9:02 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.61673	-150.38183	<b>Coordinates</b>	67.61630	-150.38183	/	67.61597 -150.38670

Elevation NED (m)(ft): 441 1447

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman C-1

Legal Description (MTRS): F032N013W11

Waterbody Name: Sleepy Creek

Anadromous Waters Catalog Number:

Geographic Comments: The stream braids out a bit below the original sample site and flows randomly through a spruce forest. Because of this, we sampled below the braids near the confluence with Glacier Creek.

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.72 DO (mg/L): 10.28 DO (%): Conductivity (µS/cm): 956 pH: 7.23

Water Color: Clear Turbidity (NTU): 0.98 Thalweg Velocity (m/s)(ft/s): 0.64 2.10

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 53 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>	Gravel
<b>Width</b>	17.0	6.2	<b>Subdominant Substrate 1:</b>	Sands
<b>Thalweg Depth</b>	2.00	0.44	<b>Subdominant Substrate 2:</b>	Silt/Sand

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	1	Closed Low Willow Shrub	1
5 - 10	Open Black Spruce-White Spruce Forest	4	Closed Low Willow Shrub	1.5
10 - 20	Open Black Spruce-White Spruce Forest	15	Closed Low Willow Shrub	1.5
20 - 30	Open Black Spruce-White Spruce Forest	20	Closed Low Willow Shrub	1.5

**Key To Fish Sampling Methods**

Estimated reach length (m): 248

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling Life Stage: juvenile Life History: Resident  
 Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 102 Max: 102 Mean: 102 Median: 102  
 Sampling Method (No. of fish): PEF (1)  
 Comments:

Species: slimy sculpin Life Stage: adult Life History: Resident  
 Total Fish Count: 4 Fish Measured: 4 Fork Lengths (mm) Min: 71 Max: 103 Mean: 86 Median: 87  
 Sampling Method (No. of fish): PEF (4)  
 Comments:

Species: slimy sculpin Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 13 Fish Measured: 3 Fork Lengths (mm) Min: 59 Max: 62 Mean: 60 Median: 60  
 Sampling Method (No. of fish): PEF (3) VOG (10)  
 Comments:

Species: slimy sculpin Life Stage: juvenile Life History: Resident  
 Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 28 Max: 28 Mean: 28 Median: 28  
 Sampling Method (No. of fish): PEF (1)  
 Comments:

## Instruments

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1004C030078.jp



FSK1004C030079.jp



FSK1004C030080.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/07/2010 9:15 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.11092	-151.07728	<b>Coordinates</b>	67.11069	-151.08128	/	67.11092 -151.07728

Elevation NED (m)(ft): 288 945

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman A-3

Legal Description (MTRS): F026N016W04

Waterbody Name: Florence Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.97 DO (mg/L): 11.54 DO (%): Conductivity (µS/cm): 55 pH: 6.66

Water Color: Clear Turbidity (NTU): 0.91 Thalweg Velocity (m/s)(ft/s): 0.53 1.74

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 79 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	13.0	8.0	<b>Subdominant Substrate 1:</b> Sands
<b>Thalweg Depth</b>	0.64	0.34	<b>Subdominant Substrate 2:</b> Silt/Sand

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	3	Closed White Spruce Forest	3
5 - 10	Closed Black Spruce-White Spruce Forest	15	Closed Black Spruce-White Spruce Forest	15
10 - 20	Closed Black Spruce-White Spruce Forest	15	Closed Black Spruce-White Spruce Forest	15
20 - 30	Closed Black Spruce-White Spruce Forest	20	Closed Black Spruce-White Spruce Forest	20

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(ANG) Angling

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Dolly Varden

Life Stage: juvenile/adult

Life History: Unknown

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 140 Max: 140 Mean: 140 Median: 140

Sampling Method (No. of fish): PEF (1)

Comments:

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 360 Max: 380 Mean: 366 Median: 370

Sampling Method (No. of fish): ANG (2) PEF (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 4 Fish Measured: 4 Fork Lengths (mm) Min: 225 Max: 300 Mean: 263 Median: 262

Sampling Method (No. of fish): ANG (4)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 6 Fish Measured: 6 Fork Lengths (mm) Min: 75 Max: 95 Mean: 84 Median: 85

Sampling Method (No. of fish): PEF (6)

Comments:

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 14    **Fish Measured:** 2    **Fork Lengths (mm) Min:** 53    **Max:** 59    **Mean:** 56    **Median:** 56  
**Sampling Method (No. of fish):** PEF (2) VOG (12)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld abney level

**Channel Depths:** graduated wading rod

**Stream Velocity:** transparent velocity head rod

**Channel Widths:** handheld laser rangefinder

**Turbidity:** LaMotte 2020e turbidimeter

**Electrofisher:** Smith-Root LR-24

**Water Quality:** YSI 556

**Transparency:** secchi tube



FSK1004C040083.jp



FSK1004C040084.jp



FSK1004C040085.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/07/2010 9:27 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.18931	-150.40849	<b>Coordinates</b>	67.18931	-150.40849	/	67.18866 -150.40322

Elevation NED (m)(ft): 349 1145

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman A-1

Legal Description (MTRS): F027N013W04

Waterbody Name: Twelvemile Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.08 DO (mg/L): 13.30 DO (%): Conductivity (µS/cm): 58 pH: 7.21

Water Color: Clear Turbidity (NTU): 6.58 Thalweg Velocity (m/s)(ft/s): 0.53 1.74

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 63 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	33.0	8.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.60	0.60	<b>Subdominant Substrate 2:</b> Sands

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open Low Willow Shrub	1.5	Closed Tall Willow Shrub	2
5 - 10	Closed Tall Willow Shrub	3	Closed Tall Willow Shrub	3
10 - 20	Closed Black Spruce-White Spruce Forest	9	Closed Tall Willow Shrub	3
20 - 30	Closed Black Spruce-White Spruce Forest	20	Open Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 70 Max: 70 Mean: 70 Median: 70

Sampling Method (No. of fish): PEF (1)

Comments:

Species: longnose sucker

Life Stage: adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 380 Max: 420 Mean: 400 Median: 400

Sampling Method (No. of fish): PEF (2)

Comments:

Species: Chinook salmon

Life Stage: juvenile

Life History: Anadromous

Total Fish Count: 7 Fish Measured: 7 Fork Lengths (mm) Min: 63 Max: 73 Mean: 70 Median: 68

Sampling Method (No. of fish): PEF (7)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 6 Fish Measured: 6 Fork Lengths (mm) Min: 71 Max: 92 Mean: 82 Median: 81

Sampling Method (No. of fish): PEF (6)

Comments:

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 8      **Fish Measured:** 8      **Fork Lengths (mm) Min:** 52      **Max:** 68      **Mean:** 60      **Median:** 60  
**Sampling Method (No. of fish):** PEF (8)  
**Comments:**

---

### Instruments

**Stream Gradient:** handheld abney level                      **Channel Depths:** graduated wading rod  
**Stream Velocity:** transparent velocity head rod                      **Channel Widths:** handheld laser rangefinder  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root LR-24  
**Water Quality:** YSI 556                      **Transparency:** secchi tube



FSK1004C050088.jp



FSK1004C050089.jp



FSK1004C050091.jp

FSK1004C050092.jp



FSK1004C050093.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time:

Station	Latitude	Longitude	Sample	Latitude	Longitude
Coordinates	67.03246	-151.32549	Coordinates	67.03246	-151.32549

Elevation NED (m)(ft):

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman A-3

Legal Description (MTRS): F026N017W32

Waterbody Name: Mud Creek

Anadromous Waters Catalog Number:

Geographic Comments: slow, muddy, often stagnant stream with very low likelihood for anadromy; did not land.

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C):	DO (mg/L):	DO (%):	Conductivity (µS/cm):	pH:
Water Color:	Turbidity (NTU):	Thalweg Velocity (m/s)(ft/s):		

**Stream Channel**

Stream Gradient (%):

Entrenchment:

Catchment Area(sq. km):

Embeddedness:

Channel Dimensions (m): Bank Full Wetted

Dominant Substrate:

Width

Subdominant Substrate 1:

Thalweg Depth

Subdominant Substrate 2:

Rosgen Class:

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5				
5 - 10				
10 - 20				
20 - 30				

**Key To Fish Sampling Methods**

(NON) None

**Fish Observations**

Species: no collection effort

Life Stage: not applicable

Life History: Not Applicable

Total Fish Count: 0

Fish Measured:

Fork Lengths (mm) Min:

Max:

Mean:

Median:

Sampling Method (No. of fish): NON (0)

Comments:

**Instruments**

Stream Gradient:

Channel Depths: graduated wading rod

Stream Velocity:

Channel Widths: measuring tape

Turbidity:

Electrofischer:

Water Quality:

Transparency:

**Station Info****Observers:** Joe Buckwalter, Daniel Reed**Date/Time:** 08/08/2010 10:37 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.18689	-148.85856	<b>Coordinates</b>	67.18689	-148.85856	/	67.18859 -148.82855

**Elevation NED (m)(ft):** 477 1565**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar A-4**Legal Description (MTRS):** F027N006W10**Waterbody Name:** West Fork Chandalar River**Anadromous Waters Catalog Number:** 334-40-11000-2925-3350-4391**Geographic Comments:****Visit Comments:** D.O. reading incorrect--wrong barometric pressure entered at calibration.**Wildlife Comments:** Peregrine nest on left-bank bluff near downstream end of reach. One agitated adult flying and one fledgling on ground (photo 38).**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 10.72	<b>DO (mg/L):</b>	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 55	<b>pH:</b> 7.03
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.28		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.85 2.79	

**Stream Channel****Stream Gradient (%):** 1.25 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 579 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	91.0	13.0	<b>Subdominant Substrate 1:</b> Boulder
<b>Thalweg Depth</b>	2.40	0.80	<b>Subdominant Substrate 2:</b> Gravel

**Rosgen Class:** C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	1.5	Closed Tall Willow Shrub	3
5 - 10	Open White Spruce Forest	9	Open White Spruce Forest	10
10 - 20	Open White Spruce Forest	9	Open White Spruce Forest	10
20 - 30	Open White Spruce Forest	9	Open White Spruce Forest	10

**Key To Fish Sampling Methods****Estimated reach length (m):** 2300 **Total Electrofishing Time (s):** 2120

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

**Species:** Arctic grayling **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 1 **Fish Measured:** **Fork Lengths (mm) Min: Max: Mean: Median:**  
**Sampling Method (No. of fish):** VOB (1)  
**Comments:** ~380mm

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 2 **Fish Measured:** 2 **Fork Lengths (mm) Min: 57 Max: 62 Mean: 59 Median: 59**  
**Sampling Method (No. of fish):** BEF (2)  
**Comments:**

**Species:** salmonid-unspecified **Life Stage:** adult **Life History:** Unknown  
**Total Fish Count:** 1 **Fish Measured:** **Fork Lengths (mm) Min: Max: Mean: Median:**  
**Sampling Method (No. of fish):** VOB (1)  
**Comments:** Probably grayling

**Species:** Chinook salmon **Life Stage:** juvenile **Life History:** Anadromous  
**Total Fish Count:** 12 **Fish Measured:** 8 **Fork Lengths (mm) Min: 71 Max: 79 Mean: 75 Median: 75**  
**Sampling Method (No. of fish):** BEF (8) VOB (4)  
**Comments:**

-continued-

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 4      **Fish Measured:**      **Fork Lengths (mm) Min:**      **Max:**      **Mean:**      **Median:**  
**Sampling Method (No. of fish):** VOB (4)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer

**Channel Depths:** graduated wading rod

**Stream Velocity:** transparent velocity head rod

**Channel Widths:** handheld laser rangefinder

**Turbidity:** LaMotte 2020e turbidimeter

**Electrofisher:** Smith-Root GPP 2.5

**Water Quality:** YSI 556

**Transparency:**



FSK1005A010031.jp



FSK1005A010032.jp



FSK1005A010036.jp



FSK1005A010039.jp



FSK1005A010040.jp

**Station Info****Observers:** Ryan Snow, Joe Giefer**Date/Time:** 08/08/2010 10:42 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.13761	-149.05398	<b>Coordinates</b>	67.13761	-149.05398	/	67.16739 -149.04066

**Elevation NED (m)(ft):** 554 1818**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar A-5**Legal Description (MTRS):** F027N007W27**Waterbody Name:****Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Primary substrate changed throughout the reach. Areas of primary substrate were Cobble areas, gravel areas and sand areas. Most fish were caught in low velocity areas with fine substrates. Very low stream gradient.**Wildlife Comments:** mergansers present**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 9.83	<b>DO (mg/L):</b> 10.74	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 51	<b>pH:</b> 7.03
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 1.12		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.68 2.23	

**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 309 **Embeddedness:** Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	72.0	16.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.26	0.48	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Viereck et al. 1992)**

<b>Dist. from Bank (m)</b>	<b>Left Bank Vegetation Type</b>	<b>Canopy Height(m)</b>	<b>Right Bank Vegetation Type</b>	<b>Canopy Height(m)</b>
0 - 5	Closed Tall Shrub Birch-Willow Shrub	2.5	Unvegetated	0
5 - 10	Closed Tall Shrub Birch-Willow Shrub	2.5	Unvegetated	0
10 - 20	Closed Tall Shrub Birch-Willow Shrub	2.5	Unvegetated	0
20 - 30	Closed Black Spruce-White Spruce Forest	17	Unvegetated	0

**Key To Fish Sampling Methods****Estimated reach length (m):** 4900 **Total Electrofishing Time (s):** 3385

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

**Species:** Arctic grayling **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 30 **Fish Measured:** 18 **Fork Lengths (mm) Min:** 332 **Max:** 390 **Mean:** 363 **Median:** 361  
**Sampling Method (No. of fish):** BEF (21) VOB (9)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 4 **Fish Measured:** 4 **Fork Lengths (mm) Min:** 250 **Max:** 314 **Mean:** 286 **Median:** 282  
**Sampling Method (No. of fish):** BEF (4)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 3 **Fish Measured:** 3 **Fork Lengths (mm) Min:** 69 **Max:** 125 **Mean:** 91 **Median:** 97  
**Sampling Method (No. of fish):** BEF (3)

**Comments:**

**Species:** Chinook salmon                      **Life Stage:** juvenile                      **Life History:** Anadromous  
**Total Fish Count:** 4      **Fish Measured:** 4      **Fork Lengths (mm) Min:** 67      **Max:** 80      **Mean:** 71      **Median:** 73  
**Sampling Method (No. of fish):** BEF (4)  
**Comments:**

**Species:** slimy sculpin                      **Life Stage:** adult                      **Life History:** Resident  
**Total Fish Count:** 1      **Fish Measured:**      **Fork Lengths (mm) Min:**      **Max:**      **Mean:**      **Median:**  
**Sampling Method (No. of fish):** VOB (1)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer                      **Channel Depths:** graduated wading rod  
**Stream Velocity:** transparent velocity head rod                      **Channel Widths:** handheld laser rangefinder  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root GPP 2.5  
**Water Quality:** YSI 556                      **Transparency:**



FSK1005B010037.jp



FSK1005B010039.jp



FSK1005B010042.jp



FSK1005B010043.jp

**Station Info****Observers:** Jonathan Kirsch, Mary Simmering**Date/Time:** 08/08/2010 6:50 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.15775	-151.84205	<b>Coordinates</b>	68.15804	-151.84265	68.15746	-151.83895

**Elevation NED (m)(ft):** 764 2507**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandler Lake A-4**Legal Description (MTRS):** U015S001E11**Waterbody Name:** Contact Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:****Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 5.39 **DO (mg/L):** 13.75 **DO (%):** **Conductivity (µS/cm):** 129 **pH:** 7.61**Water Color:** Clear **Turbidity (NTU):** 0.00 **Thalweg Velocity (m/s)(ft/s):** 1.20 3.94**Stream Channel****Stream Gradient (%):** 1.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 58 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	26.0	6.2	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.20	0.58	<b>Subdominant Substrate 2:</b> Boulder

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b>Left Bank Vegetation Type</b>	<b>Right Bank Vegetation Type</b>	
<b>0 - 5</b> Closed Low Willow Shrub	1 Open Low Willow Shrub	0.5
<b>5 - 10</b> Dry Graminoid Herbaceous	0.2 Open Low Willow Shrub	0.5
<b>10 - 20</b> Dry Graminoid Herbaceous	0.2 Open Low Willow Shrub	0.5
<b>20 - 30</b> Dry Graminoid Herbaceous	0.2 Open Low Willow Shrub	0.5

**Key To Fish Sampling Methods****Estimated reach length (m):** 248

(PEF) Portable Electrofisher

**Fish Observations**

No Fish Found

**Instruments****Stream Gradient:** handheld abney level**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** handheld laser rangefinder**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



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**Station Info****Observers:** Jonathan Kirsch, Mary Simmering**Date/Time:** 08/08/2010 7:10 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.12602	-151.74896	<b>Coordinates</b>	68.12598	-151.74861	68.12579	-151.75460

**Elevation NED (m)(ft):** 631 2070**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandler Lake A-3**Legal Description (MTRS):** U015S002E19**Waterbody Name:** Inukpasugruk Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:****Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 7.84 **DO (mg/L):** 11.55 **DO (%):** **Conductivity (µS/cm):** 208 **pH:** 7.83**Water Color:** Clear **Turbidity (NTU):** 0.31 **Thalweg Velocity (m/s)(ft/s):** 1.09 3.58**Stream Channel****Stream Gradient (%):** 1 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 120 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	44.0	6.8	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	0.65	0.50	<b>Subdominant Substrate 2:</b> Boulder

**Rosgen Class:** D3 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b>Left Bank Vegetation Type</b>	<b>Right Bank Vegetation Type</b>	
<b>0 - 5</b> Unvegetated	0	Open Tall Willow Shrub
<b>5 - 10</b> Closed Tall Willow Shrub	3	Open Tall Willow Shrub
<b>10 - 20</b> Closed Tall Willow Shrub	3	Open Tall Willow Shrub
<b>20 - 30</b> Closed Tall Willow Shrub	3	Open Tall Willow Shrub

**Key To Fish Sampling Methods****Estimated reach length (m):** 272

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations****Species:** slimy sculpin**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 2 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 52 **Max:** 52 **Mean:** 52 **Median:** 52**Sampling Method (No. of fish):** PEF (1) VOG (1)**Comments:****Instruments****Stream Gradient:** handheld abney level**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** handheld laser rangefinder**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



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FSK1005C020101.jp



FSK1005C020102.jp



FSK1005C020103.jp

**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/08/2010 7:27 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.03561	-152.24389	<b>Coordinates</b>	68.03532	-152.24447	68.03647	-152.23954

Elevation NED (m)(ft): 641 2103

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandler Lake A-4

Legal Description (MTRS): U016S002W24

Waterbody Name: Ekokpuk Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.66 DO (mg/L): 10.46 DO (%): Conductivity (µS/cm): 162 pH: 7.55

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.68 2.23

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 242 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	30.0	13.2	<b>Gravel</b>
<b>Thalweg Depth</b>	2.20	0.95	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Boulder</b>

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Unvegetated	0	Closed Low Willow Shrub	0.2
5 - 10	Closed Low Willow Shrub	0.2	Closed Low Willow Shrub	0.2
10 - 20	Closed Low Willow Shrub	0.2	Graminoid Herbaceous	0.1
20 - 30	Graminoid Herbaceous	0.1	Graminoid Herbaceous	0.1

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 514 Fish Measured: 14 Fork Lengths (mm) Min: 29 Max: 43 Mean: 36 Median: 36

Sampling Method (No. of fish): PEF (14) VOG (500)

Comments:

Species: longnose sucker

Life Stage: adult

Life History: Resident

Total Fish Count: 15 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (15)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1005C030106.jp



FSK1005C030107.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/08/2010 7:45 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.38799	-151.92808	<b>Coordinates</b>	67.38799	-151.92808	67.38736	-151.93248

Elevation NED (m)(ft): 342 1122

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman B-4

Legal Description (MTRS): F030N020W36

Waterbody Name: McCamant Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.83 DO (mg/L): 10.28 DO (%): Conductivity (µS/cm): 183 pH: 8.04

Water Color: Clear Turbidity (NTU): 9.15 Thalweg Velocity (m/s)(ft/s): 0.34 1.12

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 63 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	33.0	6.4	<b>Gravel</b>
<b>Thalweg Depth</b>	1.30	0.38	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Boulder</b>

Rosgen Class: B4 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Unvegetated	0	Open Black Spruce-White Spruce Forest	20
5 - 10	Open Low Willow Shrub	1	Closed Black Spruce-White Spruce Forest	20
10 - 20	Closed Black Spruce-White Spruce Forest	15	Closed Black Spruce-White Spruce Forest	20
20 - 30	Closed Black Spruce-White Spruce Forest	15	Closed Black Spruce-White Spruce Forest	20

**Key To Fish Sampling Methods**

Estimated reach length (m): 256

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 1 Fork Lengths (mm) Min: 195 Max: 195 Mean: 195 Median: 195

Sampling Method (No. of fish): PEF (1) VOG (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 150 Max: 150 Mean: 150 Median: 150

Sampling Method (No. of fish): PEF (1)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1005C040111.jp



FSK1005C040114.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/08/2010 8:00 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.35688	-151.89680	<b>Coordinates</b>	67.35688	-151.89680	/	67.35775 -151.89992

Elevation NED (m)(ft): 386 1266

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman B-4

Legal Description (MTRS): F029N019W07

Waterbody Name: Crevice Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 8.54 DO (mg/L): 10.43 DO (%): Conductivity (µS/cm): 270 pH: 7.42

Water Color: Clear Turbidity (NTU): 0.65 Thalweg Velocity (m/s)(ft/s): 0.88 2.89

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Entrenched

Catchment Area(sq. km): 51 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	22.0	6.2	<b>Cobble</b>
<b>Thalweg Depth</b>	1.82	0.52	<b>Subdominant Substrate 1:</b>
			<b>Gravel</b>
			<b>Subdominant Substrate 2:</b>
			<b>Boulder</b>

Rosgen Class: F3 Entrenched meandering riffle/pool channel on low gradients with high width/depth ratio.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Unvegetated	0	Closed Tall Willow Shrub	2
5 - 10	Closed Black Spruce-White Spruce Forest	15	Open Black Spruce-White Spruce Forest	20
10 - 20	Closed Black Spruce-White Spruce Forest	15	Open Black Spruce-White Spruce Forest	20
20 - 30	Closed Black Spruce-White Spruce Forest	15	Open Black Spruce-White Spruce Forest	20

**Key To Fish Sampling Methods**

Estimated reach length (m): 248

(ANG) Angling

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 5 Fish Measured: 5 Fork Lengths (mm) Min: 350 Max: 380 Mean: 363 Median: 365

Sampling Method (No. of fish): ANG (5)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 4 Fish Measured: 2 Fork Lengths (mm) Min: 195 Max: 220 Mean: 207 Median: 207

Sampling Method (No. of fish): ANG (1) PEF (1) VOG (2)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 156 Max: 156 Mean: 156 Median: 156

Sampling Method (No. of fish): PEF (1)

Comments:

## Instruments

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



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FSK1005C050118.jp



FSK1005C050122.jp



FSK1005C050123.jp



FSK1005C050001.jp  
photo by Quintin Slade,  
Quicksilver helicopter pilot.

**Station Info**

Observers: Joe Buckwalter, Daniel Reed

Date/Time: 08/09/2010 1:17 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.54469	-147.68440	<b>Coordinates</b>	67.54469	-147.68440	/	67.52674 -147.80125

Elevation NED (m)(ft): 519 1703

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-2

Legal Description (MTRS): F031N001W02

Waterbody Name: Middle Fork Chandalar River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments: Substrate and embeddedness are guesses, based on materials above water level.

Wildlife Comments: dead beaver

**Water Quality \ Stream Flow**

Water Temp (C): 10.20 DO (mg/L): 10.49 DO (%): Conductivity (µS/cm): 325 pH: 7.24

Water Color: Muddy Turbidity (NTU): 376.00 Thalweg Velocity (m/s)(ft/s): 2.70 8.86

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): ##### Embeddedness: High

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>	Cobble
<b>Width</b>	101.0	69.0	<b>Subdominant Substrate 1:</b>	Boulder
<b>Thalweg Depth</b>	3.70	2.20	<b>Subdominant Substrate 2:</b>	Sands

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Alder-Willow Shrub	2	Closed Black Cottonwood Forest	5
5 - 10	Scrub		Closed White Spruce Forest	15
10 - 20	Scrub		Closed White Spruce Forest	15
20 - 30	Scrub		Closed White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 8700 Total Electrofishing Time (s): 6246

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: burbot

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 5 Fish Measured: 4 Fork Lengths (mm) Min: 305 Max: 430 Mean: 346 Median: 367

Sampling Method (No. of fish): BEF (4) VOB (1)

Comments: Three burbot were kept as specimens (Tag ID: T000339, T000343, T000344) and fin clipped (Vial #: 156498, 1

Species: burbot

Life Stage: juvenile

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 196 Max: 221 Mean: 207 Median: 208

Sampling Method (No. of fish): BEF (3)

Comments: Three burbot were kept as specimens (Tag ID: T000339, T000343, T000344) and fin clipped (Vial #: 156498, 1

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 350 Max: 350 Mean: 350 Median: 350

Sampling Method (No. of fish): BEF (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 19 Fish Measured: 9 Fork Lengths (mm) Min: 204 Max: 325 Mean: 286 Median: 264

Sampling Method (No. of fish): BEF (9) VOB (10)

Comments:

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**Species:** Arctic grayling                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 8    **Fish Measured:** 8    **Fork Lengths (mm) Min:** 46    **Max:** 158    **Mean:** 72    **Median:** 102  
**Sampling Method (No. of fish):** BEF (8)  
**Comments:**

**Species:** longnose sucker                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 5    **Fish Measured:** 2    **Fork Lengths (mm) Min:** 288    **Max:** 342    **Mean:** 315    **Median:** 315  
**Sampling Method (No. of fish):** BEF (2) VOB (3)  
**Comments:** Two longnose suckers were kept as specimens (Tag ID: T000350, T000353) and fin clipped (Vial #: 156509, 15

**Species:** round whitefish                      **Life Stage:** adult                      **Life History:** Resident  
**Total Fish Count:** 1    **Fish Measured:** 1    **Fork Lengths (mm) Min:** 371    **Max:** 371    **Mean:** 371    **Median:** 371  
**Sampling Method (No. of fish):** BEF (1)  
**Comments:** Twelve round whitefish were kept as specimens (Tag ID: T000322, T000337, T000338, T000340, T000341, T0

**Species:** round whitefish                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 3    **Fish Measured:** 2    **Fork Lengths (mm) Min:** 243    **Max:** 304    **Mean:** 273    **Median:** 273  
**Sampling Method (No. of fish):** BEF (2) VOB (1)  
**Comments:**

**Species:** round whitefish                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 12    **Fish Measured:** 12    **Fork Lengths (mm) Min:** 55    **Max:** 190    **Mean:** 131    **Median:** 122  
**Sampling Method (No. of fish):** BEF (12)  
**Comments:**

**Species:** general fish observation, no s    **Life Stage:** juvenile/adult                      **Life History:** Unknown  
**Total Fish Count:** 17    **Fish Measured:**    **Fork Lengths (mm) Min:**    **Max:**    **Mean:**    **Median:**  
**Sampling Method (No. of fish):** VOB (17)  
**Comments:**

**Species:** general fish observation, no s    **Life Stage:** juvenile                      **Life History:** Unknown  
**Total Fish Count:** 9    **Fish Measured:**    **Fork Lengths (mm) Min:**    **Max:**    **Mean:**    **Median:**  
**Sampling Method (No. of fish):** VOB (9)  
**Comments:**

---

**Instruments**

**Stream Gradient:** handheld optical clinometer                      **Channel Depths:** handheld sonar depth finder  
**Stream Velocity:** GPS Float                      **Channel Widths:** handheld laser rangefinder  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root GPP 2.5  
**Water Quality:** YSI 556                      **Transparency:**



FSK1006A010042.jp



FSK1006A010043.jp



FSK1006A010045.jp



**Station Info****Observers:** Ryan Snow, Joe Giefer**Date/Time:** 08/09/2010 10:14 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.32606	-148.53402	<b>Coordinates</b>	67.32606	-148.53438	/	67.31608 -148.60269

**Elevation NED (m)(ft):** 542 1778**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar B-4**Legal Description (MTRS):** F029N004W19**Waterbody Name:** Big Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** No visible signs of fish in this reach. Note the very low pH. Very low stream gradient. Had to drag the boat through Extensive shallow riffles, which could not be sampled effectively and were therefore excluded from the subreach length.**Wildlife Comments:** Wolf tracks were seen on sand bar.**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 8.12	<b>DO (mg/L):</b> 10.71	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 186	<b>pH:</b> 4.12
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.53	<b>Thalweg Velocity (m/s)(ft/s):</b> 1.00 3.28		

**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 242 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	25.0	13.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.25	0.60	<b>Subdominant Substrate 2:</b> Silt/Sand

**Rosgen Class:** C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Scrub	11	Unvegetated	0
5 - 10	Open Black Spruce-White Spruce Forest	11	Unvegetated	0
10 - 20	Open Black Spruce-White Spruce Forest	11	Unvegetated	0
20 - 30	Open Black Spruce-White Spruce Forest	0.7	Closed Low Scrub	0.6

**Key To Fish Sampling Methods****Estimated reach length (m):** 4600 **Total Electrofishing Time (s):** 1878

(BEF) Boat-Mounted Electrofisher

**Fish Observations**

No Fish Found

**Instruments****Stream Gradient:** handheld optical clinometer**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** handheld laser rangefinder**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root GPP 2.5**Water Quality:** YSI 556**Transparency:**



FSK1006B010044.jp



FSK1006B010045.jp



FSK1006B010046.jp



FSK1006B010047.jp



FSK1006B010048.jp



FSK1006B010049.jp

**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/09/2010 10:32 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.14177	-148.71691	<b>Coordinates</b>	68.14182	-148.71691	68.14220	-148.70924

Elevation NED (m)(ft): 970 3182

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Philip Smith Mts A-3

Legal Description (MTRS): U015S015E17

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 4.75 DO (mg/L): 10.68 DO (%): Conductivity (µS/cm): 212 pH: 6.98

Water Color: Muddy Turbidity (NTU): 31.90 Thalweg Velocity (m/s)(ft/s): 0.64 2.10

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 50 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	42.0	11.0	<b>Cobble</b>
<b>Thalweg Depth</b>	1.70	0.52	<b>Subdominant Substrate 1:</b>
			<b>Boulder</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Unvegetated	0
5 - 10	Closed Tall Willow Shrub	2	Open Low Willow Shrub	1
10 - 20	Closed Tall Willow Shrub	2	Open Low Willow Shrub	1
20 - 30	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 12 Fish Measured: 2 Fork Lengths (mm) Min: 189 Max: 280 Mean: 234 Median: 234

Sampling Method (No. of fish): PEF (2) VOG (10)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 4 Fish Measured: 4 Fork Lengths (mm) Min: 135 Max: 179 Mean: 160 Median: 157

Sampling Method (No. of fish): PEF (4)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1006C010125.jp



FSK1006C010126.jp



FSK1006C010127.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/09/2010 11:06 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.04711	-148.66166	<b>Coordinates</b>	68.04728	-148.66143	/	68.04488 -148.66201

Elevation NED (m)(ft): 930 3051

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Philip Smith Mts A-3

Legal Description (MTRS): U016S015E21

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 4.40 DO (mg/L): 10.41 DO (%): Conductivity (µS/cm): 122 pH: 6.42

Water Color: Muddy Turbidity (NTU): 57.90 Thalweg Velocity (m/s)(ft/s): 0.96 3.15

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 54 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>	Cobble
<b>Width</b>	50.0	5.8	<b>Subdominant Substrate 1:</b>	Gravel
<b>Thalweg Depth</b>	1.80	0.60	<b>Subdominant Substrate 2:</b>	Boulder

Rosgen Class: D3 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Unvegetated	0	Unvegetated	0
5 - 10	Unvegetated	0	Unvegetated	0
10 - 20	Open Tall Willow Shrub	3	Closed Low Willow Shrub	3
20 - 30	Open Tall Willow Shrub	3	Closed Low Willow Shrub	3

**Key To Fish Sampling Methods**

Estimated reach length (m): 232

(PEF) Portable Electrofisher

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 8 Fish Measured: 8 Fork Lengths (mm) Min: 220 Max: 310 Mean: 263 Median: 265

Sampling Method (No. of fish): PEF (8)

Comments:

Species: round whitefish

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 330 Max: 330 Mean: 330 Median: 330

Sampling Method (No. of fish): PEF (1)

Comments:

Species: round whitefish

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 310 Max: 310 Mean: 310 Median: 310

Sampling Method (No. of fish): PEF (1)

Comments:

## Instruments

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1006C020130.jp



FSK1006C020131.jp



FSK1006C020132.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/09/2010 11:34 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.08742	-148.96080	<b>Coordinates</b>	68.08742	-148.96080	/	68.08530 -148.95721

Elevation NED (m)(ft): 1269 4163

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Philip Smith Mts A-4

Legal Description (MTRS): U016S014E05

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 5.13 DO (mg/L): 13.50 DO (%): Conductivity (µS/cm): 146 pH: 7.68

Water Color: Clear Turbidity (NTU): 3.89 Thalweg Velocity (m/s)(ft/s): 0.85 2.79

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 47 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>	Cobble
<b>Width</b>	70.0	11.0	<b>Subdominant Substrate 1:</b>	Gravel
<b>Thalweg Depth</b>	1.25	0.50	<b>Subdominant Substrate 2:</b>	Boulder

Rosgen Class: D3 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Unvegetated	0
5 - 10	Closed Tall Willow Shrub	2	Open Low Willow Shrub	0.5
10 - 20	Closed Tall Willow Shrub	2	Open Low Willow Shrub	0.5
20 - 30	Closed Low Willow Shrub	1	Closed Low Willow Shrub	1

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 340 Max: 340 Mean: 340 Median: 340

Sampling Method (No. of fish): PEF (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 13 Fish Measured: 7 Fork Lengths (mm) Min: 219 Max: 280 Mean: 238 Median: 249

Sampling Method (No. of fish): PEF (7) VOG (6)

Comments:

Species: round whitefish

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 346 Max: 346 Mean: 346 Median: 346

Sampling Method (No. of fish): PEF (1)

Comments:

Species: round whitefish

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 280 Max: 280 Mean: 280 Median: 280

Sampling Method (No. of fish): PEF (1)

Comments:

**Instruments**

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1006C030135.jp



FSK1006C030136.jp

**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/09/2010 11:48 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.10681	-149.20756	<b>Coordinates</b>	68.10694	-149.20785	/	68.10370 -149.20906

Elevation NED (m)(ft): 1000 3281

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Philip Smith Mts A-4

Legal Description (MTRS): U015S013E31

Waterbody Name: North Fork Chandalar River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.99 DO (mg/L): 10.20 DO (%): Conductivity (µS/cm): 216 pH: 7.53

Water Color: Clear Turbidity (NTU): 1.72 Thalweg Velocity (m/s)(ft/s): 0.61 2.00

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 86 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	90.0	7.0	<b>Gravel</b>
<b>Thalweg Depth</b>	1.50	0.62	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Sands</b>

Rosgen Class: D4 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	1	Unvegetated	0
5 - 10	Closed Low Willow Shrub	1	Open Low Willow Shrub	0.5
10 - 20	Closed Low Willow Shrub	1	Closed Tall Willow Shrub	2
20 - 30	Closed Low Willow Shrub	1	Closed Tall Willow Shrub	2

**Key To Fish Sampling Methods**

Estimated reach length (m): 280

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 400 Max: 430 Mean: 416 Median: 415

Sampling Method (No. of fish): PEF (3)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 11 Fish Measured: 6 Fork Lengths (mm) Min: 200 Max: 230 Mean: 210 Median: 215

Sampling Method (No. of fish): PEF (6) VOG (5)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1006C040138.jp



FSK1006C040139.jp



FSK1006C040140.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/10/2010 12:18 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.00920	-149.11430	<b>Coordinates</b>	68.00932	-149.11398	68.00614	-149.11599

Elevation NED (m)(ft): 976 3202

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Philip Smith Mts A-4

Legal Description (MTRS): U016S013E34

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.49 DO (mg/L): 9.89 DO (%): Conductivity (µS/cm): 204 pH: 7.39

Water Color: Clear Turbidity (NTU): 2.27 Thalweg Velocity (m/s)(ft/s): 0.74 2.43

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 40 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	115.0	7.2	<b>Cobble</b>
<b>Thalweg Depth</b>	1.40	0.31	<b>Subdominant Substrate 1:</b>
			<b>Gravel</b>
			<b>Subdominant Substrate 2:</b>
			<b>Sands</b>

Rosgen Class: D3 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	0.5	Unvegetated	0
5 - 10	Closed Low Willow Shrub	0.5	Open Low Willow Shrub	0.5
10 - 20	Closed Low Willow Shrub	0.5	Open Low Willow Shrub	0.5
20 - 30	Closed Low Willow Shrub	0.5	Open Low Willow Shrub	0.5

**Key To Fish Sampling Methods**

Estimated reach length (m): 288

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 390 Max: 390 Mean: 390 Median: 390

Sampling Method (No. of fish): PEF (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 11 Fish Measured: 6 Fork Lengths (mm) Min: 190 Max: 250 Mean: 210 Median: 220

Sampling Method (No. of fish): PEF (6) VOG (5)

Comments:

Species: round whitefish

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 5 Fish Measured: 1 Fork Lengths (mm) Min: 210 Max: 210 Mean: 210 Median: 210

Sampling Method (No. of fish): PEF (1) VOG (4)

Comments:

## Instruments

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1006C050143.jp



FSK1006C050144.jp



FSK1006C050145.jp



**Station Info**

Observers: Joe Buckwalter, John Burr

Date/Time: 08/10/2010 10:37 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.10786	-147.65219	<b>Coordinates</b>	67.10786	-147.65219	67.10900	-147.51133

Elevation NED (m)(ft): 308 1010

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar A-2

Legal Description (MTRS): F026N001W01

Waterbody Name: Chandalar River

Anadromous Waters Catalog Number: 334-40-11000-2925

Geographic Comments:

Visit Comments: D.O. reading incorrect--wrong barometric pressure entered. Substrate and embeddedness are guesses, based on materials above water level.

