

**FISH POPULATIONS IN STREAMS TO BE CROSSED BY A
PROPOSED ROAD TO THE GMT-1 WELL PAD IN
EASTERN NPR-A: 2009**

Final Report

December 2009



Prepared by:

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Prepared for:

**ConocoPhillips Alaska, Inc.
700 G Street
Anchorage, AK**

and

**Anadarko Petroleum Corp.
1200 Timberloch Place
The Woodlands, TX**

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EXECUTIVE SUMMARY

During summer 2009, fyke nets were used to sample three stream crossings along the proposed road. Sampling was by fyke net so that fish could be released unharmed. Fyke nets were arranged to sample fish moving both upstream and downstream and were emptied daily. Fish were measured and released, with no fish retained for laboratory analysis. Fish longer than 180 mm were tagged to evaluate movement patterns within the drainage system and to reveal the extent to which fish caught in the study area contribute to the subsistence catch.

Water chemistry parameters were measured to assess habitat conditions during summer. Water chemistry measurements included surface measures of water temperature, specific conductance, dissolved oxygen, pH, and turbidity.

Sampling in 2009 began in June as stream flows were receding from peak break-up flows. At the onset of sampling on June 16, channel ice had melted and water temperatures had already reached 10°C in the Tingmiaqsiugvik (Ublutuoch River). Subsequently, temperatures decreased rapidly to near 4-5°C in the smaller streams. Water temperatures generally increased during the July sampling, beginning near 7 to 18°C and increasing to around 13°C.

Species Composition

Substantial differences were found in fish use of small drainages of eastern NPR-A. Ten species were captured, with arctic grayling the most abundant species, followed by ninespine stickleback.

The Tingmiaqsiugvik (Ublutuoch River) produced the most diverse catch, with 9 species caught in June and July combined. Crea Creek produced 6 species, while Barely Creek produced only Alaska blackfish and ninespine stickleback. These results are consistent with previous sampling in these three streams, with the Tingmiaqsiugvik (Ublutuoch River) showing the greatest diversity and Barely Creek the least.

Fyke nets were placed to catch fish moving both upstream and downstream in the sampled streams. Analysis of variance was used to test for differences in upstream and downstream movements of Arctic grayling in the Tingmiaqsiugvik (Ublutuoch River) and Crea Creek during the June and July sampling periods, however none of the tests indicated a significant difference in the upstream and downstream movements. No trends in movements were obvious in the daily catch patterns.

Seasonal Distribution

In June, catches in the Tingmiaqsiugvik (Ublutuoch River) and Crea Creek were primarily arctic grayling, which comprised 63 and 91 percent of the catch at each station, respectively. In July, the proportion of grayling decreased to 51 and 10 percent of the catch at the same stations. Most of the

grayling in the Tingmiaqsiugvik (Ublutuoch River) during June were immature fish, with 96 percent less than 250. In contrast, over 66 percent of the grayling caught during June in Crea Creek exceeded 250 mm. Since grayling spawn in early to mid-June, these patterns indicate that the sampling station in Crea Creek was likely near a spawning area, while mature grayling were not spawning near the Tingmiaqsiugvik (Ublutuoch River) station.

Catches of both Alaska blackfish and ninespine stickleback in Barely Creek were higher during July than in June. Ninespine stickleback during June were composed of two size modes, while only one size mode was present in July. The larger size mode in June was likely mature adults, which subsequently died following spawning. Ninespine stickleback in Crea Creek in July were larger than those in Barely Creek, possibly reflecting better growing conditions in Crea Creek

At the Tingmiaqsiugvik (Ublutuoch River), broad whitefish, humpback whitefish and least cisco increased in abundance from June to July, while round whitefish were similar during both sampling seasons. The increase in least cisco was caused by smaller fish moving into the study reach, while lengths of round whitefish were similar in both study periods.

Tag Returns

Tags were applied to 177 fish, with 133 released in the Tingmiaqsiugvik (Ublutuoch River) and 44 released in Crea Creek. Arctic grayling were 55% of the releases, followed by round whitefish, humpback whitefish, broad whitefish and least cisco. Eight tagged arctic grayling released in 2009 were recaptured, with two moving from the Crea Creek station to the Tingmiaqsiugvik (Ublutuoch River) station. An additional grayling tagged in 2006 in Bill's Creek was recaptured at the Tingmiaqsiugvik (Ublutuoch River) station. This was the only recapture from fish tagged in previous years, despite release of over 2,300 tagged arctic grayling between 2001 and 2006. In previous years, around 300 broad whitefish, 400 humpback whitefish, 90 round whitefish and 150 least cisco had been released in the Fish Creek/Tingmiaqsiugvik system, but none were recaptured in 2009.

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INTRODUCTION

ConocoPhillips Alaska Inc. (CPAI) has been exploring for oil within the eastern portion of the National Petroleum Reserve–Alaska (NPR-A) since the winter of 1999/2000. Oil reserves have been located in the region, and the feasibility of developing a producing field in the area is being investigated. A road has been proposed to access well sites in the Greater Moose's Tooth Unit (GMTU), with the proposed road route crossing several streams (Figure 1). Information on fish populations that use the streams crossed by the proposed road will be needed to evaluate potential effects of the stream crossings.

Streams in the study region have previously been investigated by Netsch et al. (1977), and Bendock and Burr (1984). These surveys consisted of one-day visits at each site for inventory-level surveys over a wide area, with sampling by gill net, seine, minnow trap, and angling. Species reported from Uvlutuuq (Fish Creek) and Iqalliqpiq (Judy Creek) included broad whitefish, Arctic grayling, round whitefish, slimy sculpin and ninespine stickleback. The Tingmiaqsiugvik (Ublutuooh River) was also reported to contain Arctic grayling, slimy sculpin and ninespine stickleback.

Detailed study of streams in this region was begun in 2001 as the first detailed examination of fish habitats and populations in the eastern NPR-A study area (Moulton 2002, 2003, 2005, 2006, 2007). The study was designed to provide details of fish populations in eastern NPR-A (Figure 1), and the habitats used by those populations, so that oilfield facilities can be sited, designed and constructed in a manner that will avoid or minimize impacts.

The goal of the present study effort is to develop information needed to monitor fish populations using streams crossed by the proposed road so that changes, if any, in fish use of the drainage systems after field development can be evaluated.

Specific objectives of the 2009 fish survey were to conduct studies on streams along the proposed road alignment to:

- a) obtain information on the composition and seasonal distribution of fish populations within the drainages, and
- b) obtain information on fish movements within the drainages.

METHODS

During summer 2009, fyke nets were used to sample three stream crossings along the proposed road (Figures 1 and 2). All three streams had previously been sampled at various times, beginning in 2001. Sampling was in the Tingmiaqsiugvik (Ublutuoch River) and two of its tributaries, Crea Creek and Barely Creek. Sampling was conducted during two time periods in 2009: June 17-23 and July 22-28 (Table 1).

Sampling was by fyke net so that fish could be released unharmed. Fyke nets used had an opening 0.9 m deep by 1.1 m wide, the trap end was 4.9 m long, made of 9.5 mm mesh. The wings (5 m long) and lead (15 m long) were made of 12.7 mm mesh. Fyke nets were arranged to sample fish moving both upstream and downstream and were emptied daily. Fish were measured and released, with no fish retained for laboratory analysis. Duration of each set was recorded to allow calculating catch rates.

Fish longer than 180 mm were tagged to evaluate movement patterns within the drainage system and to reveal the extent to which fish caught in the study area contribute to the subsistence catch. Floy FD-94 anchor tags (monofilament = 1/2 inch, vinyl = 3/4 inch) were applied to whitefish, cisco, and burbot. Recapture was monitored in research sampling within Colville Delta and eastern NPR-A study areas and in the Nuiqsut subsistence fishery.

Water Chemistry Sampling

Water chemistry parameters were measured to assess habitat conditions during summer. Water chemistry measurements included surface measures of water temperature, specific conductance, dissolved oxygen, pH, and turbidity. Temperature, specific conductance and dissolved oxygen were *in situ* measurements taken at a depth of approximately 0.5 m near the trap end of the fyke net with a YSI Model 85 meter. A sample obtained from about 15 cm below the surface was returned to the field office to measure pH and turbidity. PH was measured with either a Coning pH meter or an Oaktron pH Tester III. Turbidity was measured with an H.F. Scientific DRT15CE turbidity meter.

RESULTS AND DISCUSSION

Physical Environment

Sampling in 2009 began in June as stream flows were receding from peak break-up flows (Figure 3a). At the onset of sampling on June 16, channel ice had melted and water temperatures had already reached 10°C in the Tingmiaqsiugvik (Ublutuoch River) (Figure 3b). Subsequently, temperatures decreased rapidly to near 4-5°C in the smaller streams. Water temperatures generally increased during the July sampling, beginning near 7 to 18°C and increasing to around 13°C.

Turbidity in the Tingmiaqsiugvik (Ublutuoch River) and its tributaries was low throughout the summer, generally in the range of 2 NTU or less, indicating consistently clear water (Figure 4a). During the period of study, specific conductance rose slowly at all sites through the summer as snow melt and runoff decreased. Barely Creek exhibited the highest specific conductance, while the Tingmiaqsiugvik (Ublutuoch River) had the lowest (Figure 4b).

Biological Observations

Species Composition

Substantial differences were found in fish use of small drainages of eastern NPR-A. Ten species were captured (Table 2). Arctic grayling were the most abundant species (16% of the total catch, 59% of the non-stickleback catch), followed by ninespine stickleback. Stations U0901 in the Tingmiaqsiugvik (Ublutuoch River) and C0301 in Crea Creek produced the greatest number of grayling. While juvenile grayling dominated the catches, adults were also present (Appendix Table C-1).

The Tingmiaqsiugvik (Ublutuoch River) produced the most diverse catch, with 9 species caught in June and July combined. Crea Creek produced 6 species, while Barely Creek produced only Alaska blackfish and ninespine stickleback. These results are consistent with previous sampling in these three streams, with the Tingmiaqsiugvik (Ublutuoch River) showing the greatest diversity and Barely Creek the least (Table 3). Catches of Arctic cisco in the Tingmiaqsiugvik (Ublutuoch River) in 2004 were substantially higher than in subsequent years. Catches of grayling in Crea Creek were high in both 2004 and 2005 (Figure 5), although some of the difference in 2005 appears to be an artifact of different sampling periods. Sampling in Barely Creek has produced only ninespine stickleback and Alaska blackfish.

Fyke nets were placed to catch fish moving both upstream and downstream in the sampled streams. Analysis of variance (Anova) was used to test for differences in upstream and downstream movements of Arctic grayling in the Tingmiaqsiugvik (Ublutuoch River) and Crea Creek during the June and July sampling periods, however none of the tests indicated a significant difference in the upstream and downstream movements. No trends in movements were obvious in the daily catch patterns (Figure 6).

Few broad whitefish were caught during 2009, with most of those caught during July in the Tingmiaqsiugvik (Ublutuoch River) (Figure 7). There was no obvious directionality to their movement.

