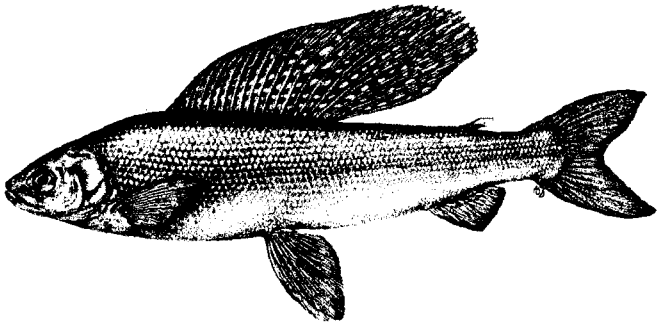
FISHERIES ENHANCEMENT INVESTIGATIONS IN THE KUPARUK RIVER OILFIELD, 1992

By

Carl R. Hemming

Technical Report 94-4



Alaska Department of Fish & Game
Habitat and Restoration Division

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EXECUTIVE SUMMARY

Deep water gravel extraction sites provide unique opportunities for fisheries enhancement. In the North Slope oilfield region, productive fish rearing areas are found in small tundra streams but few fish use these habitats. The absence of wintering habitat is thought to limit the distribution of fish. Deep basin gravel extraction sites provide suitable fish wintering habitat and when connected to small tundra streams all elements of productive fish habitat are present.

Based on the assumption that small tundra stream systems connected to deep water gravel extraction basins would support freshwater fish populations we transplanted Arctic grayling (*Thymallus arcticus*) to gravel mine sites in the Kuparuk River oilfield. This progress report evaluates the 1989 introduction of 210 Sagavanirktok River grayling to Kuparuk Mine Site B and describes the capture and introduction of 1,001 Kuparuk River grayling to Kuparuk Mine Site B and D.

Results of a mark-recaptue population estimate indicates that 55 (26%) of the 210 grayling introduced to Kuparuk Mine Site B survived from introduction in 1989 until 1992. Growth among the introduced fish has been rapid as the mean length of introduced fish was 283 mm while those recaptured in 1992 averaged 354 mm. In three years of fish sampling (1990-1992) we found little evidence of reproductive success among the introduced grayling.

In 1992, we moved grayling in June, July, and September with the largest catches occuring in September. We released 708 grayling in Mine Site D and 293 in Mine Site B. Young-of-the-year grayling were most abundant among the fish transplanted in 1992.

We captured and sacrificed a sample of 60 Kuparuk River grayling for disease screening. The sample fish ranged from 200 to 425 mm in length and scale based ages ranged from 3 to 9 years. Pathology testing was negative for common fish diseases but positive results were obtained for the antigen of *Reinbacterium salmoninarium* (Rs).

ACKNOWLEDGEMENTS

We appreciate financial and logistical support received from the Prudhoe Bay and Kuparuk River oil production units. Martin Bozeman of ARCO Alaska Inc. coordinated and assisted in our effort to obtain grant funding for this project. Larry Krizan, Al Schuyler, and the field environmental staff of the Kuparuk River oilfield were very helpful in arranging field logistical support.

Region III, Sport Fish Division assigned field personnel to the Habitat and Restoration Division through an interdivision temporary assignment. In 1992, Dave Stoller, Mark Jurgens, and Doug Edwards assisted with the field work. Overall direction for the project and constructive review of this report was provided by Dr. Alvin G. Ott.

INTRODUCTION

In 1991, the Alaska Department of Fish and Game (ADF&G), initiated a five year study designed to expand our understanding of fish use of small tundra stream systems in the North Slope oil fields and to evaluate systems with and without gravel mine site basins. These field investigations indicate that small tundra streams are productive aquatic habitats suitable for fish production but sampling suggests that fish species diversity and abundance is low (Hemming 1993). Few suitable wintering areas are found in small tundra stream systems and the absence of wintering areas may limit fish use of productive rearing habitats.

Deep mined gravel extraction basins provide habitat for overwintering fish. We found that abandoned gravel extraction sites contain areas of under ice water with chemical conditions suitable for wintering fish (Hemming 1988; Hemming et al. 1989). With the addition of deep water wintering areas all elements of productive freshwater fish habitat are present in the small tundra stream systems investigated.

After evaluation of the data gathered from small tundra streams and associated deep water gravel extraction sites we concluded that these systems might support freshwater fish not found in these drainages but common to the area. In 1989, we tested this theory with an experimental Arctic grayling (*Thymallus arcticus*) transplant using the Sagavanirktok River as the donor stock for an introduction to Kuparuk Mine Site B in the East Creek system (Winters 1990). In 1992, we conducted a similar experiment and introduced Kuparuk River grayling to Kuparuk Mine Site B and D. This progress report describes the 1992 introduction of Kuparuk River grayling to Kuparuk Mine Site B and D and evaluates the 1989 grayling introduction to Mine Site B using data collected from the introduced fish (1989-1992).

Arctic grayling were collected and tested for bacterial and viral diseases to provide a disease history for the Kuparuk River doner stock. This report presents age and growth data from a sample of 60 Kuparuk River grayling and summarizes the results of pathology testing conducted on these fish.

STUDY AREA

The Kuparuk River Oilfield is within the Arctic coastal plain physiographic province (Wahrhaftig 1965). The area is characterized by low topographic relief and numerous shallow lakes and lake basins. Climatic conditions are severe with mean daily temperatures of 0 to 9° C during summer (June through mid-September), and 0° C and lower during the remainder of the year. The mean annual wind speed is 22 km/h. Arctic coastal plain annual precipitation is less than 25 cm.

In this field experiment we captured grayling from the Kuparuk River and introduced these fish to Kuparuk Mine Site B in the East Creek system and Kuparuk Mine site D in the Ugnuravik River system (Figure 1). A description of each of these systems is presented below.

Kuparuk River System

The Kuparuk River drains a 9200 km^2 tundra area located south of the oilfield. The multiple interlaced channels of the Kuparuk River resemble a braided river pattern. However, unlike a true braided river, the intermediate islands that separate the major subchannels are relatively stable due to their frozen condition. For this reason, a split channel river classification is appropriate (Drage et al 1983).

The majority of the total annual discharge occurs during spring breakup. It has been estimated that 78% of the annual discharge occurs in June, with flows decreasing dramatically for the remainder of the summer. The width of active channels are near 100 m in late fall at freezeup while during the spring flood active channel width may exceed 1000 m. The Kuparuk River differs from other tundra streams in the area because some stream reaches maintain fluid water beneath the ice throughout the winter. These areas are usually in scour holes formed at the confluence of subchannels, or where flow impinging on a resistant bank has scoured a deeper channel. Deep water areas provide refugia used by wintering fish.

In this study we collected fish from four shallow backwater sites located within a 10 km section of the Kuparuk River and two locations in small tundra streams that are tributary to the Kuparuk River.

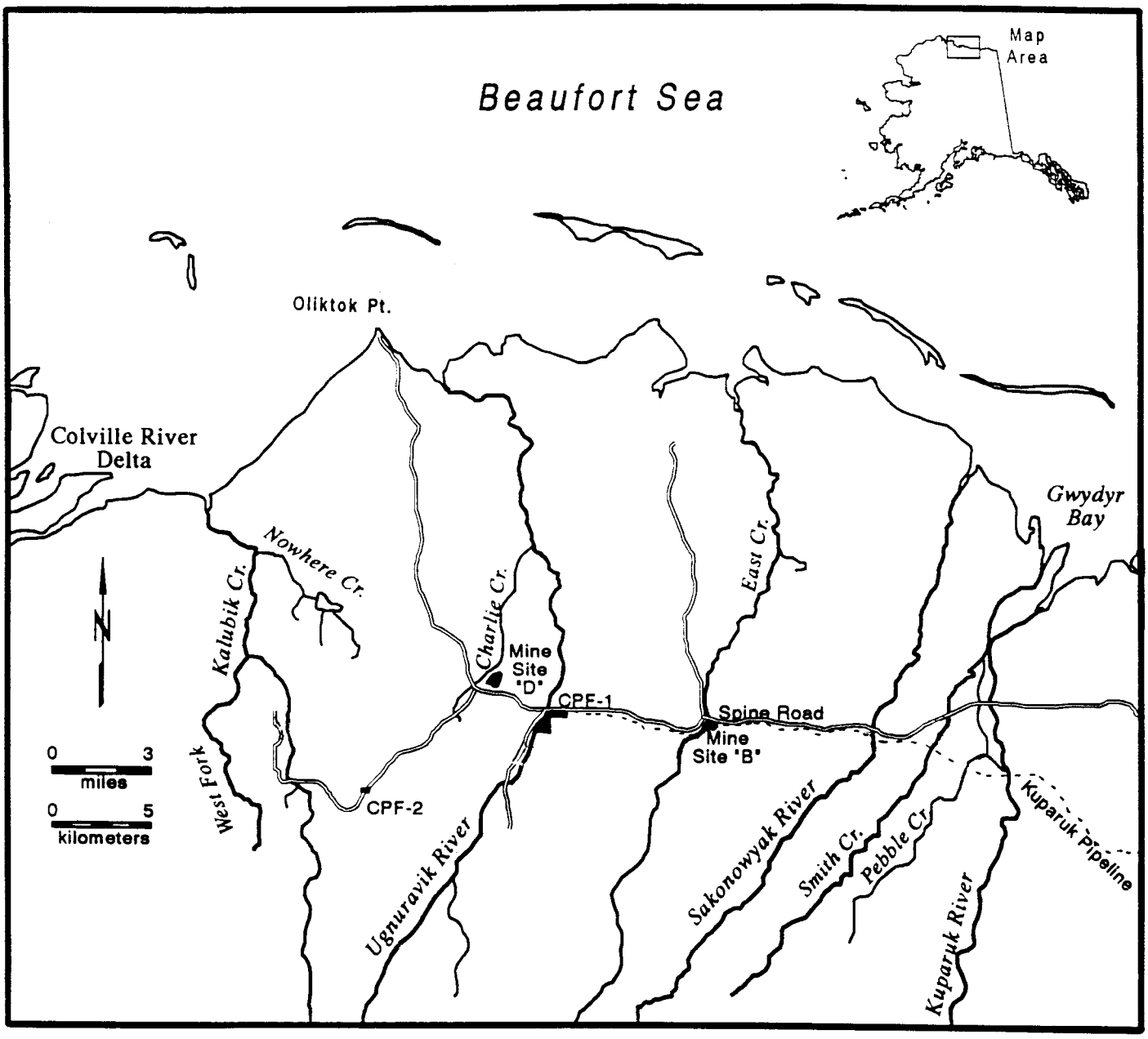

Figure 1. Map of study area and waterbodies investigated.

East Creek and Kuparuk Mine Site B

East Creek is a 26 km, beaded, tundra stream that drains a 132 km^2 area. East Creek empties into Simpson Lagoon between the Colville and Kuparuk Rivers. Peak discharge in the East Creek system often exceeds 28 m^3/s, and by late summer channel sections between pools may become intermittent.

Kuparuk Mine Site B is located adjacent to East Creek 16 km upstream from Simpson Lagoon. The site was flooded in 1978 when water from East Creek filled the excavated areas. The resultant 3.7 ha waterbody consists of adjoining 1.3 and 2.4 ha basins having a maximum depth of 11.3 m and a mean depth of 7.1 m (Hemming 1988). In 1989, three connection channels were excavated providing an inlet between the excavated basin and East Creek and connecting the two adjacent mine site basins forming an island. These channels provide continuous open water hydraulic communication between East Creek and Mine Site B and a mechanism for fish movement during the ice free season.

In 1986 and 1987 we sampled Kuparuk Mine site B with gill nets and minnow traps and captured broad whitefish (*Coregonus nasus*) and ninespine stickleback (*Pungitius pugitius*). In 1989, we introduced 210 large juvenile and adult grayling from the Sagavanirktok River. Fish sampling in Kuparuk Mine site B and East Creek in 1990 and 1991 documented the presence of least cisco (*Coregonus sardindella*), Dolly Varden (*Salvelinus malma*) and round whitefish (*Prosopium cylindraceum*) in addition to the introduced grayling.