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 11.51 DO (mg/L): DO (%): Conductivity (µS/cm): 314 pH: 7.70

Water Color: Muddy Turbidity (NTU): 420.00 Thalweg Velocity (m/s)(ft/s): 2.40 7.87

**Stream Channel**

Stream Gradient (%): 0.8 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): ##### Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	115.0	75.0	<b>Subdominant Substrate 1:</b> Boulder
<b>Thalweg Depth</b>	5.10	3.80	<b>Subdominant Substrate 2:</b> Sands

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Alder-Willow Shrub	3.5	Closed Spruce-Paper Birch Forest	10
5 - 10	Closed Balsam Poplar Forest	10	Closed Spruce-Paper Birch Forest	10
10 - 20	Closed Balsam Poplar Forest	10	Closed Spruce-Paper Birch Forest	10
20 - 30	Closed Balsam Poplar Forest	10	Closed Spruce-Paper Birch Forest	10

**Key To Fish Sampling Methods**

Estimated reach length (m): 7600 Total Electrofishing Time (s): 7479

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: burbot

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 6 Fish Measured: 3 Fork Lengths (mm) Min: 300 Max: 320 Mean: 309 Median: 310

Sampling Method (No. of fish): BEF (3) VOB (3)

Comments: Four burbot were kept as specimens (Tag ID: T00302, T000303, T00351, T000321) and fin clipped (Vial #: 15)

Species: burbot

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 225 Max: 225 Mean: 225 Median: 225

Sampling Method (No. of fish): BEF (1)

Comments:

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 343 Max: 343 Mean: 343 Median: 343

Sampling Method (No. of fish): BEF (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 38 Fish Measured: 18 Fork Lengths (mm) Min: 191 Max: 322 Mean: 268 Median: 256

Sampling Method (No. of fish): BEF (17) VOB (21)

Comments:

---

<b>Species:</b> Arctic grayling	<b>Life Stage:</b> juvenile	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 6	<b>Fish Measured:</b> 6	<b>Fork Lengths (mm) Min:</b> 85	<b>Max:</b> 187	<b>Mean:</b> 160	<b>Median:</b> 136	
<b>Sampling Method (No. of fish):</b> BEF (6)						
<b>Comments:</b>						
<b>Species:</b> longnose sucker	<b>Life Stage:</b> adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 404	<b>Max:</b> 404	<b>Mean:</b> 404	<b>Median:</b> 404	
<b>Sampling Method (No. of fish):</b> BEF (1)						
<b>Comments:</b>						
<b>Species:</b> longnose sucker	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 333	<b>Max:</b> 333	<b>Mean:</b> 333	<b>Median:</b> 333	
<b>Sampling Method (No. of fish):</b> VOB (1)						
<b>Comments:</b>						
<b>Species:</b> longnose sucker	<b>Life Stage:</b> juvenile	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 2	<b>Fish Measured:</b> 2	<b>Fork Lengths (mm) Min:</b> 104	<b>Max:</b> 135	<b>Mean:</b> 119	<b>Median:</b> 119	
<b>Sampling Method (No. of fish):</b> BEF (2)						
<b>Comments:</b> Two longnose suckers were kept as specimens (Tag ID: T000301, T000348) and fin clipped (Vial #: 156511, 15						
<b>Species:</b> northern pike	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b>	<b>Fork Lengths (mm) Min:</b>	<b>Max:</b>	<b>Mean:</b>	<b>Median:</b>	
<b>Sampling Method (No. of fish):</b> VOB (1)						
<b>Comments:</b>						
<b>Species:</b> Chinook salmon	<b>Life Stage:</b> juvenile	<b>Life History:</b> Anadromous				
<b>Total Fish Count:</b> 43	<b>Fish Measured:</b> 26	<b>Fork Lengths (mm) Min:</b> 50	<b>Max:</b> 67	<b>Mean:</b> 58	<b>Median:</b> 58	
<b>Sampling Method (No. of fish):</b> BEF (26) VOB (17)						
<b>Comments:</b>						
<b>Species:</b> chum salmon	<b>Life Stage:</b> adult	<b>Life History:</b> Anadromous				
<b>Total Fish Count:</b> 3	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 540	<b>Max:</b> 540	<b>Mean:</b> 540	<b>Median:</b> 540	
<b>Sampling Method (No. of fish):</b> BEF (1) VOB (2)						
<b>Comments:</b>						
<b>Species:</b> round whitefish	<b>Life Stage:</b> adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 365	<b>Max:</b> 365	<b>Mean:</b> 365	<b>Median:</b> 365	
<b>Sampling Method (No. of fish):</b> VOB (1)						
<b>Comments:</b>						
<b>Species:</b> round whitefish	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b>	<b>Fork Lengths (mm) Min:</b>	<b>Max:</b>	<b>Mean:</b>	<b>Median:</b>	
<b>Sampling Method (No. of fish):</b> VOB (1)						
<b>Comments:</b>						
<b>Species:</b> round whitefish	<b>Life Stage:</b> juvenile	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 4	<b>Fish Measured:</b> 4	<b>Fork Lengths (mm) Min:</b> 41	<b>Max:</b> 105	<b>Mean:</b> 72	<b>Median:</b> 73	
<b>Sampling Method (No. of fish):</b> BEF (4)						
<b>Comments:</b>						
<b>Species:</b> general fish observation, no s	<b>Life Stage:</b> juvenile	<b>Life History:</b> Unknown				
<b>Total Fish Count:</b> 6	<b>Fish Measured:</b>	<b>Fork Lengths (mm) Min:</b>	<b>Max:</b>	<b>Mean:</b>	<b>Median:</b>	
<b>Sampling Method (No. of fish):</b> VOB (6)						
<b>Comments:</b>						

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## Instruments

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> handheld sonar depth finder
<b>Stream Velocity:</b> GPS Float	<b>Channel Widths:</b> handheld laser rangefinder
<b>Turbidity:</b> LaMotte 2020e turbidimeter	<b>Electrofisher:</b> Smith-Root GPP 2.5
<b>Water Quality:</b> YSI 556	<b>Transparency:</b>



FSK1007A010058.jp



FSK1007A010059.jp



FSK1007A010060.jp



FSK1007A010063.jp



FSK1007A010064.jp

**Station Info****Observers:** Ryan Snow, Daniel Reed**Date/Time:** 08/10/2010 11:52 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.29628	-148.89616	<b>Coordinates</b>	67.29628	-148.89616	/	67.29321 -148.88421

**Elevation NED (m)(ft):** 487 1598**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar B-4**Legal Description (MTRS):** F029N006W33**Waterbody Name:** Crooked Creek**Anadromous Waters Catalog Number:****Geographic Comments:**

**Visit Comments:** The reach sample was limited by fallen trees and shallow riffles. More fallen trees above sample reach. Bankfull width was wetted stream width + 2 meters for the majority of the stream. This differed from the habitat measurements taken at the initial site. The overall average was used for this since they differed so much. Very low stream gradient.

**Wildlife Comments:****Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 10.32	<b>DO (mg/L):</b> 10.38	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 91	<b>pH:</b> 7.63
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.68		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.80	2.62

**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 200 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	14.0	10.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.76	0.40	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from Bank (m)</b>	<b>Left Bank Vegetation Type</b>	<b>Canopy Height(m)</b>	<b>Right Bank Vegetation Type</b>	<b>Canopy Height(m)</b>
0 - 5	Closed Low Scrub	1	Closed Low Willow Shrub	1.2
5 - 10	Open Black Spruce Forest	15	Unvegetated	0
10 - 20	Closed Black Spruce Forest	20	Closed Low Willow Shrub	1.5
20 - 30	Closed Black Spruce Forest	20	Open Spruce-Paper Birch Forest	10

**Key To Fish Sampling Methods****Estimated reach length (m):** 1600 **Total Electrofishing Time (s):** 2432

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

**Species:** Arctic grayling **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 8 **Fish Measured:** 3 **Fork Lengths (mm) Min:** 348 **Max:** 354 **Mean:** 351 **Median:** 351  
**Sampling Method (No. of fish):** BEF (3) VOB (5)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 16 **Fish Measured:** 16 **Fork Lengths (mm) Min:** 189 **Max:** 314 **Mean:** 258 **Median:** 251  
**Sampling Method (No. of fish):** BEF (16)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 12 **Fish Measured:** 12 **Fork Lengths (mm) Min:** 29 **Max:** 162 **Mean:** 96 **Median:** 95  
**Sampling Method (No. of fish):** BEF (12)

**Comments:**

**Species:** Chinook salmon                      **Life Stage:** juvenile                      **Life History:** Anadromous  
**Total Fish Count:** 9      **Fish Measured:** 9      **Fork Lengths (mm) Min:** 65      **Max:** 73      **Mean:** 69      **Median:** 69  
**Sampling Method (No. of fish):** BEF (9)  
**Comments:**

**Species:** slimy sculpin                      **Life Stage:** adult                      **Life History:** Resident  
**Total Fish Count:** 2      **Fish Measured:** 2      **Fork Lengths (mm) Min:** 88      **Max:** 88      **Mean:** 88      **Median:** 88  
**Sampling Method (No. of fish):** BEF (2)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer                      **Channel Depths:** graduated wading rod  
**Stream Velocity:** transparent velocity head rod                      **Channel Widths:** handheld laser rangefinder  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root GPP 2.5  
**Water Quality:** YSI 556                      **Transparency:**



FSK1007B010050.jp



FSK1007B010051.jp



FSK1007B010054.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/10/2010 9:35 PM

Station Coordinates	Latitude	Longitude	Sample Coordinates	Latitude	Longitude	Latitude	Longitude
	68.06976	-149.59039		68.06976	-149.59039	68.06612	-149.59490

Elevation NED (m)(ft): 967 3173

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Philip Smith Mts A-5

Legal Description (MTRS): U016S011E09

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 5.36	DO (mg/L): 10.52	DO (%):	Conductivity (µS/cm): 242	pH: 6.90
Water Color: Clear	Turbidity (NTU): 3.21	Thalweg Velocity (m/s)(ft/s): 0.64	2.10	

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 53 Embeddedness: Low

Channel Dimensions (m):	Bank Full	Wetted	Dominant Substrate:
Width	53.0	8.0	Gravel
Thalweg Depth	0.70	0.36	Subdominant Substrate 1: Sands
			Subdominant Substrate 2: Cobble

Rosgen Class: D4 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Open Low Willow Shrub	0.2	Closed Low Willow Shrub	0.2
5 - 10	Open Low Willow Shrub	0.2	Closed Low Willow Shrub	0.2
10 - 20	Closed Tall Willow Shrub	2	Closed Low Willow Shrub	1.5
20 - 30	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 5 Fish Measured: 5 Fork Lengths (mm) Min: 215 Max: 245 Mean: 232 Median: 230

Sampling Method (No. of fish): PEF (5)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 5 Fish Measured: 5 Fork Lengths (mm) Min: 120 Max: 182 Mean: 143 Median: 151

Sampling Method (No. of fish): PEF (5)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 81 Max: 81 Mean: 81 Median: 81

Sampling Method (No. of fish): PEF (1)

Comments:

## Instruments

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1007C010148.jp



FSK1007C010149.jp



FSK1007C010150.jp



FSK1007C010151.jp

**Station Info****Observers:** Jonathan Kirsch, Mary Simmering**Date/Time:** 08/10/2010 9:54 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.97440	-149.46011	<b>Coordinates</b>	67.97440	-149.46011	/ 67.97399	-149.44566

**Elevation NED (m)(ft):** 883 2897**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar D-5**Legal Description (MTRS):** F036N008W06**Waterbody Name:****Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Very steep canyons along majority of creek, so the habitat measurements were taken at a location we could get a helicopter into, therefore the measurements were not overly representative of the stream.**Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 7.19 **DO (mg/L):** 10.06 **DO (%):** **Conductivity (µS/cm):** 479 **pH:** 7.63**Water Color:** Clear **Turbidity (NTU):** 0.55 **Thalweg Velocity (m/s)(ft/s):** 0.47 1.54**Stream Channel****Stream Gradient (%):** 2 **Entrenchment:** Moderately Entrenched**Catchment Area(sq. km):** 62 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	17.0	5.8	<b>Subdominant Substrate 1:</b> Boulder
<b>Thalweg Depth</b>	0.45	0.17	<b>Subdominant Substrate 2:</b> Gravel

**Rosgen Class:** B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open Low Willow Shrub	1.5	Open Low Willow Shrub	1.5
5 - 10	Open Low Willow Shrub	1	Open Low Willow Shrub	1
10 - 20	Open Low Willow Shrub	1	Open Low Willow Shrub	1
20 - 30	Open Low Willow Shrub	1	Open Low Willow Shrub	1

**Key To Fish Sampling Methods****Estimated reach length (m):** 232

(ANG) Angling

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations****Species:** Arctic grayling**Life Stage:** adult**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 360 **Max:** 360 **Mean:** 360 **Median:** 360**Sampling Method (No. of fish):** ANG (1)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 5 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:****Sampling Method (No. of fish):** VOG (5)**Comments:****Instruments****Stream Gradient:** handheld abney level**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** handheld laser rangefinder**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube

-continued-



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FSK1007C020160.jp

FSK1007C020161.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/10/2010 10:10 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.84496	-149.18186	<b>Coordinates</b>	67.84494	-149.18174	/ 67.84704	-149.17597

Elevation NED (m)(ft): 786 2579

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar D-5

Legal Description (MTRS): F035N007W20

Waterbody Name: Quartz Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.95 DO (mg/L): 10.15 DO (%): Conductivity (µS/cm): 436 pH: 8.01

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.61 2.00

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Entrenched

Catchment Area(sq. km): 83 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>	Cobble
<b>Width</b>	47.0	8.0	<b>Subdominant Substrate 1:</b>	Gravel
<b>Thalweg Depth</b>	1.70	0.43	<b>Subdominant Substrate 2:</b>	Boulder

Rosgen Class: F3 Entrenched meandering riffle/pool channel on low gradients with high width/depth ratio.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Open Low Willow Shrub	0.5	Open Black Spruce-White Spruce Forest	15
5 - 10	Open Black Spruce-White Spruce Forest	15	Open Black Spruce-White Spruce Forest	15
10 - 20	Open Black Spruce-White Spruce Forest	15	Open Black Spruce-White Spruce Forest	15
20 - 30	Closed Black Spruce-White Spruce Forest	15	Open Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 5 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (5)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 140 Max: 160 Mean: 150 Median: 150

Sampling Method (No. of fish): PEF (2)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 3 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (3)

Comments:

**Instruments**

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



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FSK1007C030164.jp



FSK1007C030165.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/10/2010 10:23 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.77169	-149.47738	<b>Coordinates</b>	67.77189	-149.47734	/ 67.76852	-149.47677

Elevation NED (m)(ft): 763 2503

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar D-5

Legal Description (MTRS): F034N009W13

Waterbody Name: Mathews River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 9.53	<b>DO (mg/L):</b> 9.79	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 484	<b>pH:</b> 7.62
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.72		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.77 2.53	

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 85 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	93.0	10.0	<b>Subdominant Substrate 1:</b> Boulder
<b>Thalweg Depth</b>	1.30	0.30	<b>Subdominant Substrate 2:</b> Gravel

Rosgen Class: D3 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b>Left Bank Vegetation Type</b>	<b>Right Bank Vegetation Type</b>	
<b>0 - 5</b> Open Tall Willow Shrub	2 Open Low Willow Shrub	0.7
<b>5 - 10</b> Open Tall Willow Shrub	2 Open Low Willow Shrub	0.7
<b>10 - 20</b> Open Low Willow Shrub	0.5 Open Tall Willow Shrub	2
<b>20 - 30</b> Open Low Willow Shrub	0.5 Open Low Willow Shrub	0.5

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

**Fish Observations**

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 70 Max: 80 Mean: 75 Median: 75

Sampling Method (No. of fish): PEF (2)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1007C040168.jp



FSK1007C040169.jp



FSK1007C040170.jp

FSK1007C040171.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/10/2010 10:36 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.94481	-149.69937	<b>Coordinates</b>	67.94490	-149.69879	67.94498	-149.70622

Elevation NED (m)(ft): 702 2303

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar D-6

Legal Description (MTRS): F036N010W13

Waterbody Name: Nutirwik Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 8.76 DO (mg/L): 9.94 DO (%): Conductivity (µS/cm): 555 pH: 7.71

Water Color: Clear Turbidity (NTU): 0.25 Thalweg Velocity (m/s)(ft/s): 1.25 4.10

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Entrenched

Catchment Area(sq. km): 53 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	37.0	4.0	<b>Cobble</b>
<b>Thalweg Depth</b>	1.30	0.38	<b>Subdominant Substrate 1:</b>
			<b>Gravel</b>
			<b>Subdominant Substrate 2:</b>
			<b>Boulder</b>

Rosgen Class: F3 Entrenched meandering riffle/pool channel on low gradients with high width/depth ratio.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Unvegetated	0	Unvegetated	0
5 - 10	Unvegetated	0	Open Tall Willow Shrub	3
10 - 20	Unvegetated	0	Closed White Spruce Forest	15
20 - 30	Open Low Willow Shrub	1.5	Closed White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 160

(PEF) Portable Electrofisher

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 180 Max: 180 Mean: 180 Median: 180

Sampling Method (No. of fish): PEF (1)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 100 Max: 100 Mean: 100 Median: 100

Sampling Method (No. of fish): PEF (1)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1007C050173.jp



FSK1007C050174.jp



FSK1007C050175.jp



**Station Info****Observers:** Jonathan Kirsch, Mary Simmering**Date/Time:** 08/10/2010 10:48 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.83433	-149.91362	<b>Coordinates</b>	67.83434	-149.91403	67.83284	-149.90844

**Elevation NED (m)(ft):** 581 1906**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar D-6**Legal Description (MTRS):** F035N010W30**Waterbody Name:** Big Jim Creek**Anadromous Waters Catalog Number:****Geographic Comments:** The habitat transect in Big Jim Creek was upstream of the confluence with a right-bank tributary. However, most of the fish-collection reach was downstream of the confluence.**Visit Comments:****Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 8.61 **DO (mg/L):** 13.83 **DO (%):** **Conductivity (µS/cm):** 416 **pH:** 8.28**Water Color:** Clear **Turbidity (NTU):** 26.30 **Thalweg Velocity (m/s)(ft/s):** 0.74 2.43**Stream Channel****Stream Gradient (%):** 2 **Entrenchment:** Entrenched**Catchment Area(sq. km):** 41 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	26.0	6.7	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.25	0.52	<b>Subdominant Substrate 2:</b> Boulder

**Rosgen Class:** F3 Entrenched meandering riffle/pool channel on low gradients with high width/depth ratio.**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	3	Unvegetated	0
5 - 10	Closed Tall Willow Shrub	3	Closed Tall Willow Shrub	3
10 - 20	Closed Tall Willow Shrub	3	Closed Tall Willow Shrub	3
20 - 30	Closed Tall Willow Shrub	3	Closed Tall Willow Shrub	3

**Key To Fish Sampling Methods****Estimated reach length (m):** 268

(PEF) Portable Electrofisher

**Fish Observations****Species:** Arctic grayling**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 190 **Max:** 190 **Mean:** 190 **Median:** 190**Sampling Method (No. of fish):** PEF (1)**Comments:****Species:** slimy sculpin**Life Stage:** adult**Life History:** Resident**Total Fish Count:** 6 **Fish Measured:** 6 **Fork Lengths (mm) Min:** 70 **Max:** 142 **Mean:** 90 **Median:** 106**Sampling Method (No. of fish):** PEF (6)**Comments:****Instruments****Stream Gradient:** handheld abney level**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** handheld laser rangefinder**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



FSK1007C060178.jp



FSK1007C060179.jp



FSK1007C060180.jp

FSK1007C060181.jp



**Station Info**

Observers: Joe Buckwalter, John Burr

Date/Time: 08/11/2010 10:25 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.33450	-149.40887	<b>Coordinates</b>	67.33450	-149.40887	/	67.32215 -149.41531

Elevation NED (m)(ft): 483 1585

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-5

Legal Description (MTRS): F029N008W18

Waterbody Name: South Fork Koyukuk River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 8.82 DO (mg/L): 10.45 DO (%): Conductivity (µS/cm): 252 pH: 7.39

Water Color: Clear Turbidity (NTU): 2.10 Thalweg Velocity (m/s)(ft/s): 0.50 1.64

**Stream Channel**

Stream Gradient (%): 0.6 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 369 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	33.0	22.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.90	1.00	<b>Subdominant Substrate 2:</b> Sands

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
5 - 10	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
10 - 20	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
20 - 30	Open White Spruce Forest	9	Open White Spruce Forest	9

**Key To Fish Sampling Methods**

Estimated reach length (m): 3100 Total Electrofishing Time (s): 4425

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: burbot

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 91 Max: 91 Mean: 91 Median: 91

Sampling Method (No. of fish): BEF (1)

Comments: One burbot was kept as a specimen (Tag ID: T000320) and fin clipped (Vial #: 156463).

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 331 Max: 415 Mean: 365 Median: 373

Sampling Method (No. of fish): BEF (3)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 4 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOB (4)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 15 Fish Measured: 15 Fork Lengths (mm) Min: 39 Max: 73 Mean: 49 Median: 56

Sampling Method (No. of fish): BEF (15)

Comments:

**Species:** slimy sculpin                      **Life Stage:** adult                      **Life History:** Resident  
**Total Fish Count:** 4      **Fish Measured:** 4      **Fork Lengths (mm) Min:** 72      **Max:** 83      **Mean:** 76      **Median:** 77  
**Sampling Method (No. of fish):** BEF (4)  
**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 3      **Fish Measured:** 2      **Fork Lengths (mm) Min:** 57      **Max:** 67      **Mean:** 62      **Median:** 62  
**Sampling Method (No. of fish):** BEF (2) VOB (1)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer                      **Channel Depths:** graduated wading rod  
**Stream Velocity:** Orange Float                      **Channel Widths:** handheld laser rangefinder  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root GPP 2.5  
**Water Quality:** YSI 556                      **Transparency:**



FSK1008A010066.jp



FSK1008A010067.jp



FSK1008A010071.jp



FSK1008A010072.jp



FSK1008A010073.jp



FSK1008A010074.jp

**Station Info****Observers:** Ryan Snow, Daniel Reed**Date/Time:** 08/11/2010 11:38 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.33090	-147.85090	<b>Coordinates</b>	67.33090	-147.85090	/ 67.32084	-147.88052

**Elevation NED (m)(ft):** 484 1588**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar B-2**Legal Description (MTRS):** F029N001W19**Waterbody Name:** Flat Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Gradient was not measurable as the stream meanders were short and sharp**Wildlife Comments:** Partially-blown beaver dam was seen approximately 2 km upstream of the sample reach.**Water Quality \ Stream Flow****Water Temp (C):** 9.80 **DO (mg/L):** 10.31 **DO (%):** **Conductivity (µS/cm):** 78 **pH:** 7.25**Water Color:** Humic **Turbidity (NTU):** 3.59 **Thalweg Velocity (m/s)(ft/s):** 0.80 2.62**Stream Channel****Stream Gradient (%):** **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 360 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	18.0	10.0	<b>Subdominant Substrate 1:</b> Sands
<b>Thalweg Depth</b>	1.90	0.49	<b>Subdominant Substrate 2:</b> Cobble

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from Bank (m)</b>	<b>Left Bank Vegetation Type</b>	<b>Canopy Height(m)</b>	<b>Right Bank Vegetation Type</b>	<b>Canopy Height(m)</b>
0 - 5	Closed Black Spruce Forest	16	Closed Tall Alder-Willow Shrub	3.5
5 - 10	Open Black Spruce Forest	14	Open Black Spruce Forest	14
10 - 20	Open Black Spruce Forest	14	Open Black Spruce Forest	14
20 - 30	Open Black Spruce Forest	14	Open Black Spruce Forest	14

**Key To Fish Sampling Methods****Estimated reach length (m):** 3100 **Total Electrofishing Time (s):** 3579

(BEF) Boat-Mounted Electrofisher

**Fish Observations**

**Species:** Arctic grayling **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 8 **Fish Measured:** 8 **Fork Lengths (mm) Min:** 189 **Max:** 249 **Mean:** 215 **Median:** 219  
**Sampling Method (No. of fish):** BEF (8)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 63 **Fish Measured:** 63 **Fork Lengths (mm) Min:** 36 **Max:** 185 **Mean:** 89 **Median:** 110  
**Sampling Method (No. of fish):** BEF (63)

**Comments:**

**Species:** round whitefish **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 7 **Fish Measured:** 7 **Fork Lengths (mm) Min:** 198 **Max:** 280 **Mean:** 234 **Median:** 239  
**Sampling Method (No. of fish):** BEF (7)

**Comments:**

**Species:** round whitefish **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 13 **Fish Measured:** 13 **Fork Lengths (mm) Min:** 118 **Max:** 197 **Mean:** 167 **Median:** 157  
**Sampling Method (No. of fish):** BEF (13)

**Comments:**

## Instruments

**Stream Gradient:**

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

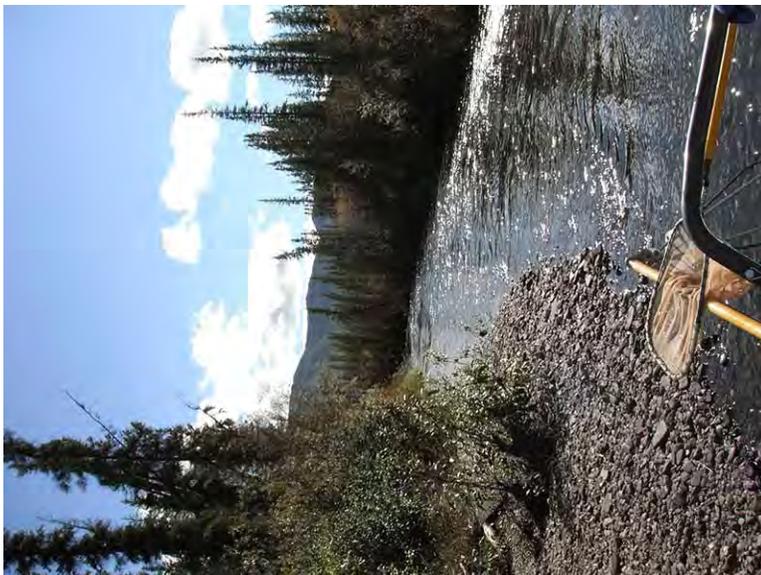
**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root GPP 2.5

**Transparency:**



FSK1008B010060.jp



FSK1008B010061.jp



FSK1008B010062.jp



FSK1008B010064.jp



FSK1008B010065.jp

**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/11/2010 6:57 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.78416	-147.67778	<b>Coordinates</b>	67.78424	-147.67744	/ 67.78285	-147.67897

Elevation NED (m)(ft): 581 1906

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar D-2

Legal Description (MTRS): F034N001W12

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.82 DO (mg/L): 10.69 DO (%): Conductivity (µS/cm): 80 pH: 6.90

Water Color: Muddy Turbidity (NTU): 18.90 Thalweg Velocity (m/s)(ft/s): 1.00 3.28

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 54 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	17.0	7.0	<b>Gravel</b>
<b>Thalweg Depth</b>	1.50	0.35	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Sands</b>

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Open Black Spruce-White Spruce Forest	15	Open Tall Scrub	2
5 - 10	Open Black Spruce-White Spruce Forest	15	Open Tall Scrub	2
10 - 20	Open Black Spruce-White Spruce Forest	15	Closed Black Spruce-White Spruce Forest	15
20 - 30	Open Black Spruce-White Spruce Forest	15	Closed Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 280

(PEF) Portable Electrofisher

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 4 Fish Measured: 4 Fork Lengths (mm) Min: 192 Max: 225 Mean: 205 Median: 208

Sampling Method (No. of fish): PEF (4)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 5 Fish Measured: 5 Fork Lengths (mm) Min: 56 Max: 91 Mean: 69 Median: 73

Sampling Method (No. of fish): PEF (5)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1008C010184.jp



FSK1008C010185.jp

FSK1008C010186.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/11/2010 7:09 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.80774	-147.77530	<b>Coordinates</b>	67.80760	-147.77618	67.80639	-147.77194

Elevation NED (m)(ft): 579 1900

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar D-2

Legal Description (MTRS): F035N001W33

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.48 DO (mg/L): 10.30 DO (%): Conductivity (µS/cm): 175 pH: 7.71

Water Color: Muddy Turbidity (NTU): 11.80 Thalweg Velocity (m/s)(ft/s): 1.62 5.31

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 51 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	8.0	6.0	<b>Sands</b>
<b>Thalweg Depth</b>	1.00	0.72	<b>Subdominant Substrate 1:</b>
			<b>Gravel</b>
			<b>Subdominant Substrate 2:</b>

Rosgen Class: C5 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	0.5	Closed Low Willow Shrub	0.3
5 - 10	Closed Low Willow Shrub	0.5	Open Black Spruce-White Spruce Forest	5
10 - 20	Closed Low Willow Shrub	0.5	Open Black Spruce-White Spruce Forest	5
20 - 30	Open Black Spruce-White Spruce Forest	15	Open Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 240

(PEF) Portable Electrofisher

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 210 Max: 230 Mean: 220 Median: 220

Sampling Method (No. of fish): PEF (2)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 5 Fish Measured: 5 Fork Lengths (mm) Min: 57 Max: 145 Mean: 98 Median: 101

Sampling Method (No. of fish): PEF (5)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1008C020189.jp



FSK1008C020190.jp



**Station Info****Observers:** Jonathan Kirsch, Mary Simmering**Date/Time:** 08/11/2010 7:18 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.82641	-148.13281	<b>Coordinates</b>	67.82608	-148.13367	67.82680	-148.13077

**Elevation NED (m)(ft):** 639 2096**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar D-3**Legal Description (MTRS):** F035N003W25**Waterbody Name:****Anadromous Waters Catalog Number:****Geographic Comments:** Due to difficult sampling conditions on the target stream, a tributary stream (actually a larger channel) was selected for sampling. The habitat transect was done above the confluence of the two streams although the fish sampling reach spanned both above and below the confluence. The only fish captured at this site (burbot) was captured below the confluence.**Visit Comments:** Sampled at confluence with another creek.**Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 6.93 **DO (mg/L):** 11.54 **DO (%):** **Conductivity (µS/cm):** 277 **pH:** 7.74**Water Color:** Clear **Turbidity (NTU):** 1.56 **Thalweg Velocity (m/s)(ft/s):** 0.45 1.48**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 23 **Embeddedness:** Negligible**Channel Dimensions (m):** **Bank Full** **Wetted** **Dominant Substrate:** Cobble**Width** 9.0 3.5 **Subdominant Substrate 1:** Gravel**Thalweg Depth** 0.90 0.32 **Subdominant Substrate 2:****Rosgen Class:** C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	0.3	Closed Low Willow Shrub	1
5 - 10	Closed Low Willow Shrub	0.3	Closed Low Willow Shrub	1
10 - 20	Closed Low Willow Shrub	0.3	Open Black Spruce-White Spruce Forest	15
20 - 30	Open Black Spruce-White Spruce Forest	7	Open Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods****Estimated reach length (m):** 150

(PEF) Portable Electrofisher

**Fish Observations****Species:** burbot**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:****Sampling Method (No. of fish):** PEF (1)**Comments:** Fish escaped before measurement**Instruments****Stream Gradient:** handheld optical clinometer**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** handheld laser rangefinder**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



FSK1008C030193.jp



FSK1008C030194.jp



FSK1008C030195.jp

FSK1008C030196.jp



**Station Info****Observers:** Jonathan Kirsch, Mary Simmering**Date/Time:** 08/11/2010 7:27 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.41833	-147.46010	<b>Coordinates</b>	67.41856	-147.46039	67.41825	-147.46289

**Elevation NED (m)(ft):** 665 2182**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar B-1**Legal Description (MTRS):** F030N001E14**Waterbody Name:** Flat Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:****Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 7.09 **DO (mg/L):** 10.14 **DO (%):** **Conductivity (µS/cm):** 43 **pH:** 6.97**Water Color:** Humic **Turbidity (NTU):** 2.03 **Thalweg Velocity (m/s)(ft/s):** 0.96 3.15**Stream Channel****Stream Gradient (%):** 1 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 87 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	12.0	5.0	<b>Subdominant Substrate 1:</b> Sands
<b>Thalweg Depth</b>	0.90	0.50	<b>Subdominant Substrate 2:</b>

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b>Left Bank Vegetation Type</b>	<b>Right Bank Vegetation Type</b>	
<b>0 - 5</b> Closed Tall Willow Shrub	2 Open Low Willow Shrub	1
<b>5 - 10</b> Open Black Spruce-White Spruce Forest	15 Closed Tall Willow Shrub	3
<b>10 - 20</b> Closed Black Spruce-White Spruce Forest	15 Closed Tall Willow Shrub	4
<b>20 - 30</b> Closed Black Spruce-White Spruce Forest	5 Open Black Spruce-White Spruce Forest	20

**Key To Fish Sampling Methods****Estimated reach length (m):** 200

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations****Species:** Arctic grayling**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 29 **Fish Measured:** 19 **Fork Lengths (mm) Min:** 35 **Max:** 64 **Mean:** 49 **Median:** 49**Sampling Method (No. of fish):** PEF (19) VOG (10)**Comments:****Instruments****Stream Gradient:** handheld optical clinometer**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** handheld laser rangefinder**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



FSK1008C040198.jp



FSK1008C040199.jp



FSK1008C040200.jp



FSK1008C040201.jp



FSK1008C040202.jp



FSK1008C040203.jp

**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/11/2010 7:37 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.36602	-148.65884	<b>Coordinates</b>	67.36615	-148.65864	/	67.36481 -148.66259

Elevation NED (m)(ft): 698 2290

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-4

Legal Description (MTRS): F029N005W04

Waterbody Name: Goldbug Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 8.90 DO (mg/L): 11.58 DO (%): Conductivity (µS/cm): 58 pH: 6.50

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.49 1.61

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 51 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	20.0	4.5	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	0.70	0.46	<b>Subdominant Substrate 2:</b> Boulder