Seasonal Distribution

In June, catches in the Tingmiaqsiugvik (Ublutuoch River) and Crea Creek were primarily arctic grayling, which comprised 63 and 91 percent of the catch at each station, respectively. In July, the proportion of grayling decreased to 51 and 10 percent of the catch at the same stations. Most of the grayling in the Tingmiaqsiugvik (Ublutuoch River) during June were immature fish, with 96 percent less than 250 mm (Figure 8). In contrast, over 66 percent of the grayling caught during June in Crea Creek exceeded 250 mm. Since grayling spawn in early to mid-June, these patterns indicate that the sampling station in Crea Creek was likely near a spawning area, while mature grayling were not spawning near the Tingmiaqsiugvik (Ublutuoch River) station.

At the Tingmiaqsiugvik (Ublutuoch River), broad whitefish, humpback whitefish and least cisco increased in abundance from June to July, while round whitefish were similar during both sampling seasons (Table 2). The increase in least cisco was caused by smaller fish moving into the study reach, while lengths of round whitefish were similar in both study periods (Figure 9).

Catches of both Alaska blackfish and ninespine stickleback in Barely Creek were higher during July than in June. Ninespine stickleback during June were composed of two size modes, while only one size mode was present in July (Figure 10). The larger size mode in June was likely mature adults, which subsequently died following spawning. Ninespine stickleback in Crea Creek in July were larger than those in Barely Creek, possibly reflecting better growing conditions in Crea Creek

Tag Returns

Tags were applied to 177 fish, with 133 released in the Tingmiaqsiugvik (Ublutuoch River) and 44 released in Crea Creek. Arctic grayling were 55% of the releases, followed by round whitefish, humpback whitefish, broad whitefish and least cisco (Table 4). Eight tagged arctic grayling released in 2009 were recaptured, with two moving from the Crea Creek station to the Tingmiaqsiugvik (Ublutuoch River) station (Table 5). An additional grayling tagged in 2006 in Bill's Creek was recaptured at the Tingmiaqsiugvik (Ublutuoch River) station. This was the only recapture from fish tagged in previous years, despite release of over 2,300 tagged arctic grayling between 2001 and 2006. In previous years, around 300 broad whitefish, 400 humpback whitefish, 90 round whitefish and 150 least cisco had been released in the Fish Creek/Tingmiaqsiugvik system, but none were recaptured in 2009.

CONCLUSIONS

Sampling during 2009 indicated, as in previous years, that the Tingmiaqsiugvik (Ublutuoeh River) drainage system is heavily used by Arctic grayling broad whitefish, humpback whitefish, least cisco and round whitefish also present during summer. Crea Creek, a clearwater tributary to the Tingmiaqsiugvik (Ublutuoeh River) with a strong connection to lakes, supported both adult and juvenile Arctic grayling, as well as a variety of other species, indicating the importance of these small connected streams as summer feeding areas, and probably grayling spawning areas.

Barely Creek, which is primarily formed by a melting snow field, becomes intermittent during summer, with the isolated pools supporting ninespine stickleback and Alaska blackfish.

LITERATURE CITED

- Bendock, T.N. and J. Burr. 1984. Freshwater fish distributions in the Central Arctic Coastal Plain (Ikpikpuk River to Colville River). Alaska Department of Fish and Game, Sport Fish Division, Fairbanks, AK. 52p.
- Bendock, T.N. and J. Burr. 1985. Freshwater fish distributions in the Central Arctic Coastal Plain (Topagoruk River to Ikpiuk River). Alaska Department of Fish and Game, Sport Fish Division, Fairbanks, AK. 30p.
- Craig, P.C. 1984. Fish use of coastal waters of the Alaskan Beaufort Sea: a review. Transactions of the American Fisheries Society 113:265-282.
- Craig, P.C., and L. Haldorson. 1986. Pacific salmon in the North American Arctic. Arctic 39(1):2-7.
- MBJ (Michael Baker Jr., Inc). 2003. Recommended lake volume estimation methods and survey procedures for North Slope lakes. Prepared by Michael Baker Jr., Inc. for ConocoPhillips. Anchorage, AK. 12 p+appendices.
- McElderry, H.I. and P.C. Craig. 1981. A fish survey in the lower Colville River drainage with an analysis of spawning use by Arctic and least cisco. Appendix 2. Final Report, Simpson Lagoon (Part 4, Fish). In: Environmental Assessment of the Alaskan Continental Shelf, Final Reports (Vol. 7). BLM/NOAA OCSEAP, Boulder, Colorado. p. 657-678.
- Morris, W. 2003. Seasonal movements and habitat use of Arctic grayling (*Thymallus arcticus*), burbot (*Lota lota*), and broad whitefish (*Coregonus nasus*) within the Fish Creek drainage of the National Petroleum Reserve-Alaska, 2001-2002. Alaska Department of Natural Resources, Office of Habitat Management and Permitting. Technical Report No. 03-02. Fairbanks, AK. 71p+appendices.
- Moulton, L.L. 2000a. Fish utilization of lakes in eastern NPR-A – 1999. Report by MJM Research to ARCO Alaska Inc. Lopez Island, WA. 248 p.
- Moulton, L.L. 2000b. Fish utilization of lakes in eastern NPR-A – 1999-2000. Report by MJM Research to ARCO Alaska Inc. Lopez Island, WA. 124 p.
- Moulton, L.L. 2001a. Fish utilization of lakes in eastern NPR-A: 1999-2001. Report by MJM Research to Phillips Alaska Inc. Lopez Island, WA. 83p.
- Moulton, L.L. 2001b. Harvest estimate and associated information for the 2000 Colville River fall fishery. Report by MJM Research to Phillips Alaska, Inc and BP Exploration (Alaska). Lopez Island, WA. 53p. + appendices.

- Moulton, L.L. 2002. Baseline surveys of fish habitats in eastern NPR-A: 2001. Report by MJM Research to Phillips Alaska, Inc. Lopez, Island., WA. 130p.
- Moulton, L.L. 2003. Fish utilization of lakes in eastern NPR-A: 1999-2001. Report by MJM Research to Phillips Alaska, Inc. Lopez, Island., WA. 83p.
- Moulton, L.L. 2005. Baseline surveys of fish habitats in eastern NPR-A: 2004. Report by MJM Research to ConocoPhillips Alaska, Inc. and Anadarko Petroleum Co. Lopez Island., WA. 33p.+ appendices.
- Moulton, L.L. 2006. Monitoring fish populations in the Ublutuoch River drainage in eastern NPR-A: 2004-2005. Report by MJM Research to ConocoPhillips Alaska, Inc. and Anadarko Petroleum Co. Lopez Island., WA. 28p.+ appendices.
- Moulton, L.L. and J. Seigle. 2007. Monitoring fish populations in the Ublutuoch River drainage in eastern NPR-A: 2004-2006. Report by MJM Research to ConocoPhillips Alaska, Inc. and Anadarko Petroleum Co. Lopez Island., WA. 28p.+ appendices.
- Netsch, N., E. Crateau, G. Love and N. Swanton. 1977. Freshwater fisheries reconnaissance of the coastal plain of National Petroleum Reserve-Alaska (NPR-A), July and August 1977. Preliminary report. USDI: US Fish and Wildlife Service. Anchorage, AK. 214p.
- Power, G. 1997. A review of fish ecology in arctic North America. Pages 13-39 in J. Reynolds, editor. Fish ecology in arctic North America. American Fisheries Society Symposium 19, Bethesda, MD.
- Ricker, W. E. 1975. Computation and interpretation of biological statistics of fish populations. Bull. Fisheries Research Board of Canada. No. 191, 382 p.

Table 1. Location of fyke net stations fished in eastern NPRA during 2009.

Station	Location	Dates Fished	Latitude (NAD83)	Longitude
C0301 (US)	Crea Creek (trib to Ublutuoch)	Jun 17-23; Jul 22-28	70.27969	151.33000
C0301 (DS)	Crea Creek (trib to Ublutuoch)	Jun 17-23; Jul 22-28	70.27969	151.33000
C0306 (US)	Barely Creek (trib to Ublutuoch)	Jun 17-23; Jul 22-28	70.28465	151.28610
C0306 (DS)	Barely Creek (trib to Ublutuoch)	Jun 17-23; Jul 22-28	70.28465	151.28610
U0102 (US)	Ublutuoch River	Jun 17-23; Jul 22-28	70.28225	151.25681
U0102 (DS)	Ublutuoch River	Jun 17-23; Jul 22-28	70.28225	151.25681

Table 2. Catches of fish by direction and season at fyke net stations in eastern NPRA streams during 2009.

Tingmiaqsiugvik (Ublutuoch River)					
Species	June		July		Total Catch
	(DS)	(US)	(DS)	(US)	
Broad whitefish	0	1	8	7	16
Humpback whitefish	1	1	26	0	28
Least cisco	0	7	36	10	53
Arctic cisco	0	1	2	1	4
Round whitefish	6	29	13	8	56
Arctic grayling	41	49	62	54	206
Rainbow smelt	0	1	0	0	1
Ninespine stickleback	6	1	0	0	7
Slimy sculpin	0	0	0	1	1
Total catch	54	90	147	81	372
No. of Species	4	8	6	6	9
Effort (hours)	169.9	168.9	168.1	169.3	676.2

Crea Creek					
Species	June		July		Total Catch
	(DS)	(US)	(DS)	(US)	
Broad whitefish	2	0	0	0	2
Humpback whitefish	1	0	0	0	1
Arctic grayling	23	63	10	6	102
Burbot	0	0	0	3	3
Alaska blackfish	1	0	0	0	1
Ninespine stickleback	4	0	82	61	147
Total catch	31	63	92	70	256
No. of Species	5	1	2	3	6
Effort (hours)	164.4	164.4	168.6	168.8	666.2

Barely Creek					
Species	June		July		Total Catch
	(DS)	(US)	(DS)	(US)	
Alaska blackfish	2	10	16	21	49
Ninespine stickleback	190	88	408	567	1,253
Total catch	192	98	424	588	1,302
No. of Species	2	2	2	2	2
Effort (hours)	167.1	167.1	168.8	168.7	671.6

DS = fish moving downstream, US = fish moving upstream

Table 3. Comparison of fish catches in small streams of eastern NPRA during 2001-2006 and 2009.