Ugnuravik River and Kuparuk Mine Site D

The Ugnuravik River is a beaded tundra stream that drains a 85 km^2 area. Average peak discharge in the Ugnuravik River is approximately 28 m^3/s (Drage et al 1983). The Ugnuravik River drains into Simpson Lagoon 2.3 km east of Oliktok point (Figure 1).

Kuparuk Mine Site D is a 15.6 ha deep mined gravel extraction basin located on a tributary to the Ugnuravik River known locally as Charlie Creek. A habitat enhancement project was completed at Mine Site D in the spring of 1990. Major elements of the project included: excavation of inlet and outlet channels connecting the deep water site to Charlie Creek, removal of the perimeter berms on the south and west sides of the basin and the placement of the overburden spoil on the ice surface, replacement of the culvert battery in the inlet channel, and the excavation of two perched ponds on top of the overburden pile located east of the basin. The intent of the channel connections and

overburden disposal were to provide hydraulic connections between the deep water mine site basin and Charlie Creek and to increase the volume of productive shallow water rearing habitat that might be used by colonizing and introduced fish.

Ninespine stickleback was the only fish captured in previous fish surveys of the Ugnuravik River system (Dew 1982). In our sampling of Kuparuk Mine Site D we captured ninespine stickleback and least cisco (Hemming 1990).

METHODS

Fish Sampling in Kuparuk Mine Site B and East Creek

We used fyke nets to recapture grayling introduced to Kuparuk Mine Site B. Each net was 3.7 m in length with two 1.2 m square entrance frames, five hoops and a 1.8 m cod end. We set the nets at three road accessible locations; 1.6 km upstream from Mine Site B in East Creek, in the inlet channel, and at the north end of Mine Site B. With few exceptions, we checked the nets daily. Water temperature was measured at each net site with a hand held mercury thermometer. Netting duration was recorded to determine catch-per-unit-effort (CPUE) for each species at each net site.

Each fish captured was identified and released at the net site. We measured fork length to the nearest millimeter for all fish captured with the exception of ninespine stickleback. Grayling were examined for tags and marks. Ninespine stickleback were too numerous to enumerate at most net sites; therefore, we estimated their abundance. We used a 1.5 cm diameter scoop to remove ninespine stickleback and multiplied the number of individuals in a standard scoop by the number of scoops required to remove all fish from the net.

We used a single census mark-recapture exercise to estimate grayling abundance in Kuparuk Mine site B. Grayling were marked with caudal fin clips in June and July. The recapture event was in August. We used the adjusted Peterson method (Ricker 1975) for estimating the number of grayling. The length of tagged grayling was compared with data collected when the fish were introduced to the site to evaluate growth rates among the introduced fish.

1992 Arctic Grayling Introductions

Fyke nets were used to capture fish from the Kuparuk River system. Nets were fished in four shallow backwater areas and in two small tundra streams that are tributary to the Kuparuk River (Figure 2). Grayling selected for transplant were measured to the nearest millimeter and placed in plastic coolers equipped with battery powered aerators, and transported to the Spine Road Bridge in a outboard powered riverboat equipped with a jet drive. The coolers were transferred from the boat to a truck for transport to the release site. Net sites on the tributary streams were accessed by truck. Grayling were transported to and released in Kuparuk Mine Site B or D immediately after capture with release occurring within three hours of capture. Fish not selected for transplant were identified and released at the net site. Fish length was measured to the nearest millimeter for all species captured except ninespine stickleback and slimy sculpin (*Cottus cognatus*). Water temperature was measured at the capture site and at the release location. When necessary ice or snow was slowly added to the coolers until water temperature in the transport containers was similar to the receiving waters.

Disease Screening

We collected a sample of 60 grayling from the Kuparuk River for disease screening. These fish were captured in fyke nets during the July and September sample periods. To provide adequate quantities of the desired tissues for pathology testing fish 200 mm or greater were selected. Fish that met the size criteria were moved to a holding pen in Smith Creek. When adequate numbers had been captured the grayling were sacrificed, a scale was removed for age determination, and the fish were shipped to the lab in a cooler filled with ice. The sample of 60 grayling included two shipments. Forty seven were captured and sent in July and 13 in September.

RESULTS

Fish Sampling in Kuparuk Mine Site B and East Creek

During the 1992 open water season we expended 32 net days of fish sampling effort in East Creek and Kuparuk Mine site B. We fished nets at up to three locations during sample periods in June, July and September. Arctic grayling and ninespine stickleback were the only species captured in 1992 and each was captured during the three sample

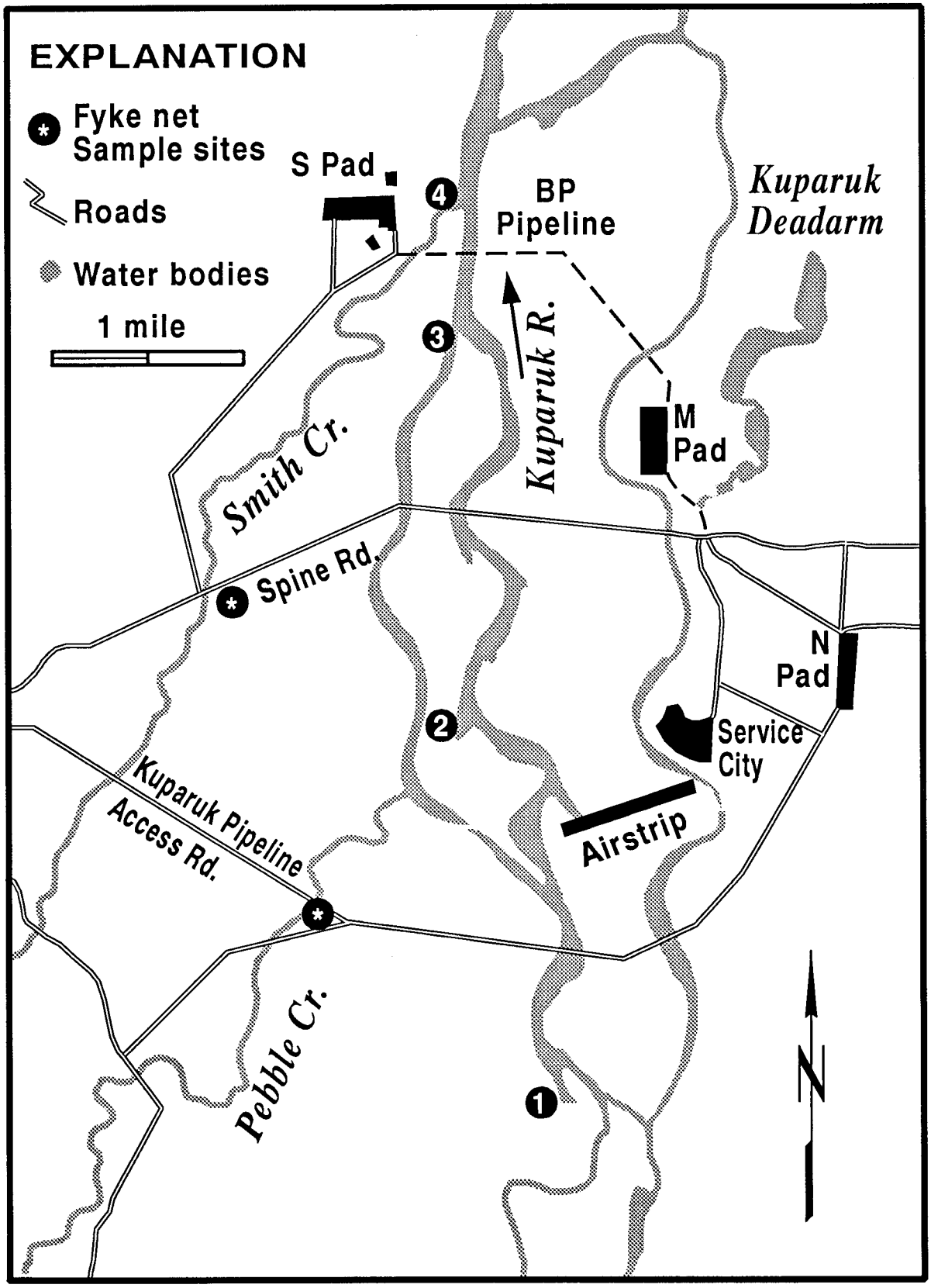

Figure 2. Kuparuk River fish capture locations, 1992.

periods at each net site fished (Table 1). The highest catch rates for ninespine stickleback were found in Mine Site B in July and at the inlet channel in September. Arctic grayling were most abundant at the inlet channel in June and September while July catches were greatest in Mine Site B.

Arctic Grayling Population Estimate

We marked 29 grayling with caudal fin clips in June and July (Appendix I). In September we captured 19 grayling and examined these fish for marks. We identified 10 fin clipped fish during the September recapture event. Using the adjusted Peterson method (Ricker 1975) the estimated population is 55 fish (95% CI 100-33). In 1989, 210 grayling were introduced to Kuparuk Mine Site B, therefore, the September 1992 estimate indicates a three year survival rate of 26% (95% CI, 15-50%).

Growth

Thirty-nine grayling from the 1989 introduction were recaptured in Kuparuk Mine Site B and East Creek in 1992. These grayling ranged from 300 to 388 mm in length and averaged 354 mm (SD = 21).

Reproduction

On June 23 we captured a 172 mm grayling in East Creek. This fish was smaller than any of the grayling introduced to the site in 1989. No young-of-the-year size class grayling were captured in Kuparuk Mine Site B or East Creek in 1992.

1992 Arctic Grayling Introductions

In 1992, we captured 1,187 grayling, 4 broad whitefish, 13 burbot (*Lota lota*), 1,353 ninespine stickleback, and 57 slimy sculpin in fyke nets fished in the Kuparuk River system (Appendix II). With the exception of grayling all fish were released at the capture location. Of the 1,187 graying captured we introduced 1,001 to Kuparuk Mine Site B and D, 60 were sacrificed for disease screening, 30 were identified as net mortalities, and the remainder were released at the capture location. Identified mortality occured among 2.5% of the grayling handled and was most common among small juvenile (< 100 mm) fish.

Table 1. Results of fyke net sampling in East Creek and Kuparuk Mine Site B, 1992.

Net Location	Dates	Time Fished Days	Mean * Water Temp C	Fish ** Species	Number	CPUE Fish/day
East Creek	June 20-26	5.9	9.8	AG	5.0	0.8
				NSB	287.0	48.6
Inlet	June 20-26	5.6	9.6	AG	12.0	2.1
				NSB	102.0	18.2
Mine Site B	June 20-26	5.9	7.9	AG	1.0	0.2
				NSB	98.0	16.6
Inlet	July 17-23	5.6	13.9	AG	2.0	0.4
				NSB	80.0	14.3
Mine Site B	July 17-24	6.6	13.9	AG	26.0	3.9
				NSB	11,726.0	1,776.6
Inlet	Sept 1-3	2.3	7.5	AG	19.0	8.3
				NSB	5,291.0	2,300.4

*** Mean temperatures from daily measurements at net sites**

**** AG = Arctic grayling**
NSB = Ninespine stickleback

Grayling were introduced to Kuparuk Mine Site D in June and to both sites in July and September. We released 708 fish in Kuparuk mine Site D and 293 in Kuparuk Mine Site B. The fish released in Mine Site D ranged from 40 to 408 mm with an average length of 115 mm (SD = 85 mm) while those released in Mine site B ranged from 40 to 403 mm and averaged 122 mm in length (SD = 77 mm).

June

In June, we moved 256 grayling from five locations in the Kuparuk River system and all were introduced to Kuparuk Mine Site D (Table 2). Grayling transplanted in June ranged from 47 to 407 mm and averaged 173 mm (SD = 104). The mean length of fish transplanted in June exceeded that of the July and September sample periods. Seventy eight percent of the adult ($\geq$ 300 mm) grayling transplanted in 1992 were moved during June. The most productive net site was Kuparuk River 4 located at the mouth of Smith Creek. Thirty eight percent of the fish transplanted in June were captured at this location (Figure 2).