Rosgen Class: B4 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	1	Closed Low Willow Shrub	0.3
5 - 10	Closed Low Willow Shrub	0.5	Closed Low Willow Shrub	0.3
10 - 20	Closed Low Willow Shrub	0.3	Closed Low Willow Shrub	0.3
20 - 30	Closed Low Willow Shrub	0.3	Closed Low Willow Shrub	0.3

**Key To Fish Sampling Methods**

Estimated reach length (m): 180

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling Life Stage: adult Life History: Resident  
 Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 400 Max: 400 Mean: 400 Median: 400  
 Sampling Method (No. of fish): PEF (1)  
 Comments:

Species: Arctic grayling Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 21 Fish Measured: 6 Fork Lengths (mm) Min: 190 Max: 320 Mean: 235 Median: 255  
 Sampling Method (No. of fish): PEF (6) VOG (15)  
 Comments:

Species: Arctic grayling Life Stage: juvenile Life History: Resident  
 Total Fish Count: 6 Fish Measured: 6 Fork Lengths (mm) Min: 117 Max: 187 Mean: 140 Median: 152  
 Sampling Method (No. of fish): PEF (6)  
 Comments:

Species: round whitefish Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 2 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:  
 Sampling Method (No. of fish): VOG (2)  
 Comments:

**Instruments**

**Stream Gradient:** handheld optical clinometer  
**Stream Velocity:** transparent velocity head rod  
**Turbidity:** LaMotte 2020e turbidimeter  
**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod  
**Channel Widths:** handheld laser rangefinder  
**Electrofisher:** Smith-Root LR-24  
**Transparency:** secchi tube



FSK1008C050205.jp



FSK1008C050206.jp



FSK1008C050207.jp



**Station Info****Observers:** Joe Buckwalter, John Burr**Date/Time:** 08/12/2010 11:47 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.79149	-150.42982	<b>Coordinates</b>	66.79149	-150.42982	66.78896	-150.45861

**Elevation NED (m)(ft):** 356 1168**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Bettles D-1**Legal Description (MTRS):** F023N013W29**Waterbody Name:** Prospect Creek**Anadromous Waters Catalog Number:** 334-40-11000-2125-3740-4080-5030**Geographic Comments:****Visit Comments:** Juvenile Chinook salmon were also collected in a Prospect Creek tributary about 2 miles upstream at 19C03.**Wildlife Comments:** beaver chew, moose tracks**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 6.38	<b>DO (mg/L):</b> 11.26	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 41	<b>pH:</b> 5.63
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.43		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.49 1.61	

**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 208 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	21.0	9.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.85	0.70	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open White Spruce Forest	5	Open White Spruce Forest	5
5 - 10	Open White Spruce Forest	5	Open White Spruce Forest	5
10 - 20	Open White Spruce Forest	5	Open White Spruce Forest	5
20 - 30	Open White Spruce Forest	5	Open White Spruce Forest	5

**Key To Fish Sampling Methods****Estimated reach length (m):** 1900 **Total Electrofishing Time (s):** 2709

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

**Species:** burbot **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 2 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 160 **Max:** 160 **Mean:** 160 **Median:** 160  
**Sampling Method (No. of fish):** BEF (1) VOB (1)

**Comments:**

**Species:** Arctic grayling **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 14 **Fish Measured:** 14 **Fork Lengths (mm) Min:** 331 **Max:** 409 **Mean:** 356 **Median:** 370  
**Sampling Method (No. of fish):** BEF (14)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 24 **Fish Measured:** 9 **Fork Lengths (mm) Min:** 216 **Max:** 312 **Mean:** 284 **Median:** 264  
**Sampling Method (No. of fish):** BEF (19) VOB (5)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 13 **Fish Measured:** 13 **Fork Lengths (mm) Min:** 72 **Max:** 155 **Mean:** 109 **Median:** 113  
**Sampling Method (No. of fish):** BEF (13)

**Comments:**

-continued-

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<b>Species:</b> Chinook salmon	<b>Life Stage:</b> juvenile	<b>Life History:</b> Anadromous	
<b>Total Fish Count:</b> 19	<b>Fish Measured:</b> 17	<b>Fork Lengths (mm) Min:</b> 62	<b>Max:</b> 75 <b>Mean:</b> 68 <b>Median:</b> 68
<b>Sampling Method (No. of fish):</b> BEF (17) VOB (2)			
<b>Comments:</b>			
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> adult	<b>Life History:</b> Resident	
<b>Total Fish Count:</b> 9	<b>Fish Measured:</b> 9	<b>Fork Lengths (mm) Min:</b> 69	<b>Max:</b> 80 <b>Mean:</b> 73 <b>Median:</b> 74
<b>Sampling Method (No. of fish):</b> BEF (9)			
<b>Comments:</b>			
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident	
<b>Total Fish Count:</b> 43	<b>Fish Measured:</b> 12	<b>Fork Lengths (mm) Min:</b> 51	<b>Max:</b> 66 <b>Mean:</b> 60 <b>Median:</b> 58
<b>Sampling Method (No. of fish):</b> BEF (14) VOB (29)			
<b>Comments:</b>			
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile	<b>Life History:</b> Resident	
<b>Total Fish Count:</b> 3	<b>Fish Measured:</b> 3	<b>Fork Lengths (mm) Min:</b> 42	<b>Max:</b> 48 <b>Mean:</b> 44 <b>Median:</b> 45
<b>Sampling Method (No. of fish):</b> BEF (3)			
<b>Comments:</b>			
<b>Species:</b> round whitefish	<b>Life Stage:</b> adult	<b>Life History:</b> Resident	
<b>Total Fish Count:</b> 3	<b>Fish Measured:</b> 3	<b>Fork Lengths (mm) Min:</b> 345	<b>Max:</b> 349 <b>Mean:</b> 347 <b>Median:</b> 347
<b>Sampling Method (No. of fish):</b> BEF (3)			
<b>Comments:</b>			

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### Instruments

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> graduated wading rod
<b>Stream Velocity:</b> Orange Float	<b>Channel Widths:</b> handheld laser rangefinder
<b>Turbidity:</b> LaMotte 2020e turbidimeter	<b>Electrofisher:</b> Smith-Root GPP 2.5
<b>Water Quality:</b> YSI 556	<b>Transparency:</b>



FSK1009A010079.jp



FSK1009A010080.jp



FSK1009A010081.jp



FSK1009A010082.jp



FSK1009A010083.jp

**Station Info**

Observers: Ryan Snow, Daniel Reed

Date/Time: 08/12/2010 10:04 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.71500	-150.47744	<b>Coordinates</b>	66.71500	-150.47744	/	66.70900 -150.50525

Elevation NED (m)(ft): 298 978

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Bettles C-1

Legal Description (MTRS): F022N014W24

Waterbody Name: North Fork Bonanza Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments: Turbidity meter errored out continuously. Sample retained for later testing.

Wildlife Comments:

**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 10.42	<b>DO (mg/L):</b> 10.82	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 32	<b>pH:</b> 6.99
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.39		<b>Thalweg Velocity (m/s)(ft/s):</b> 1.18 3.87	

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 219 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	18.0	13.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	2.60	0.60	<b>Subdominant Substrate 2:</b> Sands

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Alder-Willow Shrub	2	Closed Low Shrub Birch-Willow Shrub	3
5 - 10	Closed Tall Alder-Willow Shrub	2	Open Black Spruce Forest	13
10 - 20	Closed Black Spruce Forest	13	Open Black Spruce Forest	13
20 - 30	Closed Black Spruce Forest	13	Open Black Spruce Forest	13

**Key To Fish Sampling Methods**

Estimated reach length (m): 2100 Total Electrofishing Time (s): 2949

(BEF) Boat-Mounted Electrofisher

**Fish Observations**

Species: Arctic grayling Life Stage: adult Life History: Resident  
 Total Fish Count: 13 Fish Measured: 13 Fork Lengths (mm) Min: 329 Max: 369 Mean: 350 Median: 349  
 Sampling Method (No. of fish): BEF (13)  
 Comments:

Species: Arctic grayling Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 4 Fish Measured: 4 Fork Lengths (mm) Min: 303 Max: 328 Mean: 313 Median: 315  
 Sampling Method (No. of fish): BEF (4)  
 Comments:

Species: Arctic grayling Life Stage: juvenile Life History: Resident  
 Total Fish Count: 77 Fish Measured: 77 Fork Lengths (mm) Min: 8 Max: 150 Mean: 61 Median: 79  
 Sampling Method (No. of fish): BEF (77)  
 Comments:

Species: slimy sculpin Life Stage: adult Life History: Resident  
 Total Fish Count: 10 Fish Measured: 10 Fork Lengths (mm) Min: 69 Max: 95 Mean: 77 Median: 82  
 Sampling Method (No. of fish): BEF (10)  
 Comments:

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<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident	
<b>Total Fish Count:</b> 13	<b>Fish Measured:</b> 13	<b>Fork Lengths (mm) Min:</b> 53	<b>Max:</b> 65 <b>Mean:</b> 59 <b>Median:</b> 59
<b>Sampling Method (No. of fish):</b> BEF (13)			
<b>Comments:</b>			
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile	<b>Life History:</b> Resident	
<b>Total Fish Count:</b> 7	<b>Fish Measured:</b> 7	<b>Fork Lengths (mm) Min:</b> 22	<b>Max:</b> 30 <b>Mean:</b> 26 <b>Median:</b> 26
<b>Sampling Method (No. of fish):</b> BEF (7)			
<b>Comments:</b>			
<b>Species:</b> round whitefish	<b>Life Stage:</b> adult	<b>Life History:</b> Resident	
<b>Total Fish Count:</b> 18	<b>Fish Measured:</b> 18	<b>Fork Lengths (mm) Min:</b> 319	<b>Max:</b> 384 <b>Mean:</b> 354 <b>Median:</b> 351
<b>Sampling Method (No. of fish):</b> BEF (18)			
<b>Comments:</b>			
<b>Species:</b> round whitefish	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident	
<b>Total Fish Count:</b> 7	<b>Fish Measured:</b> 7	<b>Fork Lengths (mm) Min:</b> 218	<b>Max:</b> 318 <b>Mean:</b> 288 <b>Median:</b> 268
<b>Sampling Method (No. of fish):</b> BEF (7)			
<b>Comments:</b>			
<b>Species:</b> round whitefish	<b>Life Stage:</b> juvenile	<b>Life History:</b> Resident	
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 144	<b>Max:</b> 144 <b>Mean:</b> 144 <b>Median:</b> 144
<b>Sampling Method (No. of fish):</b> BEF (1)			
<b>Comments:</b>			

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**Instruments**

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> graduated wading rod
<b>Stream Velocity:</b> transparent velocity head rod	<b>Channel Widths:</b> handheld laser rangefinder
<b>Turbidity:</b>	<b>Electrofisher:</b> Smith-Root GPP 2.5
<b>Water Quality:</b> YSI 556	<b>Transparency:</b>



FSK1009B010066.jp



FSK1009B010067.jp



FSK1009B010068.jp



FSK1009B010069.jp



FSK1009B010070.jp

**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/12/2010 10:37 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.70829	-148.28933	<b>Coordinates</b>	67.70829	-148.28933	67.70763	-148.29426

Elevation NED (m)(ft): 608 1995

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-3

Legal Description (MTRS): F033N003W06

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 5.29 DO (mg/L): 12.70 DO (%): Conductivity (µS/cm): 252 pH: 7.89

Water Color: Clear Turbidity (NTU): 8.49 Thalweg Velocity (m/s)(ft/s): 1.27 4.17

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 53 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	20.0	7.0	<b>Cobble</b>
<b>Thalweg Depth</b>	0.65	0.50	<b>Subdominant Substrate 1:</b>
			<b>Boulder</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	3	Closed Black Spruce-White Spruce Forest	20
5 - 10	Open Black Spruce-White Spruce Forest	20	Closed Black Spruce-White Spruce Forest	20
10 - 20	Open Black Spruce-White Spruce Forest	15	Closed Black Spruce-White Spruce Forest	20
20 - 30	Open Black Spruce-White Spruce Forest	15	Closed Black Spruce-White Spruce Forest	20

**Key To Fish Sampling Methods**

Estimated reach length (m): 280

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 9 Fish Measured: 5 Fork Lengths (mm) Min: 25 Max: 77 Mean: 57 Median: 51

Sampling Method (No. of fish): PEF (5) VOG (4)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 78 Max: 78 Mean: 78 Median: 78

Sampling Method (No. of fish): PEF (1)

Comments:

Species: slimy sculpin

Life Stage: juvenile

Life History: Resident

Total Fish Count: 2 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (2)

Comments:

**Instruments**

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1009C010210.jp



FSK1009C010211.jp



FSK1009C010212.jp



FSK1009C010213.jp

**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/12/2010 10:46 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.67373	-147.92876	<b>Coordinates</b>	67.67370	-147.92896	/	67.67181 -147.92520

Elevation NED (m)(ft): 777 2549

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-2

Legal Description (MTRS): F033N002W23

Waterbody Name: Kern Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.70 DO (mg/L): 10.18 DO (%): Conductivity (µS/cm): 464 pH: 7.62

Water Color: Clear Turbidity (NTU): 10.65 Thalweg Velocity (m/s)(ft/s): 0.53 1.74

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 54 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	20.0	6.2	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.10	0.36	<b>Subdominant Substrate 2:</b>

Rosgen Class: D4 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	0.3	Open Low Willow Shrub	0.3
5 - 10	Closed Low Willow Shrub	0.3	Closed Low Willow Shrub	0.3
10 - 20	Closed Low Willow Shrub	1	Closed Low Willow Shrub	1
20 - 30	Open Black Spruce-White Spruce Forest	12	Closed Low Willow Shrub	1

**Key To Fish Sampling Methods**

Estimated reach length (m): 248

(PEF) Portable Electrofisher

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 210 Max: 210 Mean: 210 Median: 210

Sampling Method (No. of fish): PEF (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 5 Fish Measured: 5 Fork Lengths (mm) Min: 107 Max: 155 Mean: 123 Median: 131

Sampling Method (No. of fish): PEF (5)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 10 Fish Measured: 10 Fork Lengths (mm) Min: 72 Max: 100 Mean: 89 Median: 86

Sampling Method (No. of fish): PEF (10)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 8 Fish Measured: 8 Fork Lengths (mm) Min: 57 Max: 66 Mean: 61 Median: 61

Sampling Method (No. of fish): PEF (8)

Comments:

**Species:** round whitefish                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 1      **Fish Measured:** 1      **Fork Lengths (mm) Min:** 135      **Max:** 135      **Mean:** 135      **Median:** 135  
**Sampling Method (No. of fish):** PEF (1)  
**Comments:**

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### Instruments

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> graduated wading rod
<b>Stream Velocity:</b> transparent velocity head rod	<b>Channel Widths:</b> handheld laser rangefinder
<b>Turbidity:</b> LaMotte 2020e turbidimeter	<b>Electrofisher:</b> Smith-Root LR-24
<b>Water Quality:</b> YSI 556	<b>Transparency:</b> secchi tube



FSK1009C020215.jp



FSK1009C020216.jp



FSK1009C020217.jp



**Station Info****Observers:** Jonathan Kirsch, Mary Simmering**Date/Time:** 08/12/2010 11:01 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.63304	-148.29008	<b>Coordinates</b>	67.63304	-148.29008	/	67.63377 -148.29344

**Elevation NED (m)(ft):** 638 2093**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar C-3**Legal Description (MTRS):** F032N003W06**Waterbody Name:** Lake Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Appears to be excellent grayling habitat (long, deep glide, clear), but no fish were detected.**Wildlife Comments:****Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 14.22	<b>DO (mg/L):</b> 8.59	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 219	<b>pH:</b> 7.65
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.14		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.38 1.25	

**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 141 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	8.0	7.5	<b>Subdominant Substrate 1:</b> Boulder
<b>Thalweg Depth</b>	1.10	0.50	<b>Subdominant Substrate 2:</b> Gravel

**Rosgen Class:** E3 Low gradient, meandering riffle/pool stream with low width/depth ratio and little deposition. Very efficient and stable. High meander width ratio.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from Bank (m)</b>	<b>Left Bank Vegetation Type</b>	<b>Canopy Height(m)</b>	<b>Right Bank Vegetation Type</b>	<b>Canopy Height(m)</b>
0 - 5	Closed Low Willow Shrub	0.3	Closed Low Willow Shrub	1
5 - 10	Closed Low Willow Shrub	0.3	Open Black Spruce-White Spruce Forest	15
10 - 20	Closed Low Willow Shrub	0.3	Closed Black Spruce-White Spruce Forest	15
20 - 30	Closed Black Spruce-White Spruce Forest	15	Closed Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods****Estimated reach length (m):** 300

(PEF) Portable Electrofisher

**Fish Observations**

No Fish Found

**Instruments****Stream Gradient:** handheld optical clinometer**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** handheld laser rangefinder**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



FSK1009C030220.jp



FSK1009C030221.jp



FSK1009C030222.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/12/2010 11:11 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.54916	-148.01876	<b>Coordinates</b>	67.54775	-148.02255	/	67.54916 -148.01876

Elevation NED (m)(ft): 735 2411

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-3

Legal Description (MTRS): F031N002W05

Waterbody Name: McLellan Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments: Did not record velocity.

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 10.80	DO (mg/L): 11.60	DO (%):	Conductivity (µS/cm): 150	pH: 6.56
Water Color: Clear		Turbidity (NTU): 1.50	Thalweg Velocity (m/s)(ft/s):	

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 45 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	15.0	8.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.20	0.40	<b>Subdominant Substrate 2:</b> Boulder

Rosgen Class: B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	3	Closed Low Willow Shrub	1
5 - 10	Closed Tall Willow Shrub	3	Closed Low Willow Shrub	1
10 - 20	Closed Tall Willow Shrub	3	Closed Low Willow Shrub	1
20 - 30	Closed Black Spruce-White Spruce Forest	20	Open Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 4 Fish Measured: 4 Fork Lengths (mm) Min: 340 Max: 380 Mean: 362 Median: 360

Sampling Method (No. of fish): PEF (4)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 17 Fish Measured: 7 Fork Lengths (mm) Min: 230 Max: 310 Mean: 255 Median: 270

Sampling Method (No. of fish): PEF (7) VOG (10)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1009C040225.jp



FSK1009C040226.jp



FSK1009C040227.jp



**Station Info****Observers:** Jonathan Kirsch, Mary Simmering**Date/Time:** 08/12/2010 11:28 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.45778	-148.17768	<b>Coordinates</b>	67.45885	-148.17839	/	67.45699 -148.17965

**Elevation NED (m)(ft):** 782 2566**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar B-3**Legal Description (MTRS):** F030N003W03**Waterbody Name:** Big Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:****Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 7.86 **DO (mg/L):** 10.24 **DO (%):** **Conductivity (µS/cm):** 184 **pH:** 3.46**Water Color:** Clear **Turbidity (NTU):** 0.00 **Thalweg Velocity (m/s)(ft/s):** 0.69 2.26**Stream Channel****Stream Gradient (%):** 1.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 55 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	17.0	6.2	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	0.90	0.44	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b>Left Bank Vegetation Type</b>	<b>Right Bank Vegetation Type</b>	
<b>0 - 5</b> Closed Low Willow Shrub	1.5 Closed Low Willow Shrub	1.5
<b>5 - 10</b> Closed Low Willow Shrub	1.5 Closed Low Willow Shrub	1.5
<b>10 - 20</b> Closed Low Willow Shrub	1.5 Mesic Graminoid Herbaceous	0.1
<b>20 - 30</b> Closed Low Willow Shrub	1.5 Mesic Graminoid Herbaceous	0.1

**Key To Fish Sampling Methods****Estimated reach length (m):** 248

(PEF) Portable Electrofisher

**Fish Observations**

No Fish Found

**Instruments****Stream Gradient:** handheld optical clinometer**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** handheld laser rangefinder**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



FSK1009C050230.jp



FSK1009C050231.jp



FSK1009C050232.jp

FSK1009C050233.jp



**Station Info**

Observers: Joe Buckwalter, John Burr

Date/Time: 08/13/2010 10:26 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.66086	-148.39703	<b>Coordinates</b>	67.66086	-148.39703	/	67.64175 -148.40347

Elevation NED (m)(ft): 569 1867

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-3

Legal Description (MTRS): F033N004W26

Waterbody Name: North Fork Chandalar River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments: moose tracks

**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 9.71	<b>DO (mg/L):</b> 10.32	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 360	<b>pH:</b> 7.74
<b>Water Color:</b> Muddy	<b>Turbidity (NTU):</b> 8.16		<b>Thalweg Velocity (m/s)(ft/s):</b> 1.30 4.26	

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): ##### Embeddedness: Very High

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Sands
<b>Width</b>	60.0	49.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	2.85	1.60	<b>Subdominant Substrate 2:</b>

Rosgen Class: C5 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Open Tall Willow Shrub	2	Closed Tall Willow Shrub	1.5
5 - 10	Open Balsam Poplar (Black Cottonwood) Forest	7	Open White Spruce Forest	7
10 - 20	Open White Spruce Forest	7	Open White Spruce Forest	7
20 - 30	Open White Spruce Forest	7	Open White Spruce Forest	7

**Key To Fish Sampling Methods**

Estimated reach length (m): 5200 Total Electrofishing Time (s): 7912

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: burbot Life Stage: adult Life History: Resident  
 Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 629 Max: 629 Mean: 629 Median: 629  
 Sampling Method (No. of fish): BEF (1)  
 Comments:

Species: Arctic grayling Life Stage: adult Life History: Resident  
 Total Fish Count: 5 Fish Measured: 5 Fork Lengths (mm) Min: 344 Max: 385 Mean: 364 Median: 364  
 Sampling Method (No. of fish): BEF (5)  
 Comments:

Species: Arctic grayling Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 3 Fish Measured: 2 Fork Lengths (mm) Min: 191 Max: 252 Mean: 221 Median: 221  
 Sampling Method (No. of fish): BEF (2) VOB (1)  
 Comments:

Species: Arctic grayling Life Stage: juvenile Life History: Resident  
 Total Fish Count: 11 Fish Measured: 9 Fork Lengths (mm) Min: 49 Max: 183 Mean: 70 Median: 116  
 Sampling Method (No. of fish): BEF (9) VOB (2)  
 Comments:

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<b>Species:</b> northern pike	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 395	<b>Max:</b> 395	<b>Mean:</b> 395	<b>Median:</b> 395	
<b>Sampling Method (No. of fish):</b> BEF (1)						
<b>Comments:</b>						
<b>Species:</b> northern pike	<b>Life Stage:</b> juvenile	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 2	<b>Fish Measured:</b>	<b>Fork Lengths (mm) Min:</b>	<b>Max:</b>	<b>Mean:</b>	<b>Median:</b>	
<b>Sampling Method (No. of fish):</b> VOB (2)						
<b>Comments:</b>						
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 6	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 50	<b>Max:</b> 50	<b>Mean:</b> 50	<b>Median:</b> 50	
<b>Sampling Method (No. of fish):</b> BEF (1) VOB (5)						
<b>Comments:</b>						
<b>Species:</b> least cisco	<b>Life Stage:</b> juvenile	<b>Life History:</b> Unknown				
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 75	<b>Max:</b> 75	<b>Mean:</b> 75	<b>Median:</b> 75	
<b>Sampling Method (No. of fish):</b> BEF (1)						
<b>Comments:</b> One least cisco (initially identified as a sheefish) kept as a specimen (Tag ID: T000306) and fin clipped (Vial #:						
<b>Species:</b> round whitefish	<b>Life Stage:</b> adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 2	<b>Fish Measured:</b> 2	<b>Fork Lengths (mm) Min:</b> 412	<b>Max:</b> 420	<b>Mean:</b> 416	<b>Median:</b> 416	
<b>Sampling Method (No. of fish):</b> BEF (2)						
<b>Comments:</b>						
<b>Species:</b> round whitefish	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 200	<b>Max:</b> 200	<b>Mean:</b> 200	<b>Median:</b> 200	
<b>Sampling Method (No. of fish):</b> BEF (1)						
<b>Comments:</b>						

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**Instruments**

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> handheld sonar depth finder
<b>Stream Velocity:</b> GPS Float	<b>Channel Widths:</b> handheld laser rangefinder
<b>Turbidity:</b> LaMotte 2020e turbidimeter	<b>Electrofischer:</b> Smith-Root GPP 2.5
<b>Water Quality:</b> YSI 556	<b>Transparency:</b>



FSK1010A010111.jp



FSK1010A010112.jp



FSK1010A010115.jp



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FSK1010A010120.jp



FSK1010A010121.jp

**Station Info**

Observers: Ryan Snow

Date/Time: 08/13/2010 12:41 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.81187	-147.74561	<b>Coordinates</b>	67.81187	-147.74561	/	67.77084 -147.72769

Elevation NED (m)(ft): 579 1900

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar D-2

Legal Description (MTRS): F035N001W34

Waterbody Name: Middle Fork Chandalar River

Anadromous Waters Catalog Number:

Geographic Comments:

**Visit Comments:** Stream was too deep to use wading rod for depth. Well defined upstream channel with a high number of braids lower in the reach. Bankfull would be the stream depth plus 2.2 meters at the habitat transect.

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.07 DO (mg/L): 9.77 DO (%): Conductivity (µS/cm): 355 pH: 8.07

Water Color: Glacial, High Turbidity Turbidity (NTU): 170.00 Thalweg Velocity (m/s)(ft/s):

**Stream Channel**

Stream Gradient (%): 1.7 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): ##### Embeddedness: Moderate

Channel Dimensions (m): Bank Full Wetted Dominant Substrate: Gravel

Width 60.0 57.0 Subdominant Substrate 1: Sands

Thalweg Depth Subdominant Substrate 2: Cobble

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Black Spruce Forest	19	Closed Black Spruce Forest	17
5 - 10	Closed Black Spruce Forest	19	Closed Black Spruce Forest	17
10 - 20	Closed Black Spruce Forest	19	Closed Black Spruce Forest	17
20 - 30	Closed Black Spruce Forest	19	Closed Black Spruce Forest	17

**Key To Fish Sampling Methods**

Estimated reach length (m): 6300 Total Electrofishing Time (s): 2583

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: burbot

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOB (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 7 Fish Measured: 7 Fork Lengths (mm) Min: 213 Max: 297 Mean: 268 Median: 255

Sampling Method (No. of fish): BEF (7)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 7 Fish Measured: 7 Fork Lengths (mm) Min: 52 Max: 67 Mean: 56 Median: 59

Sampling Method (No. of fish): BEF (7)

Comments:

Species: slimy sculpin

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 46 Max: 46 Mean: 46 Median: 46

Sampling Method (No. of fish): BEF (1)

Comments:

-continued-

**Species:** round whitefish                      **Life Stage:** adult                      **Life History:** Resident  
**Total Fish Count:** 4      **Fish Measured:** 2      **Fork Lengths (mm) Min:** 356      **Max:** 359      **Mean:** 357      **Median:** 357  
**Sampling Method (No. of fish):** BEF (2) VOB (2)  
**Comments:**

**Species:** round whitefish                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 1      **Fish Measured:** 1      **Fork Lengths (mm) Min:** 235      **Max:** 235      **Mean:** 235      **Median:** 235  
**Sampling Method (No. of fish):** BEF (1)  
**Comments:**

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### **Instruments**

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:**

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:**

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root GPP 2.5

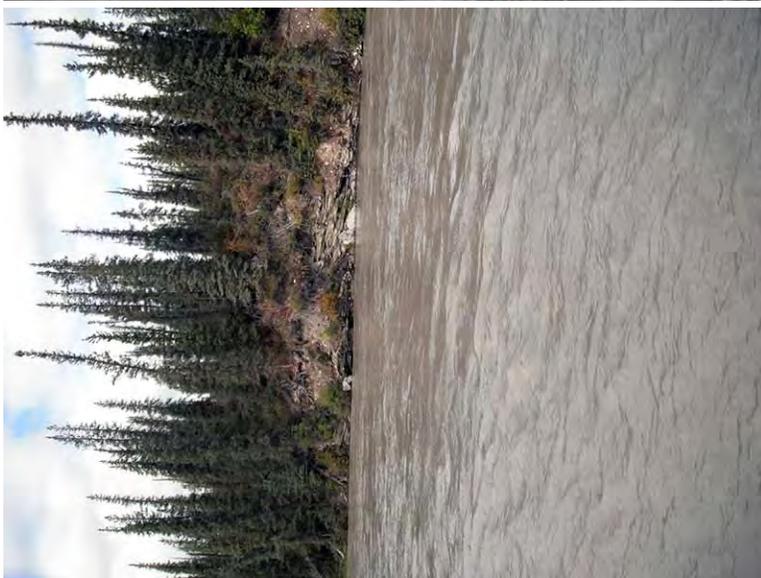
**Transparency:**



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FSK1010B010072.jp



FSK1010B010073.jp



FSK1010B010074.jp



FSK1010B010075.jp



FSK1010B010076.jp

**Station Info****Observers:** Jonathan Kirsch, Daniel Reed**Date/Time:** 08/13/2010 6:32 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.74606	-149.08305	<b>Coordinates</b>	67.74606	-149.08305	/	67.74331 -149.08668

**Elevation NED (m)(ft):** 823 2700**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar C-5**Legal Description (MTRS):** F034N007W26**Waterbody Name:** Robert Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:****Wildlife Comments:****Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 5.60	<b>DO (mg/L):</b> 11.83	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 348	<b>pH:</b> 7.85
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 1.71		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.96 3.15	

**Stream Channel****Stream Gradient (%):** 2 **Entrenchment:** Entrenched**Catchment Area(sq. km):** 40 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	53.0	8.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	0.84	0.26	<b>Subdominant Substrate 2:</b> Boulder

**Rosgen Class:** F4 Entrenched meandering riffle/pool channel on low gradients with high width/depth ratio.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b><u>Left Bank Vegetation Type</u></b>	<b><u>Right Bank Vegetation Type</u></b>	
<b>0 - 5</b> Unvegetated	0	Open Low Willow Shrub 1
<b>5 - 10</b> Open Low Willow Shrub	1.5	Open Low Willow Shrub 1
<b>10 - 20</b> Open Low Willow Shrub	1.5	Open Low Willow Shrub 1
<b>20 - 30</b> Open Low Willow Shrub	1.5	Open Low Willow Shrub 1

**Key To Fish Sampling Methods****Estimated reach length (m):** 300

(PEF) Portable Electrofisher

**Fish Observations**

No Fish Found

**Instruments****Stream Gradient:** handheld optical clinometer**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** handheld laser rangefinder**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



FSK1010C010235.jp



FSK1010C010236.jp



FSK1010C010237.jp



**Station Info**

Observers: Jonathan Kirsch, Daniel Reed

Date/Time: 08/13/2010 6:42 PM

Station	Latitude	Longitude	Sample	Latitude	Longitude	Latitude	Longitude
Coordinates	67.65761	-149.22854	Coordinates	67.65761	-149.22854	67.65545	-149.22543

Elevation NED (m)(ft): 764 2507

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-5

Legal Description (MTRS): F033N007W30

Waterbody Name: Sheep Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 5.62	DO (mg/L): 12.17	DO (%):	Conductivity (µS/cm): 354	pH: 8.04
Water Color: Clear	Turbidity (NTU): 3.22	Thalweg Velocity (m/s)(ft/s): 1.09	3.58	

**Stream Channel**

Stream Gradient (%): 2.5 Entrenchment: Entrenched

Catchment Area(sq. km): 50 Embeddedness: Negligible

Channel Dimensions (m):	Bank Full	Wetted	Dominant Substrate:
Width	25.0	9.0	Gravel
Thalweg Depth	0.80	0.75	Subdominant Substrate 1: Cobble
			Subdominant Substrate 2: Boulder

Rosgen Class: F4 Entrenched meandering riffle/pool channel on low gradients with high width/depth ratio.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Open Low Willow Shrub	1.5	Mesic Graminoid Herbaceous	0.3
5 - 10	Open Low Willow Shrub	1.5	Mesic Graminoid Herbaceous	0.3
10 - 20	Open Low Willow Shrub	1	Mesic Graminoid Herbaceous	0.3
20 - 30	Open Low Willow Shrub	1	Mesic Graminoid Herbaceous	0.3

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

**Fish Observations**

No Fish Found

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1010C020240.jp



FSK1010C020241.jp



FSK1010C020242.jp



**Station Info**

Observers: Jonathan Kirsch, Daniel Reed

Date/Time: 08/13/2010 6:52 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.70591	-149.35002	<b>Coordinates</b>	67.70591	-149.35002	/ 67.70410	-149.34649

Elevation NED (m)(ft): 825 2707

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-5

Legal Description (MTRS): F033N008W09

Waterbody Name: Big Spruce Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.00 DO (mg/L): 11.60 DO (%): Conductivity (µS/cm): 315 pH: 7.95

Water Color: Clear Turbidity (NTU): 0.59 Thalweg Velocity (m/s)(ft/s): 1.33 4.36

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 39 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	28.0	6.0	<b>Subdominant Substrate 1:</b>
<b>Thalweg Depth</b>	1.40	0.48	<b>Subdominant Substrate 2:</b>
			Gravel
			Cobble
			Boulder

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open Tall Willow Shrub	2	Open Tall Willow Shrub	2
5 - 10	Open Tall Willow Shrub	2	Open Tall Willow Shrub	2
10 - 20	Open Tall Willow Shrub	2	Open Tall Willow Shrub	2
20 - 30	Open Tall Willow Shrub	2	Open Tall Willow Shrub	2

**Key To Fish Sampling Methods**

Estimated reach length (m): 240

(PEF) Portable Electrofisher

**Fish Observations**

No Fish Found

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1010C030245.jp



FSK1010C030246.jp



FSK1010C030247.jp

FSK1010C030248.jp



**Station Info**

Observers: Jonathan Kirsch, Daniel Reed

Date/Time: 08/13/2010 6:59 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.66191	-149.68345	<b>Coordinates</b>	67.66191	-149.68345	/	67.66171 -149.68885

Elevation NED (m)(ft): 500 1640

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-6

Legal Description (MTRS): F033N009W30

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 5.97 DO (mg/L): 12.15 DO (%): Conductivity (µS/cm): 330 pH: 8.09

Water Color: Clear Turbidity (NTU): 7.24 Thalweg Velocity (m/s)(ft/s): 1.36 4.46

**Stream Channel**

Stream Gradient (%): 2.5 Entrenchment: Entrenched

Catchment Area(sq. km): 50 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	47.0	5.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	0.80	0.42	<b>Subdominant Substrate 2:</b> Boulder

Rosgen Class: F3 Entrenched meandering riffle/pool channel on low gradients with high width/depth ratio.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open Tall Alder Shrub	6	Unvegetated	0
5 - 10	Open Tall Alder Shrub	6	Unvegetated	0
10 - 20	Open Black Spruce-White Spruce Forest	12	Unvegetated	0
20 - 30	Open Black Spruce-White Spruce Forest	12	Closed Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 200

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Dolly Varden

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 8 Fish Measured: 6 Fork Lengths (mm) Min: 94 Max: 134 Mean: 112 Median: 114

Sampling Method (No. of fish): PEF (6) VOG (2)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 4 Fish Measured: 2 Fork Lengths (mm) Min: 200 Max: 212 Mean: 206 Median: 206

Sampling Method (No. of fish): PEF (2) VOG (2)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 5 Fish Measured: 5 Fork Lengths (mm) Min: 108 Max: 188 Mean: 144 Median: 148

Sampling Method (No. of fish): PEF (5)

Comments:

## Instruments

**Stream Gradient:** handheld optical clinometer  
**Stream Velocity:** transparent velocity head rod  
**Turbidity:** LaMotte 2020e turbidimeter  
**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod  
**Channel Widths:** handheld laser rangefinder  
**Electrofisher:** Smith-Root LR-24  
**Transparency:** secchi tube



FSK1010C040250.jp



FSK1010C040251.jp



FSK1010C040252.jp



**Station Info**

Observers: Jonathan Kirsch, Daniel Reed

Date/Time: 08/13/2010 7:10 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.54469	-149.92568	<b>Coordinates</b>	67.54469	-149.92568	67.54360	-149.91999

