Ecological Research Associates

FINAL REPORT

FALL FISHERIES SURVEY AND PROVISIONAL LIST OF WATERBODIES ALONG THE ALASKAN GAS PIPELINE ROUTE (PRUDHOE BAY TO THE YUKON TERRITORY) PROPOSED BY NORTHWEST ALASKAN PIPELINE COMPANY

TO
FLUOR NORTHWEST, INC.
P.O. BOX 60089
FAIRBANKS, ALASKA 99706
CONTRACT NUMBER 468085-9-K007

FOR:
NORTHWEST ALASKAN PIPELINE COMPANY
FAIRBANKS, ALASKA 99701

MARCH, 1980

FALL FISHERIES SURVEY AND PROVISIONAL LIST OF WATERBODIES ALONG THE ALASKAN GAS PIPELINE ROUTE (PRUDHOE BAY TO THE YUKON TERRITORY) PROPOSED BY NORTHWEST ALASKAN PIPELINE COMPANY

Final Report

Prepared for and Funded by
Northwest Alaskan Pipeline Company

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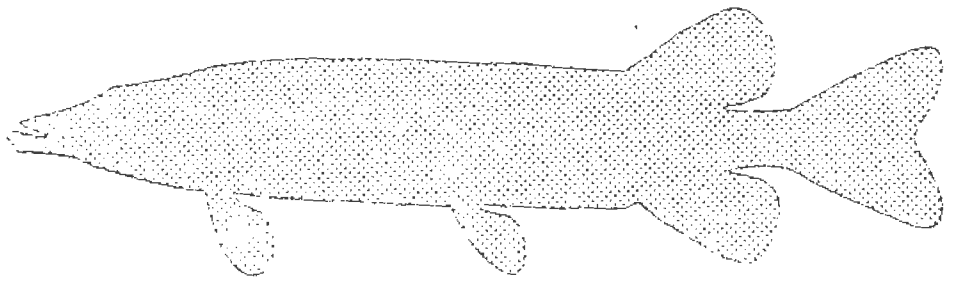
FOREWORD

From a fisheries perspective, fall is a broadly defined period of biological activity extending from late summer to early winter. It is a time of special fisheries importance since many fish spawn during this season and others migrate out of summer feeding areas which may soon dry up, freeze solid or become otherwise uninhabitable in winter.

This report examines the fall season and the activities of fishes in streams potentially affected by the NAPLINE. Few data were available for this period, particularly along the southern routing from Delta Junction to the Canadian Border. This information is a prerequisite to our understanding the year-round use of streams by fish, thereby allowing us to identify critical time periods with regard to the NAPLINE project.



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ABSTRACT

The natural gas pipeline proposed by Northwest Alaskan Pipeline Company traverses hundreds of waterbodies in the Beaufort Sea and Yukon River drainages. This report describes the fall fisheries status of these waterbodies based on a review of available information and a field survey of streams selected for initial examination. Over seventy sources of information (including reports, unpublished documents, agency memoranda and personal communications) were examined for fall fisheries data at 492 crossings of waterbodies along the pipeline route. Results of the field surveys and literature review indicate that approximately half of the streams crossed by the proposed pipeline are used by fish in the fall. An assessment of these data is listed in Appendix II.

This report describes the fall fish use of 59 waterbodies at 68 proposed crossings or near-crossings of the Northwest Alaskan Gas Pipeline in Alaska. Aerial surveys of the Chisana, Nabesna and upper Tanana River (south of Tok) were flown on 23 August and 11 October 1979, but salmon were not sighted. Ground surveys were conducted between 15 September and 3 October 1979. Biological, chemical and physical data gathered are listed in a stream catalogue. Fish species caught were grayling, humpback whitefish, round whitefish, chum salmon, northern pike, burbot, longnose sucker, lake chub, slimy sculpin and ninespine stickleback.

Fish used 38 of the 68 waterbody crossings surveyed during the fall period. No fish were caught at the remaining 30 crossings; of these, fall habitat was found suitable for fish use at 11 but unsuitable at 19. Evidence of fall spawning was observed in Mosquito Lake and the Tanana River Side Channel where round whitefish and chum salmon respectively were near a spawning condition. Many of the streams surveyed were dry or of a small size and depth and likely to freeze solid in winter. Since the eggs of fall spawning species incubate throughout the winter and hatch in spring, fall spawning cannot successfully occur in many of the small streams that were studied.

INTRODUCTION

Northwest Alaskan Pipeline Company proposes to construct the Alaskan nt of a buried pipeline which would transport chilled natural gas the arctic to southern markets. The proposed routing of the west Alaskan Pipeline (NAPLINE) parallels the Alyeska Oil Pipeline Prudhoe Bay to Delta Junction with some minor variances, and then ows the Haines-Fairbanks Products Pipeline right-of-way east from a Junction to the Alaska/Canada border.

On 4 January 1979, LGL Ecological Research Associates (LGL) was rded a contract by and through Fluor Northwest, Inc., funded by thwest Alaskan Pipeline Company to conduct fisheries surveys along NAPLINE route. The major purposes of these surveys were to identify e waterbodies crossed or potentially affected by the NAPLINE project d to assess the fish utilization of these waterbodies during winter, ring and fall seasons. This report presents the results of the fall ogram: (1) a provisional list of 492 waterbodies crossed or potentially ffected by the NAPLINE with an evaluation of existing fall fisheries ata for each; and (2) a fall assessment of waterbodies selected for ield examination during the period, 23 August-11 October 1979.