Number of fish caught

Species	Tingmiaqsiugvik (Ublutuoch River)							Crea Ck					Barely Creek	
	2001	2002	2003	2004	2005	2006	2009	2003	2004	2005	2006	2009	2003	2006
Chinook salmon				4										
Chum salmon	1				1									
Sockeye salmon					2									
Broad whitefish	121	155	6	76	26	23	16	3	8	5	1	2		
Humpback whitefish	192	5	1		26	67	28				1	1		
Least cisco	37	66	2	13	24	8	53	3	1	1				
Arctic cisco							4							
Round whitefish	70	11	2		18	20	56				5			
Arctic grayling	660	630	222	749	705	265	206	1,394	1,175	1,381	267	102		
Rainbow smelt							1							
Burbot								1	3	1		3		
Alaska blackfish								2	5		1	1	32	49
Ninespine stickleback	52	15	305	296	92	93	7	391	1,213	901	562	147	345	1,253
Slimy sculpin	7	7	9	5	1	2	1	15	5	5				
Total catch	1,140	889	547	1,143	895	478	372	1,809	2,410	2,294	837	256	377	1,302
Number of Species	8	7	7	6	9	7	9	7	7	6	6	6	2	2
Effort (hours)	653.7	590.3	645.7	987.3	1,347.8	859.5	674.8	634.8	1,331.3	1,462.1	1,049.6	666.2	188.8	671.6

Catch Rate (fish per day)

Species	Tingmiaqsiugvik (Ublutuoch River)							Crea Ck					Barely Creek	
	2001	2002	2003	2004	2005	2006	2009	2003	2004	2005	2006	2009	2003	2009
Chinook salmon				0.10										
Chum salmon	0.04				0.02									
Sockeye salmon					0.04									
Broad whitefish	4.4	6.3	0.22	1.8	0.46	0.64	0.57	0.11	0.14	0.08	0.02	0.07		
Humpback whitefish	7.0	0.20	0.04		0.46	1.87	1.00				0.02	0.04		
Least cisco	1.4	2.7	0.07	0.32	0.43	0.22	1.88	0.11	0.02	0.02				
Arctic cisco							0.14							
Round whitefish	2.6	0.4	0.07		0.32	0.56	1.99				0.11			
Arctic grayling	24.2	25.6	8.3	18.2	12.6	7.40	7.33	52.7	21.2	22.7	6.11	3.67		
Rainbow smelt							0.04							
Burbot								0.04	0.05	0.02		0.11		
Alaska blackfish								0.08	0.09		0.02	0.04	4.07	1.75
Ninespine stickleback	1.9	0.61	11.3	7.2	1.6	2.60	0.25	14.8	21.9	14.8	12.85	5.30	43.85	44.78
Slimy sculpin	0.26	0.28	0.33	0.12	0.02	0.06	0.04	0.57	0.09	0.08				
Total CPUE	41.9	36.1	20.3	27.8	15.9	13.3	13.2	68.4	43.4	37.7	19.1	9.2	47.9	46.5
Number of Species	8	7	7	6	9	7	9	7	7	6	6	6	2	2

∞

Table 4. Tagged fish released by station at proposed stream crossings during 2009.

SPECIES	Release Station		Total Release
	U0901	C0301	
Arctic grayling	56	41	97
Broad whitefish	10	2	12
Humpback whitefish	26	1	27
Round whitefish	32	0	32
Least cisco	9	0	9
Total Releases	133	44	177

Table 5. Recapture and release data for fish recaptured at proposed stream crossings during 2009.

(bold indicates different release and recapture stations)

Species	Tag	Release Data			Recapture Data			Days Out
	Number	Station	Date	Length	Station	Date	Length	
Arctic grayling								
	MJM023683	B0401	7/23/2006	320	U0901	7/28/2009	363	1101
	MJM090012	C0301	6/17/2009	182	U0901	7/27/2009	208	40
	MJM090013	C0301	6/17/2009	217	U0901	6/20/2009	216	3
	MJM090023	C0301	6/18/2009	221	C0301	6/21/2009	223	3
	MJM090045	C0301	6/21/2009	220	C0301	6/22/2009	221	1
	MJM090092	U0901	6/23/2009	196	U0901	7/28/2009	211	35
	MJM090101	U0901	7/22/2009	308	U0901	7/26/2009	304	4
	MJM090132	U0901	7/25/2009	239	U0901	7/27/2009	240	2
	MJM090146	U0901	7/26/2009	252	U0901	7/27/2009	252	1
Least Cisco								
	MJM090026	U0901	6/18/2009	185	U0901	6/19/2009	185	1
Round Whitefish								
	MJM090065	U0901	6/22/2009	210	U0901	7/27/2009	223	35

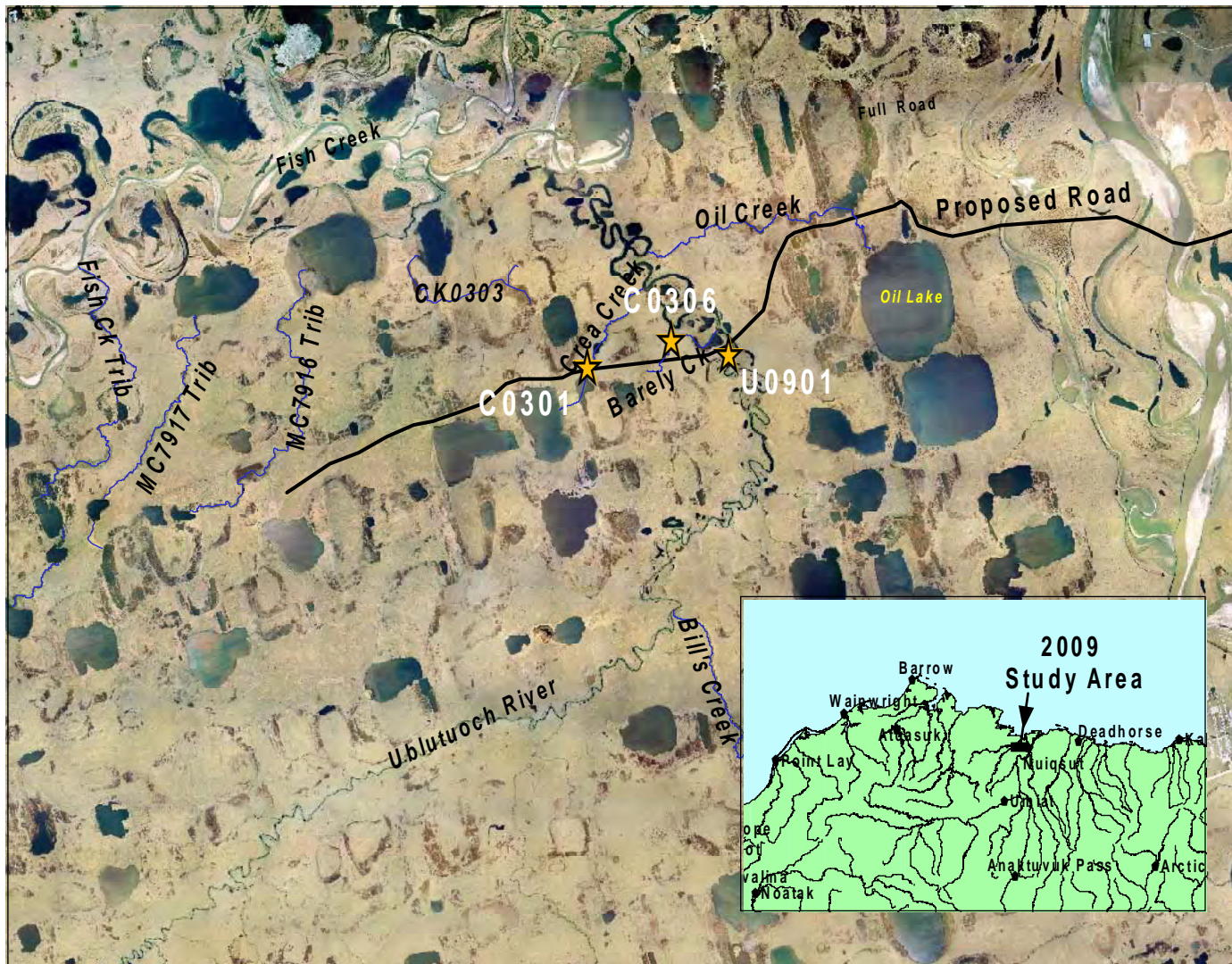


Figure 1. Location of the eastern NPR-A study area and proposed road alignment, 2009.

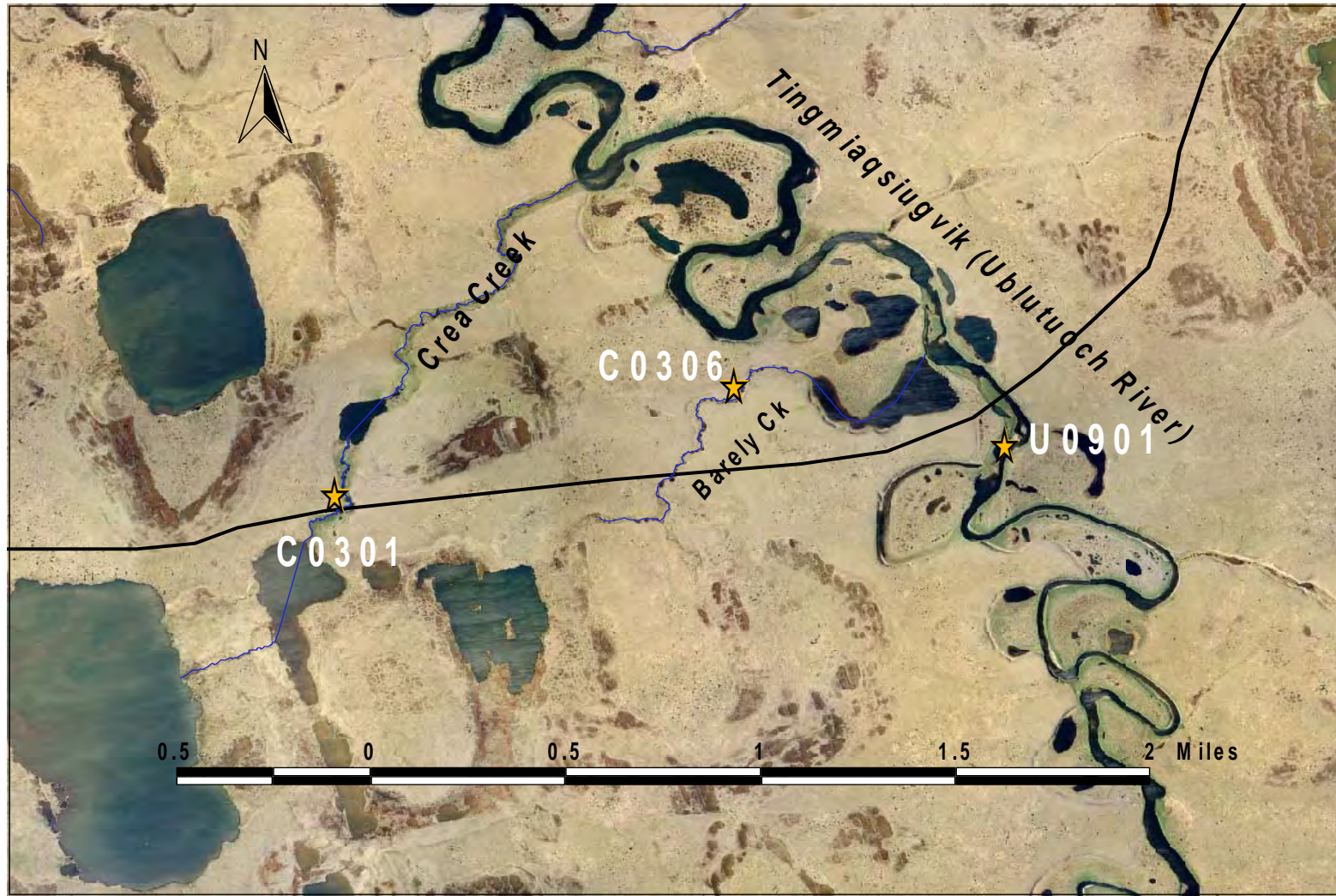


Figure 2. Fyke net locations at proposed stream crossings in eastern NPR-A study area, 2009.