Elevation NED (m)(ft): 455 1493

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-6

Legal Description (MTRS): F031N011W02

Waterbody Name: Vi Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.52 DO (mg/L): 10.90 DO (%): Conductivity (µS/cm): 527 pH: 7.92

Water Color: Clear Turbidity (NTU): 18.20 Thalweg Velocity (m/s)(ft/s): 0.80 2.62

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 50 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	28.0	7.0	<b>Gravel</b>
<b>Thalweg Depth</b>	1.20	0.30	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Boulder</b>

Rosgen Class: B4 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Unvegetated	0	Closed Low Willow Shrub	1.5
5 - 10	Unvegetated	0	Open Black Spruce-White Spruce Forest	20
10 - 20	Open Black Spruce-White Spruce Forest	10	Open Black Spruce-White Spruce Forest	15
20 - 30	Closed Black Spruce-White Spruce Forest	15	Open Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 280

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 6 Fish Measured: 1 Fork Lengths (mm) Min: 200 Max: 200 Mean: 200 Median: 200  
 Sampling Method (No. of fish): PEF (1) VOG (5)

Comments:

Species: Arctic grayling Life Stage: juvenile Life History: Resident  
 Total Fish Count: 5 Fish Measured: 5 Fork Lengths (mm) Min: 95 Max: 182 Mean: 145 Median: 138  
 Sampling Method (No. of fish): PEF (5)

Comments:

Species: slimy sculpin Life Stage: adult Life History: Resident  
 Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 72 Max: 73 Mean: 72 Median: 72  
 Sampling Method (No. of fish): PEF (3)

Comments:

Species: slimy sculpin Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 22 Fish Measured: 7 Fork Lengths (mm) Min: 62 Max: 68 Mean: 64 Median: 65  
 Sampling Method (No. of fish): PEF (7) VOG (15)

Comments:

**Instruments**

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1010C050255.jp



FSK1010C050256.jp



FSK1010C050257.jp



**Station Info**

Observers: Jonathan Kirsch, Daniel Reed

Date/Time: 08/13/2010 7:33 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.41429	-149.81631	<b>Coordinates</b>	67.41429	-149.81631	/	67.41461 -149.82217

Elevation NED (m)(ft): 733 2405

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-6

Legal Description (MTRS): F030N010W20

Waterbody Name: Minnie Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.50 DO (mg/L): 10.57 DO (%): Conductivity (µS/cm): 86 pH: 7.01

Water Color: Clear Turbidity (NTU): 0.86 Thalweg Velocity (m/s)(ft/s): 1.14 3.74

**Stream Channel**

Stream Gradient (%): 2.5 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 53 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	28.0	8.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	0.98	0.54	<b>Subdominant Substrate 2:</b> Boulder

Rosgen Class: B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Unvegetated	0	Open Black Spruce-White Spruce Forest	10
5 - 10	Open Black Spruce-White Spruce Forest	10	Open Black Spruce-White Spruce Forest	15
10 - 20	Open Black Spruce-White Spruce Forest	10	Open Black Spruce-White Spruce Forest	15
20 - 30	Open Black Spruce-White Spruce Forest	10	Open Black Spruce-White Spruce Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

**Fish Observations**

<b>Species:</b> Dolly Varden	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Unknown
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 115 <b>Max:</b> 115 <b>Mean:</b> 115 <b>Median:</b> 115
<b>Sampling Method (No. of fish):</b> PEF (1)		
<b>Comments:</b>		
<b>Species:</b> Dolly Varden	<b>Life Stage:</b> juvenile	<b>Life History:</b> Unknown
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 44 <b>Max:</b> 44 <b>Mean:</b> 44 <b>Median:</b> 44
<b>Sampling Method (No. of fish):</b> PEF (1)		
<b>Comments:</b>		
<b>Species:</b> round whitefish	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 242 <b>Max:</b> 242 <b>Mean:</b> 242 <b>Median:</b> 242
<b>Sampling Method (No. of fish):</b> PEF (1)		
<b>Comments:</b>		

## Instruments

**Stream Gradient:** handheld optical clinometer  
**Stream Velocity:** transparent velocity head rod  
**Turbidity:** LaMotte 2020e turbidimeter  
**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod  
**Channel Widths:** handheld laser rangefinder  
**Electrofisher:** Smith-Root LR-24  
**Transparency:** secchi tube



FSK1010C060260.jp



FSK1010C060261.jp



FSK1010C060262.jp

FSK1010C060263.jp



**Station Info**

Observers: Jonathan Kirsch, Daniel Reed

Date/Time: 08/13/2010 7:42 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.33565	-149.95133	<b>Coordinates</b>	67.33565	-149.95133	/ 67.33547	-149.95738

Elevation NED (m)(ft): 542 1778

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-6

Legal Description (MTRS): F029N011W14

Waterbody Name: Marion Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.84	DO (mg/L): 11.28	DO (%):	Conductivity (µS/cm): 123	pH: 4.60
Water Color: Clear	Turbidity (NTU): 0.18	Thalweg Velocity (m/s)(ft/s): 0.96	3.15	

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 82 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	25.0	10.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.00	0.50	<b>Subdominant Substrate 2:</b> Boulder

Rosgen Class: B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	1.5	Closed Low Willow Shrub	1.5
5 - 10	Closed Low Willow Shrub	1.5	Closed Low Willow Shrub	1.5
10 - 20	Closed Tall Willow Shrub	5	Closed Low Willow Shrub	1.5
20 - 30	Closed Tall Willow Shrub	5	Closed Low Willow Shrub	1.5

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

**Fish Observations**

No Fish Found

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1010C070265.jp



FSK1010C070266.jp



FSK1010C070267.jp

FSK1010C070268.jp



**Station Info**

Observers: Jonathan Kirsch, James Bales

Date/Time: 08/14/2010 8:47 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.54491	-150.82284	<b>Coordinates</b>	66.54491	-150.82284	/	66.54479 -150.84103

Elevation NED (m)(ft): 242 794

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Bettles C-2

Legal Description (MTRS): F020N015W20

Waterbody Name: Fish Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.48 DO (mg/L): 10.53 DO (%): Conductivity (µS/cm): 24 pH: 6.44

Water Color: Clear Turbidity (NTU): 0.45 Thalweg Velocity (m/s)(ft/s): 0.68 2.23

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 277 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	26.0	11.8	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.39	0.74	<b>Subdominant Substrate 2:</b> Sands

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Black Spruce-White Spruce Forest	20	Closed Black Spruce-White Spruce Forest	20
5 - 10	Closed Black Spruce-White Spruce Forest	20	Closed Black Spruce-White Spruce Forest	20
10 - 20	Closed Black Spruce-White Spruce Forest	20	Closed Black Spruce-White Spruce Forest	20
20 - 30	Closed Black Spruce-White Spruce Forest	20	Closed Black Spruce-White Spruce Forest	20

**Key To Fish Sampling Methods**

Estimated reach length (m): 1500 Total Electrofishing Time (s): 981

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 102 Fish Measured: 2 Fork Lengths (mm) Min: 365 Max: 405 Mean: 385 Median: 385

Sampling Method (No. of fish): BEF (2) VOB (100)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 14 Fish Measured: 4 Fork Lengths (mm) Min: 290 Max: 320 Mean: 310 Median: 305

Sampling Method (No. of fish): BEF (4) VOB (10)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 54 Fish Measured: 4 Fork Lengths (mm) Min: 60 Max: 125 Mean: 90 Median: 92

Sampling Method (No. of fish): BEF (4) VOB (50)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 77 Max: 77 Mean: 77 Median: 77

Sampling Method (No. of fish): BEF (1)

Comments:

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<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 5	<b>Fish Measured:</b>	<b>Fork Lengths (mm) Min:</b>	<b>Max:</b>	<b>Mean:</b>	<b>Median:</b>	
<b>Sampling Method (No. of fish):</b> VOB (5)						
<b>Comments:</b>						
<b>Species:</b> round whitefish	<b>Life Stage:</b> adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 10	<b>Fish Measured:</b>	<b>Fork Lengths (mm) Min:</b>	<b>Max:</b>	<b>Mean:</b>	<b>Median:</b>	
<b>Sampling Method (No. of fish):</b> VOB (10)						
<b>Comments:</b>						
<b>Species:</b> round whitefish	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 2	<b>Fish Measured:</b> 2	<b>Fork Lengths (mm) Min:</b> 308	<b>Max:</b> 315	<b>Mean:</b> 311	<b>Median:</b> 311	
<b>Sampling Method (No. of fish):</b> BEF (2)						
<b>Comments:</b>						

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**Instruments**

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> graduated wading rod
<b>Stream Velocity:</b> transparent velocity head rod	<b>Channel Widths:</b> handheld laser rangefinder
<b>Turbidity:</b> LaMotte 2020e turbidimeter	<b>Electrofisher:</b> Smith-Root GPP 2.5
<b>Water Quality:</b> YSI 556	<b>Transparency:</b>



FSK1011A010145.jp



FSK1011A010146.jp



FSK1011A010147.jp



FSK1011A010148.jp

**Station Info****Observers:** Ryan Snow, Greta Burkart**Date/Time:** 08/14/2010 11:15 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.65917	-150.51063	<b>Coordinates</b>	66.65917	-150.51063	/	66.65917 -150.54122

**Elevation NED (m)(ft):** 293 961**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Bettles C-2**Legal Description (MTRS):** F021N014W11**Waterbody Name:** South Fork Bonanza Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Entrenchment was low at the habitat point but appears to increase near the end of the sample reach. The second half of the reach was 15 meters wetted width and 19 meters bankfull width.**Wildlife Comments:** moose droppings**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 7.10	<b>DO (mg/L):</b> 11.23	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 42	<b>pH:</b> 7.29
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.52		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.87 2.85	

**Stream Channel****Stream Gradient (%):** 1.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 253 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	38.0	13.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.31	0.54	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	4.05	Closed Paper Birch Forest	3.51
5 - 10	Closed Tall Willow Shrub	4.05	Closed Paper Birch Forest	3.51
10 - 20	Closed Tall Willow Shrub	4.05	Closed Black Spruce-White Spruce Forest	4
20 - 30	Closed Black Spruce-White Spruce Forest	22	Closed Black Spruce-White Spruce Forest	4

**Key To Fish Sampling Methods****Estimated reach length (m):** 2200 **Total Electrofishing Time (s):** 2216

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

**Species:** Arctic grayling **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 17 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 329 **Max:** 329 **Mean:** 329 **Median:** 329  
**Sampling Method (No. of fish):** BEF (1) VOB (16)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 5 **Fish Measured:** 5 **Fork Lengths (mm) Min:** 215 **Max:** 319 **Mean:** 296 **Median:** 267  
**Sampling Method (No. of fish):** BEF (5)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 170 **Max:** 170 **Mean:** 170 **Median:** 170  
**Sampling Method (No. of fish):** BEF (1)

**Comments:**

**Species:** slimy sculpin **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 5 **Fish Measured:** 4 **Fork Lengths (mm) Min:** 75 **Max:** 95 **Mean:** 86 **Median:** 85  
**Sampling Method (No. of fish):** BEF (4) VOB (1)

**Comments:**

-continued-

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<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 65	<b>Max:</b> 65	<b>Mean:</b> 65	<b>Median:</b> 65	
<b>Sampling Method (No. of fish):</b> BEF (1)						
<b>Comments:</b>						
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 3	<b>Fish Measured:</b> 3	<b>Fork Lengths (mm) Min:</b> 34	<b>Max:</b> 37	<b>Mean:</b> 35	<b>Median:</b> 35	
<b>Sampling Method (No. of fish):</b> BEF (3)						
<b>Comments:</b>						
<b>Species:</b> round whitefish	<b>Life Stage:</b> adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 4	<b>Fish Measured:</b> 2	<b>Fork Lengths (mm) Min:</b> 354	<b>Max:</b> 362	<b>Mean:</b> 358	<b>Median:</b> 358	
<b>Sampling Method (No. of fish):</b> BEF (1) VOB (3)						
<b>Comments:</b>						

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### Instruments

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> graduated wading rod
<b>Stream Velocity:</b> Orange Float	<b>Channel Widths:</b> handheld laser rangefinder
<b>Turbidity:</b> LaMotte 2020e turbidimeter	<b>Electrofisher:</b> Smith-Root GPP 2.5
<b>Water Quality:</b> YSI 556	<b>Transparency:</b>



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FSK1011B010081.jp



FSK1011B010082.jp



FSK1011B010083.jp



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FSK1011B010088.jp



**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/14/2010 9:32 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.31426	-147.52287	<b>Coordinates</b>	67.31522	-147.52171	67.31426	-147.52287

Elevation NED (m)(ft): 662 2172

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-2

Legal Description (MTRS): F029N001E27

Waterbody Name: Funchion Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 5.55 DO (mg/L): 11.34 DO (%): Conductivity (µS/cm): 76 pH: 5.62

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.85 2.79

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 50 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	19.2	3.4	<b>Cobble</b>
<b>Thalweg Depth</b>	1.30	0.50	<b>Subdominant Substrate 1:</b>
			<b>Boulder</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open White Spruce Forest	11	Closed Tall Alder-Willow Shrub	3
5 - 10	Open White Spruce Forest	11	Closed White Spruce Forest	19.5
10 - 20	Open White Spruce Forest	11	Closed White Spruce Forest	19.5
20 - 30	Open White Spruce Forest	11	Closed White Spruce Forest	19.5

**Key To Fish Sampling Methods**

Estimated reach length (m): 150

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 16 Fish Measured: 9 Fork Lengths (mm) Min: 205 Max: 270 Mean: 239 Median: 237

Sampling Method (No. of fish): PEF (9) VOG (7)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 145 Max: 175 Mean: 155 Median: 160

Sampling Method (No. of fish): PEF (3)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1011C010271.jp



FSK1011C010272.jp



**Station Info****Observers:** Joe Buckwalter, Mary Simmering**Date/Time:** 08/14/2010 11:51 AM**Station Coordinates** Latitude 67.15086 Longitude -147.50027**Sample Coordinates** Latitude 67.15197 Longitude -147.49906 / Latitude 67.15041 Longitude -147.50053**Elevation NED (m)(ft):** 357 1171**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar A-1**Legal Description (MTRS):** F027N001E22**Waterbody Name:** Mountain Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:****Wildlife Comments:** juvenile bald eagle**Water Quality \ Stream Flow****Water Temp (C):** 3.80 **DO (mg/L):** 13.02 **DO (%):** **Conductivity (µS/cm):** 50 **pH:** 6.12**Water Color:** Clear **Turbidity (NTU):** 1.17 **Thalweg Velocity (m/s)(ft/s):** 0.74 2.43**Stream Channel****Stream Gradient (%):** 2 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 48 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	8.1	4.7	<b>Subdominant Substrate 1:</b> Boulder
<b>Thalweg Depth</b>	0.96	0.44	<b>Subdominant Substrate 2:</b> Gravel

**Rosgen Class:** C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Viereck et al. 1992)**

<b>Dist. from Bank (m)</b>	<b>Left Bank Vegetation Type</b>	<b>Canopy Height(m)</b>	<b>Right Bank Vegetation Type</b>	<b>Canopy Height(m)</b>
0 - 5	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	1.5
5 - 10	Open Black Spruce Forest	8	Closed Tall Willow Shrub	1.5
10 - 20	Open Black Spruce Forest	8	Closed Tall Willow Shrub	1.5
20 - 30	Open Black Spruce Forest	8	Closed Tall Willow Shrub	1.5

**Key To Fish Sampling Methods****Estimated reach length (m):** 216

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations****Species:** Arctic grayling**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 7 **Fish Measured:** 5 **Fork Lengths (mm) Min:** 201 **Max:** 280 **Mean:** 225 **Median:** 240**Sampling Method (No. of fish):** PEF (5) VOG (2)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 9 **Fish Measured:** 9 **Fork Lengths (mm) Min:** 135 **Max:** 185 **Mean:** 160 **Median:** 160**Sampling Method (No. of fish):** PEF (9)**Comments:****Instruments****Stream Gradient:** handheld optical clinometer**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** measuring tape**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



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**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/14/2010 2:13 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.18813	-147.66626	<b>Coordinates</b>	67.18813	-147.66626	/	67.18693 -147.66309

Elevation NED (m)(ft): 392 1286

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar A-2

Legal Description (MTRS): F027N001W01

Waterbody Name: Funchion Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments: Fish-collection reach downstream of station. No waypoint marked at downstream end of reach.

Wildlife Comments: Fresh grizzly bear tracks.

**Water Quality \ Stream Flow**

Water Temp (C): 9.15 DO (mg/L): 11.77 DO (%): Conductivity (µS/cm): 72 pH: 6.16

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.52 1.71

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 190 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>	Cobble
<b>Width</b>	19.0	11.0	<b>Subdominant Substrate 1:</b>	Gravel
<b>Thalweg Depth</b>	1.70	0.58	<b>Subdominant Substrate 2:</b>	Boulder

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open White Spruce Forest	16	Closed Tall Alder-Willow Shrub	2
5 - 10	Open White Spruce Forest	16	Closed Tall Alder-Willow Shrub	2
10 - 20	Open White Spruce Forest	16	Closed White Spruce Forest	14
20 - 30	Open White Spruce Forest	16	Closed White Spruce Forest	14

**Key To Fish Sampling Methods**

Estimated reach length (m): 340

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 5 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (5)

Comments: ~250 mm

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 40 Max: 43 Mean: 41 Median: 41

Sampling Method (No. of fish): PEF (3)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 70 Max: 95 Mean: 80 Median: 82

Sampling Method (No. of fish): PEF (3)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 64 Max: 64 Mean: 64 Median: 64

Sampling Method (No. of fish): PEF (1)

Comments:

## Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



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FSK1011C030283.jp



FSK1011C030284.jp



**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/14/2010 3:59 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.10617	-147.82276	<b>Coordinates</b>	67.10532	-147.82247	/	67.10617 -147.82276

Elevation NED (m)(ft): 362 1188

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar A-2

Legal Description (MTRS): F026N001W05

Waterbody Name: Schilling Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments: Rosgen code should be E2 (boulder substrate), but this type does not exist in Rosgen's system.

Wildlife Comments:

**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 7.22	<b>DO (mg/L):</b> 12.11	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 34	<b>pH:</b> 6.89
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.50		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.40	1.31

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 51 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Boulder
<b>Width</b>	3.1	2.7	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	0.90	0.30	<b>Subdominant Substrate 2:</b> Gravel

Rosgen Class: E3 Low gradient, meandering riffle/pool stream with low width/depth ratio and little deposition. Very efficient and stable. High meander width ratio.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Alder-Willow Shrub	2	Closed Tall Alder-Willow Shrub	2
5 - 10	Open White Spruce Forest	23	Open White Spruce Forest	7
10 - 20	Open White Spruce Forest	23	Closed Tall Shrub Birch Shrub	1.5
20 - 30	Open White Spruce Forest	23	Closed Tall Shrub Birch Shrub	1.5

**Key To Fish Sampling Methods**

Estimated reach length (m): 160

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 8 Fish Measured: 4 Fork Lengths (mm) Min: 45 Max: 62 Mean: 54 Median: 53

Sampling Method (No. of fish): PEF (4) VOG (4)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1011C040288.jp



FSK1011C040289.jp

FSK1011C040290.jp



**Station Info**

Observers: Jonathan Kirsch, James Bales

Date/Time: 08/15/2010 8:29 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.38801	-151.47547	<b>Coordinates</b>	67.38801	-151.47547	/	67.38184 -151.46629

Elevation NED (m)(ft): 315 1033

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman B-3

Legal Description (MTRS): F030N018W36

Waterbody Name: Wild River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.96 DO (mg/L): 11.16 DO (%): Conductivity (µS/cm): 306 pH: 7.94

Water Color: Clear Turbidity (NTU): 1.46 Thalweg Velocity (m/s)(ft/s): 1.14 3.74

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 510 Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	47.0	11.0	<b>Gravel</b>
<b>Thalweg Depth</b>	1.65	0.76	<b>Subdominant Substrate 1:</b>
			<b>Sands</b>
			<b>Subdominant Substrate 2:</b>
			<b>Cobble</b>

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
5 - 10	Closed Tall Willow Shrub	2	Closed Black Spruce-White Spruce Forest	12
10 - 20	Closed Black Spruce-White Spruce Forest	12	Open Black Spruce-White Spruce Forest	12
20 - 30	Closed Black Spruce-White Spruce Forest	15	Open Black Spruce-White Spruce Forest	8

**Key To Fish Sampling Methods**

Estimated reach length (m): 1500 Total Electrofishing Time (s): 870

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 18 Fish Measured: 3 Fork Lengths (mm) Min: 330 Max: 440 Mean: 376 Median: 385

Sampling Method (No. of fish): BEF (3) VOB (15)

Comments:

Species: round whitefish

Life Stage: adult

Life History: Resident

Total Fish Count: 31 Fish Measured: 1 Fork Lengths (mm) Min: 340 Max: 340 Mean: 340 Median: 340

Sampling Method (No. of fish): BEF (1) VOB (30)

Comments:

Species: round whitefish

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 315 Max: 315 Mean: 315 Median: 315

Sampling Method (No. of fish): BEF (1)

Comments:

**Instruments**

**Stream Gradient:** handheld optical clinometer  
**Stream Velocity:** transparent velocity head rod  
**Turbidity:** LaMotte 2020e turbidimeter  
**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod  
**Channel Widths:** handheld laser rangefinder  
**Electrofisher:** Smith-Root LR-24  
**Transparency:**



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FSK1012A010283.jp



**Station Info****Observers:** Ryan Snow, Greta Burkart**Date/Time:** 08/15/2010 11:06 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.40923	-151.42137	<b>Coordinates</b>	67.40923	-151.42137	/	67.40399 -151.44592

**Elevation NED (m)(ft):** 326 1070**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman B-3**Legal Description (MTRS):** F030N017W19**Waterbody Name:** Flat Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Extreme meanders. Slightly grey cloudy water. Stream velocity estimated from GPS track file. Lots of mayflies and caddisflies.**Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 7.67 **DO (mg/L):** 11.30 **DO (%):** **Conductivity (µS/cm):** 311 **pH:** 8.01**Water Color:** Clear **Turbidity (NTU):** 2.46 **Thalweg Velocity (m/s)(ft/s):** 0.70 2.30**Stream Channel****Stream Gradient (%):** 1 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 200 **Embeddedness:** Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	20.0	13.0	<b>Subdominant Substrate 1:</b> Sands
<b>Thalweg Depth</b>	1.74	0.60	<b>Subdominant Substrate 2:</b> Cobble

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Alder-Willow Shrub	1.7	Closed Low Alder-Willow Shrub	1.5
5 - 10	Closed Low Alder-Willow Shrub	1.7	Black Spruce-White Spruce Woodland	14
10 - 20	Closed Low Alder-Willow Shrub	1.7	Black Spruce-White Spruce Woodland	14
20 - 30	Closed Black Spruce-White Spruce Forest	15	Black Spruce-White Spruce Woodland	14

**Key To Fish Sampling Methods****Estimated reach length (m):** 2500 **Total Electrofishing Time (s):** 2506

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations****Species:** burbot**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 2 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 223 **Max:** 232 **Mean:** 227 **Median:** 227**Sampling Method (No. of fish):** BEF (2)**Comments:****Species:** Arctic grayling**Life Stage:** adult**Life History:** Resident**Total Fish Count:** 9 **Fish Measured:** 6 **Fork Lengths (mm) Min:** 359 **Max:** 386 **Mean:** 369 **Median:** 372**Sampling Method (No. of fish):** BEF (6) VOB (3)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 12 **Fish Measured:** 12 **Fork Lengths (mm) Min:** 228 **Max:** 324 **Mean:** 293 **Median:** 276**Sampling Method (No. of fish):** BEF (12)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 2 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 64 **Max:** 185 **Mean:** 124 **Median:** 124**Sampling Method (No. of fish):** BEF (2)**Comments:**

-continued-

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 4      **Fish Measured:** 4      **Fork Lengths (mm) Min:** 52      **Max:** 61      **Mean:** 55      **Median:** 56  
**Sampling Method (No. of fish):** BEF (4)  
**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 10      **Fish Measured:** 10      **Fork Lengths (mm) Min:** 23      **Max:** 47      **Mean:** 35      **Median:** 35  
**Sampling Method (No. of fish):** BEF (10)  
**Comments:**

**Species:** round whitefish                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 2      **Fish Measured:** 2      **Fork Lengths (mm) Min:** 240      **Max:** 272      **Mean:** 256      **Median:** 256  
**Sampling Method (No. of fish):** BEF (2)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer

**Channel Depths:** graduated wading rod

**Stream Velocity:** GPS Float

**Channel Widths:** handheld laser rangefinder

**Turbidity:** LaMotte 2020e turbidimeter

**Electrofisher:** Smith-Root GPP 2.5

**Water Quality:** YSI 556

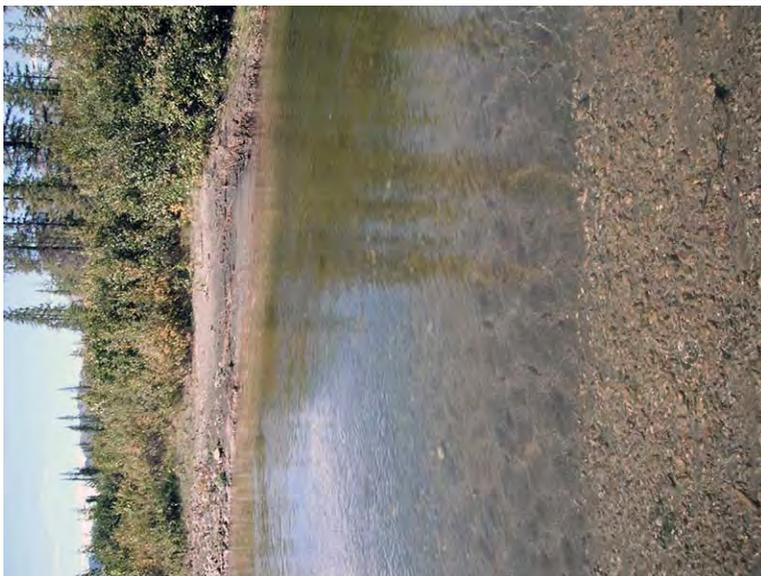
**Transparency:**



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FSK1012B010091.jp



FSK1012B010092.jp



FSK1012B010093.jp



FSK1012B010094.jp



FSK1012B010095.jp

**Station Info****Observers:** Joe Buckwalter, Mary Simmering**Date/Time:** 08/15/2010 9:20 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.09132	-148.40426	<b>Coordinates</b>	67.09029	-148.40628	67.09132	-148.40426

**Elevation NED (m)(ft):** 572 1877**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar A-3**Legal Description (MTRS):** F026N004W10**Waterbody Name:****Anadromous Waters Catalog Number:****Geographic Comments:** Unnamed Chandalar R. tributary.**Visit Comments:****Wildlife Comments:****Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 3.91	<b>DO (mg/L):</b> 12.64	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 32	<b>pH:</b> 6.43
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.67		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.49 1.61	

**Stream Channel****Stream Gradient (%):** 1 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 49 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Boulder
<b>Width</b>	13.1	5.9	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.11	0.62	<b>Subdominant Substrate 2:</b> Gravel

**Rosgen Class:** C2 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Open White Spruce Forest	1.5
5 - 10	Closed Tall Willow Shrub	2	Open White Spruce Forest	11
10 - 20	Closed Tall Willow Shrub	2	Open White Spruce Forest	11
20 - 30	Open White Spruce Forest	15	Open White Spruce Forest	11

**Key To Fish Sampling Methods****Estimated reach length (m):** 200

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations****Species:** Arctic grayling**Life Stage:** adult**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 334 **Max:** 334 **Mean:** 334 **Median:** 334**Sampling Method (No. of fish):** PEF (1)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 12 **Fish Measured:** 7 **Fork Lengths (mm) Min:** 190 **Max:** 285 **Mean:** 245 **Median:** 237**Sampling Method (No. of fish):** PEF (7) VOG (5)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 187 **Max:** 187 **Mean:** 187 **Median:** 187**Sampling Method (No. of fish):** PEF (1)**Comments:**

## Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



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**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/15/2010 11:33 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.14689	-148.43307	<b>Coordinates</b>	67.14622	-148.43559	/	67.14730 -148.43296

Elevation NED (m)(ft): 470 1542

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar A-3

Legal Description (MTRS): F027N004W21

Waterbody Name: Monarch Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.55 DO (mg/L): 12.10 DO (%): Conductivity (µS/cm): 48 pH: 6.98

Water Color: Clear Turbidity (NTU): 0.30 Thalweg Velocity (m/s)(ft/s): 0.40 1.31

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 55 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	8.8	6.1	<b>Boulder</b>
<b>Thalweg Depth</b>	0.95	0.50	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: C2 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2.5	Closed Tall Willow Shrub	2.5
5 - 10	Closed Tall Willow Shrub	2.5	Closed Tall Willow Shrub	2.5
10 - 20	Open White Spruce Forest	17	Closed White Spruce Forest	9
20 - 30	Closed White Spruce Forest	17	Closed White Spruce Forest	12

**Key To Fish Sampling Methods**

Estimated reach length (m): 250

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 14 Fish Measured: 8 Fork Lengths (mm) Min: 194 Max: 325 Mean: 258 Median: 259

Sampling Method (No. of fish): PEF (8) VOG (6)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 4 Fish Measured: 4 Fork Lengths (mm) Min: 74 Max: 165 Mean: 105 Median: 119

Sampling Method (No. of fish): PEF (4)

Comments:

Species: Chinook salmon

Life Stage: juvenile

Life History: Anadromous

Total Fish Count: 12 Fish Measured: 12 Fork Lengths (mm) Min: 61 Max: 77 Mean: 65 Median: 69

Sampling Method (No. of fish): PEF (12)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 9 Fish Measured: 9 Fork Lengths (mm) Min: 75 Max: 110 Mean: 93 Median: 92

Sampling Method (No. of fish): PEF (9)

Comments:

## Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



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**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/15/2010 2:17 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.04736	-148.82101	<b>Coordinates</b>	67.04736	-148.82101	/	67.04770 -148.82528

Elevation NED (m)(ft): 638 2093

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar A-4

Legal Description (MTRS): F026N006W26

Waterbody Name: Trail Creek

Anadromous Waters Catalog Number:

Geographic Comments: Coordinates for downstream waypoint estimated using Google Earth (220 m downstream of Upstream waypoint).

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 13.00 DO (mg/L): 9.52 DO (%): Conductivity (µS/cm): 47 pH: 7.22

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.61 2.00

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 136 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>	Cobble
<b>Width</b>	31.0	5.5	<b>Subdominant Substrate 1:</b>	Gravel
<b>Thalweg Depth</b>	1.35	0.44	<b>Subdominant Substrate 2:</b>	Boulder

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Vaccinium Dwarf Shrub Tundra	0.3	Closed Low Willow Shrub	1.2
5 - 10	Vaccinium Dwarf Shrub Tundra	0.3	Closed Low Willow Shrub	1.2
10 - 20	Vaccinium Dwarf Shrub Tundra	0.3	Closed Low Willow Shrub	1.2
20 - 30	Vaccinium Dwarf Shrub Tundra	0.3	Closed Low Willow Shrub	1.2

**Key To Fish Sampling Methods**

Estimated reach length (m): 220

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 2

Fish Measured:

Fork Lengths (mm) Min:

Max:

Mean:

Median:

Sampling Method (No. of fish): VOG (2)

Comments: ~250 mm

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 11

Fish Measured: 11

Fork Lengths (mm) Min: 47

Max: 56

Mean: 52

Median: 51

Sampling Method (No. of fish): PEF (11)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 2

Fish Measured: 2

Fork Lengths (mm) Min: 88

Max: 112

Mean: 100

Median: 100

Sampling Method (No. of fish): PEF (2)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 5

Fish Measured: 2

Fork Lengths (mm) Min: 60

Max: 60

Mean: 60

Median: 60

Sampling Method (No. of fish): PEF (2) VOG (3)

Comments:

-continued-

**Species:** slimy sculpin                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 9      **Fish Measured:** 9      **Fork Lengths (mm) Min:** 17      **Max:** 23      **Mean:** 20      **Median:** 20  
**Sampling Method (No. of fish):** PEF (9)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer                      **Channel Depths:** graduated wading rod  
**Stream Velocity:** transparent velocity head rod                      **Channel Widths:** measuring tape  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root LR-24  
**Water Quality:** YSI 556                      **Transparency:** secchi tube



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**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/15/2010 4:01 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.96288	-149.17918	<b>Coordinates</b>	66.96260	-149.17945	66.96481	-149.18054

Elevation NED (m)(ft): 850 2789

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Beaver D-5

Legal Description (MTRS): F025N007W30

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 13.22 DO (mg/L): 9.04 DO (%): Conductivity (µS/cm): 35 pH: 6.51

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.21 0.69

**Stream Channel**

Stream Gradient (%): 0.75 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 54 Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	21.5	7.7	<b>Gravel</b>
<b>Thalweg Depth</b>	1.04	0.44	<b>Subdominant Substrate 1:</b>
			<b>Sands</b>
			<b>Subdominant Substrate 2:</b>
			<b>Cobble</b>

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	1.2	Closed Low Willow Shrub	0.7
5 - 10	Willow Dwarf Shrub Tundra	0.3	Willow Dwarf Shrub Tundra	0.3
10 - 20	Willow Dwarf Shrub Tundra	0.2	Willow Dwarf Shrub Tundra	0.3
20 - 30	Willow Dwarf Shrub Tundra	0.2	Willow Dwarf Shrub Tundra	0.3

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 340 Max: 340 Mean: 340 Median: 340

Sampling Method (No. of fish): PEF (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 15 Fish Measured: 3 Fork Lengths (mm) Min: 235 Max: 305 Mean: 265 Median: 270

Sampling Method (No. of fish): PEF (3) VOG (12)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 130 Max: 143 Mean: 136 Median: 136

Sampling Method (No. of fish): PEF (2)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 5 Fish Measured: 5 Fork Lengths (mm) Min: 73 Max: 100 Mean: 86 Median: 86

Sampling Method (No. of fish): PEF (5)

Comments:

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 15    **Fish Measured:** 4    **Fork Lengths (mm) Min:** 59    **Max:** 68    **Mean:** 64    **Median:** 63  
**Sampling Method (No. of fish):** PEF (4) VOG (11)  
**Comments:**

---

### Instruments

**Stream Gradient:** handheld optical clinometer

**Channel Depths:** graduated wading rod

**Stream Velocity:** transparent velocity head rod

**Channel Widths:** measuring tape

**Turbidity:** LaMotte 2020e turbidimeter

**Electrofisher:** Smith-Root LR-24

**Water Quality:** YSI 556

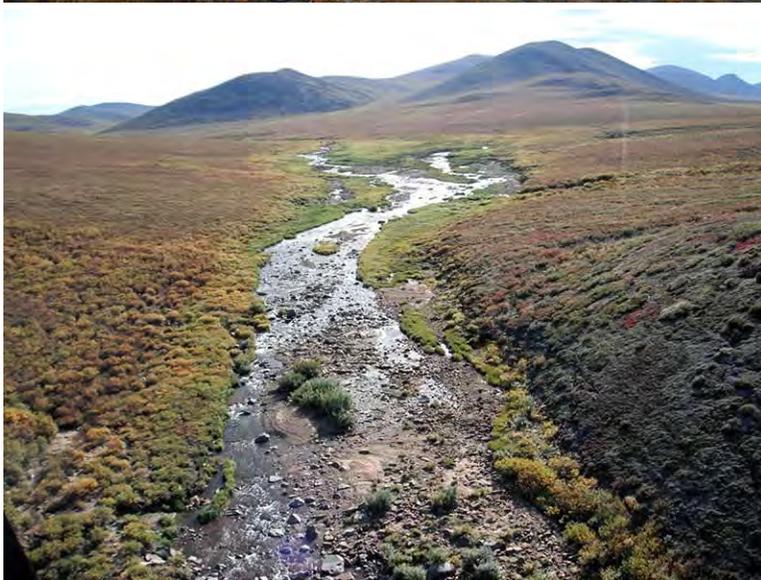
**Transparency:** secchi tube



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**Station Info**

Observers: Jonathan Kirsch, James Bales

Date/Time: 08/16/2010 9:20 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.84708	-149.92799	<b>Coordinates</b>	66.84708	-149.92799	/	66.84797 -149.96000