Fall Studies

Objectives and Justification

The objectives of the 1979 fall fisheries study were to:

1) Investigate the presence, absence and species composition of fish in selected streams for which available fisheries data are inadequate,

2) Record fish use (spawning, rearing and migrating) of selected aquatic habitats, and

3) Record stream features which may affect fish utilization of the habitat (e.g., impassible natural barriers or drainage structures).

Fish populations along the NAPLINE route typically require a variety of aquatic habitats to complete their life cycle. Several streams or sections of streams are required by these fish at specific times of the year. A common pattern, for example, is for fish to overwinter at one location, feed at another and spawn at still another. It therefore becomes necessary to investigate streams during each biologically-important season since fish utilization generally varies from stream to stream. The purpose of the present fisheries program is to document which streams are important to fish during the fall season. Many species

in the study area spawn at this time: Dolly Varden, arctic char, lake trout, inconnu, ciscoes, lake whitefish, round whitefish, humpback whitefish, king salmon, chum salmon and silver salmon. Fall is also a time when fish typically migrate from their summer feeding and rearing areas to overwintering areas. Many summer feeding and rearing areas are located in upstream portions of drainages that freeze to the bottom during winter. Fall downstream migrations are especially important since fish would likely perish in winter if such movements were not successfully completed.

Selection of Streams for Field Investigation

An evaluation of available fall information for the hundreds of streams crossed by the NAPLINE was based on an extensive literature survey, communication with state and federal agencies and professional experience. Primary sources for literature were published government and consultant reports and file data from the Joint Fish & Wildlife Advisory Team (JFWAT) in Anchorage. Agencies consulted included: State Pipeline Coordinators Office, Alaska Department of Fish and Game (Habitat, Commercial and Sport Fish Divisions) and U.S. Fish and Wildlife Service (Stream Alteration Division). Early in this review process, a list of criteria was developed to standardize the manner in which waterbodies were evaluated (Table 1).

Report Format

This report combines historical information together with data generated during field surveys in order to provide an interim assessment of fall fish use of selected streams affected by the NAPLINE route. A provisional list of 492 waterbodies crossed or potentially affected by the NAPLINE along its route from Prudhoe Bay to the Canadian Border is presented in Appendix II. For each of these streams, sources of available fall fisheries data and the current status of this information are indicated.

Data gathered during the fall field survey are presented on a stream-by-stream basis ("Stream Catalogue"). This information is also presented in a tabular summary of results (Table 2).

STUDY AREA

The study area addressed in this report extends along the NAPLINE route from Prudhoe Bay south to Fairbanks and then east to the Alaska/Yukon border (Figs. 1-4). For descriptive purposes, the route has been separated into two distinct regions: the northern segment and the southern segment.

The northern segment is aligned closely with the Trans-Alaska Pipeline System (TAPS) oil line and work pad and extends from Prudhoe

Table 1. Criteria for evaluating available fisheries data for the fall season.

Number*	Fall Criteria
1	Fall Use Area--Waterbody investigated and fish use in fall documented.
2	No Fish Use in Fall--Waterbody investigated and no fish use in fall documented.
3	No Fish Use in Fall Inferred--Absence of fall habitat inferred and supported by indirect evidence: small drainage with negligible, intermittent or no fall flow, or fish blockage present.
4	Additional Data Needed--Waterbody investigations incomplete or lacking for fall season: waterbody has not been surveyed for fish use in fall, or previous data were inconclusive.

*Cited in Appendix II.

Table 2. Results of fall survey (23 August-11 October 1979) of selected streams in the [illegible] used are: ? (suspected spawning or migration), GR (grayling), NP (northern pike), DV (Dolly Varden), RW (round whitefish), DS (chum salmon), BB (burbot), LS (longnose sucker), LC (lake chub), CN (slimy sculpin), [illegible] stickleback), NPSI (Northwest Pipeline Stream Identification Number).

Waterbody	NPSI	Fall Migration or Movement	Feeding and Rearing (Species)	No Fish Captured: Good* Habitat Present	No Fish Captured: Habitat Marginal* or Absent	Potential Fish Blocks Present	Text Page
Unnamed Creek	6-227.02	X	RW,NP				19
Scottie Creek	6-227	X	BB,LS				21
Desper Creek	6-226	X	NP				23
Sweetwater Creek	6-225				X	X	25
Unnamed Creek	6-222	X	GR			X	27
Gardiner Creek	6-219	X	GR,LS				29
Tenmile Creek	6-218			X			31
Beaver Creek	6-215	X	GR,LS				33
Bitters Creek	6-212		GR			X	35
Tanana River at Tok	6-207A,B,C	X	GR,LS,BB,RW,RW,NP,LC,CN				37
Tok River	6-205	X	GR,RW,CN				39
Crystal Springs	6-203.03	X	GR,NP				41
Yerrick Creek	6-201	X	GR,RW				43
Unnamed Creek	6-193.01				X	X	45
Unnamed Creek	5-190				X	X	47
Robertson River	5-187	X	LC				49
Bear Creek	5-185	X	GR				51
Chief Creek	5-184				X		53
Unnamed Creek	5-179		GR,RW,CN			X	55
Berry Creek	5-178	X	GR,LS,CN				57
Sears Creek	5-177	X	GR			X	59
Dry Creek	5-176				X	X	61
Johnson River	5-175	X	GR,RW,LC				63
Gerstle River	5-172	X	GR				65
Tanana River Side Channel	5-165.01	X	GR,DS,LS,RW				67
Shaw Creek	5-165	X	GR,RW				69
Rosa Creek #2	5-162				X	X	71
South Fork Minton Creek #7	5-161	X		X			73
Small Creek	5-159.02				X	X	75
Redmond Creek	5-159	X	GR			X	77
Unnamed Tributary to Salcha River	4-158.03				X	X	79
TAPS Slough	4-158.02				X	X	81
Unnamed Slough	4-158.01				X	X	83
Oxbow Slough	4-157.02				X	X	85
Little Salcha River	4-157	X	GR,CN				87