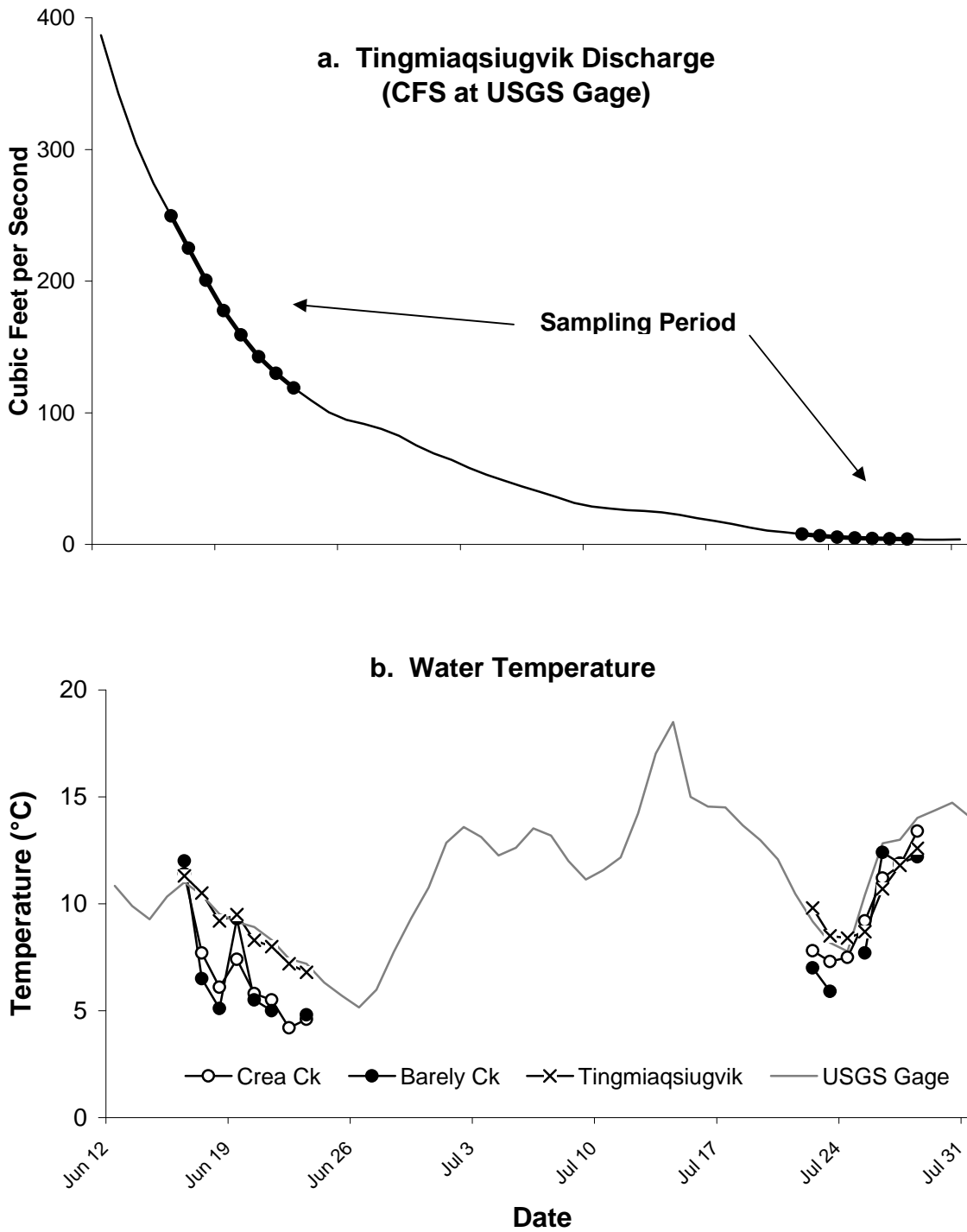


Figure 3. Mean daily discharge and water temperature at streams sampled in the eastern NPR-A study area, 2009.

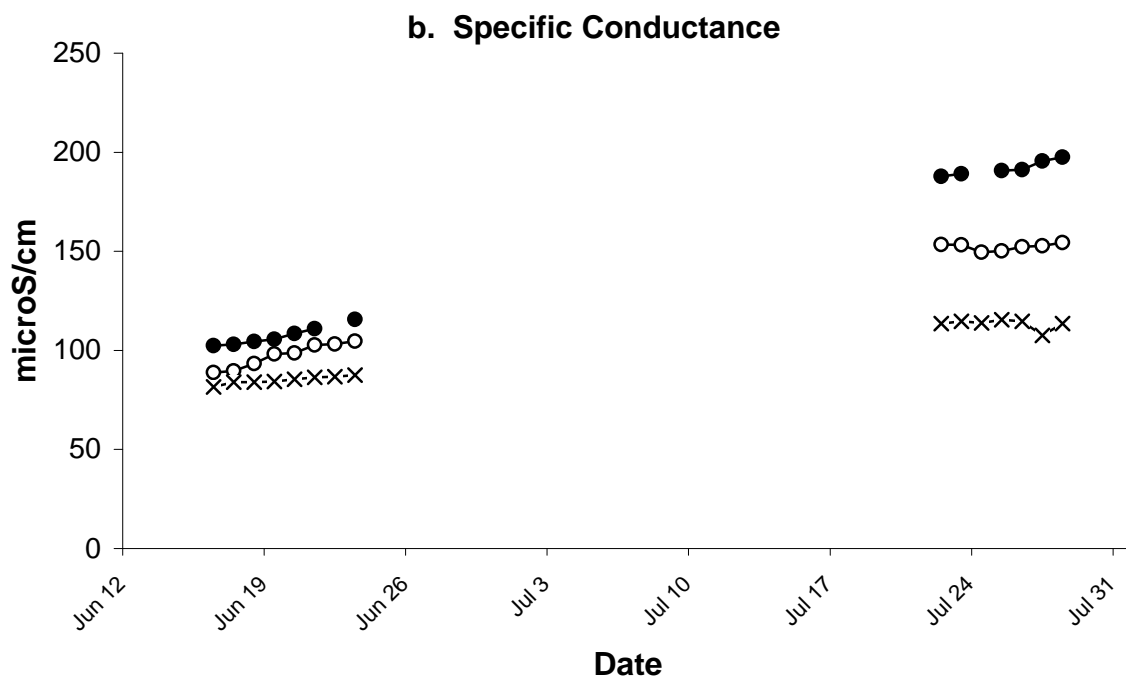
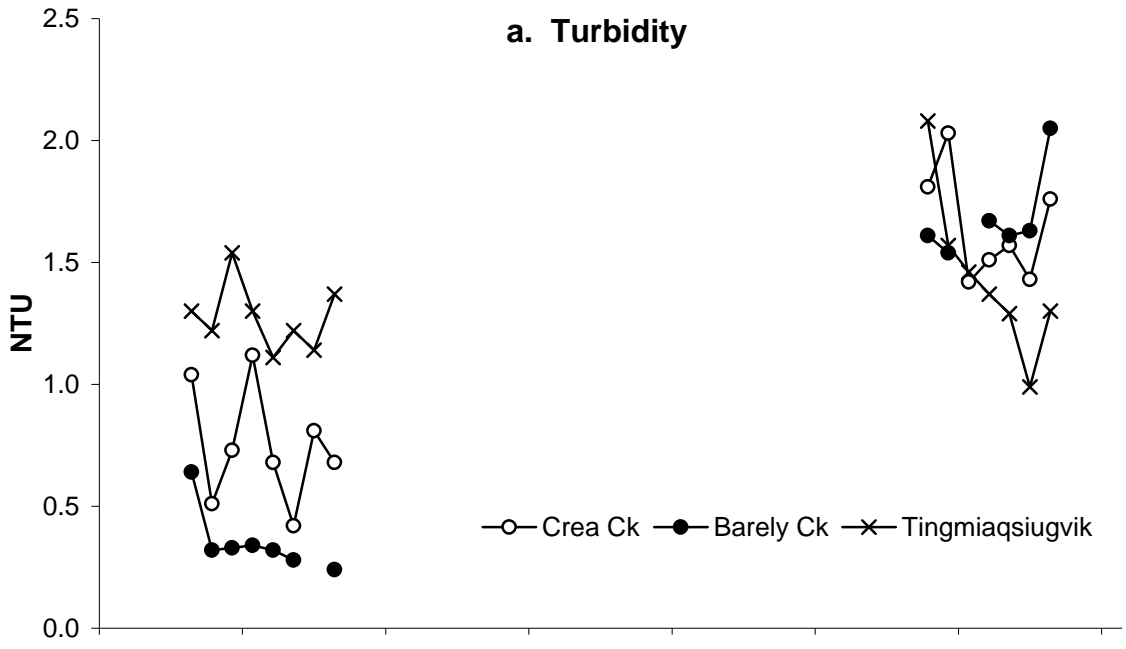


Figure 4. Turbidity and specific conductance at streams sampled in the eastern NPR-A study area, 2009.