Elevation NED (m)(ft): 512 1680

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Beaver D-6

Legal Description (MTRS): F023N011W03

Waterbody Name: Jim River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.66 DO (mg/L): 11.15 DO (%): Conductivity (µS/cm): 57 pH: 7.04

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.71 2.33

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 215 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	50.0	13.5	<b>Cobble</b>
<b>Thalweg Depth</b>	1.58	0.48	<b>Subdominant Substrate 1:</b>
			<b>Gravel</b>
			<b>Subdominant Substrate 2:</b>
			<b>Boulder</b>

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Black Spruce-White Spruce Forest	18	Open Low Willow Shrub	1
5 - 10	Closed Black Spruce-White Spruce Forest	18	Closed Tall Willow Shrub	4
10 - 20	Closed Black Spruce-White Spruce Forest	18	Closed Tall Willow Shrub	4
20 - 30	Closed Black Spruce-White Spruce Forest	18	Closed Black Spruce-White Spruce Forest	20

**Key To Fish Sampling Methods**

Estimated reach length (m): 1800 Total Electrofishing Time (s): 1006

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 51 Fish Measured: 6 Fork Lengths (mm) Min: 335 Max: 500 Mean: 400 Median: 417

Sampling Method (No. of fish): BEF (21) VOB (30)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 320 Max: 320 Mean: 320 Median: 320

Sampling Method (No. of fish): BEF (2)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 63 Max: 63 Mean: 63 Median: 63

Sampling Method (No. of fish): BEF (1)

Comments:

## Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root GPP 2.5

**Transparency:**



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**Station Info****Observers:** Ryan Snow, Greta Burkart**Date/Time:** 08/16/2010 10:33 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.07098	-149.62315	<b>Coordinates</b>	67.07098	-149.62315	/	67.06719 -149.69274

**Elevation NED (m)(ft):** 437 1434**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar A-6**Legal Description (MTRS):** F026N009W19**Waterbody Name:** Mosquito Fork**Anadromous Waters Catalog Number:****Geographic Comments:** Immediately downstream of confluence with Moore Creek.**Visit Comments:****Wildlife Comments:** moose tracks**Water Quality \ Stream Flow****Water Temp (C):** 8.80 **DO (mg/L):** 8.33 **DO (%):** **Conductivity (µS/cm):** 43 **pH:** 7.04**Water Color:** Clear **Turbidity (NTU):** 0.57 **Thalweg Velocity (m/s)(ft/s):** 1.00 3.28**Stream Channel****Stream Gradient (%):** 1.5 **Entrenchment:** Entrenched**Catchment Area(sq. km):** 445 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	26.0	25.0	<b>Subdominant Substrate 1:</b> Boulder
<b>Thalweg Depth</b>	2.45	0.85	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from Bank (m)</b>	<b>Left Bank Vegetation Type</b>	<b>Canopy Height(m)</b>	<b>Right Bank Vegetation Type</b>	<b>Canopy Height(m)</b>
0 - 5	Closed Low Willow Shrub	1.25	Closed Low Shrub Birch-Willow Shrub	1.25
5 - 10	Closed Low Willow Shrub	1.25	Closed Low Shrub Birch-Willow Shrub	1.25
10 - 20	Open Black Spruce Forest	12.6	Closed Black Spruce Forest	13.2
20 - 30	Open Black Spruce Forest	12.6	Closed Black Spruce Forest	13.2

**Key To Fish Sampling Methods****Estimated reach length (m):** 3700 **Total Electrofishing Time (s):** 2558

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

**Species:** Arctic grayling **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 16 **Fish Measured:** 6 **Fork Lengths (mm) Min:** 340 **Max:** 392 **Mean:** 362 **Median:** 366  
**Sampling Method (No. of fish):** BEF (6) VOB (10)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 2 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 304 **Max:** 309 **Mean:** 306 **Median:** 306  
**Sampling Method (No. of fish):** BEF (2)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 4 **Fish Measured:** 4 **Fork Lengths (mm) Min:** 102 **Max:** 167 **Mean:** 121 **Median:** 134  
**Sampling Method (No. of fish):** BEF (4)

**Comments:**

**Species:** Chinook salmon **Life Stage:** juvenile **Life History:** Anadromous  
**Total Fish Count:** 4 **Fish Measured:** 4 **Fork Lengths (mm) Min:** 65 **Max:** 74 **Mean:** 70 **Median:** 69  
**Sampling Method (No. of fish):** BEF (4)

**Comments:**

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<b>Species:</b> slimy sculpin	<b>Life Stage:</b> adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 2	<b>Fish Measured:</b> 2	<b>Fork Lengths (mm) Min:</b> 78	<b>Max:</b> 84	<b>Mean:</b> 81	<b>Median:</b> 81	
<b>Sampling Method (No. of fish):</b> BEF (2)						
<b>Comments:</b>						
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 3	<b>Fish Measured:</b> 3	<b>Fork Lengths (mm) Min:</b> 58	<b>Max:</b> 66	<b>Mean:</b> 63	<b>Median:</b> 62	
<b>Sampling Method (No. of fish):</b> BEF (3)						
<b>Comments:</b>						
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 6	<b>Fish Measured:</b> 6	<b>Fork Lengths (mm) Min:</b> 17	<b>Max:</b> 49	<b>Mean:</b> 37	<b>Median:</b> 33	
<b>Sampling Method (No. of fish):</b> BEF (6)						
<b>Comments:</b>						
<b>Species:</b> round whitefish	<b>Life Stage:</b> adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 364	<b>Max:</b> 364	<b>Mean:</b> 364	<b>Median:</b> 364	
<b>Sampling Method (No. of fish):</b> BEF (1)						
<b>Comments:</b>						

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**Instruments**

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> graduated wading rod
<b>Stream Velocity:</b> Orange Float	<b>Channel Widths:</b> handheld laser rangefinder
<b>Turbidity:</b> LaMotte 2020e turbidimeter	<b>Electrofisher:</b> Smith-Root GPP 2.5
<b>Water Quality:</b> YSI 556	<b>Transparency:</b>



FSK1013B010096.jp



FSK1013B010097.jp



FSK1013B010098.jp



FSK1013B010099.jp



FSK1013B010103.jp



FSK1013B010104.jp

FSK1013B010105.jp



**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/16/2010 9:01 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.59970	-148.69787	<b>Coordinates</b>	67.59895	-148.70295	67.59970	-148.69787

Elevation NED (m)(ft): 726 2382

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-4

Legal Description (MTRS): F032N005W17

Waterbody Name: Baby Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.61 DO (mg/L): 10.77 DO (%): Conductivity (µS/cm): 206 pH: 7.72

Water Color: Clear Turbidity (NTU): 0.18 Thalweg Velocity (m/s)(ft/s): 0.96 3.15

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 70 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	35.0	8.9	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	2.30	0.60	<b>Subdominant Substrate 2:</b> Gravel

Rosgen Class: C2 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Open Low Willow Shrub	0.2
5 - 10	Open White Spruce Forest	17	Open Low Willow Shrub	0.2
10 - 20	Closed White Spruce Forest	17	Closed Low Willow Shrub	0.3
20 - 30	Closed White Spruce Forest	17	Open White Spruce Forest	0.3

**Key To Fish Sampling Methods**

Estimated reach length (m): 310

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 14 Fish Measured: 12 Fork Lengths (mm) Min: 65 Max: 143 Mean: 102 Median: 104

Sampling Method (No. of fish): PEF (12) VOG (2)

Comments:

Species: round whitefish

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 137 Max: 137 Mean: 137 Median: 137

Sampling Method (No. of fish): PEF (1)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1013C010321.jp



FSK1013C010322.jp



**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/16/2010 11:22 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.50693	-148.46827	<b>Coordinates</b>	67.50585	-148.46417	67.50693	-148.46827

Elevation NED (m)(ft): 580 1903

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar C-3

Legal Description (MTRS): F031N004W16

Waterbody Name: Tobin Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 8.66 DO (mg/L): 10.55 DO (%): Conductivity (µS/cm): 168 pH: 7.47

Water Color: Muddy Turbidity (NTU): 4.79 Thalweg Velocity (m/s)(ft/s): 0.96 3.15

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 45 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	11.0	7.0	<b>Boulder</b>
<b>Thalweg Depth</b>	1.30	0.40	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: C2 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open Tall Willow Shrub	3	Open Tall Willow Shrub	3
5 - 10	Open Tall Willow Shrub	3	Open White Spruce Forest	16
10 - 20	Open Tall Willow Shrub	3	Open White Spruce Forest	16
20 - 30	Open Black Spruce-White Spruce Forest	14	Open White Spruce Forest	16

**Key To Fish Sampling Methods**

Estimated reach length (m): 270

(PEF) Portable Electrofisher

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 330 Max: 330 Mean: 330 Median: 330

Sampling Method (No. of fish): PEF (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 7 Fish Measured: 7 Fork Lengths (mm) Min: 57 Max: 100 Mean: 67 Median: 78

Sampling Method (No. of fish): PEF (7)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 4 Fish Measured: 4 Fork Lengths (mm) Min: 52 Max: 65 Mean: 59 Median: 58

Sampling Method (No. of fish): PEF (4)

Comments:

Species: slimy sculpin

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 48 Max: 48 Mean: 48 Median: 48

Sampling Method (No. of fish): PEF (1)

Comments:

**Species:** round whitefish

**Life Stage:** juvenile

**Life History:** Resident

**Total Fish Count:** 1    **Fish Measured:** 1    **Fork Lengths (mm) Min:** 156    **Max:** 156    **Mean:** 156    **Median:** 156

**Sampling Method (No. of fish):** PEF (1)

**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer

**Channel Depths:** graduated wading rod

**Stream Velocity:** transparent velocity head rod

**Channel Widths:** measuring tape

**Turbidity:** LaMotte 2020e turbidimeter

**Electrofisher:** Smith-Root LR-24

**Water Quality:** YSI 556

**Transparency:** secchi tube



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**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/16/2010 12:29 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.45918	-148.73056	<b>Coordinates</b>	67.45918	-148.73056	/	67.45998 -148.72859

Elevation NED (m)(ft): 577 1893

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-4

Legal Description (MTRS): F030N005W06

Waterbody Name: Schrader Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.19 DO (mg/L): 10.40 DO (%): Conductivity (µS/cm): 192 pH: 7.48

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 1.22 4.00

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 72 Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>	Cobble
<b>Width</b>	8.5	6.7	<b>Subdominant Substrate 1:</b>	Boulder
<b>Thalweg Depth</b>	1.10	0.58	<b>Subdominant Substrate 2:</b>	Gravel

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2.5	Closed Tall Willow Shrub	2
5 - 10	Closed Tall Willow Shrub	2.5	Closed Tall Willow Shrub	2
10 - 20	Open White Spruce Forest	15	Open White Spruce Forest	14
20 - 30	Open White Spruce Forest	15	Open White Spruce Forest	14

**Key To Fish Sampling Methods**

Estimated reach length (m): 190

(ANG) Angling

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 1 Fork Lengths (mm) Min: 370 Max: 370 Mean: 370 Median: 370

Sampling Method (No. of fish): ANG (1) PEF (1)

Comments:

Species: Chinook salmon

Life Stage: juvenile

Life History: Anadromous

Total Fish Count: 15 Fish Measured: 10 Fork Lengths (mm) Min: 62 Max: 70 Mean: 66 Median: 66

Sampling Method (No. of fish): ANG (5) PEF (10)

Comments:

Species: slimy sculpin

Life Stage: juvenile

Life History: Resident

Total Fish Count: 4 Fish Measured: 1 Fork Lengths (mm) Min: 48 Max: 48 Mean: 48 Median: 48

Sampling Method (No. of fish): ANG (3) PEF (1)

Comments:

## Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1013C030330.jp



FSK1013C030331.jp



FSK1013C030332.jp



**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/16/2010 3:02 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.32015	-149.11672	<b>Coordinates</b>	67.32112	-149.11777	/	67.31997 -149.11568

Elevation NED (m)(ft): 538 1765

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-5

Legal Description (MTRS): F029N007W21

Waterbody Name: Crooked Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 10.14 DO (mg/L): 10.28 DO (%): Conductivity (µS/cm): 245 pH: 7.13

Water Color: Clear Turbidity (NTU): 2.69 Thalweg Velocity (m/s)(ft/s): 0.53 1.74

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 71 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>	Gravel
<b>Width</b>	17.8	4.8	<b>Subdominant Substrate 1:</b>	Cobble
<b>Thalweg Depth</b>	1.05	0.46	<b>Subdominant Substrate 2:</b>	Sands

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Unvegetated	0	Closed Tall Willow Shrub	2.3
5 - 10	Unvegetated	0	Open White Spruce Forest	10
10 - 20	Open Tall Willow Shrub	2.5	Open White Spruce Forest	10
20 - 30	Open White Spruce Forest	13	Open White Spruce Forest	12

**Key To Fish Sampling Methods**

Estimated reach length (m): 220

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 6 Fish Measured: 1 Fork Lengths (mm) Min: 290 Max: 290 Mean: 290 Median: 290

Sampling Method (No. of fish): PEF (1) VOG (5)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (1)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1013C040335.jp



FSK1013C040336.jp



FSK1013C040337.jp



FSK1013C040338.jp

**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/16/2010 4:17 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.20251	-149.20092	<b>Coordinates</b>	67.20164	-149.20358	/	67.20251 -149.20092

Elevation NED (m)(ft): 608 1995

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar A-5

Legal Description (MTRS): F028N008W36

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 10.81 DO (mg/L): 10.24 DO (%): Conductivity (µS/cm): 80 pH: 7.11

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.53 1.74

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 68 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	11.3	5.2	<b>Cobble</b>
<b>Thalweg Depth</b>	1.45	0.40	<b>Subdominant Substrate 1:</b>
			<b>Gravel</b>
			<b>Subdominant Substrate 2:</b>
			<b>Sands</b>

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open White Spruce Forest	12	Open Low Willow Shrub	0.5
5 - 10	Open White Spruce Forest	12	Open Tall Willow Shrub	2
10 - 20	Open White Spruce Forest	13	Open White Spruce Forest	9
20 - 30	Open White Spruce Forest	13	Closed White Spruce Forest	10

**Key To Fish Sampling Methods**

Estimated reach length (m): 200

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 1 Fork Lengths (mm) Min: 240 Max: 240 Mean: 240 Median: 240

Sampling Method (No. of fish): PEF (1) VOG (1)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 72 Max: 82 Mean: 76 Median: 77

Sampling Method (No. of fish): PEF (3)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 6 Fish Measured: 1 Fork Lengths (mm) Min: 60 Max: 60 Mean: 60 Median: 60

Sampling Method (No. of fish): PEF (1) VOG (5)

Comments:

## Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



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FSK1013C050341.jp



FSK1013C050342.jp



**Station Info**

Observers: Jonathan Kirsch, Bob Powers

Date/Time: 08/17/2010 8:14 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.00566	-151.79698	<b>Coordinates</b>	67.00566	-151.79698	/ 66.95595	-151.73895

Elevation NED (m)(ft): 206 676

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman A-4

Legal Description (MTRS): F025N019W08

Waterbody Name: John River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 13.10 DO (mg/L): 9.68 DO (%): Conductivity (µS/cm): 440 pH: 7.96

Water Color: Muddy Turbidity (NTU): 10.46 Thalweg Velocity (m/s)(ft/s): 0.80 2.62

**Stream Channel**

Stream Gradient (%): 0.3 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): ##### Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	210.0	92.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	4.20	2.00	<b>Subdominant Substrate 2:</b> Sands

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	4	Unvegetated	0
5 - 10	Closed Black Spruce Forest	18	Open Tall Willow Shrub	4
10 - 20	Closed Black Spruce Forest	18	Closed Tall Alder-Willow Shrub	5
20 - 30	Closed Black Spruce Forest	18	Closed Tall Alder-Willow Shrub	5

**Key To Fish Sampling Methods**

Estimated reach length (m): 9100 Total Electrofishing Time (s): 4101

(BEF) Boat-Mounted Electrofisher

**Fish Observations**

Species: lake chub

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 81 Max: 115 Mean: 98 Median: 98

Sampling Method (No. of fish): BEF (2)

Comments: Two lake chub kept as specimens (Tag ID: T000307, T000308)and fin clipped (Vial #: 156466, 156467).

Species: northern pike

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 145 Max: 145 Mean: 145 Median: 145

Sampling Method (No. of fish): BEF (1)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: Visual estimate

Stream Velocity: transparent velocity head rod

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root GPP 2.5

Water Quality: YSI 556

Transparency:



FSK1014A010290.jp



FSK1014A010291.jp



FSK1014A010292.jp



FSK1014A010293.jp



FSK1014A010294.jp

**Station Info****Observers:** Ryan Snow, Greta Burkart**Date/Time:** 08/17/2010 4:05 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.14760	-151.72404	<b>Coordinates</b>	67.14760	-151.72404	/	67.13924 -151.73647

**Elevation NED (m)(ft):** 240 787**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman A-4**Legal Description (MTRS):** F027N019W22**Waterbody Name:** Timber Creek**Anadromous Waters Catalog Number:****Geographic Comments:** in Death Valley

**Visit Comments:** Foggy and cool (around 50 degrees f). Habitat was sampled just above reach. Riparian vegetation was similar for the first half of the reach, but changed dramatically around the same time we encountered beaver lodges. Substrate was dominated by sand and tannic stained sloughs with silty bottoms were present.

**Wildlife Comments:** moose tracks, three big beaver lodges (one huge one), lots of chironomids in silty sections**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 8.25	<b>DO (mg/L):</b> 8.64	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 236	<b>pH:</b> 7.57
<b>Water Color:</b> Humic	<b>Turbidity (NTU):</b> 2.70		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.67 2.20	

**Stream Channel****Stream Gradient (%):** 1 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 207 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	20.1	15.6	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.50	0.50	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b>Left Bank Vegetation Type</b>	<b>Right Bank Vegetation Type</b>	
<b>0 - 5</b> Closed Tall Willow Shrub	3	Closed Tall Alder-Willow Shrub 3
<b>5 - 10</b> Closed Tall Shrub Birch Shrub	2	Closed Tall Alder-Willow Shrub 3
<b>10 - 20</b> Open Black Spruce Forest	7.4	Open Tall Alder Shrub 3
<b>20 - 30</b> Open Black Spruce Forest	7.4	Open Tall Alder Shrub 3

**Key To Fish Sampling Methods****Estimated reach length (m):** 1900 **Total Electrofishing Time (s):** 1919

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

**Species:** round whitefish **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 9 **Fish Measured:** 4 **Fork Lengths (mm) Min:** 329 **Max:** 362 **Mean:** 345 **Median:** 345  
**Sampling Method (No. of fish):** BEF (4) VOB (5)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 3 **Fish Measured:** 3 **Fork Lengths (mm) Min:** 242 **Max:** 323 **Mean:** 270 **Median:** 282  
**Sampling Method (No. of fish):** BEF (3)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 2 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 98 **Max:** 101 **Mean:** 99 **Median:** 99  
**Sampling Method (No. of fish):** BEF (2)

**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 2      **Fish Measured:** 2      **Fork Lengths (mm) Min:** 58      **Max:** 60      **Mean:** 59      **Median:** 59  
**Sampling Method (No. of fish):** BEF (2)  
**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 4      **Fish Measured:** 4      **Fork Lengths (mm) Min:** 29      **Max:** 45      **Mean:** 34      **Median:** 37  
**Sampling Method (No. of fish):** BEF (4)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer                      **Channel Depths:** graduated wading rod  
**Stream Velocity:** Orange Float                      **Channel Widths:** measuring tape  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root GPP 2.5  
**Water Quality:** YSI 556                      **Transparency:**



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FSK1014B010108.jp



FSK1014B010109.jp



FSK1014B010114.jp



FSK1014B010115.jp

**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/17/2010 8:54 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.28842	-149.33682	<b>Coordinates</b>	67.28818	-149.33193	67.28842	-149.33682

Elevation NED (m)(ft): 511 1677

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-5

Legal Description (MTRS): F029N008W33

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 11.77 DO (mg/L): 8.64 DO (%): Conductivity (µS/cm): 135 pH: 7.00

Water Color: Humic

Turbidity (NTU): 5.20

Thalweg Velocity (m/s)(ft/s): 0.80 2.62

**Stream Channel**

Stream Gradient (%): 0.4 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 63 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	3.9	1.7	<b>Cobble</b>
<b>Thalweg Depth</b>	1.10	0.26	<b>Subdominant Substrate 1:</b>
			<b>Boulder</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: E3 Low gradient, meandering riffle/pool stream with low width/depth ratio and little deposition. Very efficient and stable. High meander width ratio.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2.2	Closed Tall Willow Shrub	2.2
5 - 10	Open White Spruce Forest	10	Open White Spruce Forest	9
10 - 20	Open White Spruce Forest	9	Open White Spruce Forest	9
20 - 30	Open White Spruce Forest	8	Open White Spruce Forest	8

**Key To Fish Sampling Methods**

Estimated reach length (m): 245

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 240 Max: 300 Mean: 266 Median: 270  
 Sampling Method (No. of fish): PEF (3)  
 Comments:

Species: Arctic grayling Life Stage: juvenile Life History: Resident  
 Total Fish Count: 9 Fish Measured: 9 Fork Lengths (mm) Min: 52 Max: 183 Mean: 103 Median: 117  
 Sampling Method (No. of fish): PEF (9)  
 Comments:

Species: slimy sculpin Life Stage: adult Life History: Resident  
 Total Fish Count: 7 Fish Measured: 7 Fork Lengths (mm) Min: 74 Max: 115 Mean: 86 Median: 94  
 Sampling Method (No. of fish): PEF (7)  
 Comments:

Species: slimy sculpin Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 7 Fish Measured: 3 Fork Lengths (mm) Min: 65 Max: 68 Mean: 66 Median: 66  
 Sampling Method (No. of fish): PEF (3) VOG (4)  
 Comments:

**Species:** slimy sculpin                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 1      **Fish Measured:** 1      **Fork Lengths (mm) Min:** 30      **Max:** 30      **Mean:** 30      **Median:** 30  
**Sampling Method (No. of fish):** PEF (1)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer                      **Channel Depths:** graduated wading rod  
**Stream Velocity:** transparent velocity head rod                      **Channel Widths:** measuring tape  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root LR-24  
**Water Quality:** YSI 556                      **Transparency:** secchi tube



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FSK1014C010350.jp



FSK1014C010351.jp



FSK1014C010352.jp



FSK1014C010353.jp

**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/17/2010 10:18 AM

Station	Latitude	Longitude	Sample	Latitude	Longitude	Latitude	Longitude
Coordinates	67.21732	-149.54411	Coordinates	67.21678	-149.54116	67.21732	-149.54411

Elevation NED (m)(ft): 456 1496

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar A-6

Legal Description (MTRS): F028N009W28

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.44 DO (mg/L): 10.09 DO (%): Conductivity (µS/cm): 280 pH: 7.55

Water Color: Clear Turbidity (NTU): 0.99 Thalweg Velocity (m/s)(ft/s): 0.53 1.74

**Stream Channel**

Stream Gradient (%): 0.4 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 52 Embeddedness: Negligible

Channel Dimensions (m):	Bank Full	Wetted	Dominant Substrate:
Width	3.4	2.2	Cobble
Thalweg Depth	1.06	0.42	Subdominant Substrate 1: Gravel
			Subdominant Substrate 2: Sands

Rosgen Class: E3 Low gradient, meandering riffle/pool stream with low width/depth ratio and little deposition. Very efficient and stable. High meander width ratio.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	0.7	Closed Low Willow Shrub	1
5 - 10	Closed Low Willow Shrub	1	Closed Low Willow Shrub	1
10 - 20	Closed Low Willow Shrub	1.3	Closed Black Spruce-White Spruce Forest	10
20 - 30	Closed Low Willow Shrub	1.5	Closed Black Spruce-White Spruce Forest	12

**Key To Fish Sampling Methods**

Estimated reach length (m): 180

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 2 Fish Measured: 1 Fork Lengths (mm) Min: 315 Max: 315 Mean: 315 Median: 315  
 Sampling Method (No. of fish): PEF (1) VOG (1)

Comments:

Species: Arctic grayling Life Stage: juvenile Life History: Resident  
 Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 57 Max: 57 Mean: 57 Median: 57  
 Sampling Method (No. of fish): PEF (1)

Comments:

Species: slimy sculpin Life Stage: adult Life History: Resident  
 Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 72 Max: 77 Mean: 74 Median: 74  
 Sampling Method (No. of fish): PEF (2)

Comments:

Species: slimy sculpin Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 1 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:  
 Sampling Method (No. of fish): VOG (1)

Comments:

## Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

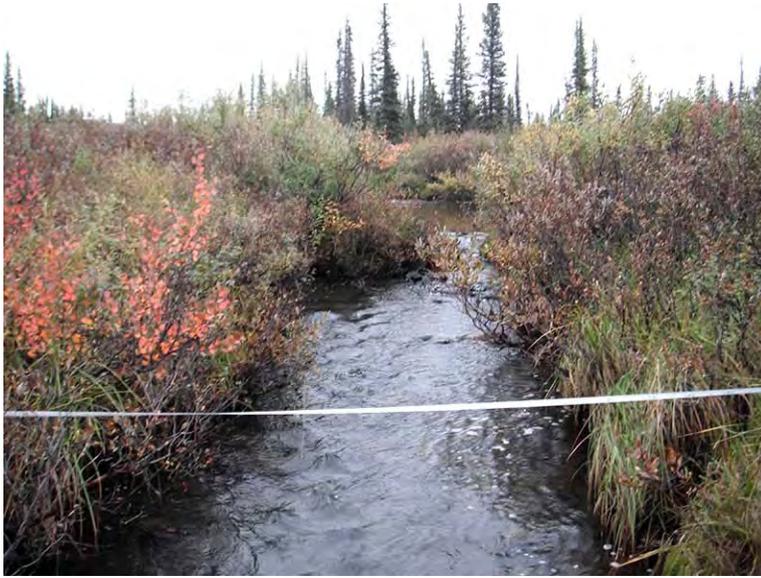
**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube

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FSK1014C020356.jp



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**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/17/2010 11:15 AM

Station	Latitude	Longitude	Sample	Latitude	Longitude	Latitude	Longitude
Coordinates	67.26302	-149.63372	Coordinates	67.26318	-149.63700	67.26302	-149.63372

Elevation NED (m)(ft): 517 1696

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-6

Legal Description (MTRS): F028N010W12

Waterbody Name: Boulder Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.73 DO (mg/L): 10.71 DO (%): Conductivity (µS/cm): 137 pH: 6.76

Water Color: Clear Turbidity (NTU): 0.03 Thalweg Velocity (m/s)(ft/s): 0.96 3.15

**Stream Channel**

Stream Gradient (%): 1.25 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 55 Embeddedness: Negligible

Channel Dimensions (m):	Bank Full	Wetted	Dominant Substrate:
Width	18.1	5.4	Cobble
Thalweg Depth	1.36	0.50	Subdominant Substrate 1: Boulder
			Subdominant Substrate 2: Gravel

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	3	Unvegetated	0
5 - 10	Closed Tall Willow Shrub	3	Closed Tall Willow Shrub	3
10 - 20	Closed Tall Willow Shrub	3	Open White Spruce Forest	8
20 - 30	Closed White Spruce Forest	9	Closed White Spruce Forest	10

**Key To Fish Sampling Methods**

Estimated reach length (m): 200

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 11 Fish Measured: 1 Fork Lengths (mm) Min: 344 Max: 344 Mean: 344 Median: 344

Sampling Method (No. of fish): PEF (1) VOG (10)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 12 Fish Measured: 2 Fork Lengths (mm) Min: 255 Max: 270 Mean: 262 Median: 262

Sampling Method (No. of fish): PEF (2) VOG (10)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 9 Fish Measured: 4 Fork Lengths (mm) Min: 60 Max: 67 Mean: 63 Median: 63

Sampling Method (No. of fish): PEF (4) VOG (5)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 4 Fish Measured: 4 Fork Lengths (mm) Min: 73 Max: 75 Mean: 73 Median: 74

Sampling Method (No. of fish): PEF (4)

Comments:

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 12    **Fish Measured:** 2    **Fork Lengths (mm) Min:** 55    **Max:** 67    **Mean:** 61    **Median:** 61  
**Sampling Method (No. of fish):** PEF (2) VOG (10)  
**Comments:**

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### Instruments

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> graduated wading rod
<b>Stream Velocity:</b> transparent velocity head rod	<b>Channel Widths:</b> measuring tape
<b>Turbidity:</b> LaMotte 2020e turbidimeter	<b>Electrofisher:</b> Smith-Root LR-24
<b>Water Quality:</b> YSI 556	<b>Transparency:</b> secchi tube



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**Station Info****Observers:** Joe Buckwalter, Mary Simmering**Date/Time:** 08/17/2010 12:56 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.25564	-149.84877	<b>Coordinates</b>	67.25694	-149.84777	67.25564	-149.84877

**Elevation NED (m)(ft):** 581 1906**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar B-6**Legal Description (MTRS):** F028N010W18**Waterbody Name:****Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Side channel also sampled (see 14C08).**Wildlife Comments:****Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 5.38	<b>DO (mg/L):</b> 11.17	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 78	<b>pH:</b> 5.69
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.35		<b>Thalweg Velocity (m/s)(ft/s):</b> 1.05 3.44	

**Stream Channel****Stream Gradient (%):** 1.75 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 38 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	19.8	4.3	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.06	0.48	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	3	Unvegetated	0
5 - 10	Open White Spruce Forest	8	Unvegetated	0
10 - 20	Open White Spruce Forest	8	Open White Spruce Forest	8
20 - 30	Open White Spruce Forest	9	Open White Spruce Forest	8

**Key To Fish Sampling Methods****Estimated reach length (m):** 170

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations****Species:** Dolly Varden**Life Stage:** adult**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 165 **Max:** 165 **Mean:** 165 **Median:** 165**Sampling Method (No. of fish):** PEF (1)**Comments:****Instruments****Stream Gradient:** handheld optical clinometer**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** measuring tape**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



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**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/17/2010 2:36 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.12608	-150.00233	<b>Coordinates</b>	67.12661	-150.00660	67.12611	-150.00221

Elevation NED (m)(ft): 421 1381

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman A-1

Legal Description (MTRS): F027N011W32

Waterbody Name: Hungarian Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 5.76 DO (mg/L): 10.69 DO (%): Conductivity (µS/cm): 68 pH: 6.11

Water Color: Clear Turbidity (NTU): 0.39 Thalweg Velocity (m/s)(ft/s): 0.91 2.98

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 56 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	10.0	4.9	<b>Subdominant Substrate 1:</b>
<b>Thalweg Depth</b>	1.28	0.50	<b>Subdominant Substrate 2:</b>

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Scrub	3	Closed Tall Willow Shrub	2.5
5 - 10	Closed Tall Scrub	3	Open White Spruce Forest	9
10 - 20	Closed White Spruce Forest	9	Open White Spruce Forest	9
20 - 30	Closed White Spruce Forest	10	Open White Spruce Forest	10

**Key To Fish Sampling Methods**

Estimated reach length (m): 230

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 332 Max: 352 Mean: 342 Median: 342

Sampling Method (No. of fish): PEF (2)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 320 Max: 320 Mean: 320 Median: 320

Sampling Method (No. of fish): PEF (1)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1014C050376.jp



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**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/17/2010 4:07 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.27267	-149.95842	<b>Coordinates</b>	67.27451	-149.95672	67.27267	-149.95842

Elevation NED (m)(ft): 549 1801

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-6

Legal Description (MTRS): F028N011W03

Waterbody Name: Myrtle Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.88 DO (mg/L): 10.89 DO (%): Conductivity (µS/cm): 116 pH: 6.59

Water Color: Clear Turbidity (NTU): 0.39 Thalweg Velocity (m/s)(ft/s): 1.00 3.28

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 20 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	8.5	6.6	<b>Boulder</b>
<b>Thalweg Depth</b>	0.85	0.30	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: B2 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
5 - 10	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
10 - 20	Closed Tall Willow Shrub	3	Closed Tall Willow Shrub	3
20 - 30	Closed Tall Willow Shrub	3	Closed Tall Willow Shrub	3

**Key To Fish Sampling Methods**

Estimated reach length (m): 240

(PEF) Portable Electrofisher

**Fish Observations**

Species: Dolly Varden

Life Stage: juvenile

Life History: Unknown

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 51 Max: 51 Mean: 51 Median: 51

Sampling Method (No. of fish): PEF (1)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1014C060388.jp



**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/17/2010 5:08 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.27298	-149.95912	<b>Coordinates</b>	67.27427	-149.95806	67.27254	-149.95881

Elevation NED (m)(ft): 550 1804

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar B-6

Legal Description (MTRS): F028N011W03

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments: Right-bank springbrook tributary to Myrtle Creek at 14C06.

Visit Comments: Turbidity is an estimate. Velocity too slow for TVHR, but flowing.

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.35 DO (mg/L): 10.15 DO (%): Conductivity (µS/cm): 111 pH: 6.05

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.11 0.36

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 0 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	4.3	3.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	0.71	0.27	<b>Subdominant Substrate 2:</b> Sands

Rosgen Class: C2 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	3
5 - 10	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	3
10 - 20	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
20 - 30	Closed Tall Willow Shrub	3	Closed Tall Willow Shrub	2

**Key To Fish Sampling Methods**

Estimated reach length (m): 160

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Dolly Varden

Life Stage: adult

Life History: Unknown

Total Fish Count: 15 Fish Measured: 10 Fork Lengths (mm) Min: 165 Max: 192 Mean: 177 Median: 178

Sampling Method (No. of fish): PEF (10) VOG (5)

Comments: Fin clips in vials 22-33.

Species: Dolly Varden

Life Stage: juvenile/adult

Life History: Unknown

Total Fish Count: 6 Fish Measured: 4 Fork Lengths (mm) Min: 90 Max: 155 Mean: 117 Median: 122

Sampling Method (No. of fish): PEF (4) VOG (2)

Comments: 6 Dolly varden were kept for UAF museum (Tag ID: T000309-T000314) and fin clipped (Vial #: 156468-15647)

Species: Dolly Varden

Life Stage: juvenile

Life History: Unknown

Total Fish Count: 8 Fish Measured: 8 Fork Lengths (mm) Min: 48 Max: 69 Mean: 60 Median: 58

Sampling Method (No. of fish): PEF (8)

Comments: Fin clips in vials 22-33.

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 7 Fish Measured: 1 Fork Lengths (mm) Min: 211 Max: 211 Mean: 211 Median: 211

Sampling Method (No. of fish): PEF (1) VOG (6)

Comments:

---

**Species:** Arctic grayling                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 17    **Fish Measured:** 17    **Fork Lengths (mm) Min:** 109    **Max:** 172    **Mean:** 139    **Median:** 140  
**Sampling Method (No. of fish):** PEF (17)

**Comments:**

**Species:** slimy sculpin                      **Life Stage:** adult                      **Life History:** Resident  
**Total Fish Count:** 1    **Fish Measured:** 1    **Fork Lengths (mm) Min:** 85    **Max:** 85    **Mean:** 85    **Median:** 85  
**Sampling Method (No. of fish):** PEF (1)

**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 2    **Fish Measured:**    **Fork Lengths (mm) Min:**    **Max:**    **Mean:**    **Median:**  
**Sampling Method (No. of fish):** VOG (2)

**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:**

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root GPP 2.5

**Transparency:** secchi tube



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**Station Info****Observers:** Joe Buckwalter, Mary Simmering**Date/Time:** 08/17/2010 1:45 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.25582	-149.84894	<b>Coordinates</b>	67.25630	-149.84849	67.25582	-149.84894

**Elevation NED (m)(ft):** 581 1906**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar B-6**Legal Description (MTRS):** F028N010W18**Waterbody Name:****Anadromous Waters Catalog Number:****Geographic Comments:** Left-bank springbrook tributary to unnamed stream (see 14C04).**Visit Comments:** Side channel. Not all habitat variables were measured. See main channel values (station 14C04).**Wildlife Comments:****Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 6.20	<b>DO (mg/L):</b> 9.11	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 77	<b>pH:</b> 5.69
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b>		<b>Thalweg Velocity (m/s)(ft/s):</b>	

**Stream Channel****Stream Gradient (%):** **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 0 **Embeddedness:**

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>			<b>Subdominant Substrate 1:</b>
<b>Thalweg Depth</b>			<b>Subdominant Substrate 2:</b>

**Rosgen Class:****Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<u>Left Bank Vegetation Type</u>	<u>Right Bank Vegetation Type</u>	
0 - 5		
5 - 10		
10 - 20		
20 - 30		

**Key To Fish Sampling Methods****Estimated reach length (m):** 70

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

**Species:** Dolly Varden **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 7 **Fish Measured:** 7 **Fork Lengths (mm) Min:** 137 **Max:** 168 **Mean:** 144 **Median:** 152  
**Sampling Method (No. of fish):** PEF (7)  
**Comments:** Fin clips in vials 10-21.