Table 2. (continued)

Waterbody	RPSI	Fall Migration or Movement	Feeding and Rearing (Species)	No Fish Captured		Potential Fish Blocks Present	Text Page
				Good* Habitat Present	Habitat Marginal* or Absent		
Million Dollar Creek #4	4-156	X	CN				89
French Creek #0	4-155	X	CN				91
Knokanpeover Creek	4-154	X	GR				93
French Creek #5	4-149	X		X			95
Bear Lake Outlet	4-148.01				X	X	97
Moose Creek #1	4-148	X	GR,HW				99
Moose Creek #2	4-147	X	BB,HW,RW				101
Moose Creek #3	4-146	X		X			103
Steele Creek	4-143				X	X	105
Engineer Creek	4-142				X	X	107
Goldstream Creek	4-141	X	GR				109
Treasure Creek	4-140			X		X	111
Shocker Creek	4-138	X	GR,CN				113
Washington Creek	4-137	X	GR				115
South Fork Aggie Creek	4-136				X	X	117
North Fork Aggie Creek	4-135				X	X	119
Tolovana River	4-128	X	GR				121
Roche Moutonee Creek	2-24	X	GR				123
Mainline Spring	2-23.02	?		X			125
Musquito Lake	2-22.01		BB,RW				127
Oksrukuyik Creek	1-19	?		X			129
Shifish Creek #2	1-18.03	?		X			131
Lower Oksrukuyik Creek #1	1-18.01	X	GR,CN				133
Clark's Lake	1-12.03			X			135
Stump Creek	1-12.02	X	GR,S9			X	137
Sagavanirktok River Side Channel #1	1-7.10				X	X	139
Sagavanirktok River Side Channel #2	1-7.08				X	X	141
Sagavanirktok River Side Channel #3	1-7.07				X	X	143
Sagavanirktok River Side Channel #4	1-7.04			X			145
Sagavanirktok River Side Channel #5	1-7.03	X	GR,S9				147
Sagavanirktok River Side Channel #6	1-7.02	X	S9				149
Little Putuligayuk	1-3			X			151
Putuligayuk River	1-	X	S9				153

*Refer to page 15 in text for description of "Good" and "Marginal" habitat.