July

In July, we captured 207 grayling from five locations and transplanted 118 to Kuparuk Mine Site D and 89 to Kuparuk Mine Site B (Table 3). The mean length of fish transplanted in July decreased from that of June and only one adult fish was captured and moved. Twenty adult grayling captured in July were used for disease screening. Kuparuk River 4 continued to produce the largest catches of grayling. In July, 48% of the fish transplanted to Kuparuk Mine Site D and 41% of those transplanted to Kuparuk Mine Site B were captured at the mouth of Smith Creek.

September

The greatest grayling catch rate occurred in September. We transplanted 538 grayling from four Kuparuk River locations and released 334 in Kuparuk Mine Site D and 204 in Kuparuk Mine Site B. The mean length of fish captured in September decreased from that found in June and July. The high catch rate and decreased mean length was influenced by the appearance of young-of-the-year (40-60 mm) fish. In September, most grayling were captured at the mouth of Smith Creek and upstream in Smith Creek.

Table 2. Mean length and capture location of Arctic grayling transplanted to Kuparuk Mine Site D, 1992.

Net Location (Figure 2)	June		July		September		Combined Jun, Jul, Sept	
	N	%	N	%	N	%	N	%
Kuparuk River 1	30	12	12	10	111	33	**153**	**22**
Kuparuk River 2	53	21	0	0	0	0	**53**	**7**
Kuparuk River 3	0	0	34	29	0	0	**34**	**5**
Kuparuk River 4	96	38	57	48	82	25	**235**	**33**
Smith Creek	42	16	1	1	124	37	**167**	**24**
Pebble Creek	35	14	14	12	66	9	**66**	**9**
All Sites	**256**		**118**		**334**		**708**	
% of Total Transplanted	**36**		**17**		**47**		**100**	
Mean Length	**173**		**117**		**72**		**115**	
Standard Deviation	**104**		**45**		**49**		**85**	
Number of Adults Greater than 300 mm	**45**		**1**		**3**		**49**	

Table 3. Mean length and capture location of Arctic grayling transplanted to Kuparuk Mine Site B, 1992.

Net Location (Figure 2)	July		September		Combined Jun, Jul, Sept	
	N	%	N	%	N	%
Kuparuk River 1	15	17	6	3	**21**	**7**
Kuparuk River 2	0	0	0	0	**0**	**0**
Kuparuk River 3	22	25	0	0	**22**	**8**
Kuparuk River 4	37	41	143	70	**180**	**61**
Smith Creek	5	6	24	12	**29**	**10**
Pebble Creek	10	11	31	15	**41**	**14**
All Sites	**89**		**204**		**293**	
% of Total Transplanted	**30**		**70**		**100**	
Mean Length	**145**		**111**		**122**	
Standard Deviation	**63**		**81**		**77**	
Number of Adults Greater than 300 mm	**1**		**7**		**8**	

Disease Screening

We captured 60 grayling from the Kuparuk River system and sent these fish to the ADF&G fish pathology lab for disease screening. Fish in the sample ranged from 200 to 425 mm and averaged 296 mm (SD = 72). Scale based ages ranged from 3 to 9 years (Table 4).

Lab testing of grayling tissue samples were negative for bacterial kidney disease (BKD), infectious pancreatic necrosis (IPN), and fish furunculosis (Appendix III). The results were positive for the antigen of *Renibacterium salmoninarum* (Rs). The Rs antigen was detected in 100% of the fish, but mostly at low levels. The presence of Rs antigen indicates previous infection of these fish by Rs organisms but Rs cells were below detectable levels using fluorescent antibody tests.

DISCUSSION

1989 Arctic Grayling Introduction to Kuparuk Mine Site B

Survival

The 1991 population estimate for Kuparuk Mine Site B and East Creek was similar to that found in 1992 (Table 5). These results indicate that nearly all fish remaining from the 1989 introduction survived between September 1991 and September 1992. These data also indicate that mortality of introduced grayling was greatest in the first two years after introduction (1989-1991) while mortality among the remaining fish has been low (1991-1992).

Growth

The average length of grayling in Kuparuk Mine Site B has increased rapidly between 1989 and 1992 (Figure 3). When transplanted in 1989 the grayling averaged 283 mm (SD = 52) while those recaptured in 1992 averaged 354 mm (SD = 21). Since all grayling recaptured in 1992 were of reproductive size ($\geq$ 300 mm), future growth rates may decrease. Slower growth is expected among adult fish as the metabolic cost of producing sex products increases.

Table 4. Age-length relationship of 60 scale aged Arctic grayling from the Kuparuk River, 1992.

Age	Number	Length Range (mm)	Mean Length (mm)	Standard Deviation
3	11	200-254	219	18
4	17	223-285	245	18
5	8	230-300	268	25
6	8	310-372	346	19
7	10	335-413	378	23
8	4	385-425	409	18
9	2	410-412	411	1
Total	**60**	**200-425**	**296**	**72**

Table 5. Arctic grayling population estimates in East Creek and Kuparuk Mine site B, 1991 and 1992.

	Total Number of Grayling		Number of Marked Grayling		Recapture/Capture Ratio	
	1991	1992	1991	1992	1991	1992
In the sample						
Actual number	18 (C)	19 (C)	12 (R)	10 (R)	0.66	0.53
95% CI			6.2 - 21	4.7 - 18.4	0.34 - 1.17	0.25 - 0.97
In Kuparuk Mine Site B						
Actual number	56 (N)	55 (N)	37 (M)	29 (M)		
95% CI	100 - 33	105 - 31				
Ratio C / N			0.32	0.34		
95% CI			0.17 - 0.57	0.18 - 0.61		
Survival						
% of grayling remaining from 1989 introduction	27%	26%				
95% CI	16 - 48%	15 - 50%				

C = Number of grayling captured in August (91) or September (92)

R = Number of recaptures in sample

N = Size of population at time of marking

M = Number of grayling marked in June and July

Arctic Grayling Growth
Kuparuk Mine Site B

Year	Number	Length Range (mm)	Mean Length (mm)	Standard Deviation
1989 (Transplanted fish)	210	176 - 399	283	52
1990	36	255 - 374	306	35
1991	45	293 - 390	336	23
1992	39	300 - 388	354	21

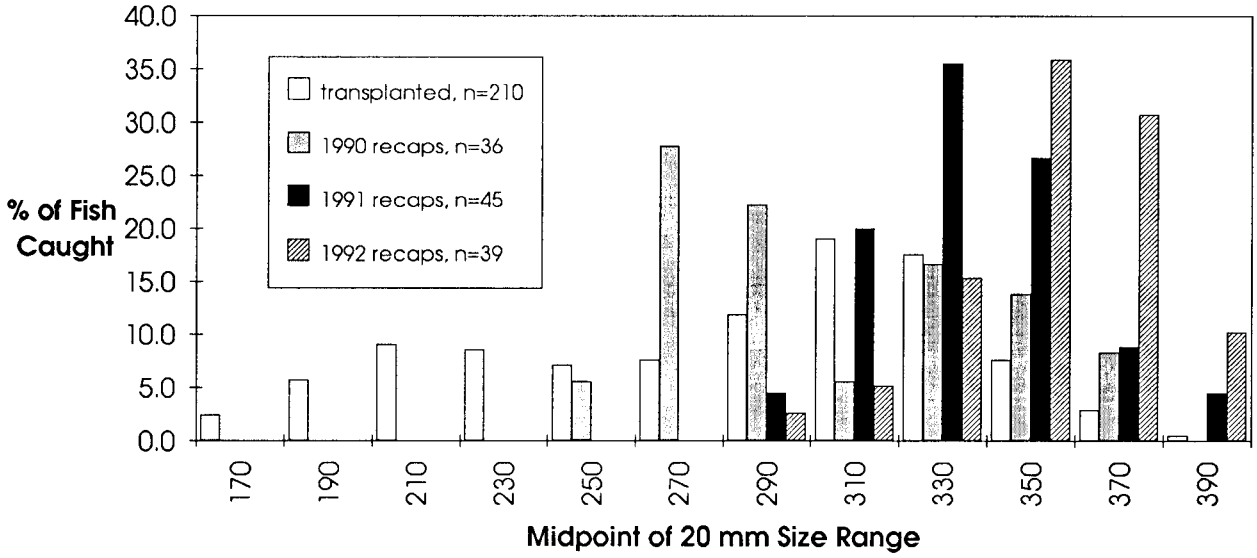

Figure 3. Length-frequency distribution of Arctic grayling transplanted to Kuparuk Mine Site B and then recaptured in 1990, 1991, and 1992.

Reproduction

Although grayling captured in 1992 were of reproductive size our data indicate that reproductive success was poor. We failed to capture young-of-the year grayling in 1992. This result is similar to that found in 1990 and 1991. In 1990, we failed to capture young-of-the-year grayling, while in 1991, we captured five grayling that were smaller than any of the fish transplanted to the site. Two of the fish captured in 1991 were estimated to be age-1 (120 mm and 115 mm) and three were estimated to be young-of-the year (< 38 mm). The length of these fish correspond to the 1990 (age-1) and 1991 (age-0) spawning seasons. In 1992 we captured a 172 mm grayling which was smaller than any of the fish introduced to the site in 1989. The length of this fish indicates it may be the progeny of the transplanted fish from the 1990 spawning season.

Poor reproductive success among introduced grayling may result from predation of fry or eggs by ninespine stickleback. Over time, competitive exclusion may result in the loss of one of the two fish species in East Creek, or greater population stability may occur with a decrease in ninespine stickleback abundance and an increase in grayling abundance.

Grayling also influence ninespine stickleback abundance through predation. We found evidence of grayling predation on ninespine stickleback when a net mortality provided an opportunity to examine stomach content. We found the remains of four ninespine stickleback as food items in the grayling stomach. Predation of ninespine stickleback by grayling may decrease the abundance of ninespine stickleback over time. Ninespine stickleback CPUE has steadily declined from 1989 through 1992 when capture rates from the same net sites and similar time periods are compared. If this trend continues greater grayling fry survival may occur in the future.

1992 Arctic Grayling Introductions

In 1989, we selected large juvenile and adult grayling from the Sagavanirktok River for introduction to Kuparuk Mine Site B. The reason for introducing large fish was the assumption that if suitable habitat was available successful spawning would occur soon after introduction and the population would expand through natural recruitment. Sampling in 1990 and 1991 indicates poor reproductive success, but we did find overwinter survival and rapid growth among the introduced grayling.

Based on our evaluation of the 1989 grayling introduction we decided to take a different approach in 1992. In 1992, we transplanted all size classes of grayling captured from the Kuparuk River. This approach resulted in the introduction of a larger number of fish with a size distribution closely resembling that of a natural population. Young-of-the-year fish were most abundant while few adult fish were captured and transplanted. If survival and rapid growth occurs among grayling introduced in 1992, additional fish will reach reproductive size at Kuparuk Mine Site B and D over the next four to five years.

There were several advantages of using the Kuparuk River as a donor stock for grayling introductions. Kuparuk Mine Site B and D are in close proximity to capture locations on the Kuparuk River which allowed us to capture, transport and release grayling daily. Moving fish immediately after capture eliminates the need for holding fish which requires, additional handling and transfer between the holding location and transport containers. Use of Kuparuk River capture sites also reduced the time required for vehicle transport.

The Kuparuk River is a an appropriate donor stock for introductions to coastal stream systems in the Kuparuk oilfield. Grayling in coastal streams draining into the Beaufort Sea may move through estuarine areas and between coastal drainages (West et al 1992). Dispersal and exchange of fish between Kuparuk oilfield area coastal streams and the Kuparuk River is more likely to occur than exchange between more distant systems such as the Sagavanirktok River. Use of Kuparuk River grayling reduces the chance of disease transmission and insures a similar genetic composition to fish stocks that may naturally disperse from the Kuparuk River and colonize coastal tundra streams such as the Ugnuravik River and East Creek.

Disease Screening

The age-length relationship of 60 grayling from the Kuparuk River was compared to a sample of 58 scale aged grayling collected from the Sagavanirktok River near Prudhoe Bay in 1988 and a sample of 187 from the Sagavanirktok River taken near Happy Valley in 1989. The Kuparuk River grayling grew faster and attained greater maximum size than those collected from either of the Sagavanirktok River locations.