**Species:** Dolly Varden **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 11 **Fish Measured:** 6 **Fork Lengths (mm) Min:** 100 **Max:** 130 **Mean:** 117 **Median:** 115  
**Sampling Method (No. of fish):** PEF (6) VOG (5)  
**Comments:** Fin clips in vials 10-21.

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 14 **Fish Measured:** 9 **Fork Lengths (mm) Min:** 116 **Max:** 175 **Mean:** 131 **Median:** 145  
**Sampling Method (No. of fish):** PEF (9) VOG (5)  
**Comments:**

**Instruments****Stream Gradient:****Channel Depths:****Stream Velocity:****Channel Widths:****Turbidity:****Electrofisher:** Smith-Root LR-24

-continued-

Water Quality: YSI 556

Transparency:



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**Station Info**

Observers: Jonathan Kirsch, Bob Powers

Date/Time: 08/18/2010 7:36 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	68.08858	-151.92704	<b>Coordinates</b>	68.08858	-151.92704	/	68.07602 -151.97038

Elevation NED (m)(ft): 608 1995

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandler Lake A-4

Legal Description (MTRS): U016S001E04

Waterbody Name: John River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 3.88 DO (mg/L): 11.20 DO (%): Conductivity (µS/cm): 246 pH: 7.83

Water Color: Clear Turbidity (NTU): 2.99 Thalweg Velocity (m/s)(ft/s): 0.60 1.97

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 282 Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	150.0	18.0	<b>Sands</b>
<b>Thalweg Depth</b>	3.00	1.80	<b>Subdominant Substrate 1:</b>
			<b>Gravel</b>
			<b>Subdominant Substrate 2:</b>
			<b>Cobble</b>

Rosgen Class: C5 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	0.5	Closed Low Willow Shrub	0.5
5 - 10	Closed Low Willow Shrub	0.5	Willow Dwarf Shrub Tundra	0.1
10 - 20	Closed Low Willow Shrub	0.5	Willow Dwarf Shrub Tundra	0.1
20 - 30	Closed Low Willow Shrub	0.5	Willow Dwarf Shrub Tundra	0.1

**Key To Fish Sampling Methods**

Estimated reach length (m): 2800 Total Electrofishing Time (s): 2610

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: longnose sucker

Life Stage: adult

Life History: Resident

Total Fish Count: 6 Fish Measured: 3 Fork Lengths (mm) Min: 375 Max: 383 Mean: 378 Median: 379

Sampling Method (No. of fish): BEF (3) VOB (3)

Comments:

Species: round whitefish

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 370 Max: 370 Mean: 370 Median: 370

Sampling Method (No. of fish): BEF (1)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: handheld sonar depth finder

Stream Velocity: GPS Float

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root GPP 2.5

Water Quality: YSI 556

Transparency:



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**Station Info****Observers:** Ryan Snow, Greta Burkart**Date/Time:** 08/18/2010 12:41 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.17570	-150.35147	<b>Coordinates</b>	67.17570	-150.35147	/	67.11822 -150.43014

**Elevation NED (m)(ft):** 289 948**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman A-1**Legal Description (MTRS):** F027N013W11**Waterbody Name:** Middle Fork Koyukuk River**Anadromous Waters Catalog Number:****Geographic Comments:** The stream is braided.**Visit Comments:** Habitat transect is 50 meters upstream of reach. Too wide and deep to measure depth and velocity of thalweg. River is a little high.**Wildlife Comments:** moose, raptor**Water Quality \ Stream Flow****Water Temp (C):** 10.20 **DO (mg/L):** 11.08 **DO (%):** **Conductivity (µS/cm):** 456 **pH:** 8.17**Water Color:** Muddy **Turbidity (NTU):** 256.00 **Thalweg Velocity (m/s)(ft/s):** 1.10 3.61**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** ##### **Embeddedness:** Low**Channel Dimensions (m):** **Bank Full** **Wetted** **Dominant Substrate:** Gravel**Width** 366.0 176.0 **Subdominant Substrate 1:** Sands**Thalweg Depth** **Subdominant Substrate 2:** Cobble**Rosgen Class:** D4 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.**Riparian Vegetation Communities (Viereck et al. 1992)**

<b>Dist. from Bank (m)</b>	<b>Left Bank Vegetation Type</b>	<b>Canopy Height(m)</b>	<b>Right Bank Vegetation Type</b>	<b>Canopy Height(m)</b>
0 - 5	Open Low Alder-Willow Shrub	1.4	Closed Tall Alder-Willow Shrub	2.6
5 - 10	Closed Tall Alder-Willow Shrub	2	Closed Tall Alder-Willow Shrub	3
10 - 20	Closed Tall Alder-Willow Shrub	2	Closed Black Spruce-White Spruce Forest	10.4
20 - 30	Closed Black Spruce Forest	15.4	Closed Black Spruce-White Spruce Forest	19.6

**Key To Fish Sampling Methods****Estimated reach length (m):** 8900 **Total Electrofishing Time (s):** 3991

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations****Species:** Arctic grayling**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 3 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 152 **Max:** 177 **Mean:** 164 **Median:** 164**Sampling Method (No. of fish):** BEF (2) VOB (1)**Comments:****Species:** lake chub**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 97 **Max:** 97 **Mean:** 97 **Median:** 97**Sampling Method (No. of fish):** BEF (1)**Comments:** One lake chub kept as a specimen (Tag ID: T000315) and fin clipped (156474).**Species:** slimy sculpin**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 4 **Fish Measured:** 4 **Fork Lengths (mm) Min:** 53 **Max:** 61 **Mean:** 56 **Median:** 57**Sampling Method (No. of fish):** BEF (4)**Comments:****Species:** slimy sculpin**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 4 **Fish Measured:** 4 **Fork Lengths (mm) Min:** 32 **Max:** 41 **Mean:** 35 **Median:** 36**Sampling Method (No. of fish):** BEF (4)**Comments:**

-continued-

**Instruments**

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** GPS Float

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:**

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root GPP 2.5

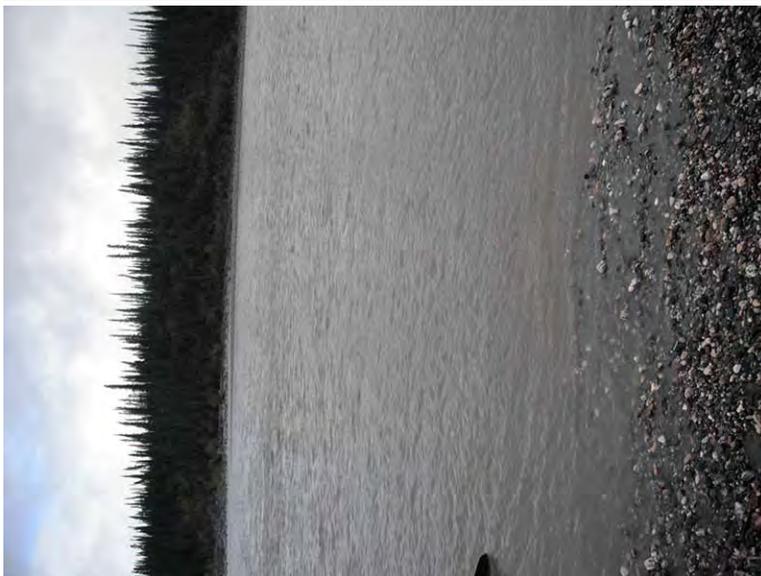
**Transparency:**



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**Station Info****Observers:** Joe Buckwalter, Mary Simmering**Date/Time:** 08/18/2010 9:34 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.53181	-152.66162	<b>Coordinates</b>	67.53153	-152.66197	67.53259	-152.66084

**Elevation NED (m)(ft):** 576 1890**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman C-6**Legal Description (MTRS):** F031N023W10**Waterbody Name:****Anadromous Waters Catalog Number:****Geographic Comments:** Tributary to Shukok Creek.**Visit Comments:****Wildlife Comments:****Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 7.36	<b>DO (mg/L):</b> 10.62	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 419	<b>pH:</b> 7.65
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.26		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.57 1.87	

**Stream Channel****Stream Gradient (%):** 1 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 20 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	10.1	4.9	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	0.67	0.20	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** D3 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	1.2	Open Low Willow Shrub	1.2
5 - 10	Closed Low Willow Shrub	1.2	Closed Low Willow Shrub	1.2
10 - 20	Closed Low Willow Shrub	1.2	Closed Low Willow Shrub	1.2
20 - 30	Closed Low Willow Shrub	1.2	Closed Low Willow Shrub	1.2

**Key To Fish Sampling Methods****Estimated reach length (m):** 160

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 8 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 39 **Max:** 41 **Mean:** 40 **Median:** 40  
**Sampling Method (No. of fish):** PEF (3) VOG (5)  
**Comments:**

**Species:** slimy sculpin **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 4 **Fish Measured:** 4 **Fork Lengths (mm) Min:** 75 **Max:** 102 **Mean:** 86 **Median:** 88  
**Sampling Method (No. of fish):** PEF (4)  
**Comments:**

**Species:** slimy sculpin **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 4 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:**  
**Sampling Method (No. of fish):** PEF (1) VOG (3)  
**Comments:**

## Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



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**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/18/2010 11:12 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.47282	-152.60368	<b>Coordinates</b>	67.47345	-152.60912	/	67.47282 -152.60368

Elevation NED (m)(ft): 480 1575

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman B-6

Legal Description (MTRS): F031N023W36

Waterbody Name: Sixtymile Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.75 DO (mg/L): 10.86 DO (%): Conductivity (µS/cm): 91 pH: 7.44

Water Color: Clear Turbidity (NTU): 0.27 Thalweg Velocity (m/s)(ft/s): 0.61 2.00

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 43 Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	22.5	7.6	<b>Cobble</b>
<b>Thalweg Depth</b>	0.70	0.30	<b>Subdominant Substrate 1:</b>
			<b>Gravel</b>
			<b>Subdominant Substrate 2:</b>
			<b>Sands</b>

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Scrub	3	Open Tall Willow Shrub	2
5 - 10	Closed Tall Scrub	3	Open Tall Willow Shrub	2
10 - 20	Closed White Spruce Forest	12	Open Tall Willow Shrub	2.3
20 - 30	Closed White Spruce Forest	13	Closed White Spruce Forest	13

**Key To Fish Sampling Methods**

Estimated reach length (m): 280

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 405 Max: 405 Mean: 405 Median: 405

Sampling Method (No. of fish): PEF (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 300 Max: 300 Mean: 300 Median: 300

Sampling Method (No. of fish): PEF (1)

Comments:

Species: northern pike

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 410 Max: 410 Mean: 410 Median: 410

Sampling Method (No. of fish): PEF (1)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 4 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): PEF (2) VOG (2)

Comments:

**Instruments**

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



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**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/18/2010 1:53 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.44087	-152.20165	<b>Coordinates</b>	67.44106	-152.20894	/	67.44087 -152.20165

Elevation NED (m)(ft): 426 1398

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman B-5

Legal Description (MTRS): F030N021W10

Waterbody Name: McKinley Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 8.13 DO (mg/L): 11.81 DO (%): Conductivity (µS/cm): 355 pH: 8.02

Water Color: Clear Turbidity (NTU): 0.18 Thalweg Velocity (m/s)(ft/s): 1.18 3.87

**Stream Channel**

Stream Gradient (%): 1.75 Entrenchment: Entrenched

Catchment Area(sq. km): 57 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	20.6	9.4	<b>Boulder</b>
<b>Thalweg Depth</b>	1.00	0.48	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: B2 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed White Spruce Forest	7	Open Low Willow Shrub	1
5 - 10	Closed White Spruce Forest	7	Open Low Willow Shrub	1
10 - 20	Closed White Spruce Forest	7	Closed White Spruce Forest	7
20 - 30	Closed White Spruce Forest	8	Closed White Spruce Forest	7

**Key To Fish Sampling Methods**

Estimated reach length (m): 370

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 5 Fish Measured: 4 Fork Lengths (mm) Min: 100 Max: 115 Mean: 106 Median: 107

Sampling Method (No. of fish): PEF (4) VOG (1)

Comments:

Species: salmonid-unspecified

Life Stage: juvenile/adult

Life History: Unknown

Total Fish Count: 2 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (2)

Comments: Probably a Dolly Varden. 80-120 mm

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 82 Max: 82 Mean: 82 Median: 82

Sampling Method (No. of fish): PEF (2)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 6 Fish Measured: 2 Fork Lengths (mm) Min: 63 Max: 66 Mean: 64 Median: 64

Sampling Method (No. of fish): PEF (2) VOG (4)

Comments:

**Instruments**

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



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FSK1015C030442.jp

**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/18/2010 3:40 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.29328	-152.48531	<b>Coordinates</b>	67.29277	-152.49064	67.29328	-152.48531

Elevation NED (m)(ft): 522 1713

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman B-5

Legal Description (MTRS): F029N022W33

Waterbody Name: Malamute Fork John River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.38 DO (mg/L): 10.53 DO (%): Conductivity (µS/cm): 199 pH: 7.82

Water Color: Clear Turbidity (NTU): 0.96 Thalweg Velocity (m/s)(ft/s): 1.05 3.44

**Stream Channel**

Stream Gradient (%): 2.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 52 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	16.1	6.2	<b>Cobble</b>
<b>Thalweg Depth</b>	1.70	0.70	<b>Subdominant Substrate 1:</b>
			<b>Boulder</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Open Tall Willow Shrub		Closed Low Willow Shrub	
5 - 10	Open Tall Willow Shrub		Closed White Spruce Forest	
10 - 20	Closed White Spruce Forest		Closed White Spruce Forest	
20 - 30	Closed White Spruce Forest		Closed White Spruce Forest	

**Key To Fish Sampling Methods**

Estimated reach length (m): 240

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Dolly Varden

Life Stage: juvenile/adult

Life History: Unknown

Total Fish Count: 9 Fish Measured: 5 Fork Lengths (mm) Min: 90 Max: 139 Mean: 114 Median: 114

Sampling Method (No. of fish): PEF (5) VOG (4)

Comments: Fin clips in vials 34-38.

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 3 Fish Measured: 1 Fork Lengths (mm) Min: 139 Max: 139 Mean: 139 Median: 139

Sampling Method (No. of fish): PEF (1) VOG (2)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



FSK1015C040446.jp



FSK1015C040447.jp



FSK1015C040448.jp



**Station Info**

Observers: Jonathan Kirsch, Mary Simmering

Date/Time: 08/19/2010 7:57 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.20789	-149.61633	<b>Coordinates</b>	67.20789	-149.61633	/	67.19106 -149.60972

Elevation NED (m)(ft): 455 1493

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar A-6

Legal Description (MTRS): F028N009W31

Waterbody Name: South Fork Koyukuk River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.27 DO (mg/L): 11.82 DO (%): Conductivity (µS/cm): 227 pH: 8.04

Water Color: Clear Turbidity (NTU): 2.62 Thalweg Velocity (m/s)(ft/s): 0.80 2.62

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 717 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	70.0	18.0	<b>Gravel</b>
<b>Thalweg Depth</b>	2.20	0.90	<b>Subdominant Substrate 1: Sands</b>
			<b>Subdominant Substrate 2: Cobble</b>

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Unvegetated	0	Closed Low Willow Shrub	1.2
5 - 10	Unvegetated	0	Closed Black Spruce-White Spruce Forest	2.2
10 - 20	Closed Low Willow Shrub	1.2	Closed Black Spruce-White Spruce Forest	11
20 - 30	Closed Low Willow Shrub	1.2	Closed Black Spruce-White Spruce Forest	13

**Key To Fish Sampling Methods**

Estimated reach length (m): 2800 Total Electrofishing Time (s): 2158

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 3 Fish Measured: 1 Fork Lengths (mm) Min: 440 Max: 440 Mean: 440 Median: 440

Sampling Method (No. of fish): BEF (1) VOB (2)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 50 Max: 50 Mean: 50 Median: 50

Sampling Method (No. of fish): BEF (1)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: GPS Float

Channel Widths: handheld laser rangefinder

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root GPP 2.5

Water Quality: YSI 556

Transparency:



FSK1016A010302.jp



FSK1016A010303.jp



FSK1016A010304.jp



**Station Info****Observers:** Cecil Rich, Greta Burkart**Date/Time:** 08/19/2010 10:05 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.59943	-150.39511	<b>Coordinates</b>	67.59943	-150.39511	/	67.57063 -150.39743

**Elevation NED (m)(ft):** 442 1450**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman C-1**Legal Description (MTRS):** F032N013W14**Waterbody Name:** Glacier River**Anadromous Waters Catalog Number:****Geographic Comments:** We began sampling at point bar on large delta of left bank tributary.

**Visit Comments:** Habitat transect was located at the start of the reach (see Station coordinates entered for this site) along a mid channel bar (wide, shallow depositional area just below left-bank tributary confluence--see photo 129). However, widths & depths and velocity recorded for this site were measured at a second channel cross section (more representative of entire reach) at 67.57514, -150.39200. Fish were sampled along the right-bank side of the thalweg.

**Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 6.92 **DO (mg/L):** 11.09 **DO (%):** **Conductivity (µS/cm):** 558 **pH:** 8.03**Water Color:** Glacial, Low Turbidit **Turbidity (NTU):** 13.80 **Thalweg Velocity (m/s)(ft/s):** 1.18 3.87**Stream Channel****Stream Gradient (%):** 2 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 317 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bankfull</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	60.0	22.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.66	0.62	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b><u>Left Bank Vegetation Type</u></b>	<b><u>Right Bank Vegetation Type</u></b>	
<b>0 - 5</b> Closed Low Willow Shrub	1.5	Open Black Spruce-White Spruce Forest
<b>5 - 10</b> Closed Tall Alder-Willow Shrub	2	Open Black Spruce-White Spruce Forest
<b>10 - 20</b> Closed Low Willow Shrub	1.5	Open Black Spruce-White Spruce Forest
<b>20 - 30</b> Closed Tall Alder-Willow Shrub	2.5	Open Black Spruce-White Spruce Forest

**Key To Fish Sampling Methods****Estimated reach length (m):**4600 **Total Electrofishing Time (s):**2294

(BEF) Boat-Mounted Electrofisher

**Fish Observations****Species:** Arctic grayling**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 2 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 118 **Max:** 165 **Mean:** 141 **Median:** 141**Sampling Method (No. of fish):** BEF (2)**Comments:****Species:** slimy sculpin**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 3 **Fish Measured:** 3 **Fork Lengths (mm) Min:** 45 **Max:** 49 **Mean:** 46 **Median:** 47**Sampling Method (No. of fish):** BEF (3)**Comments:**

**Instruments**

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** Orange Float

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root GPP 2.5

**Transparency:**



FSK1016b010122.jpg



FSK1016b010123.jpg



FSK1016b010124.jpg



FSK1016b010129.jpg

**Station Info**

Observers: Joe Buckwalter, Bob Powers

Date/Time: 08/19/2010 8:11 AM

Station	Latitude	Longitude	Sample	Latitude	Longitude
Coordinates	67.12979	-151.98322	Coordinates	67.12979	-151.98322

Elevation NED (m)(ft): 242 794

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman A-4

Legal Description (MTRS): F027N020W28

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments: Aerial photos only. No LZ; beaver dam complex.

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C):	DO (mg/L):	DO (%):	Conductivity (µS/cm):	pH:
Water Color:	Turbidity (NTU):	Thalweg Velocity (m/s)(ft/s):		

**Stream Channel**

Stream Gradient (%):

Entrenchment:

Catchment Area(sq. km):

Embeddedness:

Channel Dimensions (m): Bank Full Wetted

Dominant Substrate:

Width

Subdominant Substrate 1:

Thalweg Depth

Subdominant Substrate 2:

Rosgen Class:

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5				
5 - 10				
10 - 20				
20 - 30				

**Key To Fish Sampling Methods**

(NON) None

**Fish Observations**

Species: no collection effort

Life Stage: not applicable

Life History: Not Applicable

Total Fish Count: 0

Fish Measured:

Fork Lengths (mm) Min:

Max:

Mean:

Median:

Sampling Method (No. of fish): NON (0)

Comments:

**Instruments**

Stream Gradient:

Channel Depths:

Stream Velocity:

Channel Widths:

Turbidity:

Electrofisher:

Water Quality:

Transparency:



FSK1016C010452.jp



FSK1016C010453.jp

**Station Info****Observers:** Joe Buckwalter, Bob Powers**Date/Time:** 08/19/2010 9:59 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.23170	-152.07809	<b>Coordinates</b>	67.23085	-152.08154	67.23170	-152.07809

**Elevation NED (m)(ft):** 331 1086**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman A-5**Legal Description (MTRS):** F028N021W24**Waterbody Name:** Missouri Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Bluish/ gray water color. Most fish collected from clear side channels .**Wildlife Comments:****Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 3.91	<b>DO (mg/L):</b> 14.18	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 264	<b>pH:</b> 7.61
<b>Water Color:</b> Muddy	<b>Turbidity (NTU):</b> 8.49		<b>Thalweg Velocity (m/s)(ft/s):</b> 1.33 4.36	

**Stream Channel****Stream Gradient (%):** 1.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 41 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	19.2	5.5	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.40	0.47	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open White Spruce Forest	15	Closed Tall Alder-Willow Shrub	3
5 - 10	Open White Spruce Forest	15	Closed Tall Alder-Willow Shrub	3
10 - 20	Open White Spruce Forest	15	Closed Tall Alder-Willow Shrub	3
20 - 30	Open White Spruce Forest	15	Closed Tall Alder-Willow Shrub	3

**Key To Fish Sampling Methods****Estimated reach length (m):** 220

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

**Species:** Dolly Varden **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 175 **Max:** 175 **Mean:** 175 **Median:** 175  
**Sampling Method (No. of fish):** PEF (1)  
**Comments:**

**Species:** Dolly Varden **Life Stage:** juvenile/adult **Life History:** Unknown  
**Total Fish Count:** 6 **Fish Measured:** 6 **Fork Lengths (mm) Min:** 93 **Max:** 139 **Mean:** 106 **Median:** 116  
**Sampling Method (No. of fish):** PEF (6)  
**Comments:** Fin clips in vials 39-45.

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 15 **Fish Measured:** 14 **Fork Lengths (mm) Min:** 113 **Max:** 162 **Mean:** 133 **Median:** 137  
**Sampling Method (No. of fish):** PEF (14) VOG (1)  
**Comments:**

**Instruments**

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1016C020459.jp



FSK1016C020460.jp



FSK1016C020461.jp



FSK1016C020462.jp



FSK1016C020463.jp



FSK1016C020464.jp

**Station Info**

Observers: Joe Buckwalter, Bob Powers

Date/Time: 08/19/2010 1:04 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.18850	-151.77174	<b>Coordinates</b>	67.18863	-151.77372	67.18795	-151.76858

Elevation NED (m)(ft): 266 873

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman A-4

Legal Description (MTRS): F027N019W05

Waterbody Name: Timber Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 8.41 DO (mg/L): 10.60 DO (%): Conductivity (µS/cm): 201 pH: 7.24

Water Color: Clear Turbidity (NTU): 1.29 Thalweg Velocity (m/s)(ft/s): 1.20 3.94

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 69 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	15.0	7.0	<b>Cobble</b>
<b>Thalweg Depth</b>	1.20	0.40	<b>Subdominant Substrate 1:</b>
			<b>Gravel</b>
			<b>Subdominant Substrate 2:</b>
			<b>Sands</b>

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
5 - 10	Closed White Spruce-Paper Birch-Balsam Poplar (Black Cottonwood Forest)	16	Closed Tall Willow Shrub	2
10 - 20	Closed White Spruce-Paper Birch-Balsam Poplar (Black Cottonwood Forest)	16	Closed Tall Willow Shrub	2
20 - 30	Closed White Spruce-Paper Birch-Balsam Poplar (Black Cottonwood Forest)	16	Closed Tall Willow Shrub	2

**Key To Fish Sampling Methods**

Estimated reach length (m): 280

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: burbot

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 260 Max: 260 Mean: 260 Median: 260

Sampling Method (No. of fish): PEF (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (1)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 75 Max: 75 Mean: 75 Median: 75

Sampling Method (No. of fish): PEF (1)

Comments:

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 3      **Fish Measured:** 1      **Fork Lengths (mm) Min:** 66      **Max:** 66      **Mean:** 66      **Median:** 66  
**Sampling Method (No. of fish):** PEF (1) VOG (2)  
**Comments:**

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### Instruments

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> graduated wading rod
<b>Stream Velocity:</b> transparent velocity head rod	<b>Channel Widths:</b> measuring tape
<b>Turbidity:</b> LaMotte 2020e turbidimeter	<b>Electrofisher:</b> Smith-Root LR-24
<b>Water Quality:</b> YSI 556	<b>Transparency:</b> secchi tube



FSK1016C030466.jp



FSK1016C030467.jp



FSK1016C030468.jp



**Station Info**

Observers: Joe Buckwalter, Bob Powers

Date/Time: 08/19/2010 2:51 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.22112	-151.70387	<b>Coordinates</b>	67.22247	-151.69860	/	67.22112 -151.70387

Elevation NED (m)(ft): 341 1119

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman A-4

Legal Description (MTRS): F028N019W27

Waterbody Name: Suckik Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 5.34 DO (mg/L): 12.74 DO (%): Conductivity (µS/cm): 224 pH: 7.61

Water Color: Clear Turbidity (NTU): 0.75 Thalweg Velocity (m/s)(ft/s): 2.00 6.56

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 61 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	11.5	7.2	<b>Boulder</b>
<b>Thalweg Depth</b>	1.16	0.58	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: B2 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Alder-Willow Shrub	4	Closed White Spruce-Paper Birch-Balsam Poplar (Black Cottonwood Forest)	10
5 - 10	Closed Tall Alder-Willow Shrub	4	Closed White Spruce-Paper Birch-Balsam Poplar (Black Cottonwood Forest)	10
10 - 20	Closed Tall Alder-Willow Shrub	4	Closed White Spruce-Paper Birch-Balsam Poplar (Black Cottonwood Forest)	10
20 - 30	Closed Tall Alder-Willow Shrub	4	Closed White Spruce-Paper Birch-Balsam Poplar (Black Cottonwood Forest)	10

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Dolly Varden Life Stage: juvenile/adult Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 96 Max: 145 Mean: 120 Median: 120

Sampling Method (No. of fish): PEF (2)

Comments:

Species: Arctic grayling Life Stage: juvenile Life History: Resident

Total Fish Count: 16 Fish Measured: 11 Fork Lengths (mm) Min: 100 Max: 177 Mean: 126 Median: 138

Sampling Method (No. of fish): PEF (11) VOG (5)

Comments:

## Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1016C040476.jp



FSK1016C040477.jp



FSK1016C040478.jp



FSK1016C040479.jp



FSK1016C040480.jp



FSK1016C040481.jp

**Station Info**

Observers: Jonathan Kirsch, James Bales

Date/Time: 08/20/2010 9:36 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.08890	-150.94769	<b>Coordinates</b>	67.08890	-150.94769	/	67.05839 -151.08757

Elevation NED (m)(ft): 236 774

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman A-2

Legal Description (MTRS): F026N015W07

Waterbody Name: North Fork Koyukuk River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 8.73 DO (mg/L): 11.34 DO (%): Conductivity (µS/cm): 365 pH: 7.79

Water Color: Muddy Turbidity (NTU): 38.60 Thalweg Velocity (m/s)(ft/s): 0.80 2.62

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): ##### Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	200.0	80.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	5.00	2.50	<b>Subdominant Substrate 2:</b> Sands

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	3	Unvegetated	0
5 - 10	Closed Spruce-Paper Birch Forest	10	Closed Paper Birch Forest	3
10 - 20	Closed Spruce-Paper Birch Forest	12	Closed Paper Birch Forest	5
20 - 30	Closed Spruce-Paper Birch Forest	12	Closed Paper Birch Forest	10

**Key To Fish Sampling Methods**

Estimated reach length (m): ##### Total Electrofishing Time (s): 5164

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 345 Max: 390 Mean: 367 Median: 367

Sampling Method (No. of fish): BEF (2)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 240 Max: 270 Mean: 255 Median: 255

Sampling Method (No. of fish): BEF (2)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 116 Max: 160 Mean: 138 Median: 138

Sampling Method (No. of fish): BEF (2)

Comments:

Species: longnose sucker

Life Stage: adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 390 Max: 440 Mean: 415 Median: 415

Sampling Method (No. of fish): BEF (2)

Comments:

**Species:** longnose sucker                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 4    **Fish Measured:** 4    **Fork Lengths (mm) Min:** 45    **Max:** 165    **Mean:** 87    **Median:** 105  
**Sampling Method (No. of fish):** BEF (4)

**Comments:**

**Species:** Chinook salmon                      **Life Stage:** juvenile                      **Life History:** Anadromous  
**Total Fish Count:** 4    **Fish Measured:** 2    **Fork Lengths (mm) Min:** 78    **Max:** 82    **Mean:** 80    **Median:** 80  
**Sampling Method (No. of fish):** BEF (2) VOB (2)

**Comments:**

**Species:** round whitefish                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 1    **Fish Measured:** 1    **Fork Lengths (mm) Min:** 151    **Max:** 151    **Mean:** 151    **Median:** 151  
**Sampling Method (No. of fish):** BEF (1)

**Comments:**

---

### Instruments

**Stream Gradient:** handheld optical clinometer

**Channel Depths:** handheld sonar depth finder

**Stream Velocity:** GPS Float

**Channel Widths:** handheld laser rangefinder

**Turbidity:** LaMotte 2020e turbidimeter

**Electrofisher:** Smith-Root GPP 2.5

**Water Quality:** YSI 556

**Transparency:**



FSK1017A010307.jp



FSK1017A010308.jp



FSK1017A010309.jp



**Station Info****Observers:** Cecil Rich, Greta Burkart**Date/Time:** 08/20/2010 2:22 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.69878	-151.49458	<b>Coordinates</b>	66.69878	-151.49458	/	66.68494 -151.50661

**Elevation NED (m)(ft):** 160 525**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Bettles C-3**Legal Description (MTRS):** F022N018W29**Waterbody Name:****Anadromous Waters Catalog Number:****Geographic Comments:**

**Visit Comments:** Channel likely formed, then abandoned, by the SF Koyukuk--now occupied by a tributary, and beavers. Channel impounded by beavers through first 5 subreaches. Subreaches 5-8 were riffle-pool (c4) and wetted width decreased. Submergent aquatic vegetation along channel margins, whorled milfoil and other macrophytes. Beaver lodges at upstream station. Six to eight beaver dams across stream ranging from 8 inches to 3 feet tall.

**Wildlife Comments:** Signs of moose and beaver were present.**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 13.30	<b>DO (mg/L):</b> 7.98	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 190	<b>pH:</b> 7.00
<b>Water Color:</b> Humic	<b>Turbidity (NTU):</b> 5.75		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.00 0.00	

**Stream Channel****Stream Gradient (%):** 0 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 238 **Embeddedness:** Very High

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	42.0	41.0	<b>Subdominant Substrate 1:</b> Organic
<b>Thalweg Depth</b>	1.90	1.76	<b>Subdominant Substrate 2:</b>

**Rosgen Class:** BVP Beaver Pond Complex**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from Bank (m)</b>	<b>Left Bank Vegetation Type</b>	<b>Canopy Height(m)</b>	<b>Right Bank Vegetation Type</b>	<b>Canopy Height(m)</b>
0 - 5	Open Tall Alder-Willow Shrub	3	Closed Tall Alder-Willow Shrub	3
5 - 10	Closed Paper Birch Forest	3.5	Closed Paper Birch Forest	3
10 - 20	Closed Paper Birch Forest	4	Closed Paper Birch Forest	4
20 - 30	Closed Paper Birch Forest	4	Closed Paper Birch Forest	5

**Key To Fish Sampling Methods****Estimated reach length (m):** 3200 **Total Electrofishing Time (s):** 2197

(BEF) Boat-Mounted Electrofisher

**Fish Observations****Species:** northern pike**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 435 **Max:** 435 **Mean:** 435 **Median:** 435**Sampling Method (No. of fish):** BEF (1)**Comments:****Species:** slimy sculpin**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 4 **Fish Measured:** 4 **Fork Lengths (mm) Min:** 29 **Max:** 43 **Mean:** 35 **Median:** 36**Sampling Method (No. of fish):** BEF (4)**Comments:**

**Instruments**

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** GPS Float

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root GPP 2.5

**Transparency:**



FSK1017b010131.jpg



FSK1017b010136.jpg



FSK1017b010138.jpg



FSK1017b010139.jpg



FSK1017b010140.jpg

**Station Info**

Observers: Joe Buckwalter, Bob Powers

Date/Time: 08/20/2010 8:47 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.55895	-151.49711	<b>Coordinates</b>	67.55996	-151.49385	/	67.55895 -151.49711

Elevation NED (m)(ft): 356 1168

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman C-3

Legal Description (MTRS): F032N018W35

Waterbody Name: Tobin Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 5.38 DO (mg/L): 10.03 DO (%): Conductivity (µS/cm): 570 pH: 7.87

Water Color: Clear Turbidity (NTU): 1.29 Thalweg Velocity (m/s)(ft/s): 0.85 2.79

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 69 Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	26.8	7.7	<b>Gravel</b>
<b>Thalweg Depth</b>	1.60	0.50	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Sands</b>

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open Tall Willow Shrub	3	Open White Spruce Forest	5
5 - 10	Closed Spruce-Paper Birch Forest	12	Open White Spruce Forest	5
10 - 20	Closed Spruce-Paper Birch Forest	12	Open White Spruce Forest	5
20 - 30	Closed Spruce-Paper Birch Forest	12	Open White Spruce Forest	5

**Key To Fish Sampling Methods**

Estimated reach length (m): 355

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 79 Max: 79 Mean: 79 Median: 79

Sampling Method (No. of fish): PEF (1)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 11 Fish Measured: 5 Fork Lengths (mm) Min: 51 Max: 66 Mean: 57 Median: 58

Sampling Method (No. of fish): PEF (5) VOG (6)

Comments:

Species: slimy sculpin

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 48 Max: 48 Mean: 48 Median: 48

Sampling Method (No. of fish): PEF (1)

Comments:

**Instruments**

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1017C010497.jp



FSK1017C010498.jp



FSK1017C010499.jp



FSK1017C010500.jp  
Looking downstream toward  
Wild Lake.