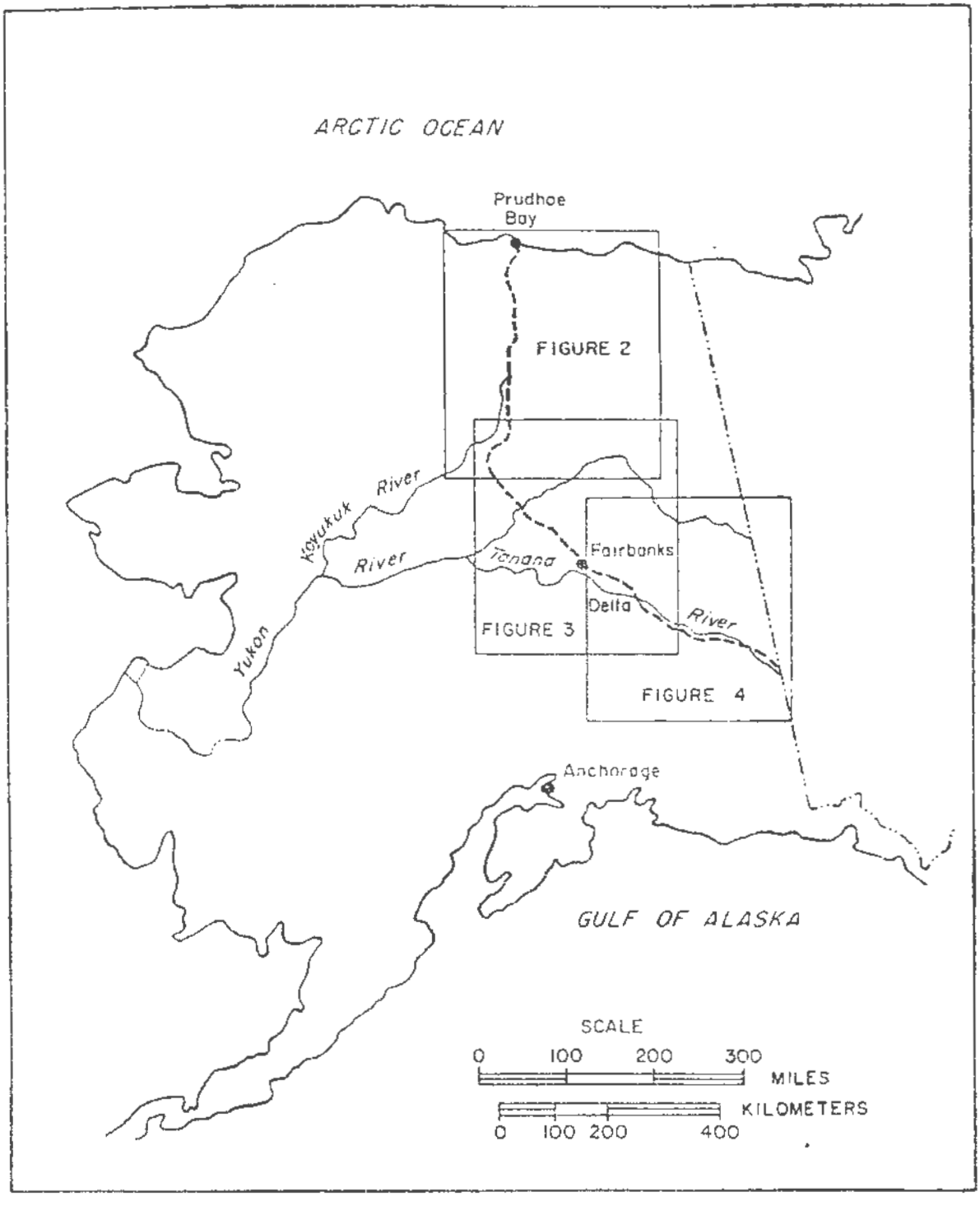

Fig. 1. Route of the proposed NAPLINE from Prudhoe Bay to the Alaska/Yukon border.

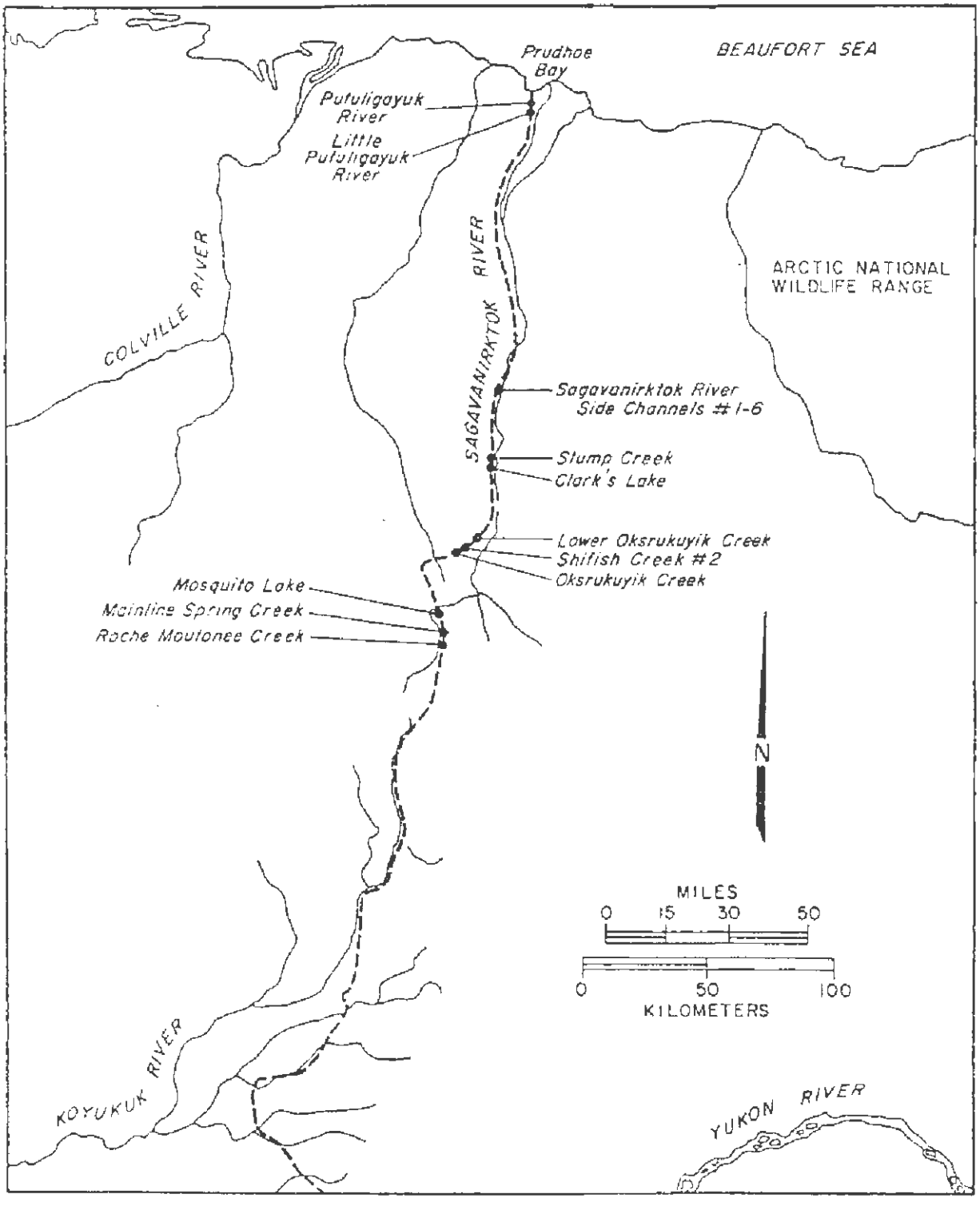

Fig. 2. NAPLINE route and sample sites from Prudhoe Bay to the headwaters of the Koyukuk River.