No diseases were detected in laboratory testing of the Kuparuk River grayling but positive results were obtained for the antigen of Rs. This result is not unusual as all

grayling and Dolly Varden samples received and tested at the laboratory have been positive for the antigen of Rs.

Evaluation of the disease history of any resident salmonid stock in the receiving watershed is recommended. Broad whitefish and least cisco have been captured in East Creek and least cisco have been captured in Kuparuk Mine Site D. Disease histories are not available for these anadromous whitefish populations. It is likely that least cisco and broad whitefish found in small coastal streams in the Kuparuk oilfield are associated with the Kuparuk or Colville Rivers.

LITERATURE CITED

Dew, C.B. 1982. Kuparuk field fish survey, 1981. Final report. Prepared by Woodward-Clyde Consultants for ARCO Alaska Inc., Anchorage. 15 pp.

Drage, B., D. Hoch, L. Griffiths, and J. Gilman. 1983. 1983 Kuparuk breakup study Kuparuk development area. Prepared by Peratrovich Nottingham and Drage, Inc. for ARCO Alaska Inc., Anchorage. 48 pp.

Hemming, C.R. 1988. Aquatic habitat evaluation of flooded North Slope gravel mine sites (1986-1987). Alaska Dept. of Fish and Game, Habitat Division Tech. Rpt. No. 88-1. Juneau. 69 pp.

Hemming, C.R. 1990. Fisheries investigations of flooded North Slope gravel mine sites, 1989. Alaska Dept. of Fish and Game, Habitat Division Tech. Rpt. No. 90-2. Juneau. 38 pp.

Hemming, C.R. 1993. Tundra stream fish habitat investigations in the North Slope oilfields, 1993. Alaska Dept. of Fish and Game, Habitat and Restoration Division Tech. Rpt. No. 93-1. Juneau. 64 pp.

Hemming, C.R., P.K. Weber, and J.F. Winters. 1989. Limnological and fisheries investigations of flooded North Slope gravel mine sites, 1988. Alaska Dept. of Fish and Game, Habitat Division Tech Rpt. No. 89-1. Juneau. 60 pp.

Ricker, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Fish. Res. Board Can. Bull. 191: 382 pp.

Wahrhaftig, C. 1965. Physiographic divisions of Alaska. U.S. Geol. Surv. Prof. Pap. 482. 52 pp.

West, R.L., M.W. Smith, W.E. Barber, J.B. Reynolds and H. Hop. 1992. Autumn migration and overwintering of Arctic grayling in coastal streams of the Arctic National Wildlife Refuge, Alaska. Transactions of the American Fisheries Society 121:709-715.

Winters, J.F. 1990. A transplant of Arctic grayling to a flooded gravel mine site in the Kuparuk River oilfield. Alaska Dept of Fish and Game, Habitat Division Tech. Rpt. No. 90-4. Juneau. 26 pp.

Appendix I. Length of Arctic grayling captured in East Creek and Kuparuk Mine Site B, 1992.

Date	Location	Length (mm)	Tag #	Fin clip *	Comment
6/21/92	Inlet	308	2226	TC	
		347	-	TC	
		359	2030	TC	
		365	2161	TC	
		369	2273	TC	
		382	-	TC	
		385	-	TC	
6/22/92	East Cr.	375	2220	TC	
	Inlet	325	2279	TC	
		365	-	TC	
6/23/92	East Cr.	172	-	TC	Not transplanted
6/24/92	East Cr.	327	-	TC	
		330	2099	TC	
	Inlet	343	-	TC	
		366	-	TC	
		384	-	R	
6/25/92	East Cr.	329	-	R	
	Mine Site B	353	2240	TC	
7/18/92	Mine Site B	341	2104	TC	
		344	-	TC	
		352	2240	R	
		367	-	R	
		371	-	TC	
7/19/92	Inlet	346	-	R	
	Mine Site B	300	-	TC	
		320	2238	TC	
		342	-	TC	
		352	-	R	
		358	2008	TC	
		387	-	TC	
7/20/92	Mine Site B	301	-	R	
		373	-	TC	
7/21/92	Inlet	358	-	-	mortality
	Mine Site B	334	-	TC	
		338	-	TC	
		345	-	R	
		347	2107	TC	
		353	2240	R	
		363	-	R	
7/22/92	Mine Site B	334	-	R	

Appendix I. Length of Arctic grayling captured in East Creek and Kuparuk Mine Site B, 1992.

Date	Location	Length (mm)	Tag #	Fin clip *	Comment
7/23/92	Mine Site B	344	-	R	
		362	2008	R	
		376	2212	TC	
7/24/92	Mine Site B	344	2089	TC	
		346	2017	R	
		381	-	R	
9/2/92	Inlet	348	2104	R	
		361	2240	R	
		368	2008	R	
		373	2273	R	
		380	-	R	
9/3/92	Inlet	339	2221	-	
		340	2215	-	
		343	-	-	
		343	-	R	
		345	-	-	
		345	2099	R	
		353	-	R	
		355	2017	R	
		359	-	-	
		369	2214	-	
		370	-	-	
		373	-	-	
		379	2220	R	
		388	2185	-	

*TC = Top caudal fin clip
R = Recapture

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 1	6/21/92	AG	5	141	Transplanted Kuparuk Mine Site D
				164	Transplanted Kuparuk Mine Site D
				232	Transplanted Kuparuk Mine Site D
				359	Transplanted Kuparuk Mine Site D
				365	Transplanted Kuparuk Mine Site D
Kuparuk River 2		AG	13	56	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				62	Transplanted Kuparuk Mine Site D
				65	Transplanted Kuparuk Mine Site D
				71	Transplanted Kuparuk Mine Site D
				96	Transplanted Kuparuk Mine Site D
				97	Transplanted Kuparuk Mine Site D
				101	Transplanted Kuparuk Mine Site D
				102	Transplanted Kuparuk Mine Site D
				104	Transplanted Kuparuk Mine Site D
				104	Transplanted Kuparuk Mine Site D
				111	Transplanted Kuparuk Mine Site D
				235	Transplanted Kuparuk Mine Site D
Pebble Creek		AG	10	54	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				59	Transplanted Kuparuk Mine Site D
				81	Mortality
				90	Transplanted Kuparuk Mine Site D
				118	Transplanted Kuparuk Mine Site D
				169	Transplanted Kuparuk Mine Site D
				178	Transplanted Kuparuk Mine Site D
				334	Transplanted Kuparuk Mine Site D
		NSB	2		Released at Net Site
		SSc	2		Released at Net Site
Kuparuk River 1	6/22/92	AG	16	50	Transplanted Kuparuk Mine Site D
				52	Mortality
				88	Transplanted Kuparuk Mine Site D
				93	Transplanted Kuparuk Mine Site D
				101	Transplanted Kuparuk Mine Site D
				107	Transplanted Kuparuk Mine Site D
				112	Transplanted Kuparuk Mine Site D
				113	Transplanted Kuparuk Mine Site D
				130	Transplanted Kuparuk Mine Site D
				241	Transplanted Kuparuk Mine Site D
				244	Transplanted Kuparuk Mine Site D
				269	Transplanted Kuparuk Mine Site D
				322	Transplanted Kuparuk Mine Site D
				327	Transplanted Kuparuk Mine Site D
				343	Transplanted Kuparuk Mine Site D
				405	Transplanted Kuparuk Mine Site D
		NSB	1		Released at Net Site
		SSc	7		Released at Net Site
Kuparuk River 2		AG	29	49	Transplanted Kuparuk Mine Site D
				50	Mortality
				54	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 2	6/22/92	AG		54	Transplanted Kuparuk Mine Site D
				54	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				59	Transplanted Kuparuk Mine Site D
				59	Transplanted Kuparuk Mine Site D
				59	Transplanted Kuparuk Mine Site D
				59	Transplanted Kuparuk Mine Site D
				59	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				61	Mortality
				63	Mortality
				97	Transplanted Kuparuk Mine Site D
				101	Transplanted Kuparuk Mine Site D
				106	Transplanted Kuparuk Mine Site D
				114	Transplanted Kuparuk Mine Site D
				115	Transplanted Kuparuk Mine Site D
				120	Transplanted Kuparuk Mine Site D
				159	Transplanted Kuparuk Mine Site D
				162	Transplanted Kuparuk Mine Site D
				199	Transplanted Kuparuk Mine Site D
				215	Transplanted Kuparuk Mine Site D
				258	Transplanted Kuparuk Mine Site D
		NSB	2		Relesed at Net Site
Smith Creek		AG	4	130	Transplanted Kuparuk Mine Site D
				137	Transplanted Kuparuk Mine Site D
				158	Transplanted Kuparuk Mine Site D
				173	Transplanted Kuparuk Mine Site D
		NSB	7		Released at Net Site
		SSc	1		Released at Net Site
Pebble Creek		AG	4	133	Transplanted Kuparuk Mine Site D
				142	Transplanted Kuparuk Mine Site D
				164	Transplanted Kuparuk Mine Site D
				183	Transplanted Kuparuk Mine Site D
		NSB	2		Released at Net Site
		SSc	1		Released at Net Site
Kuparuk River 1	6/23/92	AG	2	332	Transplanted Kuparuk Mine Site D
				387	Transplanted Kuparuk Mine Site D
		BB	1	690	Grayling Tail Protruding From Mouth/ released
Kuparuk River 2		AG	7	52	Transplanted Kuparuk Mine Site D
				56	Transplanted Kuparuk Mine Site D
				104	Transplanted Kuparuk Mine Site D
				110	Transplanted Kuparuk Mine Site D
				173	Transplanted Kuparuk Mine Site D
				244	Transplanted Kuparuk Mine Site D
				250	Mortality
		NSB	2		Released at Net Site
		SSC	1		Released at Net Site