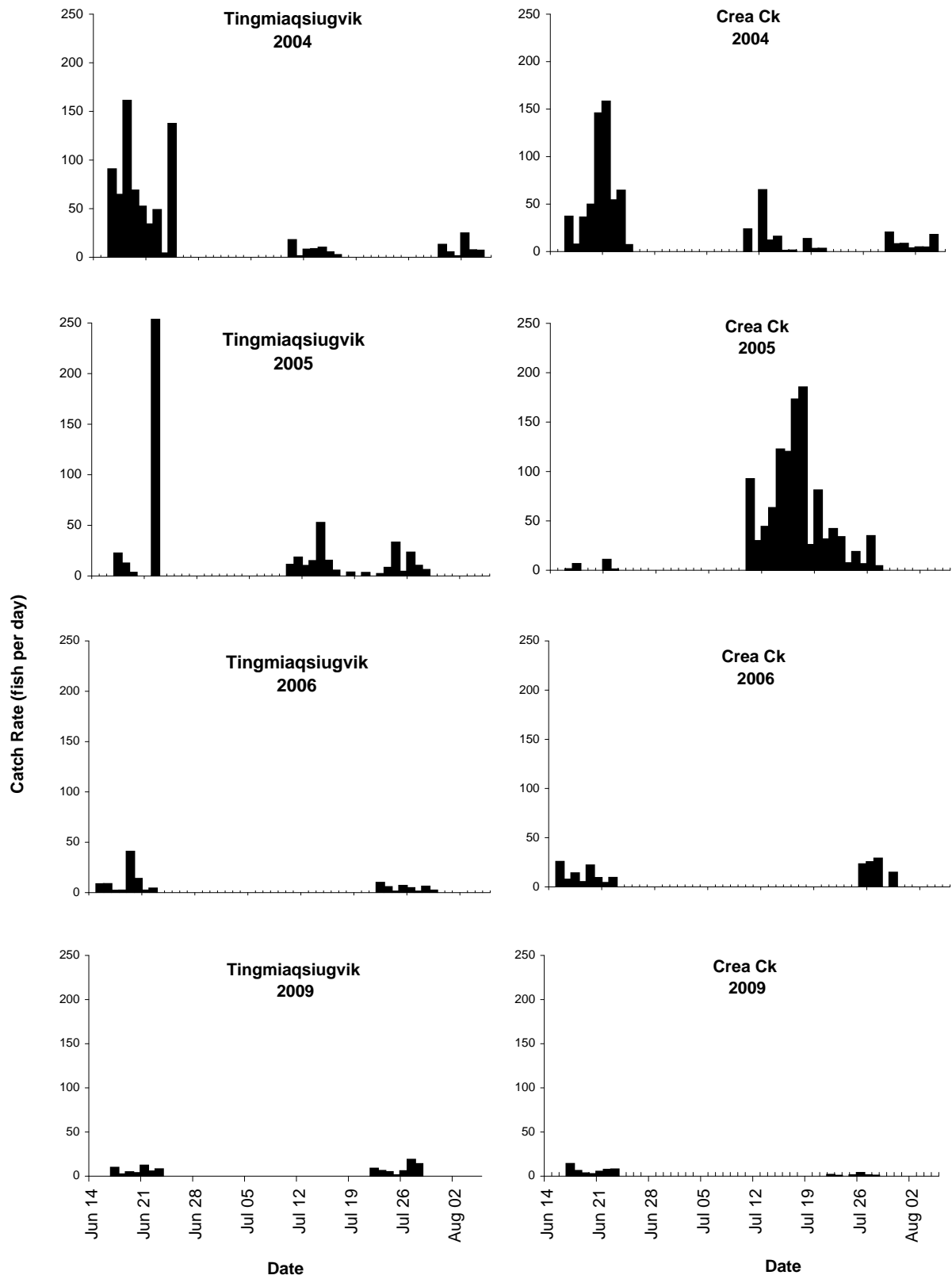


Figure 5. Comparison of arctic grayling daily catch rates in 2 eastern NPR-A streams sampled in 2004-2009.

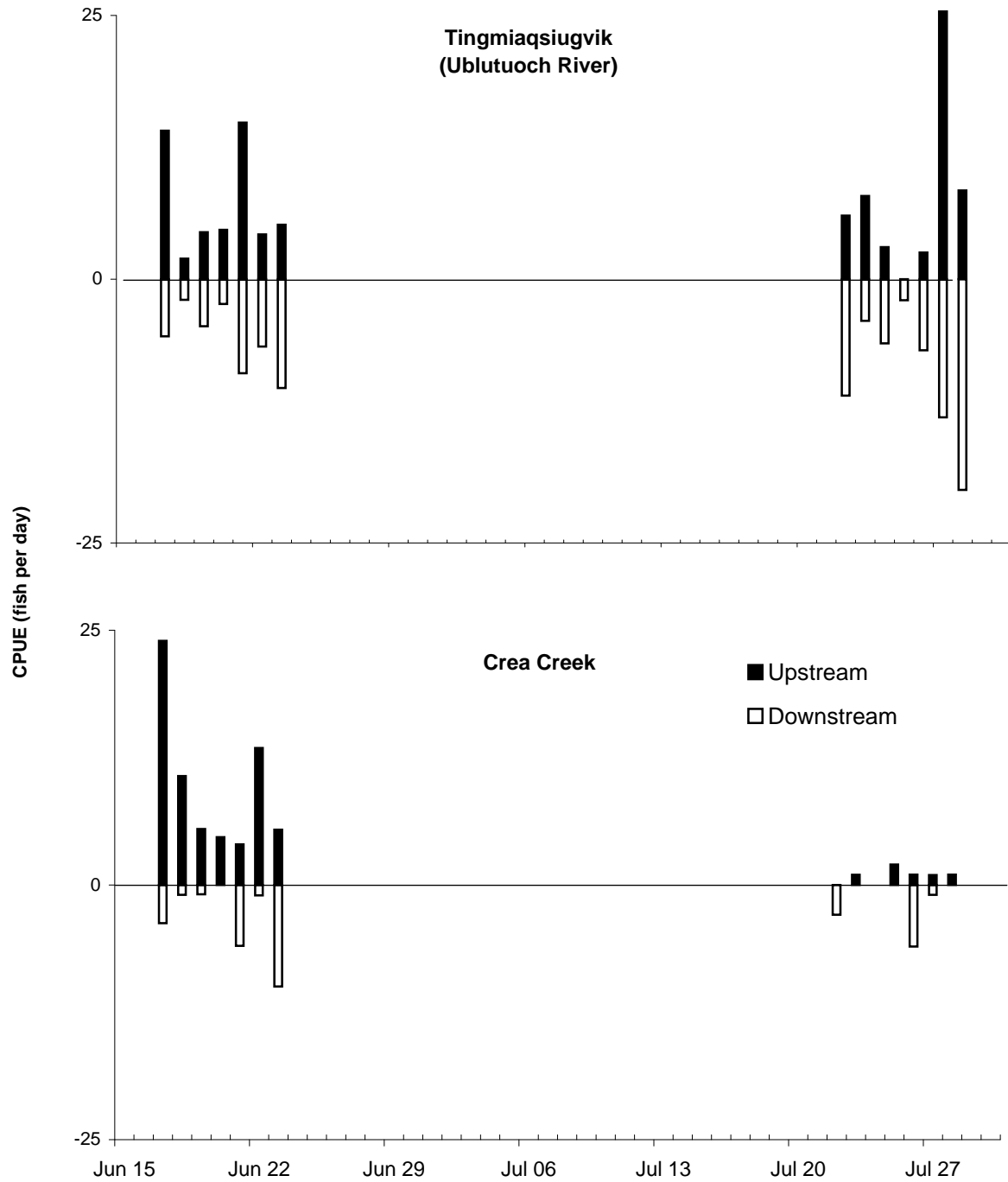


Figure 6. Comparison of arctic grayling catch rates for fish moving upstream and downstream in streams of eastern NPR-A during 2009. (Downstream = fish moving downstream, Upstream = fish moving upstream)

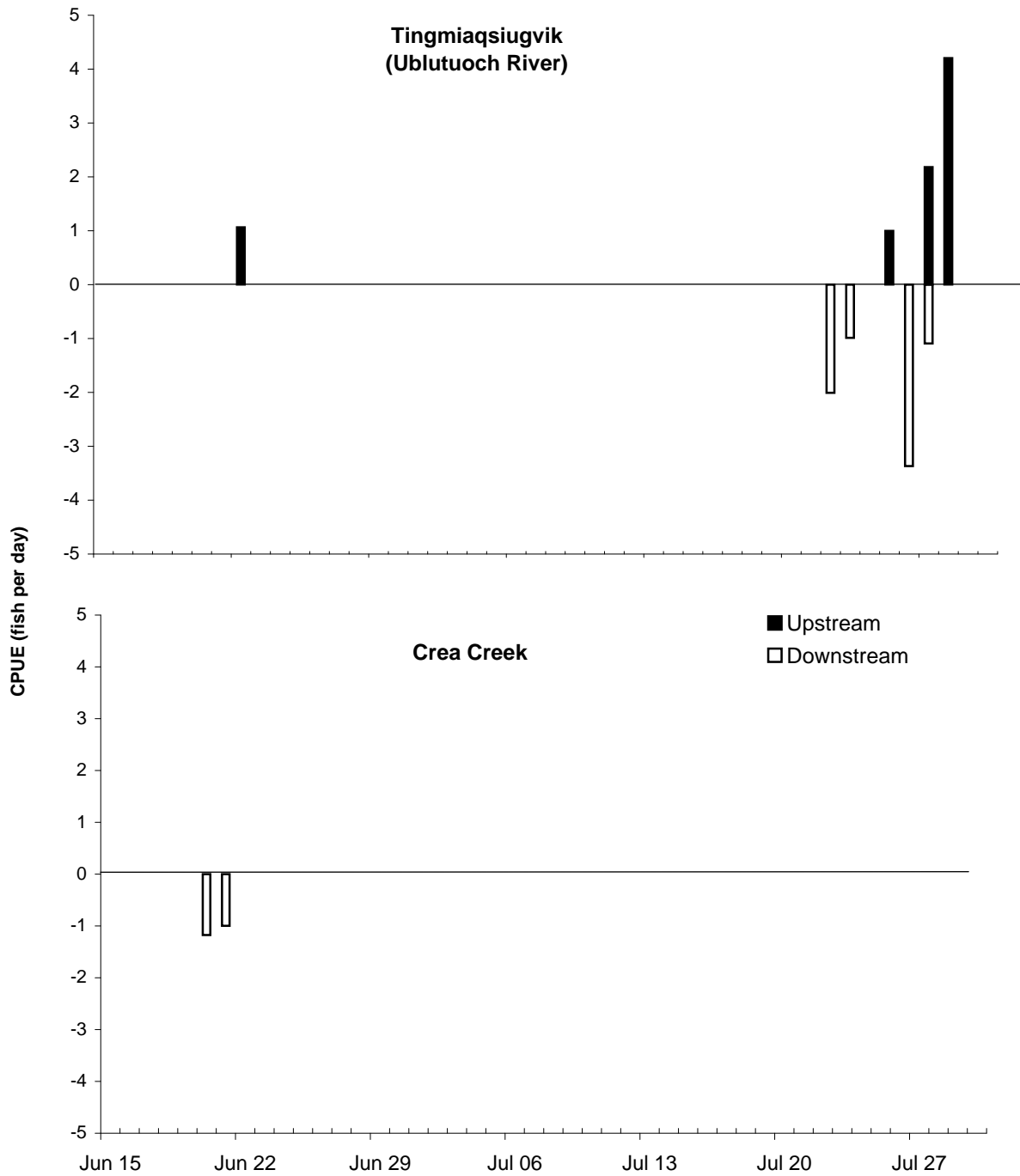


Figure 7. Comparison of broad whitefish catch rates for fish moving upstream and downstream in streams of eastern NPR-A during 2009. (Downstream = fish moving downstream, Upstream = fish moving upstream)