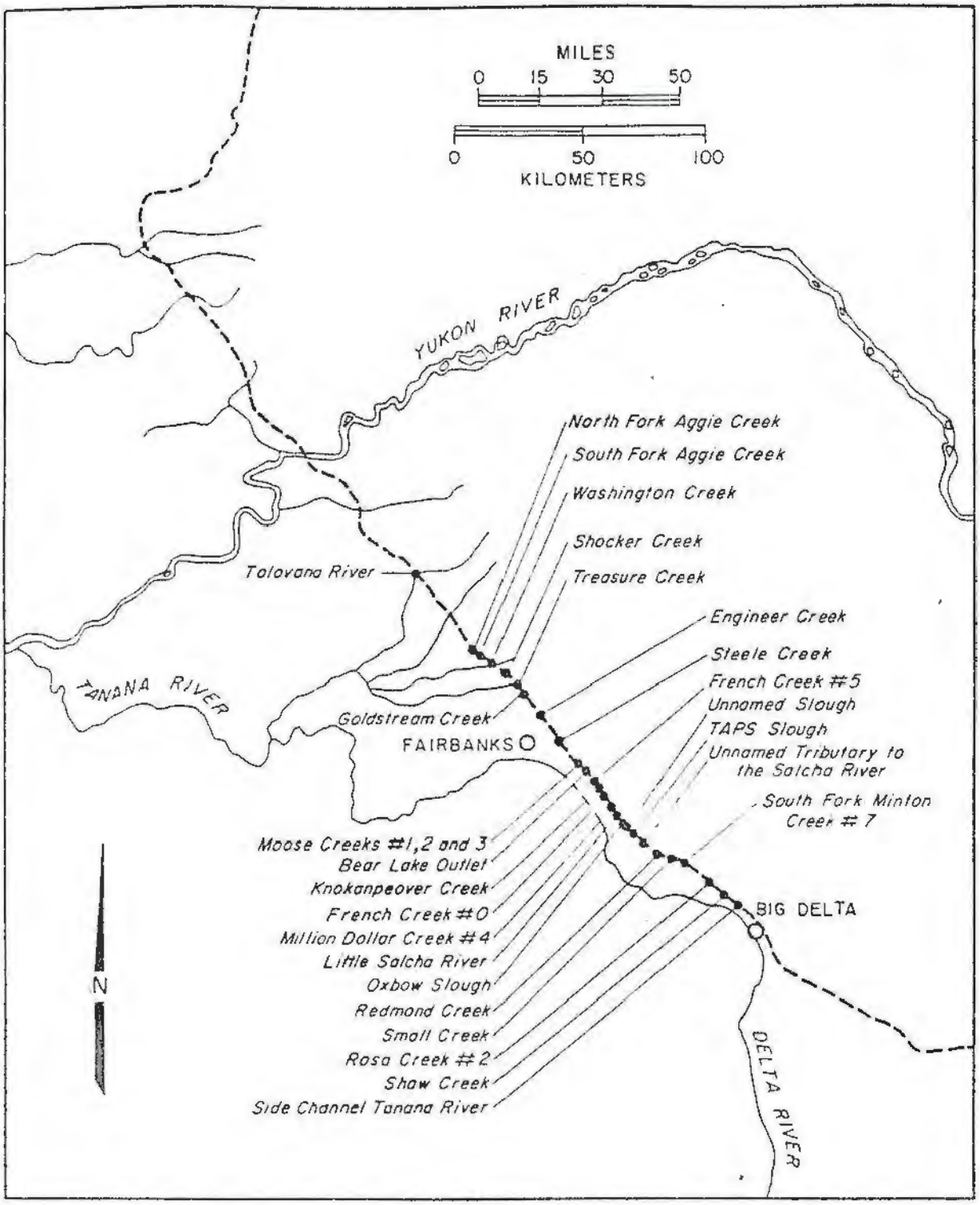

Fig. 3. NAPLINE route and sample sites from the headwaters of the Koyukuk River to Big Delta.