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Smith Creek	6/23/92	AG	6	52	Mortality
				96	Transplanted Kuparuk Mine Site D
				98	Transplanted Kuparuk Mine Site D
				119	Transplanted Kuparuk Mine Site D
				168	Transplanted Kuparuk Mine Site D
				247	Transplanted Kuparuk Mine Site D
Pebble Creek		AG	11	47	Transplanted Kuparuk Mine Site D
				55	Mortality
				60	Mortality
				61	Transplanted Kuparuk Mine Site D
				64	Transplanted Kuparuk Mine Site D
				114	Transplanted Kuparuk Mine Site D
				126	Transplanted Kuparuk Mine Site D
				257	Transplanted Kuparuk Mine Site D
				348	Transplanted Kuparuk Mine Site D
				348	Transplanted Kuparuk Mine Site D
				377	Transplanted Kuparuk Mine Site D
		NSB	1		Released at Net Site
		SSc	2		Released at Net Site
Kuparuk River 1	6/24/92	AG	4	252	Transplanted Kuparuk Mine Site D
				339	Transplanted Kuparuk Mine Site D
				357	Transplanted Kuparuk Mine Site D
				407	Transplanted Kuparuk Mine Site D
Kuparuk River 2		AG	3	63	Transplanted Kuparuk Mine Site D
				107	Transplanted Kuparuk Mine Site D
				312	Transplanted Kuparuk Mine Site D
		SSc	1		Released at Net Site
Kuparuk River 4		AG	39	100	Transplanted Kuparuk Mine Site D
				101	Transplanted Kuparuk Mine Site D
				111	Transplanted Kuparuk Mine Site D
				122	Transplanted Kuparuk Mine Site D
				129	Transplanted Kuparuk Mine Site D
				139	Transplanted Kuparuk Mine Site D
				142	Transplanted Kuparuk Mine Site D
				151	Transplanted Kuparuk Mine Site D
				151	Transplanted Kuparuk Mine Site D
				166	Transplanted Kuparuk Mine Site D
				167	Transplanted Kuparuk Mine Site D
				172	Transplanted Kuparuk Mine Site D
				172	Transplanted Kuparuk Mine Site D
				174	Transplanted Kuparuk Mine Site D
				180	Transplanted Kuparuk Mine Site D
				194	Transplanted Kuparuk Mine Site D
				202	Transplanted Kuparuk Mine Site D
				211	Transplanted Kuparuk Mine Site D
				235	Transplanted Kuparuk Mine Site D
				246	Transplanted Kuparuk Mine Site D
				267	Transplanted Kuparuk Mine Site D
				268	Transplanted Kuparuk Mine Site D
				271	Transplanted Kuparuk Mine Site D
				272	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 4	6/24/94	AG		277	Transplanted Kuparuk Mine Site D
				282	Transplanted Kuparuk Mine Site D
				286	Transplanted Kuparuk Mine Site D
				292	Transplanted Kuparuk Mine Site D
				295	Transplanted Kuparuk Mine Site D
				306	Transplanted Kuparuk Mine Site D
				316	Transplanted Kuparuk Mine Site D
				330	Transplanted Kuparuk Mine Site D
				331	Transplanted Kuparuk Mine Site D
				335	Transplanted Kuparuk Mine Site D
				337	Transplanted Kuparuk Mine Site D
				337	Transplanted Kuparuk Mine Site D
				341	Transplanted Kuparuk Mine Site D
				364	Transplanted Kuparuk Mine Site D
				374	Transplanted Kuparuk Mine Site D
		SSc	1		Released at Net Site
Smith Creek		AG	15	88	Transplanted Kuparuk Mine Site D
				107	Transplanted Kuparuk Mine Site D
				113	Transplanted Kuparuk Mine Site D
				162	Transplanted Kuparuk Mine Site D
				193	Transplanted Kuparuk Mine Site D
				199	Transplanted Kuparuk Mine Site D
				234	Transplanted Kuparuk Mine Site D
				237	Transplanted Kuparuk Mine Site D
				240	Transplanted Kuparuk Mine Site D
				243	Transplanted Kuparuk Mine Site D
				286	Transplanted Kuparuk Mine Site D
				306	Transplanted Kuparuk Mine Site D
				339	Transplanted Kuparuk Mine Site D
				351	Transplanted Kuparuk Mine Site D
				353	Transplanted Kuparuk Mine Site D
		SSc	1		Released at Net Site
Pebble Creek		AG	4	65	Transplanted Kuparuk Mine Site D
				273	Transplanted Kuparuk Mine Site D
				284	Transplanted Kuparuk Mine Site D
				365	Transplanted Kuparuk Mine Site D
		NSB	1		Released at Net Site
		SSc	1		Released at Net Site
Kuparuk River 1.	6/25/92	AG	3	315	Transplanted Kuparuk Mine Site D
				374	Transplanted Kuparuk Mine Site D
				408	Transplanted Kuparuk Mine Site D
Kuparuk River 2		AG	2	153	Transplanted Kuparuk Mine Site D
				158	Transplanted Kuparuk Mine Site D
		BWF	1	560	Released at Net Site
Kuparuk River 4		AG	29	48	Transplanted Kuparuk Mine Site D
				53	Transplanted Kuparuk Mine Site D
				56	Mortality
				59	Transplanted Kuparuk Mine Site D
				62	Transplanted Kuparuk Mine Site D
				91	Transplanted Kuparuk Mine Site D
				93	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 4	6/25/92	AG		93	Transplanted Kuparuk Mine Site D
				98	Transplanted Kuparuk Mine Site D
				105	Transplanted Kuparuk Mine Site D
				106	Transplanted Kuparuk Mine Site D
				109	Mortality
				109	Transplanted Kuparuk Mine Site D
				113	Transplanted Kuparuk Mine Site D
				120	Transplanted Kuparuk Mine Site D
				133	Transplanted Kuparuk Mine Site D
				137	Transplanted Kuparuk Mine Site D
				157	Transplanted Kuparuk Mine Site D
				162	Transplanted Kuparuk Mine Site D
				170	Transplanted Kuparuk Mine Site D
				174	Transplanted Kuparuk Mine Site D
				225	Transplanted Kuparuk Mine Site D
				235	Transplanted Kuparuk Mine Site D
				270	Transplanted Kuparuk Mine Site D
				281	Transplanted Kuparuk Mine Site D
				283	Transplanted Kuparuk Mine Site D
				302	Transplanted Kuparuk Mine Site D
				331	Transplanted Kuparuk Mine Site D
				333	Transplanted Kuparuk Mine Site D
		NSB	5		Released at Net Site
Smith Creek		AG	12	66	Transplanted Kuparuk Mine Site D
				152	Transplanted Kuparuk Mine Site D
				265	Transplanted Kuparuk Mine Site D
				273	Transplanted Kuparuk Mine Site D
				277	Transplanted Kuparuk Mine Site D
				282	Transplanted Kuparuk Mine Site D
				295	Transplanted Kuparuk Mine Site D
				328	Transplanted Kuparuk Mine Site D
				336	Transplanted Kuparuk Mine Site D
				352	Transplanted Kuparuk Mine Site D
				382	Transplanted Kuparuk Mine Site D
				399	Transplanted Kuparuk Mine Site D
		NSB	1		Released at Net Site
Pebble Creek		AG	2	152	Transplanted Kuparuk Mine Site D
				277	Transplanted Kuparuk Mine Site D
		NSB	2		Released at Net Site
		SSc	1		Released at Net Site
Kuparuk River 4	6/26/92	AG	36	49	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Mortality
				56	Mortality
				57	Mortality
				57	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				62	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 4	6/26/92	AG		62	Transplanted Kuparuk Mine Site D
				63	Transplanted Kuparuk Mine Site D
				95	Transplanted Kuparuk Mine Site D
				97	Transplanted Kuparuk Mine Site D
				97	Transplanted Kuparuk Mine Site D
				98	Transplanted Kuparuk Mine Site D
				100	Transplanted Kuparuk Mine Site D
				101	Transplanted Kuparuk Mine Site D
				103	Transplanted Kuparuk Mine Site D
				104	Transplanted Kuparuk Mine Site D
				105	Transplanted Kuparuk Mine Site D
				105	Transplanted Kuparuk Mine Site D
				107	Transplanted Kuparuk Mine Site D
				108	Transplanted Kuparuk Mine Site D
				108	Transplanted Kuparuk Mine Site D
				110	Transplanted Kuparuk Mine Site D
				111	Transplanted Kuparuk Mine Site D
				111	Transplanted Kuparuk Mine Site D
				113	Transplanted Kuparuk Mine Site D
				117	Transplanted Kuparuk Mine Site D
				118	Transplanted Kuparuk Mine Site D
				144	Transplanted Kuparuk Mine Site D
				147	Transplanted Kuparuk Mine Site D
				152	Transplanted Kuparuk Mine Site D
				168	Transplanted Kuparuk Mine Site D
		NSB	1		Released at Net Site
		SSc	1		Released at Net Site
Smith Creek		AG	20	49	Transplanted Kuparuk Mine Site D
				51	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				54	Mortality
				136	Transplanted Kuparuk Mine Site D
				143	Transplanted Kuparuk Mine Site D
				149	Transplanted Kuparuk Mine Site D
				246	Transplanted Kuparuk Mine Site D
				246	Transplanted Kuparuk Mine Site D
				262	Released at Net Site
				270	Released at Net Site
				273	Released at Net Site
				305	Released at Net Site
				311	Released at Net Site
				324	Released at Net Site
				328	Released at Net Site
				341	Released at Net Site
				350	Released at Net Site
				369	Released at Net Site
				370	Released at Net Site
		NSB	1		Released at Net Site
		SSc	3		Released at Net Site
Pebble Creek		AG	7	61	Transplanted Kuparuk Mine Site D
				65	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Pebble Creek	6/26/92	AG		108	Transplanted Kuparuk Mine Site D
				123	Transplanted Kuparuk Mine Site D
				149	Transplanted Kuparuk Mine Site D
				159	Transplanted Kuparuk Mine Site D
				379	Transplanted Kuparuk Mine Site D
		SSc	2		Released at Net Site
Pebble Creek	7/18/92	AG	15	73	Transplanted Kuparuk Mine Site D
				78	Transplanted Kuparuk Mine Site D
				86	Transplanted Kuparuk Mine Site D
				140	Transplanted Kuparuk Mine Site D
				202	Disease Sample
				217	Disease Sample
				229	Disease Sample
				231	Disease Sample
				241	Disease Sample
				242	Disease Sample
				243	Disease Sample
				248	Disease Sample
				251	Disease Sample
				253	Disease Sample
				256	Disease Sample
Smith Creek		AG	4	192	Transplanted Kuparuk Mine Site D
				216	Disease Sample
				240	Disease Sample
				252	Disease Sample
		NSB	1		Released at Net Site
Kuparuk River 1	7/19/92	AG	20	193	Disease Sample
				238	Disease Sample
				269	Disease Sample
				330	Disease Sample
				353	Disease Sample
				354	Disease Sample
				359	Disease Sample
				366	Disease Sample
				375	Disease Sample
				375	Disease Sample
				383	Disease Sample
				386	Disease Sample
				388	Disease Sample
				394	Mortality
				402	Disease Sample
				404	Disease Sample
				406	Disease Sample
				409	Disease Sample
				416	Disease Sample
				423	Disease Sample
Kuparuk River 3		AG	9	80	Transplanted Kuparuk Mine Site D
				87	Transplanted Kuparuk Mine Site D
				122	Transplanted Kuparuk Mine Site D
				127	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 3	7/19/92	AG		128	Transplanted Kuparuk Mine Site D
				129	Transplanted Kuparuk Mine Site D
				137	Transplanted Kuparuk Mine Site D
				140	Transplanted Kuparuk Mine Site D
				190	Transplanted Kuparuk Mine Site D
		NSB	1		Released at Net Site
Kuparuk River 4		AG	14	64	Transplanted Kuparuk Mine Site D
				76	Transplanted Kuparuk Mine Site D
				86	Transplanted Kuparuk Mine Site D
				105	Transplanted Kuparuk Mine Site D
				122	Transplanted Kuparuk Mine Site D
				123	Transplanted Kuparuk Mine Site D
				125	Transplanted Kuparuk Mine Site D
				131	Transplanted Kuparuk Mine Site D
				137	Transplanted Kuparuk Mine Site D
				181	Transplanted Kuparuk Mine Site D
				192	Transplanted Kuparuk Mine Site D
				195	Transplanted Kuparuk Mine Site D
				263	Disease Sample
				342	Disease Sample
		BWF	2	439	Released at Net Site
				482	TAG 9201021/Released
Smith Creek		AG	3	284	Disease Sample
				296	Disease Sample
				310	Disease Sample
Pebble Creek		AG	5	73	Transplanted Kuparuk Mine Site D
				134	Transplanted Kuparuk Mine Site D
				136	Transplanted Kuparuk Mine Site D
				231	Disease Sample
				231	Disease Sample
Kuparuk River 1	7/20/92	AG	13	78	Transplanted Kuparuk Mine Site D
				80	Transplanted Kuparuk Mine Site D
				81	Mortality
				82	Transplanted Kuparuk Mine Site D
				83	Transplanted Kuparuk Mine Site D
				84	Transplanted Kuparuk Mine Site D
				84	Transplanted Kuparuk Mine Site D
				87	Transplanted Kuparuk Mine Site D
				87	Transplanted Kuparuk Mine Site D
				89	Transplanted Kuparuk Mine Site D
				106	Transplanted Kuparuk Mine Site D
				134	Transplanted Kuparuk Mine Site D
				261	Disease Sample
Kuparuk River 3		AG	26	70	Transplanted Kuparuk Mine Site D
				71	Transplanted Kuparuk Mine Site D
				75	Transplanted Kuparuk Mine Site D
				77	Transplanted Kuparuk Mine Site D
				78	Transplanted Kuparuk Mine Site D
				79	Transplanted Kuparuk Mine Site D
				81	Transplanted Kuparuk Mine Site D
				84	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 3	7/20/92	AG		84	Transplanted Kuparuk Mine Site D
				104	Transplanted Kuparuk Mine Site D
				107	Transplanted Kuparuk Mine Site D
				118	Transplanted Kuparuk Mine Site D
				122	Transplanted Kuparuk Mine Site D
				124	Transplanted Kuparuk Mine Site D
				127	Transplanted Kuparuk Mine Site D
				134	Transplanted Kuparuk Mine Site D
				135	Transplanted Kuparuk Mine Site D
				138	Transplanted Kuparuk Mine Site D
				161	Transplanted Kuparuk Mine Site D
				182	Transplanted Kuparuk Mine Site D
				183	Transplanted Kuparuk Mine Site D
				187	Transplanted Kuparuk Mine Site D
				187	Transplanted Kuparuk Mine Site D
				198	Transplanted Kuparuk Mine Site D
				204	Disease Sample
				206	Disease Sample
Kuparuk River 4		AG	45	63	Transplanted Kuparuk Mine Site D
				64	Transplanted Kuparuk Mine Site D
				69	Transplanted Kuparuk Mine Site D
				72	Transplanted Kuparuk Mine Site D
				72	Transplanted Kuparuk Mine Site D
				73	Transplanted Kuparuk Mine Site D
				74	Transplanted Kuparuk Mine Site D
				76	Transplanted Kuparuk Mine Site D
				76	Transplanted Kuparuk Mine Site D
				77	Transplanted Kuparuk Mine Site D
				78	Transplanted Kuparuk Mine Site D
				79	Transplanted Kuparuk Mine Site D
				82	Transplanted Kuparuk Mine Site D
				83	Transplanted Kuparuk Mine Site D
				85	Transplanted Kuparuk Mine Site D
				85	Transplanted Kuparuk Mine Site D
				86	Transplanted Kuparuk Mine Site D
				87	Transplanted Kuparuk Mine Site D
				87	Transplanted Kuparuk Mine Site D
				88	Transplanted Kuparuk Mine Site D
				95	Transplanted Kuparuk Mine Site D
				108	Transplanted Kuparuk Mine Site D
				109	Transplanted Kuparuk Mine Site D
				111	Transplanted Kuparuk Mine Site D
				118	Transplanted Kuparuk Mine Site D
				118	Transplanted Kuparuk Mine Site D
				120	Transplanted Kuparuk Mine Site D
				120	Transplanted Kuparuk Mine Site D
				121	Transplanted Kuparuk Mine Site D
				123	Transplanted Kuparuk Mine Site D
				123	Transplanted Kuparuk Mine Site D
				124	Transplanted Kuparuk Mine Site D
				125	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 4	7/20/92			126	Transplanted Kuparuk Mine Site D
				131	Transplanted Kuparuk Mine Site D
				131	Transplanted Kuparuk Mine Site D
				132	Transplanted Kuparuk Mine Site D
				134	Transplanted Kuparuk Mine Site D
				152	Transplanted Kuparuk Mine Site D
				155	Transplanted Kuparuk Mine Site D
				160	Transplanted Kuparuk Mine Site D
				177	Transplanted Kuparuk Mine Site D
				223	Disease Sample
				243	Disease Sample
				408	Disease Sample
		BWF	1	387	Released at Net Site
		NSB	2		Released at Net Site
Smith Creek		AG	1	260	Disease Sample
		NSB	1		Released at Net Site
Pebble Creek		AG	9	75	Transplanted Kuparuk Mine Site D
				78	Transplanted Kuparuk Mine Site D
				78	Transplanted Kuparuk Mine Site D
				80	Transplanted Kuparuk Mine Site D
				113	Transplanted Kuparuk Mine Site D
				126	Transplanted Kuparuk Mine Site D
				171	Transplanted Kuparuk Mine Site D
				191	Disease Sample
				200	Disease Sample
		NSB	6		Released at Net Site
Kuparuk River 1	7/21/92	AG	3	87	Transplanted Kuparuk Mine Site B / adipose fin clip
				180	Transplanted Kuparuk Mine Site B / adipose fin clip
				304	Transplanted Kuparuk Mine Site D
Kuparuk River 3		AG	7	74	Transplanted Kuparuk Mine Site B / adipose fin clip
				75	Transplanted Kuparuk Mine Site B / adipose fin clip
				76	Transplanted Kuparuk Mine Site B / adipose fin clip
				85	Transplanted Kuparuk Mine Site B / adipose fin clip
				86	Transplanted Kuparuk Mine Site B / adipose fin clip
				109	Transplanted Kuparuk Mine Site B / adipose fin clip
				204	Transplanted Kuparuk Mine Site D
		SSc	1		Released at Net Site
Kuparuk River 4		AG	26	73	Mortality
				78	Mortality
				82	Mortality
				101	Transplanted Kuparuk Mine Site B / adipose fin clip
				121	Transplanted Kuparuk Mine Site B / adipose fin clip
				127	Transplanted Kuparuk Mine Site B / adipose fin clip
				127	Transplanted Kuparuk Mine Site B / adipose fin clip
				127	Transplanted Kuparuk Mine Site B / adipose fin clip
				128	Transplanted Kuparuk Mine Site B / adipose fin clip
				131	Transplanted Kuparuk Mine Site B / adipose fin clip
				132	Transplanted Kuparuk Mine Site B / adipose fin clip
				138	Transplanted Kuparuk Mine Site B / adipose fin clip
				167	Transplanted Kuparuk Mine Site B / adipose fin clip
				167	Transplanted Kuparuk Mine Site B / adipose fin clip