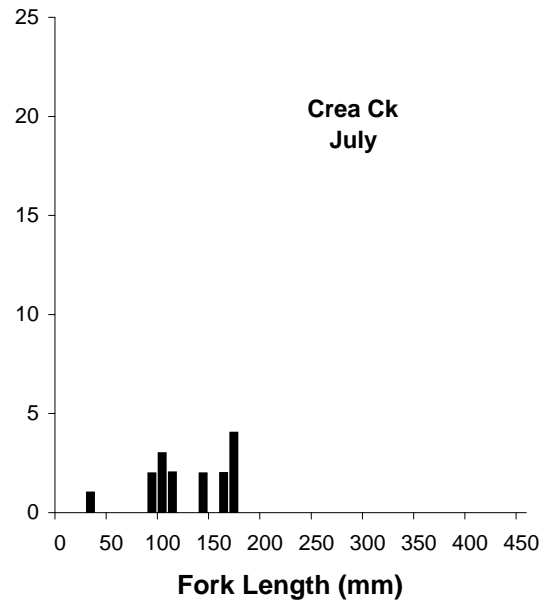
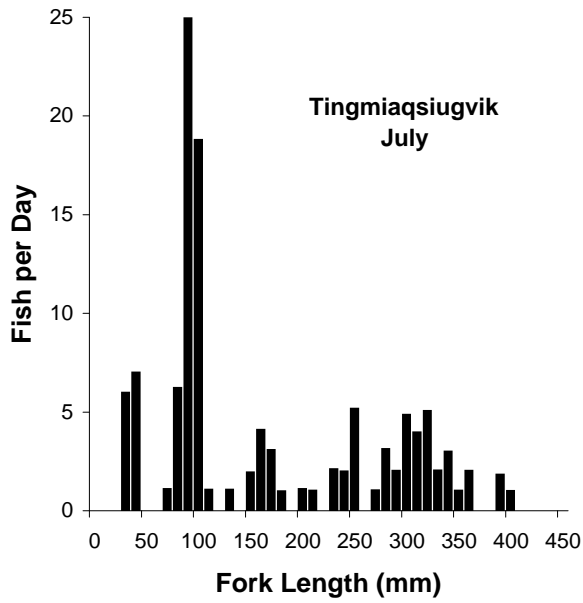
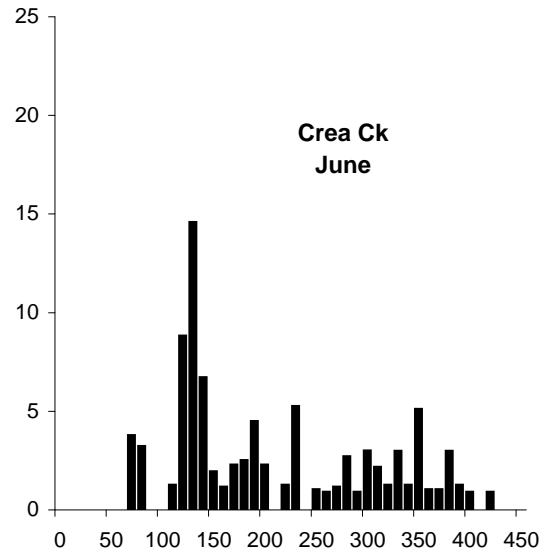
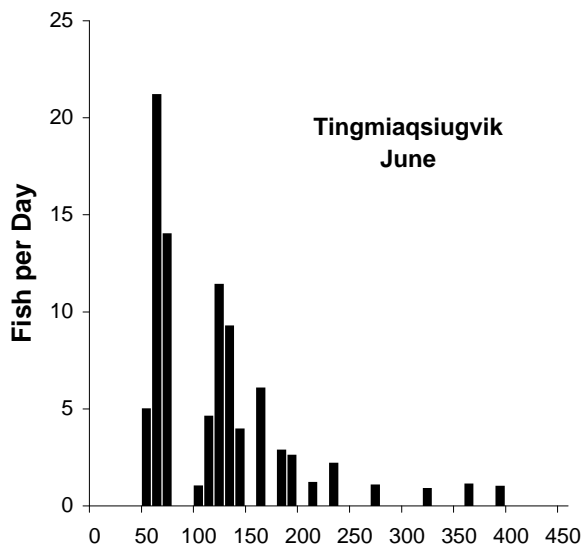


Figure 8. Length frequencies of arctic grayling in the Tingmiaqsiugvik (Ublutuoch River) and Crea Creek during June and July, 2009.

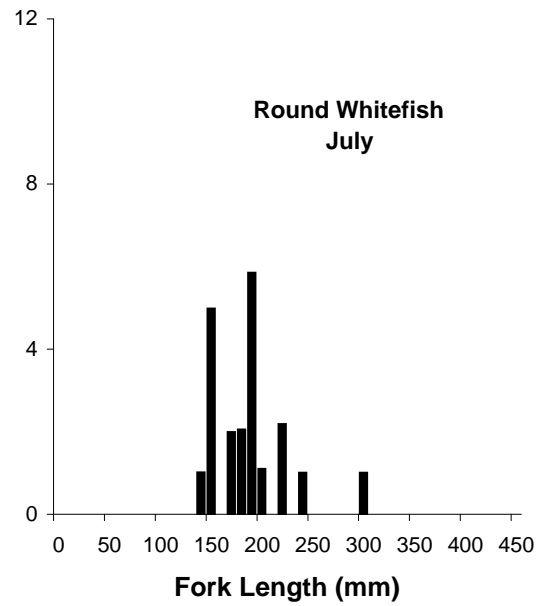
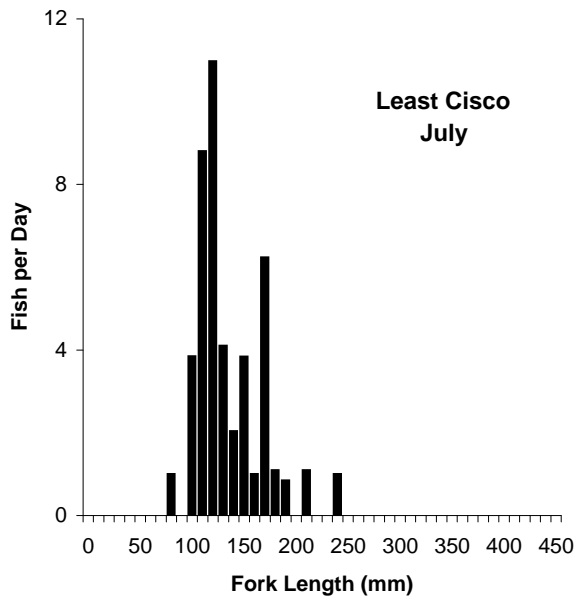
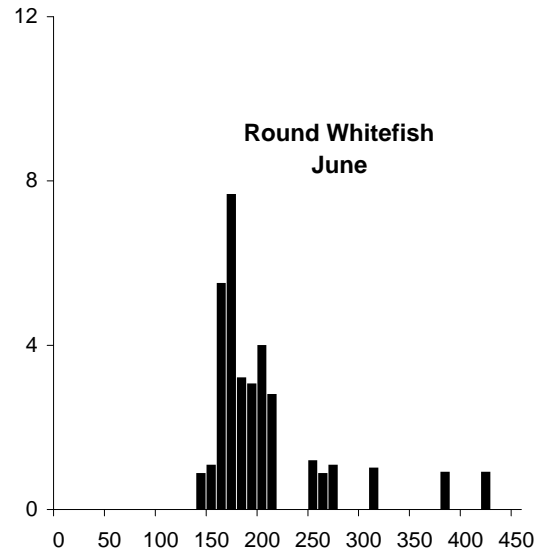
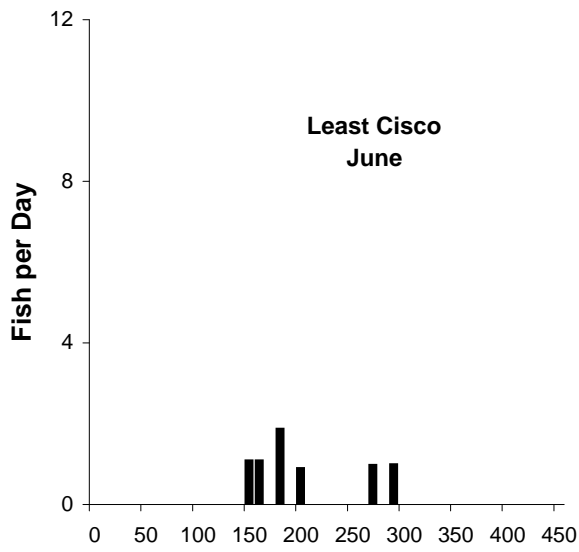


Figure 9. Length frequencies of least cisco and round whitefish in the Tingmiaqsiugvik (Ublutuoch River) during June and July, 2009.

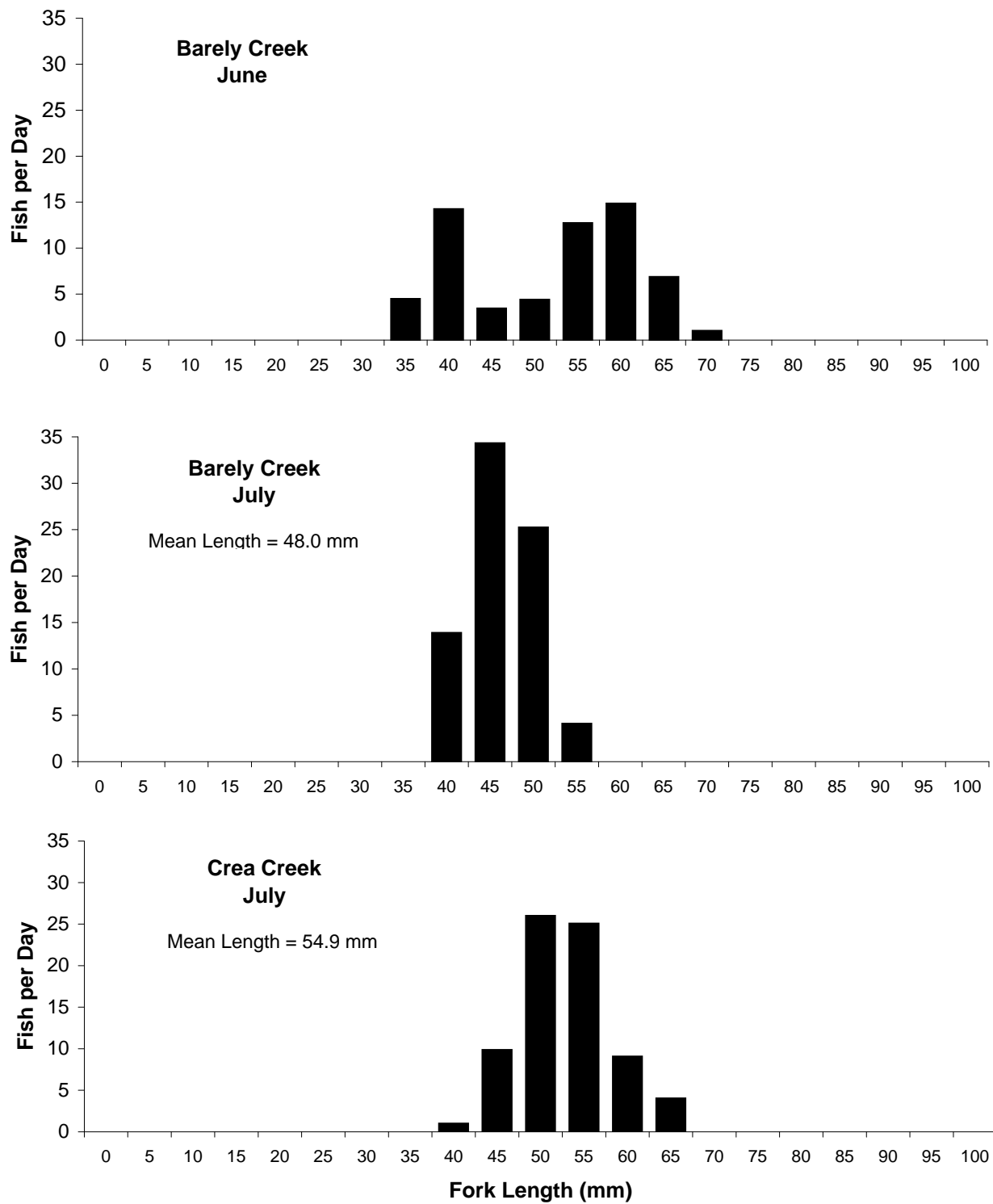


Figure 10. Comparison of ninespine stickleback lengths in Crea Creek and Barely Creek, 2009.