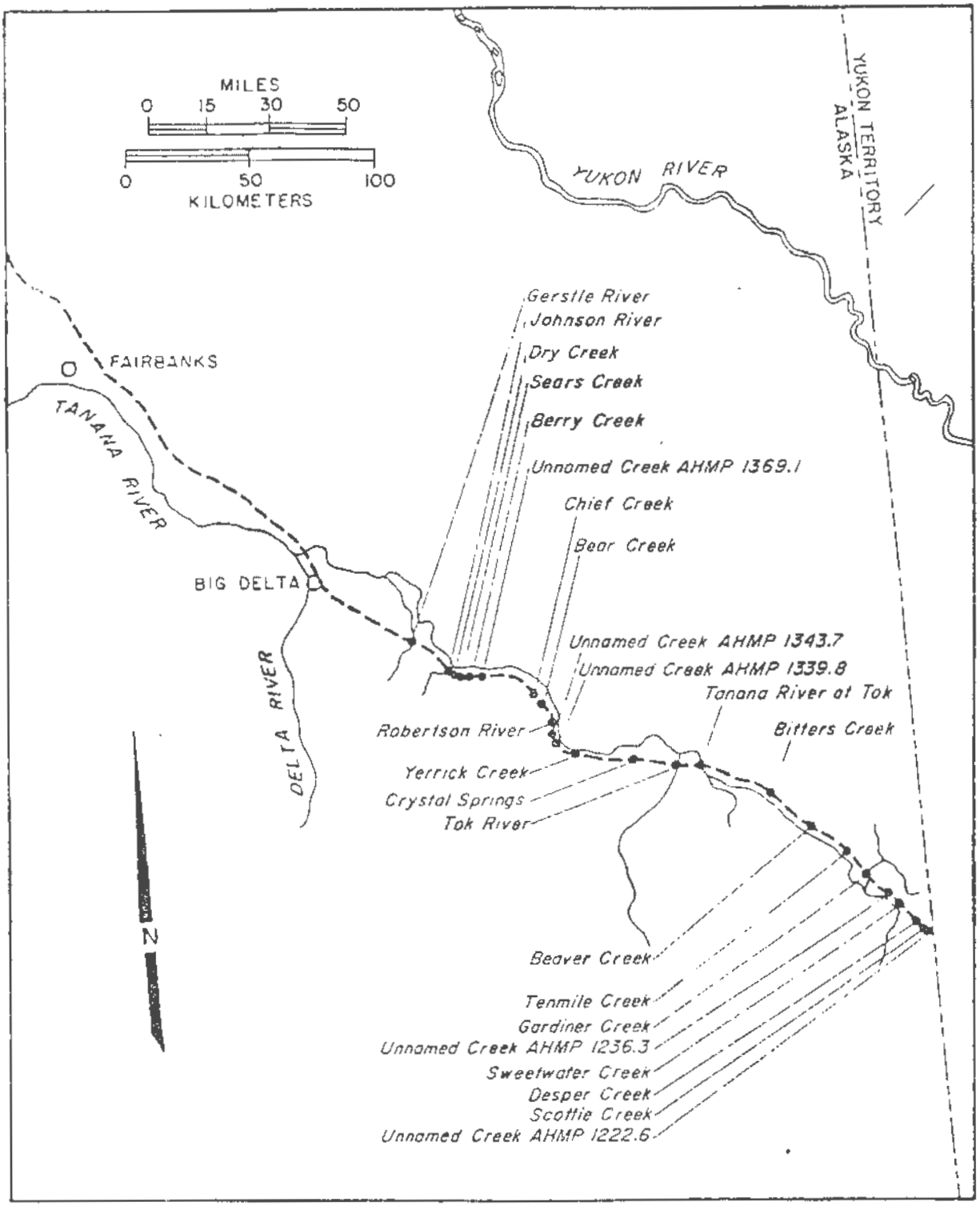

Fig. 4. NAPLINE route and sample sites from Big Delta to the Alaska/Yukon border.

'ay to Delta Junction. Between Prudhoe Bay and Atigun Pass, a distance f approximately 276 km, the proposed route crosses the arctic coastal plain, traverses the northern foothills of the Brooks Range and crests Atigun Pass--the highest point in the Alaska routing. Within this area, the NAPLINE alignment parallels most of the Sagavanirktok River and crosses numerous side channels. Larger streams like the Sagavanirktok characteristically are fast-flowing, clear and have wide, extensively braided, gravel floodplains. They support resident and anadromous fish at different times of year and are often used for overwintering. Smaller streams along this section are usually narrow, single channel drainages with stained water and support fewer species of fish than larger streams. Thes drainages usually freeze to the bottom in winter. Surrounding vegetative types include willow, penny birch and dwarf tundra flora.

South of Atigun Pass, the route continues through the Brooks Range where it crosses the Dietrich and Upper Koyukuk drainages. Most streams within the first 130 km south of Atigun Pass are wide, braided and fast-flowing throughout the summer. Floodplains are gravel and usually without meanders. Vegetative cover in this region changes from white spruce, lichens and dwarf willows in mountainous areas to black spruce and birch, intermixed with tundra and muskeg in lower elevations.

Approximately 130 km south of Atigun Pass, the NAPLINE route enters the Yukon drainage where most streams exhibit a high degree of meandering. Although some of the larger streams are clear, most are stained brown with tannins and lignins leached from muskeg areas. Many of the larger streams, like the Koyukuk and Jim River, support overwintering fish and provide habitat for fall spawning salmon. Although most small streams do not provide overwintering habitat, they are used by juvenile and young-of-the-year fish during summer. Dwarf spruce and willow are predominant in tundra areas, while large spruce and birch vegetate river bottoms.

From the Yukon River crossing, the NAPLINE parallels the TAPS oil line through the White Mountains and into the Fairbanks area. Here the northern segment routing continues southeast within the Tanana River Valley to Big Delta.

The southern segment of the study area begins near Delta Junction where the NAPLINE route diverges from the Trans-Alaska Oil Pipeline. The proposed gas line continues southeast from Delta Junction, and parallels the Fairbanks-Haines pipeline to the Yukon border. Throughout most of the 313 km between Delta and the Yukon border, the route is within the broad, flat Tanana River Valley or in the northern foothills of the Alaska Range. This routing passes through alternating tundra or muskeg and mature stands of spruce, birch and willow.

Within the first 100 km east of Delta Junction, the NAPLINE crosses four major rivers: Little Gerstle, Gerstle, Johnson and Robertson rivers. These are glacial rivers that are highly turbid and have extensively braided floodplains. Most other drainages crossed in this area are small tundra streams which are used by fish during summer but often freeze solid during winter.