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 4	7/21/92	AG		168	Transplanted Kuparuk Mine Site B / adipose fin clip
				174	Transplanted Kuparuk Mine Site B / adipose fin clip
				179	Transplanted Kuparuk Mine Site B / adipose fin clip
				187	Transplanted Kuparuk Mine Site B / adipose fin clip
				187	Transplanted Kuparuk Mine Site B / adipose fin clip
				194	Transplanted Kuparuk Mine Site B / adipose fin clip
				196	Transplanted Kuparuk Mine Site B / adipose fin clip
				197	Transplanted Kuparuk Mine Site B / adipose fin clip
				199	Transplanted Kuparuk Mine Site B / adipose fin clip
				214	Transplanted Kuparuk Mine Site D
				236	Transplanted Kuparuk Mine Site D
				265	Transplanted Kuparuk Mine Site D
Pebble Creek		AG	4	196	Transplanted Kuparuk Mine Site B / adipose fin clip
				211	Transplanted Kuparuk Mine Site B / adipose fin clip
				216	Transplanted Kuparuk Mine Site B / adipose fin clip
				233	Transplanted Kuparuk Mine Site B / adipose fin clip
Smith Creek		NSB	6		Released at Net Site
Kuparuk River 1	7/22/92	AG	4	81	Transplanted Kuparuk Mine Site B / adipose fin clip
				120	Transplanted Kuparuk Mine Site B / adipose fin clip
				127	Transplanted Kuparuk Mine Site B / adipose fin clip
				131	Transplanted Kuparuk Mine Site B / adipose fin clip
Kuparuk River 3		AG	3	81	Transplanted Kuparuk Mine Site B / adipose fin clip
				191	Transplanted Kuparuk Mine Site B / adipose fin clip
				202	Transplanted Kuparuk Mine Site B / adipose fin clip
Kuparuk River 4		AG	3	84	Transplanted Kuparuk Mine Site B / adipose fin clip
				211	Transplanted Kuparuk Mine Site B / adipose fin clip
				291	Transplanted Kuparuk Mine Site B / adipose fin clip
Smith Creek		AG	1	112	Transplanted Kuparuk Mine Site B / adipose fin clip
		NSB	6		Released at Net Site
Pebble Creek		AG	2	83	Transplanted Kuparuk Mine Site B / adipose fin clip
				223	Transplanted Kuparuk Mine Site B / adipose fin clip
Kuparuk River 1	7/23/92	AG	8	83	Transplanted Kuparuk Mine Site B / adipose fin clip
				84	Transplanted Kuparuk Mine Site B / adipose fin clip
				91	Transplanted Kuparuk Mine Site B / adipose fin clip
				104	Transplanted Kuparuk Mine Site B / adipose fin clip
				138	Transplanted Kuparuk Mine Site B / adipose fin clip
				139	Transplanted Kuparuk Mine Site B / adipose fin clip
				176	Transplanted Kuparuk Mine Site B / adipose fin clip
				406	Transplanted Kuparuk Mine Site B / adipose fin clip
		NSB	2		Released at Net Site
Kuparuk River 3		AG	14	78	Mortality
				79	Transplanted Kuparuk Mine Site B / adipose fin clip
				82	Transplanted Kuparuk Mine Site B / adipose fin clip
				82	Transplanted Kuparuk Mine Site B / adipose fin clip
				90	Transplanted Kuparuk Mine Site B / adipose fin clip
				93	Transplanted Kuparuk Mine Site B / adipose fin clip
				101	Transplanted Kuparuk Mine Site B / adipose fin clip
				122	Transplanted Kuparuk Mine Site B / adipose fin clip
				122	Transplanted Kuparuk Mine Site B / adipose fin clip
				124	Transplanted Kuparuk Mine Site B / adipose fin clip
				142	Transplanted Kuparuk Mine Site B / adipose fin clip

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 3	7/23/92	AG		161	Transplanted Kuparuk Mine Site B / adipose fin clip
				179	Transplanted Kuparuk Mine Site B / adipose fin clip
				251	Transplanted Kuparuk Mine Site B / adipose fin clip
		NSB	1		Released at Net Site
		SSc	1		Released at Net Site
Smith Creek		AG	2	249	Transplanted Kuparuk Mine Site B / adipose fin clip
				250	Transplanted Kuparuk Mine Site B / adipose fin clip
		NSB	2		Released at Net Site
		SSc	1		Released at Net Site
Pebble Creek		AG	2	83	Transplanted Kuparuk Mine Site B / adipose fin clip
				207	Transplanted Kuparuk Mine Site B / adipose fin clip
		NSB	2		Released at Net Site
Kuparuk River 1	7/24/92	AG	1	141	Transplanted Kuparuk Mine Site B / adipose fin clip
Pebble Creek		AG	2	77	Transplanted Kuparuk Mine Site B / adipose fin clip
				79	Transplanted Kuparuk Mine Site B / adipose fin clip
		NSB	12		Released at Net Site
Smith Creek		AG	2	257	Transplanted Kuparuk Mine Site B / adipose fin clip
				264	Transplanted Kuparuk Mine Site B / adipose fin clip
		NSB	8		Released at Net Site
Kuparuk River 1	9/1/92	AG	6	45	Transplanted Kuparuk Mine Site B
				50	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				57	Transplanted Kuparuk Mine Site B
				70	Transplanted Kuparuk Mine Site B
				89	Transplanted Kuparuk Mine Site B
		BB	2	50	Released at Net Site
				650	Released at Net Site
Kuparuk River 4		AG	105	40	Transplanted Kuparuk Mine Site B
				45	Transplanted Kuparuk Mine Site B
				48	Transplanted Kuparuk Mine Site B
				48	Transplanted Kuparuk Mine Site B
				48	Transplanted Kuparuk Mine Site B
				50	Transplanted Kuparuk Mine Site B
				50	Transplanted Kuparuk Mine Site B
				50	Transplanted Kuparuk Mine Site B
				50	Transplanted Kuparuk Mine Site B
				50	Transplanted Kuparuk Mine Site B
				51	Transplanted Kuparuk Mine Site B
				51	Transplanted Kuparuk Mine Site B
				52	Transplanted Kuparuk Mine Site B
				52	Transplanted Kuparuk Mine Site B
				52	Transplanted Kuparuk Mine Site B
				52	Transplanted Kuparuk Mine Site B
				52	Transplanted Kuparuk Mine Site B
				52	Transplanted Kuparuk Mine Site B
				52	Transplanted Kuparuk Mine Site B
				52	Transplanted Kuparuk Mine Site B
				53	Transplanted Kuparuk Mine Site B
				53	Transplanted Kuparuk Mine Site B
				53	Transplanted Kuparuk Mine Site B