APPENDIX A
Water chemistry from fyke net stations in eastern NPR-A during 2009

Appendix Table A-1. Water chemistry parameters measured at NPRA fyke net sampling sites, 2009.

Station	Date	Temp (°C)	Dissolved Oxygen		Specific Conductance (microS/cm)	Turbidity (NTU)	pH
			(mg/l)	(%)			
CK0301	6/16/09	11.4	10.67	99.9	88.8	1.0	7.56
CK0301	6/17/09	7.7	10.70	89.8	89.6	0.5	7.32
CK0301	6/18/09	6.1	11.31	91.9	93.4	0.7	7.48
CK0301	6/19/09	7.4	11.86	98.8	98.2	1.1	7.51
CK0301	6/20/09	5.8	12.13	97.7	98.7	0.7	7.63
CK0301	6/21/09	5.5	12.15	97.1	102.8	0.4	7.47
CK0301	6/22/09	4.2	12.11	93.4	103.2	0.8	7.42
CK0301	6/23/09	4.6	12.24	95.6	104.7	0.7	7.46
CK0301	7/22/09	7.8	10.32	87.1	153.4	1.8	7.66
CK0301	7/23/09	7.3	11.30	93.8	153.2	2.0	7.58
CK0301	7/24/09	7.5	10.88	90.3	149.6	1.4	7.78
CK0301	7/25/09	9.2	11.60	101.6	150.2	1.5	7.83
CK0301	7/26/09	11.2	--	--	152.4	1.6	7.84
CK0301	7/27/09	11.8	--	--	152.7	1.4	7.80
CK0301	7/28/09	13.4	--	--	154.4	1.8	7.82
CK0306	6/16/09	12.0	9.83	90.7	102.4	0.6	7.36
CK0306	6/17/09	6.5	10.59	87.8	103.0	0.3	7.22
CK0306	6/18/09	5.1	11.36	90.3	104.5	0.3	7.36
CK0306	6/19/09	9.3	11.42	97.3	105.6	0.3	7.43
CK0306	6/20/09	5.5	11.41	90.2	108.5	0.3	7.44
CK0306	6/21/09	5.0	11.35	89.8	111.0	0.3	7.44
CK0306	6/22/09	--	--	--	--	--	--
CK0306	6/23/09	4.8	11.88	92.3	115.6	0.2	7.38
CK0306D:	7/22/09	7.0	10.92	90.0	187.7	1.6	7.79
CK0306D:	7/23/09	5.9	11.37	90.8	189.1	1.5	7.73
CK0306D:	7/24/09	--	--	--	--	--	--
CK0306D:	7/25/09	7.7	--	--	190.7	1.7	7.65
CK0306D:	7/26/09	12.4	--	--	191.2	1.6	7.62
CK0306D:	7/27/09	11.9	--	--	195.7	1.6	7.60
CK0306D:	7/28/09	12.2	--	--	197.5	2.1	7.52
CK0306U:	7/24/09	6.6	10.98	89.6	165.3	1.6	7.61
CK0306U:	7/25/09	9.0	--	--	165.0	--	--
CK0306U:	7/26/09	12.0	9.24	90.0	168.3	--	--
CK0306U:	7/27/09	12.0	--	--	171.3	--	--
CK0306U:	7/28/09	13.0	--	--	171.5	--	--

Appendix Table A-1. Water chemistry parameters measured at NPRA fyke net sampling sites, 2009.

Station	Date	Temp (°C)	Dissolved Oxygen		Specific Conductance (microS/cm)	Turbidity (NTU)	pH
			(mg/l)	(%)			
U0901	6/16/09	11.3	10.41	95.4	81.5	1.3	7.50
U0901	6/17/09	10.5	9.92	88.9	83.9	1.2	7.39
U0901	6/18/09	9.2	10.28	89.2	83.9	1.5	7.60
U0901	6/19/09	9.5	10.72	94.3	84.2	1.3	7.62
U0901	6/20/09	8.3	11.01	93.5	85.5	1.1	7.63
U0901	6/21/09	8.0	10.98	92.5	86.5	1.2	7.61
U0901	6/22/09	7.2	11.10	92.0	86.7	1.1	7.57
U0901	6/23/09	6.8	11.48	93.7	87.5	1.4	7.54
U0901	7/22/09	9.8	11.34	99.4	113.6	2.1	8.19
U0901	7/23/09	8.5	11.15	95.9	114.6	1.6	7.98
U0901	7/24/09	8.4	11.47	98.0	113.9	1.5	7.89
U0901	7/25/09	8.7	11.58	100.2	115.4	1.4	7.89
U0901	7/26/09	10.7	--	--	114.7	1.3	8.14
U0901	7/27/09	11.8	--	--	107.5	1.0	8.08
U0901	7/28/09	12.6	--	--	113.5	1.3	7.96

APPENDIX B
Fish caught by fyke net in eastern NPR-A during 2009

Appendix Table B-1. Daily catches of fish and effort at fyke net stations in eastern NPRA streams during 2009.

Tingmiaqsuigvik (Ublutuoch River)

Species	Jun 17	Jun 17	Jun 18	Jun 18	Jun 19	Jun 19	Jun 20	Jun 20	Jun 21	Jun 21	Jun 22	Jun 22	Jun 23	Jun 23
	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US
Broad whitefish													1	
Humpback whitefish									1	1				
Least cisco		2		2		2				1				
Arctic cisco												1		
Round whitefish					1	2		1	2	4		13	3	9
Arctic grayling	5	13	2	2	5	5	2	4	9	15	6	4	12	6
Rainbow smelt				1										
Ninespine stickleback											6			1
Slimy sculpin														
Effort (hrs)	23.1	22.2	24.8	24.6	26.8	26.9	20.5	20.5	24.3	24.2	22.6	22.6	27.9	27.9

Tingmiaqsuigvik (Ublutuoch River) (continued)

Species	Jul 22	Jul 22	Jul 23	Jul 23	Jul 24	Jul 24	Jul 25	Jul 25	Jul 26	Jul 26	Jul 27	Jul 27	Jul 28	Jul 28
	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US
Broad whitefish	2		1					1	4		1	2		4
Humpback whitefish	9		1		4		2		8				2	
Least cisco	5		1		4		20		2	4	2	4	2	2
Arctic cisco	1		1	1										
Round whitefish	2		3			2	2	1		1	1	3	5	1
Arctic grayling	11	6	4	8	6	3	2		8	3	12	26	19	8
Rainbow smelt														
Ninespine stickleback														
Slimy sculpin				1										
Effort (hrs)	24.1	23.9	24.5	24.3	23.6	23.7	24.1	24.1	23.4	28.5	24.6	22.0	23.8	22.8

Crea Creek

Species	Jun 17	Jun 17	Jun 18	Jun 18	Jun 19	Jun 19	Jun 20	Jun 20	Jun 21	Jun 21	Jun 22	Jun 22	Jun 23	Jun 23
	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US
Broad whitefish							1		1					
Humpback whitefish														1
Round whitefish														
Arctic grayling	3	19	1	11	1	6		4	6	4	1	13	11	6
Burbot														
Alaska blackfish						1								
Ninespine stickleback			2		1						1			
Effort (hrs)	19.2	19.0	24.6	24.7	26.3	26.3	20.4	20.5	24.1	24.1	23.3	23.2	26.5	26.6

Crea Creek (continued)

Species	Jul 22	Jul 22	Jul 23	Jul 23	Jul 24	Jul 24	Jul 25	Jul 25	Jul 26	Jul 26	Jul 27	Jul 27	Jul 28	Jul 28
	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US
Broad whitefish														
Humpback whitefish														
Round whitefish		0	0											
Arctic grayling	3			1				2	6	1	1	1		1
Burbot						2					1			
Alaska blackfish														
Ninespine stickleback					5	30	3	8	31	7	23	4	20	12
Effort (hrs)	24.4	24.7	24.2	24.2	23.8	23.6	23.9	24.1	23.8	23.8	24.6	24.6	23.8	23.8

Appendix Table B-1. Daily catches of fish and effort at fyke net stations in eastern NPRA streams during 2009.

Barely Creek														
	Jun 17	Jun 17	Jun 18	Jun 18	Jun 19	Jun 19	Jun 20	Jun 20	Jun 21	Jun 21	Jun 22	Jun 22	Jun 23	Jun 23
Species	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US
Alaska blackfish		2		3		4		1			1			1
Ninespine stickleback	23	40	34	17	28	9	36	6	30	11			39	5
Effort (hrs)	19.6	19.8	24.8	24.7	27.8	27.8	20.6	20.6	24.1	24.0			50.3	50.2
	0.818	0.826	1.031	1.028	1.156	1.156	0.858	0.859	1.003	1	0	0	2.094	2.092

Barely Creek (continued)														
	Jul 22	Jul 22	Jul 23	Jul 23	Jul 24	Jul 24	Jul 25	Jul 25	Jul 26	Jul 26	Jul 27	Jul 27	Jul 28	Jul 28
Species	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US
Alaska blackfish		3	1		2		4	3	4	5	3	6	2	4
Ninespine stickleback	14	25	2	4	38	24	52	84	167	241	88	79	47	110
Effort (hrs)	24.6	24.4	24.2	24.3	23.3	23.8	24.3	23.8	24.1	24.08	24.2	24.17	24.1	24.08

APPENDIX C

Length frequencies of fish caught by fyke net in eastern NPR-A during 2009

Appendix Table C-1. Length frequencies of Arctic grayling caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Crea Creek													
	Jun 17		Jun 18		Jun 19		Jun 20		Jun 21		Jun 22		Jun 23	
	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US
0														
10														
20														
30														
40														
50														
60														
70			3											
80		1		1						1				
90														
100														
110		1												
120		1		3		1					1			3
130	1	2		4		1		1	2			1		2
140				1					2			1	1	2
150												1		1
160								1						
170	1											1		
180	1	1												
190		2		1					1					
200		1										1		
210														
220		1												
230		1	1						1	1		1		
240														
250												1		
260														1
270								1						
280													1	2
290						1								
300				1						1		1		
310		1												1
320		1												
330						1		1						1
340		1												
350		1				2				1		1		
360												1		
370												1		
380						1						2		
390		1												
400														1
410														
420													1	
430														
440														
450														
Total:	3	19	1	11	1	6	0	4	6	4	1	13	11	6

Appendix Table C-1. Length frequencies of Arctic grayling caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Crea Creek													
	Jul 22		Jul 23		Jul 24		Jul 25		Jul 26		Jul 27		Jul 28	
	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US
0														
10														
20														
30								1						
40														
50														
60														
70														
80														
90		2												
100		1		1						1				
110									2					
120														
130														
140								1				1		
150														
160											1			1
170									4					
180														
190														
200														
210														
220														
230														
240														
250														
260														
270														
280														
290														
300														
310														
320														
330														
340														
350														
360														
370														
380														
390														
400														
410														
420														
430														
440														
450														
Total:	3	0	0	1	0	0	0	2	6	1	1	1	0	1