**Station Info**

Observers: Joe Buckwalter, Bob Powers

Date/Time: 08/20/2010 11:25 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.52489	-151.39407	<b>Coordinates</b>	67.52567	-151.39712	67.52489	-151.39407

Elevation NED (m)(ft): 426 1398

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman C-3

Legal Description (MTRS): F031N017W08

Waterbody Name: Flat Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 8.48 DO (mg/L): 8.56 DO (%): Conductivity (µS/cm): 244 pH: 7.59

Water Color: Muddy Turbidity (NTU): 6.76 Thalweg Velocity (m/s)(ft/s): 0.85 2.79

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 53 Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	16.1	5.2	<b>Gravel</b>
<b>Thalweg Depth</b>	1.50	0.82	<b>Subdominant Substrate 1: Sands</b>
			<b>Subdominant Substrate 2: Cobble</b>

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	1	Closed Low Willow Shrub	1
5 - 10	Closed Low Willow Shrub	1	Closed Low Willow Shrub	1
10 - 20	Open White Spruce Forest	10	Closed Low Willow Shrub	1
20 - 30	Closed Low Willow Shrub	1	Closed Low Willow Shrub	1

**Key To Fish Sampling Methods**

Estimated reach length (m): 180

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 7 Fish Measured: 3 Fork Lengths (mm) Min: 204 Max: 220 Mean: 209 Median: 212

Sampling Method (No. of fish): PEF (3) VOG (4)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 8 Fish Measured: 8 Fork Lengths (mm) Min: 44 Max: 177 Mean: 79 Median: 110

Sampling Method (No. of fish): PEF (8)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 82 Max: 82 Mean: 82 Median: 82

Sampling Method (No. of fish): PEF (2)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 4 Fish Measured: 4 Fork Lengths (mm) Min: 63 Max: 67 Mean: 65 Median: 65

Sampling Method (No. of fish): PEF (4)

Comments:

**Species:** slimy sculpin                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 1      **Fish Measured:** 1      **Fork Lengths (mm) Min:** 22      **Max:** 22      **Mean:** 22      **Median:** 22  
**Sampling Method (No. of fish):** PEF (1)  
**Comments:**

**Species:** round whitefish                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 1      **Fish Measured:** 1      **Fork Lengths (mm) Min:** 230      **Max:** 230      **Mean:** 230      **Median:** 230  
**Sampling Method (No. of fish):** PEF (1)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer                      **Channel Depths:** graduated wading rod  
**Stream Velocity:** transparent velocity head rod                      **Channel Widths:** measuring tape  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root LR-24  
**Water Quality:** YSI 556                      **Transparency:** secchi tube



FSK1017C020502.jp



FSK1017C020503.jp



FSK1017C020504.jp



FSK1017C020505.jp

**Station Info**

Observers: Joe Buckwalter, Bob Powers

Date/Time: 08/20/2010 12:55 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.50218	-151.62573	<b>Coordinates</b>	67.50277	-151.62969	/	67.50251 -151.62361

Elevation NED (m)(ft): 402 1319

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman C-4

Legal Description (MTRS): F031N018W20

Waterbody Name: Seward Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 5.86 DO (mg/L): 9.54 DO (%): Conductivity (µS/cm): 242 pH: 7.57

Water Color: Clear Turbidity (NTU): 1.69 Thalweg Velocity (m/s)(ft/s): 0.74 2.43

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 54 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	13.1	7.2	<b>Cobble</b>
<b>Thalweg Depth</b>	0.90	0.39	<b>Subdominant Substrate 1:</b>
			<b>Boulder</b>
			<b>Subdominant Substrate 2:</b>
			<b>Silt/Sand</b>

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Open White Spruce Forest	20	Open Tall Alder-Willow Shrub	2
5 - 10	Open White Spruce Forest	20	Closed Balsam Poplar-White Spruce Forest	12
10 - 20	Open White Spruce Forest	20	Closed Balsam Poplar-White Spruce Forest	12
20 - 30	Open White Spruce Forest	20	Closed Balsam Poplar-White Spruce Forest	12

**Key To Fish Sampling Methods**

Estimated reach length (m): 310

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 5 Fish Measured: 3 Fork Lengths (mm) Min: 80 Max: 89 Mean: 85 Median: 84

Sampling Method (No. of fish): PEF (3) VOG (2)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 6 Fish Measured: 2 Fork Lengths (mm) Min: 82 Max: 100 Mean: 91 Median: 91

Sampling Method (No. of fish): PEF (2) VOG (4)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1017C030509.jp



FSK1017C030510.jp



FSK1017C030511.jp



FSK1017C030512.jp

**Station Info**

Observers: Joe Buckwalter, Bob Powers

Date/Time: 08/20/2010 2:58 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.31775	-151.69119	<b>Coordinates</b>	67.31639	-151.69239	67.31775	-151.69119

Elevation NED (m)(ft): 577 1893

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman B-4

Legal Description (MTRS): F029N019W25

Waterbody Name: Madison Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 5.07	<b>DO (mg/L):</b> 11.07	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 174	<b>pH:</b> 7.87
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.00		<b>Thalweg Velocity (m/s)(ft/s):</b> 1.05 3.44	

**Stream Channel**

Stream Gradient (%): 5.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 6 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Boulder
<b>Width</b>	6.6	4.6	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	0.80	0.28	<b>Subdominant Substrate 2:</b> Gravel

Rosgen Class: B2 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b>Left Bank Vegetation Type</b>	<b>Right Bank Vegetation Type</b>	
0 - 5 Open Tall Willow Shrub	2 Open Tall Willow Shrub	2
5 - 10 Open Tall Willow Shrub	2 Open Tall Willow Shrub	2
10 - 20 Open Tall Willow Shrub	2 Open Tall Willow Shrub	2
20 - 30 Open Tall Willow Shrub	2 Open Tall Willow Shrub	2

**Key To Fish Sampling Methods**

Estimated reach length (m): 160

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

<b>Species:</b> Dolly Varden	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Unknown
<b>Total Fish Count:</b> 9	<b>Fish Measured:</b> 9	<b>Fork Lengths (mm) Min:</b> 83
		<b>Max:</b> 152
		<b>Mean:</b> 97
		<b>Median:</b> 117
<b>Sampling Method (No. of fish):</b> PEF (9)		
<b>Comments:</b>		

<b>Species:</b> Dolly Varden	<b>Life Stage:</b> juvenile	<b>Life History:</b> Unknown
<b>Total Fish Count:</b> 2	<b>Fish Measured:</b>	<b>Fork Lengths (mm) Min:</b>
		<b>Max:</b>
		<b>Mean:</b>
		<b>Median:</b>
<b>Sampling Method (No. of fish):</b> VOG (2)		
<b>Comments:</b>		

**Instruments****Stream Gradient:** handheld abney level**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** measuring tape**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



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FSK1017C040515.jp



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FSK1017C040517.jp



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**Station Info**

Observers: Jonathan Kirsch, James Bales

Date/Time: 08/22/2010 7:21 PM

Station	Latitude	Longitude	Sample	Latitude	Longitude	Latitude	Longitude
Coordinates	67.18051	-152.27815	Coordinates	67.18051	-152.27815	67.16917	-152.26382

Elevation NED (m)(ft): 330 1083

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman A-5

Legal Description (MTRS): F027N021W07

Waterbody Name: Malamute Fork John River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.49 DO (mg/L): 11.42 DO (%): Conductivity (µS/cm): 245 pH: 8.61

Water Color: Clear Turbidity (NTU): 2.30 Thalweg Velocity (m/s)(ft/s): 0.96 3.15

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 191 Embeddedness: Low

Channel Dimensions (m):	Bank Full	Wetted	Dominant Substrate:	Gravel
Width	32.0	13.0	Subdominant Substrate 1:	Cobble
Thalweg Depth	1.80	0.60	Subdominant Substrate 2:	Sands

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2.5
5 - 10	Open Black Spruce Forest	10	Closed Tall Willow Shrub	2.5
10 - 20	Open Black Spruce Forest	10	Open Black Spruce Forest	16
20 - 30	Open Black Spruce Forest	10	Open Black Spruce Forest	16

**Key To Fish Sampling Methods**

Estimated reach length (m): 2100 Total Electrofishing Time (s): 1327

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 6 Fish Measured: 2 Fork Lengths (mm) Min: 350 Max: 400 Mean: 375 Median: 375

Sampling Method (No. of fish): BEF (2) VOB (4)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 320 Max: 325 Mean: 322 Median: 322

Sampling Method (No. of fish): BEF (2)

Comments:

Species: longnose sucker

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOB (1)

Comments:

Species: chum salmon

Life Stage: adult spawning

Life History: Anadromous

Total Fish Count: 7 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOB (7)

Comments:

## Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root GPP 2.5

**Transparency:**



FSK1018A010312.jp



FSK1018A010313.jp



FSK1018A010314.jp



**Station Info****Observers:** Cecil Rich, Greta Burkart**Date/Time:** 08/21/2010 11:54 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.37350	-152.36665	<b>Coordinates</b>	67.37350	-152.36665	/	67.34953 -152.30428

**Elevation NED (m)(ft):** 387 1270**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman B-5**Legal Description (MTRS):** F029N022W01**Waterbody Name:** Sixtymile Creek**Anadromous Waters Catalog Number:****Geographic Comments:**

**Visit Comments:** Hunting camp upstream from sample reach. Downstream dominant substrate changed (1: cobble, 2: boulder) and channel narrowed and had fewer braids. Photos 148-156 were taken at subreach 10. At our take-out (subreach 15) there had been a mass wasting event that created an unusually tall and wide alluvial fan. Some vegetation had recolonized.

**Wildlife Comments:** Signs of moose (droppings) and bear (tracks) were present.

**Water Quality \ Stream Flow**

**Water Temp (C):** 8.22 **DO (mg/L):** 11.22 **DO (%):** **Conductivity (µS/cm):** 350 **pH:** 9.69

**Water Color:** Clear **Turbidity (NTU):** 2.40 **Thalweg Velocity (m/s)(ft/s):** 1.25 4.10

**Stream Channel**

**Stream Gradient (%):** 2 **Entrenchment:** Slightly Entrenched

**Catchment Area(sq. km):** 248 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	68.0	22.6	<b>Subdominant Substrate 1:</b> Sands
<b>Thalweg Depth</b>	1.14	0.54	<b>Subdominant Substrate 2:</b> Cobble

**Rosgen Class:** D4 Braided channel with longitudinal and transverse bars. Very wide channel with eroding banks.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Open Low Willow Shrub	1.2	Open Low Willow-Sedge Shrub Tundra	2
5 - 10	Open Low Willow Shrub	1.5	Open Low Willow Shrub	2
10 - 20	Open Low Willow Shrub	1.5	Open Low Willow Shrub	1.5
20 - 30	Open Low Willow Shrub	1.5	Open Low Willow Shrub	1.5

**Key To Fish Sampling Methods**

**Estimated reach length (m):** 4300 **Total Electrofishing Time (s):** 1651

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

**Species:** Arctic grayling **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 1 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:**  
**Sampling Method (No. of fish):** VOB (1)  
**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 106 **Max:** 106 **Mean:** 106 **Median:** 106  
**Sampling Method (No. of fish):** BEF (1)  
**Comments:**

**Species:** slimy sculpin **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 1 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:**  
**Sampling Method (No. of fish):** VOB (1)  
**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 3      **Fish Measured:** 3      **Fork Lengths (mm) Min:** 50      **Max:** 54      **Mean:** 52      **Median:** 52  
**Sampling Method (No. of fish):** BEF (2) VOB (1)  
**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 1      **Fish Measured:** 1      **Fork Lengths (mm) Min:** 32      **Max:** 32      **Mean:** 32      **Median:** 32  
**Sampling Method (No. of fish):** VOB (1)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer                      **Channel Depths:** graduated wading rod  
**Stream Velocity:** Orange Float                      **Channel Widths:** measuring tape  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root GPP 2.5  
**Water Quality:** YSI 556                      **Transparency:**



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FSK1018b010142.jpg



FSK1018b010143.jpg



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FSK1018b010146.jpg



FSK1018b010147.jpg



FSK1018b010153.jpg



FSK1018b010154.jpg



**Station Info**

Observers: Joe Buckwalter, Bob Powers

Date/Time: 08/21/2010 8:55 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.38488	-151.17836	<b>Coordinates</b>	67.38633	-151.17765	67.38459	-151.17741

Elevation NED (m)(ft): 458 1503

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman B-3

Legal Description (MTRS): F030N016W32

Waterbody Name: Michigan Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments: Landing zone 20 meters from Gates of the Arctic N.P boundary.

Wildlife Comments: Grizzly bear 1 mile downstream.

**Water Quality \ Stream Flow**

Water Temp (C): 5.27 DO (mg/L): 11.08 DO (%): Conductivity (µS/cm): 432 pH: 8.11

Water Color: Clear Turbidity (NTU): 0.67 Thalweg Velocity (m/s)(ft/s): 0.53 1.74

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 94 Embeddedness: Moderate

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	25.2	8.7	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.20	0.50	<b>Subdominant Substrate 2:</b> Sands

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
5 - 10	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
10 - 20	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
20 - 30	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2

**Key To Fish Sampling Methods**

Estimated reach length (m): 260

(PEF) Portable Electrofisher

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 328 Max: 328 Mean: 328 Median: 328

Sampling Method (No. of fish): PEF (1)

Comments:

**Instruments**

Stream Gradient: handheld abney level

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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**Station Info**

Observers: Joe Buckwalter, Bob Powers

Date/Time: 08/21/2010 10:11 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.29585	-151.06301	<b>Coordinates</b>	67.29659	-151.05760	67.29585	-151.06301

Elevation NED (m)(ft): 634 2080

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman B-3

Legal Description (MTRS): F029N016W35

Waterbody Name: Fall Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 3.83 DO (mg/L): 12.44 DO (%): Conductivity (µS/cm): 258 pH: 7.93

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 1.05 3.44

**Stream Channel**

Stream Gradient (%): 3.5 Entrenchment: Moderately Entrenched

Catchment Area(sq. km): 21 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	11.5	6.7	<b>Boulder</b>
<b>Thalweg Depth</b>	0.92	0.54	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: B2 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Alder-Willow Shrub	2	Closed Tall Alder-Willow Shrub	2
5 - 10	Closed Tall Alder-Willow Shrub	2	Closed Tall Alder-Willow Shrub	2
10 - 20	Closed White Spruce Forest	5	Open White Spruce Forest	13
20 - 30	Closed White Spruce Forest	5	Open White Spruce Forest	13

**Key To Fish Sampling Methods**

Estimated reach length (m): 270

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Dolly Varden

Life Stage: adult

Life History: Unknown

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 191 Max: 270 Mean: 230 Median: 230

Sampling Method (No. of fish): PEF (2)

Comments:

Species: Dolly Varden

Life Stage: juvenile/adult

Life History: Unknown

Total Fish Count: 4 Fish Measured: 3 Fork Lengths (mm) Min: 105 Max: 141 Mean: 126 Median: 123

Sampling Method (No. of fish): PEF (3) VOG (1)

Comments:

Species: Arctic grayling

Life Stage: adult

Life History: Resident

Total Fish Count: 2 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (2)

Comments:

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 302 Max: 312 Mean: 308 Median: 307

Sampling Method (No. of fish): PEF (3)

Comments:

## Instruments

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



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**Station Info****Observers:** Joe Buckwalter, Bob Powers**Date/Time:** 08/21/2010 12:05 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.13503	-151.44297	<b>Coordinates</b>	67.13310	-151.43934	/	67.13503 -151.44297

**Elevation NED (m)(ft):** 267 876**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman A-3**Legal Description (MTRS):** F027N018W26**Waterbody Name:** Chicken Creek**Anadromous Waters Catalog Number:****Geographic Comments:** Drains Wild River valley terminal moraine.**Visit Comments:****Wildlife Comments:** Grizzly bear 1 mile down stream from sample site.**Water Quality \ Stream Flow****Water Temp (C):** 6.98 **DO (mg/L):** 11.16 **DO (%):** **Conductivity (µS/cm):** 104 **pH:** 7.36**Water Color:** Clear **Turbidity (NTU):** 0.56 **Thalweg Velocity (m/s)(ft/s):** 0.74 2.43**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 64 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	14.5	8.4	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.10	0.44	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	4	Open Spruce-Balsam Poplar	7
5 - 10	Closed Low Willow Shrub	1	Open Spruce-Balsam Poplar	23
10 - 20	Closed Low Willow Shrub	1	Open Spruce-Balsam Poplar	23
20 - 30	Closed Low Willow Shrub	1	Open Spruce-Balsam Poplar	23

**Key To Fish Sampling Methods****Estimated reach length (m):** 340

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

**Species:** Chinook salmon **Life Stage:** juvenile **Life History:** Anadromous  
**Total Fish Count:** 14 **Fish Measured:** 9 **Fork Lengths (mm) Min:** 54 **Max:** 72 **Mean:** 64 **Median:** 63  
**Sampling Method (No. of fish):** PEF (9) VOG (5)

**Comments:**

**Species:** slimy sculpin **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 70 **Max:** 70 **Mean:** 70 **Median:** 70  
**Sampling Method (No. of fish):** PEF (1)

**Comments:**

**Species:** slimy sculpin **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 6 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 64 **Max:** 64 **Mean:** 64 **Median:** 64  
**Sampling Method (No. of fish):** PEF (1) VOG (5)

**Comments:**

**Species:** slimy sculpin **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 35 **Max:** 35 **Mean:** 35 **Median:** 35  
**Sampling Method (No. of fish):** PEF (1)

**Comments:**

## Instruments

**Stream Gradient:** handheld abney level

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

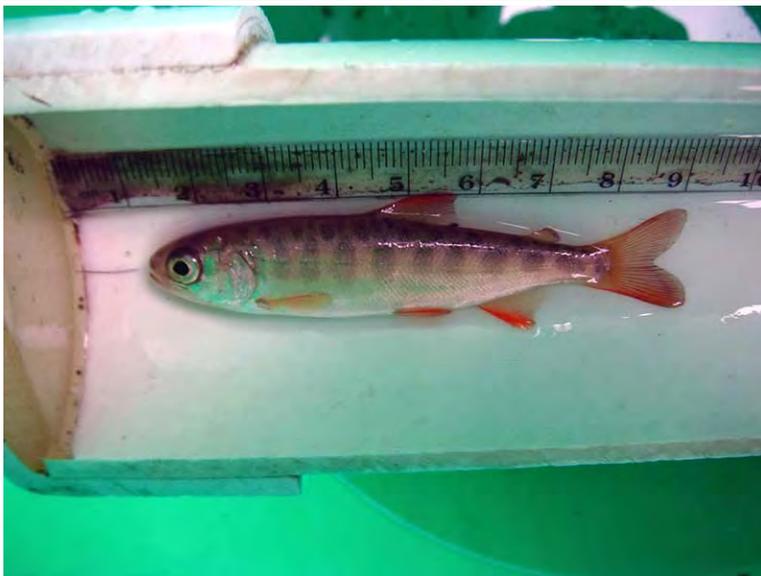
**Transparency:** secchi tube



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**Station Info**

**Observers:** Joe Buckwalter, Bob Powers

**Date/Time:** 08/21/2010 2:52 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.02439	-151.73426	<b>Coordinates</b>	67.02439	-151.73426

**Elevation NED (m)(ft):** 222 728

**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83

**USGS Quadrangle:** Wiseman A-4

**Legal Description (MTRS):** F025N019W04

**Waterbody Name:** Ninemile Creek

**Anadromous Waters Catalog Number:**

**Geographic Comments:**

**Visit Comments:** Did not land--slow, tannic, lots of trees over channel. Not likely anadromous fish habitat.

**Wildlife Comments:**

**Water Quality \ Stream Flow**

<b>Water Temp (C):</b>	<b>DO (mg/L):</b>	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b>	<b>pH:</b>
<b>Water Color:</b>	<b>Turbidity (NTU):</b>	<b>Thalweg Velocity (m/s)(ft/s):</b>		

**Stream Channel**

<b>Stream Gradient (%):</b>	<b>Entrenchment:</b>		
<b>Catchment Area(sq. km):</b>	<b>Embeddedness:</b>		
<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>			<b>Subdominant Substrate 1:</b>
<b>Thalweg Depth</b>			<b>Subdominant Substrate 2:</b>

**Rosgen Class:**

**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b><u>Left Bank Vegetation Type</u></b>	<b><u>Right Bank Vegetation Type</u></b>	
0 - 5		
5 - 10		
10 - 20		
20 - 30		

**Key To Fish Sampling Methods**

(NON) None

**Fish Observations**

**Species:** no collection effort **Life Stage:** not applicable **Life History:** Not Applicable

**Total Fish Count:** 0 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:**

**Sampling Method (No. of fish):** NON (0)

**Comments:**

**Instruments**

<b>Stream Gradient:</b>	<b>Channel Depths:</b>
<b>Stream Velocity:</b>	<b>Channel Widths:</b>
<b>Turbidity:</b>	<b>Electrofisher:</b>
<b>Water Quality:</b>	<b>Transparency:</b>



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FSK1018C040538.jp

**Station Info**

Observers: Joe Buckwalter, Bob Powers

Date/Time: 08/21/2010 2:54 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.10591	-150.48379	<b>Coordinates</b>	67.10703	-150.48274	/	67.10591 -150.48379

Elevation NED (m)(ft): 293 961

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman A-1

Legal Description (MTRS): F026N013W06

Waterbody Name: Mailbox Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.86 DO (mg/L): 10.31 DO (%): Conductivity (µS/cm): 134 pH: 7.47

Water Color: Clear Turbidity (NTU): 0.75 Thalweg Velocity (m/s)(ft/s): 0.45 1.48

**Stream Channel**

Stream Gradient (%): 0.75 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 13 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	2.8	1.6	<b>Boulder</b>
<b>Thalweg Depth</b>	0.75	0.30	<b>Subdominant Substrate 1:</b>
			<b>Cobble</b>
			<b>Subdominant Substrate 2:</b>
			<b>Silt/Sand</b>

Rosgen Class: C2 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Open Mixed Conifer Forest	7	Closed Low Shrub Birch-Willow Shrub	1.5
5 - 10	Open Mixed Conifer Forest	7	Closed Low Shrub Birch-Willow Shrub	1.5
10 - 20	Open Mixed Conifer Forest	7	Closed Low Shrub Birch-Willow Shrub	1.5
20 - 30	Open Mixed Conifer Forest	7	Closed Low Shrub Birch-Willow Shrub	1.5

**Key To Fish Sampling Methods**

Estimated reach length (m): 135

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 14 Fish Measured: 14 Fork Lengths (mm) Min: 59 Max: 130 Mean: 93 Median: 94

Sampling Method (No. of fish): PEF (14)

Comments:

Species: northern pike

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 260 Max: 260 Mean: 260 Median: 260

Sampling Method (No. of fish): PEF (1)

Comments:

Species: Chinook salmon

Life Stage: juvenile

Life History: Anadromous

Total Fish Count: 5 Fish Measured: 2 Fork Lengths (mm) Min: 75 Max: 76 Mean: 75 Median: 75

Sampling Method (No. of fish): PEF (2) VOG (3)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 8 Fish Measured: 8 Fork Lengths (mm) Min: 72 Max: 111 Mean: 82 Median: 91

Sampling Method (No. of fish): PEF (8)

Comments:

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 22    **Fish Measured:** 7    **Fork Lengths (mm) Min:** 54    **Max:** 67    **Mean:** 63    **Median:** 60  
**Sampling Method (No. of fish):** PEF (7) VOG (15)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld abney level

**Channel Depths:** graduated wading rod

**Stream Velocity:** transparent velocity head rod

**Channel Widths:** measuring tape

**Turbidity:** LaMotte 2020e turbidimeter

**Electrofisher:** Smith-Root LR-24

**Water Quality:** YSI 556

**Transparency:** secchi tube



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FSK1018C050541.jp



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**Station Info**

Observers: Jonathan Kirsch, James Bales

Date/Time: 08/22/2010 7:48 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.54440	-152.20697	<b>Coordinates</b>	67.54440	-152.20697	67.51845	-152.17175

Elevation NED (m)(ft): 274 899

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Wiseman C-5

Legal Description (MTRS): F031N021W03

Waterbody Name: John River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 8.65 DO (mg/L): 11.44 DO (%): Conductivity (µS/cm): 431 pH: 7.96

Water Color: Muddy Turbidity (NTU): 11.10 Thalweg Velocity (m/s)(ft/s): 1.50 4.92

**Stream Channel**

Stream Gradient (%): 0.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): ##### Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	105.0	45.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	3.60	1.80	<b>Subdominant Substrate 2:</b> Sands

Rosgen Class: C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Unvegetated	0	Closed Paper Birch Forest	15
5 - 10	Unvegetated	0	Closed Paper Birch Forest	15
10 - 20	Closed Tall Willow Shrub	2.5	Closed Paper Birch Forest	15
20 - 30	Closed Paper Birch Forest	12	Closed Paper Birch Forest	15

**Key To Fish Sampling Methods**

Estimated reach length (m): 4200 Total Electrofishing Time (s): 2970

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 300 Max: 300 Mean: 300 Median: 300

Sampling Method (No. of fish): BEF (1)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 183 Max: 183 Mean: 183 Median: 183

Sampling Method (No. of fish): BEF (1)

Comments:

Species: longnose sucker

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 390 Max: 390 Mean: 390 Median: 390

Sampling Method (No. of fish): BEF (1)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 53 Max: 60 Mean: 56 Median: 56

Sampling Method (No. of fish): BEF (2)

Comments:

**Species:** round whitefish                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 2      **Fish Measured:** 2      **Fork Lengths (mm) Min:** 245      **Max:** 310      **Mean:** 277      **Median:** 277  
**Sampling Method (No. of fish):** BEF (2)  
**Comments:**

**Species:** round whitefish                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 2      **Fish Measured:** 1      **Fork Lengths (mm) Min:** 62      **Max:** 62      **Mean:** 62      **Median:** 62  
**Sampling Method (No. of fish):** BEF (1) VOB (1)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer                      **Channel Depths:** handheld sonar depth finder  
**Stream Velocity:** GPS Float                      **Channel Widths:** handheld laser rangefinder  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root GPP 2.5  
**Water Quality:** YSI 556                      **Transparency:**



FSK1019A010325.jp



FSK1019A010326.jp



FSK1019A010332.jp



FSK1019A010333.jp

**Station Info****Observers:** Cecil Rich, Bob Powers**Date/Time:** 08/22/2010 11:03 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.54643	-151.82635	<b>Coordinates</b>	67.54643	-151.82635	/	67.51051 -151.82442

**Elevation NED (m)(ft):** 389 1276**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman C-4**Legal Description (MTRS):** F031N019W04**Waterbody Name:** Allen River**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Photos missing.**Wildlife Comments:** Bear and moose tracks on point bar at upstream station.**Water Quality \ Stream Flow****Water Temp (C):** 7.97 **DO (mg/L):** 11.10 **DO (%):** **Conductivity (µS/cm):** 814 **pH:** 7.94**Water Color:** Muddy **Turbidity (NTU):** 76.50 **Thalweg Velocity (m/s)(ft/s):** 1.40 4.59**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 473 **Embeddedness:**

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	39.0	29.0	<b>Subdominant Substrate 1:</b> Sands
<b>Thalweg Depth</b>	2.06	1.26	<b>Subdominant Substrate 2:</b>

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b>Left Bank Vegetation Type</b>	<b>Right Bank Vegetation Type</b>	
0 - 5 Closed Low Willow Shrub	1.5 Open Black Spruce Forest	9
5 - 10 Open Black Spruce Forest	10 Open Black Spruce Forest	2
10 - 20 Open Black Spruce Forest	6 Open Black Spruce Forest	2
20 - 30 Open Black Spruce Forest	6 Open Black Spruce Forest	2

**Key To Fish Sampling Methods****Estimated reach length (m):** 7500 **Total Electrofishing Time (s):** 3419

(BEF) Boat-Mounted Electrofisher

**Fish Observations****Species:** lake chub**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 128 **Max:** 128 **Mean:** 128 **Median:** 128**Sampling Method (No. of fish):** BEF (1)**Comments:****Species:** longnose sucker**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 305 **Max:** 305 **Mean:** 305 **Median:** 305**Sampling Method (No. of fish):** BEF (1)**Comments:****Species:** longnose sucker**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 150 **Max:** 150 **Mean:** 150 **Median:** 150**Sampling Method (No. of fish):** BEF (1)**Comments:****Species:** slimy sculpin**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 2 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 35 **Max:** 47 **Mean:** 41 **Median:** 41**Sampling Method (No. of fish):** BEF (2)**Comments:**

## Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** Orange Float

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root GPP 2.5

**Transparency:**

**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/22/2010 9:00 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.58614	-150.26355	<b>Coordinates</b>	66.58523	-150.25680	66.58614	-150.26355

Elevation NED (m)(ft): 635 2083

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Bettles C-1

Legal Description (MTRS): F020N013W02

Waterbody Name: Fish Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 7.28 DO (mg/L): 9.52 DO (%): Conductivity (µS/cm): 16 pH: 3.85

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.21 0.69

**Stream Channel**

Stream Gradient (%): 1.25 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 47 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	15.4	14.6	<b>Cobble</b>
<b>Thalweg Depth</b>	0.92	0.50	<b>Subdominant Substrate 1:</b>
			<b>Boulder</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Open Tall Willow Shrub	2	Open Tall Willow Shrub	2
5 - 10	Vaccinium Dwarf Shrub Tundra	0.3	Vaccinium Dwarf Shrub Tundra	0.3
10 - 20	Vaccinium Dwarf Shrub Tundra	0.3	Vaccinium Dwarf Shrub Tundra	0.3
20 - 30	Vaccinium Dwarf Shrub Tundra	0.3	Vaccinium Dwarf Shrub Tundra	0.3

**Key To Fish Sampling Methods**

Estimated reach length (m): 330

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 8 Fish Measured: 3 Fork Lengths (mm) Min: 191 Max: 201 Mean: 197 Median: 196  
 Sampling Method (No. of fish): PEF (3) VOG (5)

Comments:

Species: Arctic grayling Life Stage: juvenile Life History: Resident  
 Total Fish Count: 6 Fish Measured: 6 Fork Lengths (mm) Min: 108 Max: 174 Mean: 150 Median: 141  
 Sampling Method (No. of fish): PEF (6)

Comments:

Species: slimy sculpin Life Stage: adult Life History: Resident  
 Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 100 Max: 106 Mean: 103 Median: 103  
 Sampling Method (No. of fish): PEF (2)

Comments:

Species: slimy sculpin Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 8 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:  
 Sampling Method (No. of fish): VOG (8)

Comments:

**Species:** slimy sculpin                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 4      **Fish Measured:** 4      **Fork Lengths (mm) Min:** 21      **Max:** 27      **Mean:** 25      **Median:** 24  
**Sampling Method (No. of fish):** PEF (4)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld optical clinometer                      **Channel Depths:** graduated wading rod  
**Stream Velocity:** transparent velocity head rod                      **Channel Widths:** measuring tape  
**Turbidity:** LaMotte 2020e turbidimeter                      **Electrofisher:** Smith-Root LR-24  
**Water Quality:** YSI 556                      **Transparency:** secchi tube



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FSK1019C010545.jp



FSK1019C010546.jp



FSK1019C010547.jp



FSK1019C010548.jp

**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/22/2010 10:37 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.67704	-150.19825	<b>Coordinates</b>	66.67676	-150.19369	/	66.67704 -150.19825

Elevation NED (m)(ft): 423 1388

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Bettles C-1

Legal Description (MTRS): F021N012W05

Waterbody Name: South Fork Bonanza Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 6.26	DO (mg/L): 11.26	DO (%):	Conductivity (µS/cm): 40	pH: 5.16
Water Color: Clear	Turbidity (NTU): 0.00	Thalweg Velocity (m/s)(ft/s): 0.40	1.31	

**Stream Channel**

Stream Gradient (%): 1.5 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 64 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	18.2	6.2	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.16	0.42	<b>Subdominant Substrate 2:</b> Boulder

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	3	Closed Tall Willow Shrub	3
5 - 10	Closed Tall Willow Shrub	3	Closed Tall Willow Shrub	3
10 - 20	Open White Spruce Forest	9	Closed Tall Willow Shrub	3
20 - 30	Open White Spruce Forest	9	Closed White Spruce Forest	9

**Key To Fish Sampling Methods**

Estimated reach length (m): 240

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 15 Fish Measured: 10 Fork Lengths (mm) Min: 194 Max: 277 Mean: 220 Median: 235  
 Sampling Method (No. of fish): PEF (10) VOG (5)

Comments:

Species: Arctic grayling Life Stage: juvenile Life History: Resident  
 Total Fish Count: 47 Fish Measured: 47 Fork Lengths (mm) Min: 61 Max: 187 Mean: 77 Median: 124  
 Sampling Method (No. of fish): PEF (47)

Comments:

Species: slimy sculpin Life Stage: adult Life History: Resident  
 Total Fish Count: 25 Fish Measured: 5 Fork Lengths (mm) Min: 69 Max: 122 Mean: 105 Median: 95  
 Sampling Method (No. of fish): PEF (5) VOG (20)

Comments:

## Instruments

**Stream Gradient:** handheld optical clinometer

**Stream Velocity:** transparent velocity head rod

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** measuring tape

**Electrofisher:** Smith-Root LR-24

**Transparency:** secchi tube



FSK1019C020549.jp



FSK1019C020550.jp



FSK1019C020551.jp



FSK1019C020552.jp



FSK1019C020553.jp

**Station Info****Observers:** Joe Buckwalter, Mary Simmering**Date/Time:** 08/22/2010 12:18 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.78860	-150.37742	<b>Coordinates</b>	66.78871	-150.37464	66.78875	-150.37786

**Elevation NED (m)(ft):** 362 1188**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Bettles D-1**Legal Description (MTRS):** F023N013W28**Waterbody Name:****Anadromous Waters Catalog Number:****Geographic Comments:** Tributary to Prospect Creek.

**Visit Comments:** Juvenile Chinook salmon were also collected in Prospect Creek about 2 miles downstream at 09A01. There is an active, channel-spanning beaver dam ~1/2-mile upstream at 66.78637, -150.36246; see photo # 554. We also electrofished about 4 miles upstream of this dam (plus 2 more dams), but found only sculpins (see 19C04).

**Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 6.76 **DO (mg/L):** 10.90 **DO (%):** **Conductivity (µS/cm):** 54 **pH:** 5.59**Water Color:** Clear **Turbidity (NTU):** 0.09 **Thalweg Velocity (m/s)(ft/s):** 0.47 1.54**Stream Channel****Stream Gradient (%):** 1 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 94 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	15.4	4.8	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.20	0.50	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
5 - 10	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2
10 - 20	Open White Spruce Forest	9	Bluejoint-Herb	0.2
20 - 30	Bluejoint-Herb	0.2	Bluejoint-Herb	0.2

**Key To Fish Sampling Methods****Estimated reach length (m):** 170

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

**Species:** Arctic grayling **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 4 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 235 **Max:** 235 **Mean:** 235 **Median:** 235  
**Sampling Method (No. of fish):** PEF (1) VOG (3)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile **Life History:** Resident  
**Total Fish Count:** 7 **Fish Measured:** 7 **Fork Lengths (mm) Min:** 68 **Max:** 185 **Mean:** 114 **Median:** 126  
**Sampling Method (No. of fish):** PEF (7)

**Comments:**

**Species:** Chinook salmon **Life Stage:** juvenile **Life History:** Anadromous  
**Total Fish Count:** 30 **Fish Measured:** 20 **Fork Lengths (mm) Min:** 69 **Max:** 83 **Mean:** 74 **Median:** 76  
**Sampling Method (No. of fish):** PEF (20) VOG (10)

**Comments:**

---

**Species:** slimy sculpin                      **Life Stage:** adult                      **Life History:** Resident  
**Total Fish Count:** 11    **Fish Measured:** 11    **Fork Lengths (mm) Min:** 70    **Max:** 92    **Mean:** 76    **Median:** 81  
**Sampling Method (No. of fish):** PEF (11)

**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 22    **Fish Measured:** 7    **Fork Lengths (mm) Min:** 52    **Max:** 67    **Mean:** 59    **Median:** 59  
**Sampling Method (No. of fish):** PEF (7) VOG (15)

**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 1    **Fish Measured:** 1    **Fork Lengths (mm) Min:** 40    **Max:** 40    **Mean:** 40    **Median:** 40  
**Sampling Method (No. of fish):** PEF (1)

**Comments:**

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**Instruments**

**Stream Gradient:** handheld optical clinometer  
**Stream Velocity:** transparent velocity head rod  
**Turbidity:** LaMotte 2020e turbidimeter  
**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod  
**Channel Widths:** measuring tape  
**Electrofisher:** Smith-Root LR-24  
**Transparency:** secchi tube



FSK1019C030554.jp  
Beaver dam ~1/2 mile upstream.



FSK1019C030556.jp



FSK1019C030557.jp



FSK1019C030558.jp



FSK1019C030559.jp



FSK1019C030560.jp

**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/22/2010 2:44 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.77228	-150.25272	<b>Coordinates</b>	66.77228	-150.25272	/ 66.77255	-150.25491

Elevation NED (m)(ft): 427 1401

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Bettles D-1

Legal Description (MTRS): F023N012W31

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments: Tributary to Prospect Creek.