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 4	9/1/92	AG		54	Transplanted Kuparuk Mine Site B
				55	Mortality
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				56	Transplanted Kuparuk Mine Site B
				57	Transplanted Kuparuk Mine Site B
				57	Transplanted Kuparuk Mine Site B
				58	Transplanted Kuparuk Mine Site B
				58	Transplanted Kuparuk Mine Site B
				58	Transplanted Kuparuk Mine Site B
				58	Transplanted Kuparuk Mine Site B
				59	Transplanted Kuparuk Mine Site B
				60	mortality
				60	Transplanted Kuparuk Mine Site B
				60	Transplanted Kuparuk Mine Site B
				60	Transplanted Kuparuk Mine Site B
				60	Transplanted Kuparuk Mine Site B
				60	Transplanted Kuparuk Mine Site B
				60	Transplanted Kuparuk Mine Site B
				60	Transplanted Kuparuk Mine Site B
				61	Transplanted Kuparuk Mine Site B
				61	Transplanted Kuparuk Mine Site B
				61	Transplanted Kuparuk Mine Site B
				62	Transplanted Kuparuk Mine Site B
				62	Transplanted Kuparuk Mine Site B
				62	Transplanted Kuparuk Mine Site B
				62	Transplanted Kuparuk Mine Site B
				62	Transplanted Kuparuk Mine Site B
				62	Transplanted Kuparuk Mine Site B
				63	Transplanted Kuparuk Mine Site B
				63	Transplanted Kuparuk Mine Site B
				65	Mortality
				65	Transplanted Kuparuk Mine Site B
				65	Transplanted Kuparuk Mine Site B
				65	Transplanted Kuparuk Mine Site B
				65	Transplanted Kuparuk Mine Site B
				65	Transplanted Kuparuk Mine Site B

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 4	9/1/92	AG		68	Transplanted Kuparuk Mine Site B
				69	Transplanted Kuparuk Mine Site B
				70	Transplanted Kuparuk Mine Site B
				70	Transplanted Kuparuk Mine Site B
				86	Transplanted Kuparuk Mine Site B
				91	Transplanted Kuparuk Mine Site B
				92	Transplanted Kuparuk Mine Site B
				92	Transplanted Kuparuk Mine Site B
				93	Transplanted Kuparuk Mine Site B
				93	Transplanted Kuparuk Mine Site B
				94	Transplanted Kuparuk Mine Site B
				95	Transplanted Kuparuk Mine Site B
				95	Transplanted Kuparuk Mine Site B
				100	Transplanted Kuparuk Mine Site B
				101	Transplanted Kuparuk Mine Site B
				102	Transplanted Kuparuk Mine Site B
				105	Transplanted Kuparuk Mine Site B
				105	Transplanted Kuparuk Mine Site B
				110	Transplanted Kuparuk Mine Site B
				123	Transplanted Kuparuk Mine Site B
				135	Transplanted Kuparuk Mine Site B
				143	Transplanted Kuparuk Mine Site B
				149	Transplanted Kuparuk Mine Site B
				168	Transplanted Kuparuk Mine Site B
				183	Transplanted Kuparuk Mine Site B
				323	Disease Sample
				335	Disease Sample
				353	Disease Sample
				366	Disease Sample
				371	Disease Sample
		BB	3	40	Released at Net Site
				233	Released at Net Site
				415	Released at Net Site
		NSB	50		Released at Net Site
		SSc	6		Released at Net Site
Pebble Creek		AG	39	58	Transplanted Kuparuk Mine Site B
				60	Transplanted Kuparuk Mine Site B
				61	Transplanted Kuparuk Mine Site B
				62	Transplanted Kuparuk Mine Site B
				63	Transplanted Kuparuk Mine Site B
				64	Transplanted Kuparuk Mine Site B
				65	Transplanted Kuparuk Mine Site B
				65	Transplanted Kuparuk Mine Site B
				95	Transplanted Kuparuk Mine Site B
				171	Transplanted Kuparuk Mine Site B
				173	Transplanted Kuparuk Mine Site B
				176	Transplanted Kuparuk Mine Site B
				177	Transplanted Kuparuk Mine Site B
				178	Transplanted Kuparuk Mine Site B
				178	Transplanted Kuparuk Mine Site B
				179	Transplanted Kuparuk Mine Site B

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Pebble Creek	9/1/92	AG		179	Transplanted Kuparuk Mine Site B
				180	Transplanted Kuparuk Mine Site B
				182	Transplanted Kuparuk Mine Site B
				183	Transplanted Kuparuk Mine Site B
				184	Transplanted Kuparuk Mine Site B
				190	Transplanted Kuparuk Mine Site B
				190	Transplanted Kuparuk Mine Site B
				192	Transplanted Kuparuk Mine Site B
				193	Transplanted Kuparuk Mine Site B
				196	Transplanted Kuparuk Mine Site B
				197	Transplanted Kuparuk Mine Site B
				197	Transplanted Kuparuk Mine Site B
				202	Disease Sample
				204	Transplanted Kuparuk Mine Site B
				213	Transplanted Kuparuk Mine Site B
				222	Transplanted Kuparuk Mine Site B
				217	Disease Sample
				217	Disease Sample
				220	Transplanted Kuparuk Mine Site B
				222	Disease Sample
				225	Disease Sample
				237	Disease Sample
				247	Transplanted Kuparuk Mine Site B
		NSB	99		Released at Net Site
Smith Creek		AG	24	39	Transplanted Kuparuk Mine Site B
				45	Transplanted Kuparuk Mine Site B
				50	Transplanted Kuparuk Mine Site B
				63	Transplanted Kuparuk Mine Site B
				135	Transplanted Kuparuk Mine Site B
				135	Transplanted Kuparuk Mine Site B
				150	Transplanted Kuparuk Mine Site B
				155	Transplanted Kuparuk Mine Site B
				174	Transplanted Kuparuk Mine Site B
				181	Transplanted Kuparuk Mine Site B
				185	Transplanted Kuparuk Mine Site B
				190	Transplanted Kuparuk Mine Site B
				200	Transplanted Kuparuk Mine Site B
				200	Transplanted Kuparuk Mine Site B
				215	Transplanted Kuparuk Mine Site B
				227	Transplanted Kuparuk Mine Site B
				245	Transplanted Kuparuk Mine Site B
				247	Transplanted Kuparuk Mine Site B
				253	Transplanted Kuparuk Mine Site B
				255	Transplanted Kuparuk Mine Site B
				283	Transplanted Kuparuk Mine Site B
				283	Transplanted Kuparuk Mine Site B
				288	Transplanted Kuparuk Mine Site B
				329	Transplanted Kuparuk Mine Site B
		NSB	20		Released at Net Site
Kuparuk River 1	9/2/92	AG	48	40	Transplanted Kuparuk Mine Site D
				40	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 1	9/2/92	AG		45	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				51	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				54	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
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				56	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
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				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				61	Transplanted Kuparuk Mine Site D
				62	Transplanted Kuparuk Mine Site D
				65	Transplanted Kuparuk Mine Site D
				65	Transplanted Kuparuk Mine Site D
				65	Transplanted Kuparuk Mine Site D
				97	Transplanted Kuparuk Mine Site D
				100	Transplanted Kuparuk Mine Site D
				110	Transplanted Kuparuk Mine Site D
		BB	1	50	Released at Net Site
Kuparuk River 4		AG	84	40	Transplanted Kuparuk Mine Site D
				43	Transplanted Kuparuk Mine Site D
				45	Transplanted Kuparuk Mine Site D
				45	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 4	9/2/92	AG		45	Transplanted Kuparuk Mine Site D
				47	Transplanted Kuparuk Mine Site D
				49	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				51	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				53	Transplanted Kuparuk Mine Site D
				53	Transplanted Kuparuk Mine Site D
				54	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				57	Mortality
				57	Mortality
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
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				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				61	Transplanted Kuparuk Mine Site D
				62	Transplanted Kuparuk Mine Site D
				62	Transplanted Kuparuk Mine Site D
				63	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 4	9/2/92	AG		63	Transplanted Kuparuk Mine Site D
				63	Transplanted Kuparuk Mine Site D
				65	Transplanted Kuparuk Mine Site D
				65	Transplanted Kuparuk Mine Site D
				65	Transplanted Kuparuk Mine Site D
				69	Transplanted Kuparuk Mine Site D
				69	Transplanted Kuparuk Mine Site D
				69	Transplanted Kuparuk Mine Site D
				70	Transplanted Kuparuk Mine Site D
				70	Transplanted Kuparuk Mine Site D
				70	Transplanted Kuparuk Mine Site D
				75	Transplanted Kuparuk Mine Site D
				83	Transplanted Kuparuk Mine Site D
				85	Transplanted Kuparuk Mine Site D
				88	Transplanted Kuparuk Mine Site D
				93	Transplanted Kuparuk Mine Site D
				93	Transplanted Kuparuk Mine Site D
				100	Transplanted Kuparuk Mine Site D
				103	Transplanted Kuparuk Mine Site D
				105	Transplanted Kuparuk Mine Site D
				108	Transplanted Kuparuk Mine Site D
				109	Transplanted Kuparuk Mine Site D
				192	Transplanted Kuparuk Mine Site D
				283	Transplanted Kuparuk Mine Site D
				289	Transplanted Kuparuk Mine Site D
				293	Transplanted Kuparuk Mine Site D
				305	Transplanted Kuparuk Mine Site D
				340	Transplanted Kuparuk Mine Site D
				379	Transplanted Kuparuk Mine Site D
		BB	1	700	Released at Net Site
		NSB	63		Released at Net Site
		SSc	2		Released at Net Site
Smith Creek		AG	45	42	Transplanted Kuparuk Mine Site D
				43	Transplanted Kuparuk Mine Site D
				43	Transplanted Kuparuk Mine Site D
				43	Transplanted Kuparuk Mine Site D
				45	Transplanted Kuparuk Mine Site D
				45	Transplanted Kuparuk Mine Site D
				45	Transplanted Kuparuk Mine Site D
				46	Transplanted Kuparuk Mine Site D
				47	Transplanted Kuparuk Mine Site D
				47	Transplanted Kuparuk Mine Site D
				47	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Smith Creek	9/2/92	AG		52	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				53	Transplanted Kuparuk Mine Site D
				53	Transplanted Kuparuk Mine Site D
				53	Transplanted Kuparuk Mine Site D
				53	Transplanted Kuparuk Mine Site D
				54	Transplanted Kuparuk Mine Site D
				54	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				56	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				90	Transplanted Kuparuk Mine Site D
				101	Transplanted Kuparuk Mine Site D
				183	Transplanted Kuparuk Mine Site D
				191	Transplanted Kuparuk Mine Site D
				233	Transplanted Kuparuk Mine Site D
				251	Transplanted Kuparuk Mine Site D
				260	Transplanted Kuparuk Mine Site D
		NSB	110		Released at Net Site
		SSc	1		Released at Net Site
Pebble Creek		AG	6	52	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				62	Transplanted Kuparuk Mine Site D
				62	Transplanted Kuparuk Mine Site D
				102	Transplanted Kuparuk Mine Site D
				192	Transplanted Kuparuk Mine Site D
		BB	2	70	Released at Net Site
				75	Released at Net Site
		NSB	429		Released at Net Site
		SSc	2		Released at Net Site
Kuparuk River 1	9/3/92	AG	64	40	Transplanted Kuparuk Mine Site D
				45	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				49	Transplanted Kuparuk Mine Site D
				49	Transplanted Kuparuk Mine Site D
				49	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				51	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 1	9/3/92	AG		53	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				56	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				59	Mortality
				59	Transplanted Kuparuk Mine Site D
				59	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				61	Transplanted Kuparuk Mine Site D
				61	Transplanted Kuparuk Mine Site D
				62	Transplanted Kuparuk Mine Site D
				64	Transplanted Kuparuk Mine Site D
				65	Transplanted Kuparuk Mine Site D
				69	Transplanted Kuparuk Mine Site D
				69	Transplanted Kuparuk Mine Site D
				70	Transplanted Kuparuk Mine Site D
				70	Transplanted Kuparuk Mine Site D
				70	Transplanted Kuparuk Mine Site D
				71	Transplanted Kuparuk Mine Site D
				103	Transplanted Kuparuk Mine Site D
				109	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 1	9/3/92	BB	1	97	Released at Net Site
		NSB	6		Released at Net Site
		SSc	3		Released at Net Site
Kuparuk River 4		AG	48	48	Transplanted Kuparuk Mine Site B
				49	Transplanted Kuparuk Mine Site B
				50	Transplanted Kuparuk Mine Site B
				52	Transplanted Kuparuk Mine Site B
				52	Transplanted Kuparuk Mine Site B
				53	Transplanted Kuparuk Mine Site B
				55	Mortality
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				55	Transplanted Kuparuk Mine Site B
				58	Transplanted Kuparuk Mine Site B
				58	Transplanted Kuparuk Mine Site B
				58	Transplanted Kuparuk Mine Site B
				59	Transplanted Kuparuk Mine Site B
				60	Transplanted Kuparuk Mine Site B
				60	Transplanted Kuparuk Mine Site B
				60	Transplanted Kuparuk Mine Site B
				60	Transplanted Kuparuk Mine Site B
				62	Transplanted Kuparuk Mine Site B
				62	Transplanted Kuparuk Mine Site B
				62	Transplanted Kuparuk Mine Site B
				65	Transplanted Kuparuk Mine Site B
				69	Transplanted Kuparuk Mine Site B
				69	Transplanted Kuparuk Mine Site B
				69	Transplanted Kuparuk Mine Site B
				69	Transplanted Kuparuk Mine Site B
				69	Transplanted Kuparuk Mine Site B
				90	Transplanted Kuparuk Mine Site B
				95	Transplanted Kuparuk Mine Site B
				99	Transplanted Kuparuk Mine Site B
				99	Transplanted Kuparuk Mine Site B
				109	Transplanted Kuparuk Mine Site B
				112	Transplanted Kuparuk Mine Site B
				125	Transplanted Kuparuk Mine Site B
				132	Transplanted Kuparuk Mine Site B
				233	Transplanted Kuparuk Mine Site B
				235	Transplanted Kuparuk Mine Site B
				240	Transplanted Kuparuk Mine Site B
				246	Transplanted Kuparuk Mine Site B
				253	Transplanted Kuparuk Mine Site B
				265	Transplanted Kuparuk Mine Site B
				287	Transplanted Kuparuk Mine Site B
				343	Transplanted Kuparuk Mine Site B
				347	Transplanted Kuparuk Mine Site B
				349	Transplanted Kuparuk Mine Site B
				370	Transplanted Kuparuk Mine Site B
				400	Transplanted Kuparuk Mine Site B
				403	Transplanted Kuparuk Mine Site B