Appendix Table C-1. Length frequencies of Arctic grayling caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Ublutuoch River													
	Jun 17		Jun 18		Jun 19		Jun 20		Jun 21		Jun 22		Jun 23	
	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US
0														
10														
20														
30														
40														
50									2		2			1
60	2		2	1	2	1	1	2	4	2	1	2		1
70	2				2	2		1	1		3	2		1
80														
90														
100										1				
110		1				2							1	1
120		3								3			4	2
130		5								3			1	
140		1							1	1			1	
150														
160		2			1					3				
170														
180										2			1	
190													1	2
200														
210								1						
220														
230								1		1				
240														
250														
260														
270	1													
280														
290														
300														
310														
320														1
330														
340														
350														
360		1												
370														
380														
390				1										
400														
410														
420														
430														
440														
450														
Total:	5	13	2	2	5	5	2	4	9	15	6	4	12	6

Appendix Table C-1. Length frequencies of Arctic grayling caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Ublutuoch River													
	Jul 22		Jul 23		Jul 24		Jul 25		Jul 26		Jul 27		Jul 28	
	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US
0														
10														
20														
30		1		4		1								
40				3	3						1			
50														
60														
70												1		
80	1	1				1						1		2
90	2	2	1	1	1	1			1		1	9	3	2
100	1		1						1		3	8	2	2
110														1
120														
130														1
140														
150										1		1		
160					1							1	1	1
170	1											1	1	
180												1		
190														
200												1		
210														1
220														
230								1					1	
240	1											1		
250									2			1	2	
260														
270					1									
280												1	2	
290		1												1
300	1								1	1	1			1
310	1		1								1			1
320	1						1		2					1
330									1					1
340	1	1										1		
350														1
360														2
370														
380														
390			1							1				
400	1													
410														
420														
430														
440														
450														
Total:	11	6	4	8	6	3	2	0	8	3	12	26	19	8

Appendix Table C-2. Length frequencies of broad whitefish caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Ublutuoch River					
	Jun 22		Jun 23		Jun 24	
	DS	US	DS	US	DS	US
0						
10						
20						
30						
40						
50						
60						
70						
80						
90						
100		1				
110						
120						
130						
140						
150						
160						
170						
180						
190						
200						
210						
220						
230						
240						
250						
260						
270						
280						
290						
300						
310						
320						
330						
340						
350						
360						
370						
380						
390						
400						
410						
420						
430						
440						
450						
460						
470						
480						
490						
500						
510						
520						
530						
540						
550						
560						
570						
580						
590						
Total:	0	1	0	0	0	0

Fork Length (mm)	Ublutuoch River														
	Jul 22		Jul 23		Jul 24		Jul 25		Jul 26		Jul 27		Jul 28		
	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	
0															
10															
20															
30															
40															
50															
60															
70															
80															
90													1		
100															
110													1		
120				1								1			
130										1					
140															
150															
160															
170															
180															
190															
200															
210															
220															
230															
240															
250															
260															
270															
280															
290															
300															
310															
320															
330														1	
340															
350															
360										2					
370															
380														2	
390										1					
400															
410															
420				1											
430															
440														1	
450															
460															
470															
480															
490															
500															
510										1					
520															
530															
540															
550															
560				1											
570															
580															
590															
Total:	2	0	1	0	0	0	0	0	1	4	0	1	2	0	4

Appendix Table C-2. Length frequencies of broad whitefish caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Crea Creek			
	Jun 20		Jun 21	
	DS	US	DS	US
0				
10				
20				
30				
40				
50				
60				
70				
80				
90				
100				
110				
120				
130				
140				
150				
160				
170				
180				
190				
200				
210				
220				
230				
240				
250				
260				
270				
280				
290				
300				
310				
320				
330				
340				
350				
360				
370				
380				
390				
400				
410				
420				
430				
440				
450				
460				
470				
480				
490				
500	1			
510			1	
520				
530				
540				
550				
560				
570				
580				
590				
Total:	1	0	1	0

Appendix Table C-3. Length frequencies of humpback whitefish caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Crea Creek		Fork Length (mm)	Ublutuoeh River																
	Jun 23			Jun 21		Jul 22		Jul 23		Jul 24		Jul 25		Jul 26		Jul 27		Jul 28		
	DS	US		DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	
0			0																	
10			10																	
20			20																	
30			30																	
40			40																	
50			50																	
60			60																	
70			70																	
80			80																	
90			90																	
100			100																	
110			110																	
120			120																	
130			130																	
140			140																	
150			150																	
160			160																	
170			170																	
180			180																	
190			190																	
200			200																	
210			210																	
220			220																	
230			230																	
240			240																	
250			250																	
260			260																	
270			270																	
280			280																	
290			290																	
300			300																	
310			310																	
320			320																	
330			330																	
340			340																	
350			350		1															
360			360					2												
370			370		1			3						1						
380			380											1				1		
390			390					1		1		1		2						
400			400					1						1						
410		1	410						1											
420			420							1		1		2						
430			430											1						
440			440							2										
450			450					1												
460			460					1												
470			470																1	
480			480																	
490			490																	
500			500																	
Total:		1	0	Total:	1	1	9	0	1	0	4	0	2	0	8	0	0	0	2	0

Appendix Table C-4. Length frequencies of least cisco caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Ublutuoch River					Jul 22		Jul 23		Jul 24		Jul 25		Jul 26		Jul 27		Jul 28	
	Jun 17 US	Jun 18 US	Jun 19 US	Jun 20 DS	Jun 21 US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US
0																			
10																			
20																			
30																			
40																			
50																			
60																			
70																			
80								1											
90																			
100							1					1		1				1	
110							1		1			6		1					
120												9		1		1			
130												2							2
140														1				1	
150		1								1		1		1		1			
160		1																	
170																		2	
180				1		1												1	
190															1				
200					1														
210																		1	
220																			
230																			
240													1						
250																			
260																			
270						1													
280																			
290																			1
300																			
310																			
320																			
330																			
340																			
350																			
360																			
370																			
380																			
390																			
400																			
410																			
420																			
430																			
440																			
450																			
Total:	2	2	2	0	1	5	0	1	0	4	0	20	0	2	4	2	4	2	2

Appendix Table C-5. Length frequencies of round whitefish caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Ublutuoch River																								
	Jun 19		Jun 20		Jun 21		Jun 22		Jun 23		Jul 22		Jul 23		Jul 24		Jul 25		Jul 26		Jul 27		Jul 28		
	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	
0																									
10																									
20																									
30																									
40																									
50																									
60																									
70																									
80																									
90																									
100																									
110																									
120																									
130																									
140										1													1		
150									1				2			1	1						1		
160						1			1	2	2														
170	1					1			3	3											1		1		
180									3								1							1	
190							2		1			1	1			1			1				2		
200						1			2	1												1			
210									1	2															
220																						2			
230																									
240													1												
250						1																			
260										1															
270									1																
280																									
290																									
300																	1								
310						1																			
320																									
330																									
340																									
350																									
360																									
370																									
380																						1			
390																									
400																									
410																									
420																						1			
430																									
440																									
450																									
Total:	1	2	0	1	2	4	0	13	3	9		2	0	3	0	0	2	2	1	0	1	1	3	5	1

Appendix Table C-6. Length frequencies of slimy sculpin caught by fyke net in eastern NPR-A, 2009.

Fork Ublutuoch River	
Length	Jul 23
(mm)	DS
0	
10	
20	
30	
40	1
50	
60	
70	
80	
90	
100	
110	
120	
130	
140	
150	
160	
170	
180	
190	
200	
210	
220	
230	
240	
250	
Total:	1

Appendix Table C-7. Length frequencies of Alaska blackfish caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Barely Creek														Barely Creek														Crea Creek				
	Jun 17		Jun 18		Jun 19		Jun 20		Jun 21		Jun 22		Jun 23		Jul 22		Jul 23		Jul 24		Jul 25		Jul 26		Jul 27		Jul 28		Jun 19				
	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US			
0																																	
10																																	
20																																	
30																																	
40																																	
50									1																								
60																																	
70		1		2		2													1	1	2					1							
80		1		1		2				1									2	1	1	1							2				
90															2			1		1	1	3	2	4		1			1				
100														1			1		1				1	1	1		1						
110																1																	
120																																	
130																																	
140																																	
150																																	
160																																	
170																																	
180																																	
190																																	
200																																	
210																																	
220																																	
230																																	
240																																	
250																																	
Total:	0	2	0	3	0	4	1	0	0	1	0	0	1	0	0	0	1	0	3	1	0	2	0	4	3	4	5	3	6	0	4	1	0

Appendix Table C-8. Length frequencies of rainbow smelt caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Ublutuoch River
	Jun 18 DS
0	
10	
20	
30	
40	
50	
60	
70	
80	1
90	
100	
110	
120	
130	
140	
150	
160	
170	
180	
190	
200	
210	
220	
230	
240	
250	
Total:	1

Appendix Table C-9. Length frequencies of arctic cisco caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Ublutuoch River					
	Jun 22 US	Jul 22 DS	Jul 23 US	Jul 24 DS	Jul 25 DS	Jul 26 DS
0						
10						
20						
30						
40						
50						
60						
70						
80						
90	1					
100		1				
110			1			
120			1			
130						
140						
150						
160						
170						
180						
190						
200						
210						
220						
230						
240						
250						
260						
270						
280						
290						
300						
310						
320						
330						
340						
350						
360						
370						
380						
390						
400						
410						
420						
430						
440						
450						
460						
470						
480						
490						
500						
Total:	1	1	2	0	0	0

Appendix Table C-10. Length frequencies of burbot caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Crea Creek			
	Jul 24		Jul 26	
	DS	US	DS	US
0				
10				
20				
30				
40				
50				
60				
70				
80				
90				
100				
110		1		
120				
130		1		1
140				
150				
160				
170				
180				
190				
200				
210				
220				
230				
240				
250				
260				
270				
280				
290				
300				
310				
320				
330				
340				
350				
360				
370				
380				
390				
400				
410				
420				
430				
440				
450				
460				
470				
480				
490				
Total:	0	2	0	1

Appendix Table C-11. Length frequencies of ninespine stickleback caught by fyke net in eastern NPR-A, 2009.

Fork Length (mm)	Barely Creek								Crea Creek										
	Jun 21		Jun 23		Jul 22		Jul 23		Jul 24		Jul 24		Jul 25		Jul 26		Jul 27		
	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	DS	US	
0																			
5																			
10																			
15																			
20																			
25																			
30																			
35	3	1	1																
40	7	2	10	1	6	5			3										1
45	2		3		1	15			18										
50		2	3	2	6	5			14				11	2	3		1	6	3
55	6	1	10	2	1				3				11	1	2		4	7	
60	7	5	6										6		1				2
65	4		6										2		1				1
70	1																		
75																			
80																			
85																			
90																			
95																			
100																			
105																			
110																			
115																			
120																			
125																			
130																			
135																			
140																			
145																			
150																			
Total:	30	11	39	5	14	25	0	0	38	0	0	0	30	3	8	0	7	23	4