**Visit Comments:** Electrofished a 150-m reach. In the interest of time, no habitat assessment was done here (see also 19C03 about 4 miles downstream). Good habitat, but 3 beaver dams downstream (upstream of 19C03) may prevent fish access to this location.

Wildlife Comments:

**Water Quality \ Stream Flow**

<b>Water Temp (C):</b>	<b>DO (mg/L):</b>	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b>	<b>pH:</b>
<b>Water Color:</b>	<b>Turbidity (NTU):</b>	<b>Thalweg Velocity (m/s)(ft/s):</b>		

**Stream Channel**

<b>Stream Gradient (%):</b>	<b>Entrenchment:</b>
<b>Catchment Area(sq. km):</b> 62	<b>Embeddedness:</b>
<b>Channel Dimensions (m):</b>	<b>Bank Full</b> <b>Wetted</b>
<b>Width</b>	<b>Dominant Substrate:</b>
<b>Thalweg Depth</b>	<b>Subdominant Substrate 1:</b>
	<b>Subdominant Substrate 2:</b>

Rosgen Class:

**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b><u>Left Bank Vegetation Type</u></b>	<b><u>Right Bank Vegetation Type</u></b>	
0 - 5		
5 - 10		
10 - 20		
20 - 30		

**Key To Fish Sampling Methods**

Estimated reach length (m): 150

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident
<b>Total Fish Count:</b> 4	<b>Fish Measured:</b>	<b>Fork Lengths (mm) Min: Max: Mean: Median:</b>
<b>Sampling Method (No. of fish):</b> VOG (4)		
<b>Comments:</b>		

**Instruments**

<b>Stream Gradient:</b>	<b>Channel Depths:</b>
<b>Stream Velocity:</b>	<b>Channel Widths:</b>
<b>Turbidity:</b>	<b>Electrofisher:</b>
<b>Water Quality:</b>	<b>Transparency:</b>

**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/22/2010 2:48 PM

Station	Latitude	Longitude	Sample	Latitude	Longitude
Coordinates	66.79454	-150.42123	Coordinates	66.79454	-150.42123

Elevation NED (m)(ft): 356 1168

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Bettles D-1

Legal Description (MTRS): F023N013W29

Waterbody Name: Prospect Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments: Did not sample because there was a large beaver dam here--We did not find anadromous fish at 19C04 above similar beaver dams.

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C):	DO (mg/L):	DO (%):	Conductivity (µS/cm):	pH:
Water Color:	Turbidity (NTU):	Thalweg Velocity (m/s)(ft/s):		

**Stream Channel**

Stream Gradient (%):	Entrenchment:		
Catchment Area(sq. km):	Embeddedness:		
Channel Dimensions (m):	Bank Full	Wetted	Dominant Substrate:
Width			Subdominant Substrate 1:
Thalweg Depth			Subdominant Substrate 2:

Rosgen Class:

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5				
5 - 10				
10 - 20				
20 - 30				

**Key To Fish Sampling Methods**

(NON) None

**Fish Observations**

Species: no collection effort	Life Stage: not applicable	Life History: Not Applicable
Total Fish Count: 0	Fish Measured:	Fork Lengths (mm) Min: Max: Mean: Median:
Sampling Method (No. of fish): NON (0)		
Comments:		

**Instruments**

Stream Gradient:	Channel Depths:
Stream Velocity:	Channel Widths:
Turbidity:	Electrofischer:
Water Quality:	Transparency:



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**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/22/2010 2:58 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.71700	-150.08782	<b>Coordinates</b>	66.71485	-150.08222	66.71700	-150.08782

Elevation NED (m)(ft): 453 1486

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Bettles C-1

Legal Description (MTRS): F022N012W23

Waterbody Name: North Fork Bonanza Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 10.96 DO (mg/L): 10.30 DO (%): Conductivity (µS/cm): 44 pH: 6.70

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.77 2.53

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Entrenched

Catchment Area(sq. km): 83 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	13.2	12.0	<b>Boulder</b>
<b>Thalweg Depth</b>	0.60	0.24	<b>Subdominant Substrate 1: Cobble</b>
			<b>Subdominant Substrate 2: Gravel</b>

Rosgen Class: B2 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2.3	Closed Tall Willow Shrub	2.3
5 - 10	Vaccinium Dwarf Shrub Tundra	0.2	Vaccinium Dwarf Shrub Tundra	0.2
10 - 20	Vaccinium Dwarf Shrub Tundra	0.2	Vaccinium Dwarf Shrub Tundra	0.2
20 - 30	Vaccinium Dwarf Shrub Tundra	0.2	Vaccinium Dwarf Shrub Tundra	0.2

**Key To Fish Sampling Methods**

Estimated reach length (m): 350

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 11 Fish Measured: 1 Fork Lengths (mm) Min: 315 Max: 315 Mean: 315 Median: 315

Sampling Method (No. of fish): PEF (1) VOG (10)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 11 Fish Measured: 11 Fork Lengths (mm) Min: 59 Max: 122 Mean: 70 Median: 90

Sampling Method (No. of fish): PEF (11)

Comments:

Species: slimy sculpin

Life Stage: adult

Life History: Resident

Total Fish Count: 2 Fish Measured: 2 Fork Lengths (mm) Min: 81 Max: 87 Mean: 84 Median: 84

Sampling Method (No. of fish): PEF (2)

Comments:

Species: slimy sculpin

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 5 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:

Sampling Method (No. of fish): VOG (5)

Comments:

**Instruments**

**Stream Gradient:** handheld optical clinometer  
**Stream Velocity:** transparent velocity head rod  
**Turbidity:** LaMotte 2020e turbidimeter  
**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod  
**Channel Widths:** measuring tape  
**Electrofisher:** Smith-Root LR-24  
**Transparency:** secchi tube



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FSK1019C060563.jp



FSK1019C060564.jp



FSK1019C060565.jp

**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/22/2010 4:44 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.85511	-149.76263	<b>Coordinates</b>	66.85583	-149.75883	66.85511	-149.76263

Elevation NED (m)(ft): 619 2031

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Beaver D-6

Legal Description (MTRS): F024N010W32

Waterbody Name: Jim River

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 9.28 DO (mg/L): 9.60 DO (%): Conductivity (µS/cm): 48 pH: 6.93

Water Color: Clear Turbidity (NTU): 0.00 Thalweg Velocity (m/s)(ft/s): 0.93 3.05

**Stream Channel**

Stream Gradient (%): 0.75 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 51 Embeddedness: Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	21.9	4.4	<b>Cobble</b>
<b>Thalweg Depth</b>	1.10	0.55	<b>Subdominant Substrate 1:</b>
			<b>Boulder</b>
			<b>Subdominant Substrate 2:</b>
			<b>Gravel</b>

Rosgen Class: B3 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Unvegetated	0	Closed Low Willow Shrub	1
5 - 10	Closed Tall Willow Shrub	2	Closed Low Willow Shrub	1
10 - 20	Closed Tall Willow Shrub	2	Closed Low Willow Shrub	1
20 - 30	Closed Low Willow Shrub	1	Closed Low Willow Shrub	1

**Key To Fish Sampling Methods**

Estimated reach length (m): 190

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 30 Fish Measured: 10 Fork Lengths (mm) Min: 203 Max: 295 Mean: 238 Median: 249

Sampling Method (No. of fish): PEF (10) VOG (20)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 9 Fish Measured: 9 Fork Lengths (mm) Min: 43 Max: 187 Mean: 150 Median: 115

Sampling Method (No. of fish): PEF (9)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1019C070568.jp



FSK1019C070569.jp

FSK1019C070570.jp



**Station Info****Observers:** Jonathan Kirsch, James Bales**Date/Time:** 08/23/2010 9:14 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.12510	-147.64894	<b>Coordinates</b>	67.12659	-147.64880	/	67.12137 -147.65113

**Elevation NED (m)(ft):** 305 1001**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar A-2**Legal Description (MTRS):** F027N001W36**Waterbody Name:** Funchion Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Too small to float, so I deployed minnow traps, dip-netted backwaters and angled.**Wildlife Comments:****Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 5.39	<b>DO (mg/L):</b> 11.48	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 78	<b>pH:</b> 6.97
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.87		<b>Thalweg Velocity (m/s)(ft/s):</b> 0.61 2.00	

**Stream Channel****Stream Gradient (%):** 1.8 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 204 **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	15.0	6.0	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.10	0.55	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Black Spruce-White Spruce Forest	10	Open Low Willow Shrub	1.5
5 - 10	Closed Black Spruce-White Spruce Forest	10	Open Low Willow Shrub	1.5
10 - 20	Closed Black Spruce-White Spruce Forest	10	Closed Black Spruce-White Spruce Forest	10
20 - 30	Closed Black Spruce-White Spruce Forest	10	Closed Black Spruce-White Spruce Forest	10

**Key To Fish Sampling Methods****Estimated reach length (m):** 700

(ANG) Angling

(DIP) Dip Net

(MTQ) Minnow Trap, 1/4 in. Mesh

(VOG) Visual Observation, Ground

**Fish Observations****Species:** Arctic grayling**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 26 **Fish Measured:** 6 **Fork Lengths (mm) Min:** 212 **Max:** 290 **Mean:** 235 **Median:** 251**Sampling Method (No. of fish):** ANG (6) VOG (20)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 17 **Fish Measured:** 2 **Fork Lengths (mm) Min:** 45 **Max:** 48 **Mean:** 46 **Median:** 46**Sampling Method (No. of fish):** DIP (2) VOG (15)**Comments:****Species:** chum salmon**Life Stage:** carcass**Life History:** Anadromous**Total Fish Count:** 2 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:****Sampling Method (No. of fish):** VOG (2)**Comments:**

**Instruments**

**Stream Gradient:** handheld optical clinometer  
**Stream Velocity:** transparent velocity head rod  
**Turbidity:** LaMotte 2020e turbidimeter  
**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod  
**Channel Widths:** measuring tape  
**Electrofisher:**  
**Transparency:**



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FSK1020A010351.jp



FSK1020A010352.jp

FSK1020A010353.jp



**Station Info****Observers:** Cecil Rich, Bob Powers**Date/Time:** 08/23/2010 8:54 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.27979	-151.38740	<b>Coordinates</b>	67.27979	-151.38740	/	67.26984 -151.39259

**Elevation NED (m)(ft):** 288 945**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman B-3**Legal Description (MTRS):** F028N017W06**Waterbody Name:** Michigan Creek**Anadromous Waters Catalog Number:****Geographic Comments:** We started our sampling reach just below a debris jam where the stream became navigable.**Visit Comments:****Wildlife Comments:****Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 5.97	<b>DO (mg/L):</b> 11.78	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 460	<b>pH:</b> 8.12
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 3.45		<b>Thalweg Velocity (m/s)(ft/s):</b> 1.28 4.20	

**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 300 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	23.3	14.8	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	0.86	0.66	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Tall Alder-Willow Shrub	3.5	Open Low Willow Shrub	1
5 - 10	Closed Tall Alder-Willow Shrub	3.5	Closed Tall Alder-Willow Shrub	3.5
10 - 20	Closed Tall Alder-Willow Shrub	3.3	Closed Tall Alder-Willow Shrub	3.5
20 - 30	Closed White Spruce Forest	15	Closed White Spruce Forest	15

**Key To Fish Sampling Methods****Estimated reach length (m):** 1800 **Total Electrofishing Time (s):** 1058

(BEF) Boat-Mounted Electrofisher

**Fish Observations****Species:** Dolly Varden**Life Stage:** juvenile**Life History:** Unknown**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 63 **Max:** 63 **Mean:** 63 **Median:** 63**Sampling Method (No. of fish):** BEF (1)**Comments:****Instruments****Stream Gradient:** handheld optical clinometer**Channel Depths:** graduated wading rod**Stream Velocity:** Orange Float**Channel Widths:** measuring tape**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root GPP 2.5**Water Quality:** YSI 556**Transparency:**



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FSK1020b010169.jpg



FSK1020b010170.jpg



FSK1020b010182.jpg



FSK1020b010183.jpg



FSK1020b010167.jpg

**Station Info****Observers:** Cecil Rich, Bob Powers**Date/Time:** 08/23/2010 12:30 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.26984	-151.39259	<b>Coordinates</b>	67.26984	-151.39259	67.23372	-151.43176

**Elevation NED (m)(ft):** 279 915**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman B-3**Legal Description (MTRS):** F028N017W07**Waterbody Name:** Wild River**Anadromous Waters Catalog Number:****Geographic Comments:** Upstream Station is just downstream of Michigan Creek confluence.**Visit Comments:** Water quality measurements taken at downstream end of reach.**Wildlife Comments:** Grizzly bear tracks along stream downstream of confluence with Michigan Creek.**Water Quality \ Stream Flow****Water Temp (C):** 10.51 **DO (mg/L):** 11.62 **DO (%):** **Conductivity (µS/cm):** 428 **pH:** 8.07**Water Color:** Clear **Turbidity (NTU):** 2.17 **Thalweg Velocity (m/s)(ft/s):** 1.50 4.92**Stream Channel****Stream Gradient (%):** 0.5 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** ##### **Embeddedness:** Low

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	56.0	48.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.64	0.84	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from Bank (m)</b>	<b>Left Bank Vegetation Type</b>	<b>Canopy Height(m)</b>	<b>Right Bank Vegetation Type</b>	<b>Canopy Height(m)</b>
0 - 5	Closed Tall Willow Shrub	2	Closed Tall Willow Shrub	2.5
5 - 10	Closed Tall Willow Shrub	3.5	Closed White Spruce Forest	8
10 - 20	Closed Tall Willow Shrub	3.5	Closed White Spruce Forest	8
20 - 30	Closed White Spruce Forest	15	Closed White Spruce Forest	8

**Key To Fish Sampling Methods****Estimated reach length (m):** 9900 **Total Electrofishing Time (s):** 4326

(BEF) Boat-Mounted Electrofisher

(VOB) Visual Observation, Boat

**Fish Observations**

**Species:** Arctic grayling **Life Stage:** adult **Life History:** Resident  
**Total Fish Count:** 8 **Fish Measured:** 3 **Fork Lengths (mm) Min:** 332 **Max:** 357 **Mean:** 342 **Median:** 344  
**Sampling Method (No. of fish):** BEF (3) VOB (5)

**Comments:**

**Species:** Arctic grayling **Life Stage:** juvenile/adult **Life History:** Resident  
**Total Fish Count:** 4 **Fish Measured:** 4 **Fork Lengths (mm) Min:** 267 **Max:** 328 **Mean:** 304 **Median:** 297  
**Sampling Method (No. of fish):** BEF (4)

**Comments:**

**Species:** Chinook salmon **Life Stage:** juvenile **Life History:** Anadromous  
**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 68 **Max:** 68 **Mean:** 68 **Median:** 68  
**Sampling Method (No. of fish):** BEF (1)

**Comments:**

**Species:** chum salmon **Life Stage:** adult **Life History:** Anadromous  
**Total Fish Count:** 2 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:**  
**Sampling Method (No. of fish):** VOB (2)

**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile/adult                      **Life History:** Resident  
**Total Fish Count:** 4      **Fish Measured:** 2      **Fork Lengths (mm) Min:** 52      **Max:** 57      **Mean:** 54      **Median:** 54  
**Sampling Method (No. of fish):** BEF (2) VOB (2)  
**Comments:**

**Species:** slimy sculpin                      **Life Stage:** juvenile                      **Life History:** Resident  
**Total Fish Count:** 4      **Fish Measured:** 4      **Fork Lengths (mm) Min:** 24      **Max:** 42      **Mean:** 34      **Median:** 33  
**Sampling Method (No. of fish):** BEF (4)  
**Comments:**

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### Instruments

**Stream Gradient:** handheld abney level

**Stream Velocity:** GPS Float

**Turbidity:** LaMotte 2020e turbidimeter

**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod

**Channel Widths:** handheld laser rangefinder

**Electrofisher:** Smith-Root GPP 2.5

**Transparency:**



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FSK1020b020172.jpg



FSK1020b020173.jpg



FSK1020b020175.jpg



FSK1020b020179.jpg



FSK1020b020180.jpg

**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/23/2010 8:31 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.09091	-149.39669	<b>Coordinates</b>	67.08970	-149.39425	67.09144	-149.39758

Elevation NED (m)(ft): 669 2195

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar A-5

Legal Description (MTRS): F026N008W07

Waterbody Name: Siwash Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 4.61 DO (mg/L): 11.96 DO (%): Conductivity (µS/cm): 31 pH: 5.99

Water Color: Clear Turbidity (NTU): 0.11 Thalweg Velocity (m/s)(ft/s): 1.09 3.58

**Stream Channel**

Stream Gradient (%): 1.75 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 48 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	23.9	7.7	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.50	0.30	<b>Subdominant Substrate 2:</b> Boulder

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Vioreck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	1	Open Tall Willow Shrub	2
5 - 10	Closed Low Willow Shrub	0.5	Open Tall Willow Shrub	2
10 - 20	Closed Low Willow Shrub	0.5	Open Tall Willow Shrub	2
20 - 30	Vaccinium Dwarf Shrub Tundra	0.2	Open Tall Willow Shrub	2

**Key To Fish Sampling Methods**

Estimated reach length (m): 280

(PEF) Portable Electrofisher

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 3 Fish Measured: 3 Fork Lengths (mm) Min: 108 Max: 114 Mean: 110 Median: 111

Sampling Method (No. of fish): PEF (3)

Comments:

**Instruments**

Stream Gradient: handheld optical clinometer

Channel Depths: graduated wading rod

Stream Velocity: transparent velocity head rod

Channel Widths: measuring tape

Turbidity: LaMotte 2020e turbidimeter

Electrofisher: Smith-Root LR-24

Water Quality: YSI 556

Transparency: secchi tube



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FSK1020C010573.jp



FSK1020C010577.jp



**Station Info****Observers:** Joe Buckwalter, Mary Simmering**Date/Time:** 08/23/2010 10:12 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.96885	-149.64274	<b>Coordinates</b>	66.96779	-149.64779	66.96885	-149.64274

**Elevation NED (m)(ft):** 701 2300**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Beaver D-6**Legal Description (MTRS):** F025N010W25**Waterbody Name:** Moore Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:****Wildlife Comments:****Water Quality \ Stream Flow****Water Temp (C):** 4.93 **DO (mg/L):** 12.28 **DO (%):** **Conductivity (µS/cm):** 48 **pH:** 6.13**Water Color:** Clear **Turbidity (NTU):** 0.00 **Thalweg Velocity (m/s)(ft/s):****Stream Channel****Stream Gradient (%):** 4 **Entrenchment:** Moderately Entrenched**Catchment Area(sq. km):** 30 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b>
<b>Width</b>	12.2	6.6	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.50	0.68	<b>Subdominant Substrate 2:</b> Gravel

**Rosgen Class:** B2 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from Bank (m)</b>	<b>Left Bank Vegetation Type</b>	<b>Canopy Height(m)</b>	<b>Right Bank Vegetation Type</b>	<b>Canopy Height(m)</b>
0 - 5	Open Tall Willow Shrub	1.3	Closed Low Willow Shrub	0.5
5 - 10	Open Tall Willow Shrub	1.3	Closed Low Willow Shrub	0.5
10 - 20	Open Tall Willow Shrub	2	Closed Low Willow Shrub	0.5
20 - 30	Open Tall Willow Shrub	2	Closed Low Willow Shrub	0.5

**Key To Fish Sampling Methods****Estimated reach length (m):** 180

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations****Species:** Arctic grayling**Life Stage:** juvenile/adult**Life History:** Resident**Total Fish Count:** 24 **Fish Measured:** 4 **Fork Lengths (mm) Min:** 194 **Max:** 243 **Mean:** 222 **Median:** 218**Sampling Method (No. of fish):** PEF (4) VOG (20)**Comments:****Species:** Arctic grayling**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 24 **Fish Measured:** 24 **Fork Lengths (mm) Min:** 108 **Max:** 168 **Mean:** 142 **Median:** 138**Sampling Method (No. of fish):** PEF (24)**Comments:****Instruments****Stream Gradient:** handheld optical clinometer**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** measuring tape**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



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FSK1020C020582.jp



FSK1020C020583.jp



**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/23/2010 11:40 AM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.03490	-149.72868	<b>Coordinates</b>	67.03318	-149.73294	67.03490	-149.72868

Elevation NED (m)(ft): 543 1781

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Chandalar A-6

Legal Description (MTRS): F026N010W34

Waterbody Name: Keating Creek

Anadromous Waters Catalog Number:

Geographic Comments:

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

Water Temp (C): 5.05 DO (mg/L): 12.64 DO (%): Conductivity (µS/cm): 20 pH: 5.85

Water Color: Clear Turbidity (NTU): 1.85 Thalweg Velocity (m/s)(ft/s): 1.22 4.00

**Stream Channel**

Stream Gradient (%): 2 Entrenchment: Entrenched

Catchment Area(sq. km): 45 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	14.5	7.9	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	1.05	0.36	<b>Subdominant Substrate 2:</b> Boulder

Rosgen Class: B4 Moderately entrenched, moderate gradient, riffle dominated channel, with infrequently spaced pools. Very stable plan and profile. Stable banks.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	Left Bank Vegetation Type	Canopy Height(m)	Right Bank Vegetation Type	Canopy Height(m)
0 - 5	Closed Low Willow Shrub	0.4	Closed Low Willow Shrub	0.4
5 - 10	Closed Low Willow Shrub	0.4	Closed Low Willow Shrub	0.4
10 - 20	Closed Low Willow Shrub	0.4	Closed Low Willow Shrub	0.4
20 - 30	Closed Low Willow Shrub	0.4	Closed Low Willow Shrub	0.4

**Key To Fish Sampling Methods**

Estimated reach length (m): 300

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling

Life Stage: juvenile/adult

Life History: Resident

Total Fish Count: 24 Fish Measured: 4 Fork Lengths (mm) Min: 208 Max: 270 Mean: 225 Median: 239

Sampling Method (No. of fish): PEF (4) VOG (20)

Comments:

Species: Arctic grayling

Life Stage: juvenile

Life History: Resident

Total Fish Count: 10 Fish Measured: 10 Fork Lengths (mm) Min: 108 Max: 181 Mean: 133 Median: 144

Sampling Method (No. of fish): PEF (10)

Comments:

Species: round whitefish

Life Stage: adult

Life History: Resident

Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 339 Max: 339 Mean: 339 Median: 339

Sampling Method (No. of fish): PEF (1)

Comments:

## Instruments

**Stream Gradient:** handheld optical clinometer  
**Stream Velocity:** transparent velocity head rod  
**Turbidity:** LaMotte 2020e turbidimeter  
**Water Quality:** YSI 556

**Channel Depths:** graduated wading rod  
**Channel Widths:** measuring tape  
**Electrofisher:** Smith-Root LR-24  
**Transparency:** secchi tube



FSK1020C030586.jp



FSK1020C030587.jp



FSK1020C030588.jp



**Station Info**

Observers: Joe Buckwalter, Mary Simmering

Date/Time: 08/23/2010 1:57 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.93280	-150.04782	<b>Coordinates</b>	66.93343	-150.04121	/	66.93280 -150.04782

Elevation NED (m)(ft): 513 1683

Coordinate Determination Method: Non-Differential GPS Field Measurement Datum: NAD83

USGS Quadrangle: Bettles D-1

Legal Description (MTRS): F024N012W01

Waterbody Name:

Anadromous Waters Catalog Number:

Geographic Comments: Tributary to Jim Creek. See also Station 20C05--beaver dam upstream.

Visit Comments:

Wildlife Comments:

**Water Quality \ Stream Flow**

<b>Water Temp (C):</b> 10.27	<b>DO (mg/L):</b> 11.59	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b> 44	<b>pH:</b> 6.48
<b>Water Color:</b> Clear	<b>Turbidity (NTU):</b> 0.00		<b>Thalweg Velocity (m/s)(ft/s):</b> 1.47 4.82	

**Stream Channel**

Stream Gradient (%): 1 Entrenchment: Slightly Entrenched

Catchment Area(sq. km): 65 Embeddedness: Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Cobble
<b>Width</b>	19.0	7.9	<b>Subdominant Substrate 1:</b> Gravel
<b>Thalweg Depth</b>	1.05	0.50	<b>Subdominant Substrate 2:</b> Boulder

Rosgen Class: C3 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.

**Riparian Vegetation Communities (Viereck et al. 1992)**

Dist. from Bank (m)	<u>Left Bank Vegetation Type</u>	Canopy Height(m)	<u>Right Bank Vegetation Type</u>	Canopy Height(m)
0 - 5	Closed Tall Willow Shrub	2.3	Closed Tall Willow Shrub	2.3
5 - 10	Closed Tall Willow Shrub	2.3	Closed Tall Willow Shrub	2.3
10 - 20	Open Black Spruce Forest	7	Closed Tall Willow Shrub	2
20 - 30	Closed White Spruce Forest	8	Closed White Spruce Forest	8

**Key To Fish Sampling Methods**

Estimated reach length (m): 320

(PEF) Portable Electrofisher

(VOG) Visual Observation, Ground

**Fish Observations**

Species: Arctic grayling Life Stage: adult Life History: Resident  
 Total Fish Count: 1 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:  
 Sampling Method (No. of fish): VOG (1)  
 Comments:

Species: Arctic grayling Life Stage: juvenile/adult Life History: Resident  
 Total Fish Count: 1 Fish Measured: 1 Fork Lengths (mm) Min: 320 Max: 320 Mean: 320 Median: 320  
 Sampling Method (No. of fish): PEF (1)  
 Comments:

Species: Arctic grayling Life Stage: juvenile Life History: Resident  
 Total Fish Count: 1 Fish Measured: Fork Lengths (mm) Min: Max: Mean: Median:  
 Sampling Method (No. of fish): VOG (1)  
 Comments:

Species: Chinook salmon Life Stage: juvenile Life History: Anadromous  
 Total Fish Count: 8 Fish Measured: 4 Fork Lengths (mm) Min: 69 Max: 72 Mean: 70 Median: 70  
 Sampling Method (No. of fish): PEF (4) VOG (4)  
 Comments:

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<b>Species:</b> slimy sculpin	<b>Life Stage:</b> adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 11	<b>Fish Measured:</b> 11	<b>Fork Lengths (mm) Min:</b> 69	<b>Max:</b> 88	<b>Mean:</b> 74	<b>Median:</b> 78	
<b>Sampling Method (No. of fish):</b> PEF (11)						
<b>Comments:</b>						
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile/adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 26	<b>Fish Measured:</b> 6	<b>Fork Lengths (mm) Min:</b> 50	<b>Max:</b> 68	<b>Mean:</b> 60	<b>Median:</b> 59	
<b>Sampling Method (No. of fish):</b> PEF (6) VOG (20)						
<b>Comments:</b>						
<b>Species:</b> slimy sculpin	<b>Life Stage:</b> juvenile	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b> 1	<b>Fork Lengths (mm) Min:</b> 24	<b>Max:</b> 24	<b>Mean:</b> 24	<b>Median:</b> 24	
<b>Sampling Method (No. of fish):</b> PEF (1)						
<b>Comments:</b>						
<b>Species:</b> round whitefish	<b>Life Stage:</b> adult	<b>Life History:</b> Resident				
<b>Total Fish Count:</b> 1	<b>Fish Measured:</b>	<b>Fork Lengths (mm) Min:</b>	<b>Max:</b>	<b>Mean:</b>	<b>Median:</b>	
<b>Sampling Method (No. of fish):</b> VOG (1)						
<b>Comments:</b>						

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**Instruments**

<b>Stream Gradient:</b> handheld optical clinometer	<b>Channel Depths:</b> graduated wading rod
<b>Stream Velocity:</b> transparent velocity head rod	<b>Channel Widths:</b> measuring tape
<b>Turbidity:</b> LaMotte 2020e turbidimeter	<b>Electrofischer:</b> Smith-Root LR-24
<b>Water Quality:</b> YSI 556	<b>Transparency:</b> secchi tube



FSK1020C040594.jp



FSK1020C040595.jp



FSK1020C040596.jp



FSK1020C040597.jp



FSK1020C040598.jp

**Station Info**

**Observers:** Joe Buckwalter, Mary Simmering

**Date/Time:** 08/23/2010 6:29 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	66.94809	-149.98785	<b>Coordinates</b>	66.94809	-149.98785

**Elevation NED (m)(ft):** 565 1854

**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83

**USGS Quadrangle:** Beaver D-6

**Legal Description (MTRS):** F025N011W33

**Waterbody Name:**

**Anadromous Waters Catalog Number:**

**Geographic Comments:** Tributary to Jim Creek.

**Visit Comments:** Did not land here--just took photos of an active, channel-spanning beaver dam 1.5 miles upstream of 20C04. This dam may impede upstream fish passage, but we didn't sample above it to confirm.

**Wildlife Comments:**

**Water Quality \ Stream Flow**

<b>Water Temp (C):</b>	<b>DO (mg/L):</b>	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b>	<b>pH:</b>
<b>Water Color:</b>	<b>Turbidity (NTU):</b>	<b>Thalweg Velocity (m/s)(ft/s):</b>		

**Stream Channel**

<b>Stream Gradient (%):</b>	<b>Entrenchment:</b>
<b>Catchment Area(sq. km):</b>	<b>Embeddedness:</b>
<b>Channel Dimensions (m):</b>	<b>Bank Full</b> <b>Wetted</b>
<b>Width</b>	<b>Dominant Substrate:</b>
<b>Thalweg Depth</b>	<b>Subdominant Substrate 1:</b>
	<b>Subdominant Substrate 2:</b>

**Rosgen Class:**

**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b><u>Left Bank Vegetation Type</u></b>	<b><u>Right Bank Vegetation Type</u></b>	
0 - 5		
5 - 10		
10 - 20		
20 - 30		

**Key To Fish Sampling Methods**

(NON) None

**Fish Observations**

**Species:** no collection effort **Life Stage:** not applicable **Life History:** Not Applicable

**Total Fish Count:** 0 **Fish Measured:** **Fork Lengths (mm) Min:** **Max:** **Mean:** **Median:**

**Sampling Method (No. of fish):** NON (0)

**Comments:**

**Instruments**

<b>Stream Gradient:</b>	<b>Channel Depths:</b>
<b>Stream Velocity:</b>	<b>Channel Widths:</b>
<b>Turbidity:</b>	<b>Electrofisher:</b>
<b>Water Quality:</b>	<b>Transparency:</b>



FSK1020C050599.jp



FSK1020C050600.jp

**Station Info****Observers:** Joe Buckwalter, Mary Simmering**Date/Time:** 08/23/2010 6:38 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.04518	-149.97486	<b>Coordinates</b>	67.04518	-149.97486

**Elevation NED (m)(ft):** 361 1184**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Chandalar A-6**Legal Description (MTRS):** F026N011W28**Waterbody Name:** Granite Creek**Anadromous Waters Catalog Number:****Geographic Comments:****Visit Comments:** Did not land here--just took photos of an active, channel-spanning beaver dam near the mouth of Granite Creek (target stream S101). This dam may impede upstream fish passage, but we didn't sample above it to confirm.**Wildlife Comments:****Water Quality \ Stream Flow**

<b>Water Temp (C):</b>	<b>DO (mg/L):</b>	<b>DO (%):</b>	<b>Conductivity (µS/cm):</b>	<b>pH:</b>
<b>Water Color:</b>	<b>Turbidity (NTU):</b>		<b>Thalweg Velocity (m/s)(ft/s):</b>	

**Stream Channel**

<b>Stream Gradient (%):</b>	<b>Entrenchment:</b>
<b>Catchment Area(sq. km):</b>	<b>Embeddedness:</b>
<b>Channel Dimensions (m):</b>	<b>Bank Full</b> <b>Wetted</b>
<b>Width</b>	<b>Dominant Substrate:</b>
<b>Thalweg Depth</b>	<b>Subdominant Substrate 1:</b>
	<b>Subdominant Substrate 2:</b>

**Rosgen Class:****Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b><u>Left Bank Vegetation Type</u></b>	<b><u>Right Bank Vegetation Type</u></b>	
0 - 5		
5 - 10		
10 - 20		
20 - 30		

**Key To Fish Sampling Methods**

(NON) None

**Fish Observations**

<b>Species:</b> no collection effort	<b>Life Stage:</b> not applicable	<b>Life History:</b> Not Applicable
<b>Total Fish Count:</b> 0	<b>Fish Measured:</b>	<b>Fork Lengths (mm) Min: Max: Mean: Median:</b>
<b>Sampling Method (No. of fish):</b> NON (0)		
<b>Comments:</b>		

**Instruments**

<b>Stream Gradient:</b>	<b>Channel Depths:</b>
<b>Stream Velocity:</b>	<b>Channel Widths:</b>
<b>Turbidity:</b>	<b>Electrofisher:</b>
<b>Water Quality:</b>	<b>Transparency:</b>



FSK1020C060601.jp

**Station Info****Observers:** Joe Buckwalter, Mary Simmering**Date/Time:** 08/23/2010 4:07 PM

<b>Station</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Sample</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Coordinates</b>	67.09020	-150.40422	<b>Coordinates</b>	67.09020	-150.40422	/	67.09037 -150.40707

**Elevation NED (m)(ft):** 315 1033**Coordinate Determination Method:** Non-Differential GPS Field Measurement **Datum:** NAD83**USGS Quadrangle:** Wiseman A-1**Legal Description (MTRS):** F026N013W10**Waterbody Name:****Anadromous Waters Catalog Number:****Geographic Comments:** Upstream terminus of the sample reach is at a lake outlet.**Visit Comments:****Wildlife Comments:** Scuds (photos 609-611). Unknown fish nest (photo 606) about 1 ft in diameter.**Water Quality \ Stream Flow****Water Temp (C):** 15.44 **DO (mg/L):** 12.66 **DO (%):** **Conductivity (µS/cm):** 116 **pH:** 9.56**Water Color:** Clear **Turbidity (NTU):** 0.63 **Thalweg Velocity (m/s)(ft/s):** 0.19 0.62**Stream Channel****Stream Gradient (%):** 0 **Entrenchment:** Slightly Entrenched**Catchment Area(sq. km):** 30 **Embeddedness:** Negligible

<b>Channel Dimensions (m):</b>	<b>Bank Full</b>	<b>Wetted</b>	<b>Dominant Substrate:</b> Gravel
<b>Width</b>	3.5	3.0	<b>Subdominant Substrate 1:</b> Cobble
<b>Thalweg Depth</b>	0.58	0.22	<b>Subdominant Substrate 2:</b> Sands

**Rosgen Class:** C4 Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad, well-defined floodplains.**Riparian Vegetation Communities (Vioreck et al. 1992)**

<b>Dist. from</b>	<b>Canopy</b>	<b>Canopy</b>
<b>Bank (m)</b>	<b>Height(m)</b>	<b>Height(m)</b>
<b><u>Left Bank Vegetation Type</u></b>	<b><u>Right Bank Vegetation Type</u></b>	
0 - 5 Bluejoint-Shrub	1.2 Bluejoint-Herb	1.2
5 - 10 Bluejoint-Shrub	1.2 Closed Tall Willow Shrub	2
10 - 20 Bluejoint-Shrub	1.2 Closed Tall Willow Shrub	2
20 - 30 Open White Spruce Forest	9 Open White Spruce Forest	8

**Key To Fish Sampling Methods****Estimated reach length (m):** 160

(PEF) Portable Electrofisher

**Fish Observations****Species:** northern pike**Life Stage:** juvenile**Life History:** Resident**Total Fish Count:** 1 **Fish Measured:** 1 **Fork Lengths (mm) Min:** 134 **Max:** 134 **Mean:** 134 **Median:** 134**Sampling Method (No. of fish):** PEF (1)**Comments:****Instruments****Stream Gradient:** handheld optical clinometer**Channel Depths:** graduated wading rod**Stream Velocity:** transparent velocity head rod**Channel Widths:** measuring tape**Turbidity:** LaMotte 2020e turbidimeter**Electrofisher:** Smith-Root LR-24**Water Quality:** YSI 556**Transparency:** secchi tube



FSK1020C070603.jp



FSK1020C070605.jp



FSK1020C070606.jp



FSK1020C070608.jp



FSK1020C070609.jp



FSK1020C070615.jp



FSK1020C070616.jp