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Kuparuk River 4	9/3/92	BB	2	492	Released at Net Site
				700	Released at Net Site
		NSB	143		Released at Net Site
		SSc	4		Released at Net Site
Smith Creek		AG	80	40	Transplanted Kuparuk Mine Site D
				40	Transplanted Kuparuk Mine Site D
				42	Transplanted Kuparuk Mine Site D
				43	Mortality
				43	Transplanted Kuparuk Mine Site D
				43	Transplanted Kuparuk Mine Site D
				45	Transplanted Kuparuk Mine Site D
				45	Transplanted Kuparuk Mine Site D
				45	Transplanted Kuparuk Mine Site D
				45	Transplanted Kuparuk Mine Site D
				45	Transplanted Kuparuk Mine Site D
				46	Transplanted Kuparuk Mine Site D
				47	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				48	Transplanted Kuparuk Mine Site D
				49	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				50	Transplanted Kuparuk Mine Site D
				51	Transplanted Kuparuk Mine Site D
				51	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				52	Transplanted Kuparuk Mine Site D
				53	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				55	Transplanted Kuparuk Mine Site D
				56	Transplanted Kuparuk Mine Site D
				56	Transplanted Kuparuk Mine Site D
				56	Transplanted Kuparuk Mine Site D
				57	Transplanted Kuparuk Mine Site D
				58	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Smith Creek	9/3/92	AG		60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				60	Transplanted Kuparuk Mine Site D
				61	Transplanted Kuparuk Mine Site D
				63	Transplanted Kuparuk Mine Site D
				65	Transplanted Kuparuk Mine Site D
				65	Transplanted Kuparuk Mine Site D
				65	Transplanted Kuparuk Mine Site D
				70	Transplanted Kuparuk Mine Site D
				70	Transplanted Kuparuk Mine Site D
				85	Transplanted Kuparuk Mine Site D
				85	Transplanted Kuparuk Mine Site D
				87	Transplanted Kuparuk Mine Site D
				95	Transplanted Kuparuk Mine Site D
				96	Transplanted Kuparuk Mine Site D
				97	Transplanted Kuparuk Mine Site D
				100	Transplanted Kuparuk Mine Site D
				100	Transplanted Kuparuk Mine Site D
				100	Transplanted Kuparuk Mine Site D
				100	Transplanted Kuparuk Mine Site D
				102	Transplanted Kuparuk Mine Site D
				103	Transplanted Kuparuk Mine Site D
				103	Transplanted Kuparuk Mine Site D
				103	Transplanted Kuparuk Mine Site D
				105	Transplanted Kuparuk Mine Site D
				105	Transplanted Kuparuk Mine Site D
				120	Transplanted Kuparuk Mine Site D
				145	Transplanted Kuparuk Mine Site D
				215	Transplanted Kuparuk Mine Site D
				255	Transplanted Kuparuk Mine Site D
				263	Transplanted Kuparuk Mine Site D
				280	Transplanted Kuparuk Mine Site D
		NSB	286		Released at Net Site
		SSc	6		Released at Net Site
Pebble Creek		AG	11	60	Transplanted Kuparuk Mine Site D
				69	Transplanted Kuparuk Mine Site D
				69	Transplanted Kuparuk Mine Site D
				70	Transplanted Kuparuk Mine Site D
				96	Transplanted Kuparuk Mine Site D
				103	Transplanted Kuparuk Mine Site D
				105	Transplanted Kuparuk Mine Site D
				147	Transplanted Kuparuk Mine Site D
				150	Transplanted Kuparuk Mine Site D
				150	Transplanted Kuparuk Mine Site D
				159	Transplanted Kuparuk Mine Site D
		NSB	69		Released at Net Site
		SSc	5		Released at Net Site
Smith Creek	9/4/92	AG	96	35	Released at Net Site
				39	Released at Net Site
				40	Released at Net Site

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Smith Creek	9/4/92	AG		40	Released at Net Site
				40	Released at Net Site
				40	Released at Net Site
				40	Released at Net Site
				41	Released at Net Site
				43	Released at Net Site
				45	Released at Net Site
				45	Released at Net Site
				45	Released at Net Site
				45	Released at Net Site
				45	Released at Net Site
				45	Released at Net Site
				45	Released at Net Site
				45	Released at Net Site
				45	Released at Net Site
				45	Released at Net Site
				45	Released at Net Site
				46	Released at Net Site
				47	Released at Net Site
				47	Released at Net Site
				47	Released at Net Site
				47	Released at Net Site
				48	Released at Net Site
				49	Released at Net Site
				50	Released at Net Site
				50	Released at Net Site
				50	Released at Net Site
				50	Released at Net Site
				50	Released at Net Site
				50	Released at Net Site
				50	Released at Net Site
				50	Released at Net Site
				50	Released at Net Site
				50	Released at Net Site
				50	Released at Net Site
				50	Released at Net Site
				50	Released at Net Site
				53	Mortality
				53	Released at Net Site
				53	Released at Net Site
				53	Released at Net Site
				55	Released at Net Site
				55	Released at Net Site
				55	Released at Net Site
				55	Released at Net Site
				55	Released at Net Site
				55	Released at Net Site
				55	Released at Net Site
				56	Released at Net Site
				60	Released at Net Site
				60	Released at Net Site
				63	Released at Net Site

APPENDIX II. Fish captured at Kuparuk River fyke net sites, 1992.

Net Location (Figure 2)	Date	Fish * Species Captured	Number	Fork Length (mm)	Comments
Smith Creek	9/4/92	AG		63	Released at Net Site
				63	Released at Net Site
				65	Released at Net Site
				69	Released at Net Site
				70	Released at Net Site
				83	Released at Net Site
				85	Released at Net Site
				89	Released at Net Site
				90	Released at Net Site
				90	Released at Net Site
				91	Released at Net Site
				92	Released at Net Site
				93	Released at Net Site
				93	Released at Net Site
				94	Released at Net Site
				95	Released at Net Site
				95	Released at Net Site
				95	Released at Net Site
				95	Released at Net Site
				99	Released at Net Site
				100	Released at Net Site
				100	Released at Net Site
				100	Released at Net Site
				100	Released at Net Site
				103	Released at Net Site
				103	Released at Net Site
				107	Released at Net Site
				107	Released at Net Site
				107	Released at Net Site
				109	Released at Net Site
				110	Released at Net Site
				110	Released at Net Site
				111	Released at Net Site
				112	Released at Net Site
				112	Released at Net Site
				120	Released at Net Site
				122	Released at Net Site
				122	Released at Net Site
				125	Released at Net Site
				125	Released at Net Site
				130	Released at Net Site
				183	Released at Net Site
		NSB	214		Released at Net Site
		SSc	7		Released at Net Site

AG = Arctic grayling
BB = Burbot
BWF = Broad whitefish
SSc = Slimy sculpin
NSB = Ninespine Stickleback

Appendix III. Laboratory results of Kuparuk River Arctic grayling disease screening, 1992.

ACCESSION NO: 93-0005

ALASKA DEPARTMENT OF FISH AND GAME
FISH PATHOLOGY SECTION, F.R.E.D. DIVISION
333 RASPBERRY ROAD, ANCHORAGE, AK 99518-1599

REPORT OF LABORATORY EXAMINATION

LOT (YEAR, STOCK, SPECIES): Kuparuk River arctic grayling, Thymallus arcticus

FACILITY: ADF&G/Habitat Division

CONTACT PERSON/ADDRESS: Carl Hemming, 1300 College Road
Fairbanks, AK 99701-1599

SAMPLE DATE: 07/19/92
09/01/92

DATE SAMPLE RECEIVED: 07/21/92
09/03/92

SPECIMEN TYPE: whole fish

LIFE STAGE: adult

STATE: fresh

NUMBER IN SAMPLE: 60

WILD: yes

HISTORY/SIGNS: NA

REASON FOR SUBMISSION: Disease history development.

FINAL REPORT DATE: 10/15/92

CLINICAL FINDINGS:

FAT:
0/60 positive for Aeromonas salmonicida
0/60 positive for Yersinia ruckeri Type I
0/60 positive for Yersinia ruckeri Type II
0/20 bacterial isolates from kidneys cross-react with BKD conjugate.
0/3 high level ELISA positive kidneys positive for BKD.

ELISA:
60/60 positive for the antigen of Renibacterium salmoninarum (Rs). Average optical density values $\geq$ 0.095 were considered positive for Rs antigen. Most positive optical density values were low level from 0.1 to 0.3. Two fish had higher levels of 0.914 and 1.269.

VIROLOGY: *0/60 (10 X 5 fish, 2 X 4 fish, 1 X 2 fish pools) positive for virus. The first set of tissues was processed by quantal assay on EPC and CHSE-214 cell lines at 15°C for 19 days and blindpassed for an additional 15 days. The second set was processed by quantal assay on EPC and CHSE-214 cell lines for 14 days and blindpassed for an additional 14 days. Minimum level of detection = 50 infectious particles/gm of tissue. Cells were pretreated with PEG to enhance viral infectivity.*

COMMENTS/RECOMMENDATIONS: *The Rs antigen was detected in 100% of these fish, but mostly at low levels. No cross-reacting organisms were detected nor were Rs cells observed by FAT. The presence of Rs antigen by ELISA indicates previous infection of these fish by the Rs organism, although presently the numbers of Rs cells were below detectable levels by FAT. No virus was detected.*

If these fish are considered for transplant, the positive ELISA findings would require careful evaluation of the disease histories of any resident salmonid stocks in the receiving watershed.

FISH HEALTH INVESTIGATOR: *Jill Follett, Tammy Burton, Ted Meyers*

TECHNICAL ASSISTANCE: *Norman Starkey*

COPIES TO: *FY93, Misc., Burkett, Meyers*