The current alignment leaves the foothills of the northern Alaska Range near Tok, Alaska, and borders the Tetlin Flats. This is a wet muskeg area characterized by an abundance of lakes, ponds and small streams. During ice-free months, many lakes and most small streams are used by waterfowl and fish. During winter, the smaller waterbodies freeze solid and do not provide overwintering habitat. Larger streams on the southern section, like the Tanana and Chisana rivers, become clear in early winter and provide overwintering habitat. From Tetlin Flats, the NAPLINE alignment continues east through the Upper Tanana River drainage basin to the eastern boundary of the study area--the Alaska/Yukon border.

METHODS

Fall field investigations were conducted between 23 August and 11 October 1979. Two aerial surveys were conducted in the upper Tanana River drainage in an effort to locate fall spawning species of salmon. The low altitude surveys were accomplished by means of a Cessna 180 fixed-wing aircraft on 23 August, 1979 and 11 October 1979.

Ground surveys along the proposed NAPLINE route were conducted by two two-man field crews. The TAPS Haul Road provided access to streams investigated 15-20 September between Atigun Pass and Prudhoe Bay. Existing transportation routes (the Richardson and Alaska Highways and the TAPS Haul Road) and a Bell 206B Jet Ranger helicopter provided access to areas surveyed between the Alaska/Canada border and the Yukon River 25 September-3 October 1979.

The series of Northwest Pipeline route sheets used throughout this report to identify stream locations is indicated in Reference 42.

Field Samples

Streams were examined in the vicinity of each NAPLINE crossing selected for investigation. Field surveys were generally conducted within 100 m upstream and 100 m downstream of the proposed crossing. The habitats sampled were those most likely to be used by fish (i.e, calm backwater or eddys for juvenile and young-of-the-year fish, deep pools for adult fish and shallow gravel areas for bottom-dwelling fish). Where appropriate, data describing biological, chemical and physical conditions of streams were collected and are presented within this report.

Fish

A variety of techniques were used to sample fish. Within shallow waterbodies, the Smith-Root Type VIII-A backpack electroshocker was generally most effective. Beach seines of 1/8-inch mesh also proved effective. In larger and deeper streams, monofilament (1.2-1.8 cm square mesh) and nylon (1.8-3.2 cm square mesh) gillnets provided primary means of sampling. Angling, dipnets, minnow traps, baited set lines and visual (including low altitude aerial) observations were also used where appropriate.

With the exception of some large catches, captured fish were measured to the nearest millimeter and released if possible. When large numbers of one species were captured, all fish were counted but only minimum and maximum lengths were measured to obtain length ranges. Fork lengths were recorded for all species except burbot and slimy sculpin where total lengths were measured.

Since age and growth data are not available for specific waterbodies examined in this study area, life history classifications (fry, juvenile and adult) are professional judgements based on age and growth information for the general region.

Physical and Chemical Measurements

Flow was measured with a Gurly Pigmy current meter. The lower detection limit of this meter is approximately 0.005 m/sec when stream flow is measured for a standard period of 60 sec. Stream discharge was calculated based on stream velocity and the cross-sectional area of water. The latter was calculated from measurements of velocity and depth at intervals which varied from 0.25 to approximately 2.5 m, depending on stream size. Depth profiles obtained in this manner have been filed with Northwest Alaskan Pipeline Company and Fluor Northwest, Inc.

Dissolved oxygen (Hach Kit Model OX-2P), pH (Hach Kit Model 17-N), conductivity (YSI Model 22 S-C-T) and temperature (Taylor field thermometer) were measured when free water was present. A Hach Mini pH meter and the temperature mode of the S-C-T meter were utilized to ensure precision and accuracy. Early in the survey equipment malfunction necessitated discontinued use of the Mini pH meter. Water quality test equipment was calibrated in the field with each use according to manufacturers' instructions and, as closely as possible, to methods provided in the 14th edition of Standard Methods for the Examination of Water and Wastewater. Taylor field thermometers, calibrated against an NBS certified thermometer, were accurate within the limits of manufacturers' specifications. Calibration of field equipment for the purpose of quality control may be found in Appendix I.

Conductivity measurements are recorded at field temperatures. Conversion of these values to conductivity at standard temperature (25°C) may be accomplished by using calculations provided in the 14th edition of Standard Methods for the Examination of Water and Wastewater.

Water color, bottom type, channel and floodplain width, and distances of sampling sites from the proposed NAPLINE crossing were estimated in the field and should be considered approximations of conditions at the time of the observation.

Data Limitations

Although a variety of sampling gear was used to collect fish, it is recognized that each method is, to some degree, selective for sizes of fish. Gillnets do not capture young-of-the-year fish and minnow traps do not catch larger fish. Angling tended to catch only large fish in

clear streams. Beach seining was effective in shallow water for juvenile and young-of-the-year fish but generally failed to catch larger fish. Electroshocking was the most effective means of collecting fish in the majority of streams sampled. This method collected bottom-dwelling fish, young-of-the-year fish and juvenile and adult fish. The most obvious limitation of this method was the depth to which the operator could work. Deep streams, which could not be waded and electroshocked, were sampled with gillnets, angling and/or aerial surveys. Despite these sampling variabilities, it was felt that by using the appropriate gear for the habitat sampled, the catch was representative of the fish present.

RESULTS AND DISCUSSION

Provisional List of Waterbodies

In a large-scale project such as pipeline construction, it is essential for reference purposes to maintain an updated list of waterbodies crossed or potentially affected by the pipeline. To date, the provisional list contains 492 entries (Appendix II). References 4, 11, 42, 43 and 48 provided the basis for this list which includes lotic and lentic habitats known to contain fish or having potential for fish utilization. Many waterbodies have multiple NAPLINE crossings--each crossing is treated as a separate entry in the list.

References that contain fall fisheries data are listed for each waterbody and the most recent evaluation of this information, according to the criteria listed in Table 1, is presented. It must be emphasized that this review is an ongoing process. Since our initial examination of available information one year ago, a substantial amount of new data has been gathered. These data, together with site inspections of streams in the study area have allowed a more realistic appraisal of streams and fish populations along the NAPLINE. These up-dated results indicate that the largest category of streams now included in the provisional list are those known to be used by fish during fall. However, there is also a large group of "borderline" streams for which data are considered inadequate to confidently classify their fall fisheries utilization. In all, 161 crossings of 130 waterbodies require more information. Most of these waterbodies are thought to have a low fisheries potential in fall because of their small size (drainage basins usually less than five square miles).

General Results of Fall Survey

The fall field program utilized aerial and ground surveys to collect fisheries data along the NAPLINE route. Two aerial surveys of the Chisana, Nabesna and Upper Tanana River (south of Tok) drainages were conducted on 23 August and 11 October 1979. The purpose of these surveys was to identify any utilization by anadromous species (primarily

chum and coho salmon) of this area. Existing knowledge of salmon resources in the Tanana River drainages above the Alaska Highway is very limited and relies greatly upon personal communication with local residents and fishermen (Ref. 8). Historical and recent observations, although vague and sometimes conflicting, suggest that a few salmon utilize some areas of the drainages in question, but there are no major concentrations.

Aerial surveys were extensive and, in general, surveyed the main channel and all clearwater tributaries of the Chisana, Nabesna and Upper Tanana Rivers. Special attention was given to specific locations of historical salmon sitings and observations that identified potential salmon spawning areas (e.g., mouth of Scottie Creek, upper Chisana River near Sheep Creek, mouth of the Tetlin River). Fish observations in the main channel of the Nabesna, Chisana and upper Tanana Rivers were hampered by turbidity but visibility and flying conditions were otherwise excellent on both surveys. Good habitat (clear water, substantial flow, cobble and gravel bottom and deep pools and shallow riffles) was apparent in many clearwater tributaries of the Chisana and Nabesna Rivers. Numerous small fish (15-30 cm) were sited in backwaters of the main channel of the Nabesna River. These were believed to be grayling or whitefish. No salmon or their remains and no concentrations of carrion eating birds such as ravens, gulls and eagles were observed on either aerial survey. After completion of the survey on 23 August, a local resident of Northway indicated that salmon had been present the previous year near Sheep Creek on the Chisana River and that one or two salmon were also caught in a fish wheel four miles downstream from Northway on the Tanana River.

Ground surveys were conducted along the NAPLINE route from 15 September to 3 October 1979. During these surveys, 59 waterbodies (some with multiple crossings) including side channels of major rivers, lakes, streams, sloughs and a spring were investigated. In all, 68 crossings were examined.

Ten species of fish were collected at 38 of the waterbody crossings sampled:

Arctic grayling (*Thymallus arcticus*)
Northern pike (*Esox lucius*)
Humpback whitefish (*Coregonus clupeaformis*)
Round whitefish (*Prosopium cylindraceum*)
Burbot (*Lota lota*)
Longnose sucker (*Catostomus catostomus*)
Lake chub (*Couesius plumbeus*)
Slimy sculpin (*Cottus cognatus*)
Chum salmon (*Oncorhynchus keta*)
Ninespine stickleback (*Pungitius pungitius*)

The species caught and their use of streams along the NAPLINE route are summarized in Table 2 and presented in detail in the Stream Catalogue. Grayling were the most frequently occuring species and were present in 28 of 36 waterbodies found to contain fish.

The 38 waterbodies found to support fish populations during fall were used for feeding (rearing), migrating and/or spawning by one or more of the above-mentioned species. Waterbodies utilized for spawning were identified by the presence of pre-spawning or ripe adults. The absence of pre-spawning or ripe adults does not necessarily indicate that spawning did not occur. Fall spawning species (whitefish and salmon), although common to the study area, were found in only 10 waterbodies surveyed during fall. Mosquito Lake and, presumably, the Tanana River Side Channel were determined to be utilized for spawning. Numerous pre-spawning round whitefish were captured in Mosquito Lake and a single ripe male chum salmon was captured in the Tanana River Side Channel.

Fall migration or dispersal of fish was probable in the fish-bearing streams surveyed. Movements probably varied from minor dispersal to major upstream and/or downstream migrations to overwintering areas. Data regarding the magnitude, timing and direction of runs are difficult to obtain without extensive monitoring beyond the scope of this program.

Twenty-five waterbody crossings were found to have potential barriers to fall fish movement in the NAPLINE area. Barriers, both natural (log jams, beaver dams, waterfalls and dry areas) and artificial (highway culverts and low water crossings) varied greatly in permanency and effectiveness. Detailed descriptions of fish barriers can be found in the appropriate stream assessments.

No fish were captured at or near 30 waterbody crossings surveyed during fall. Using the following guidelines, habitat was considered to be good at 11 waterbody crossings but marginal or absent at 19:

Good fish habitat--generally had an adequate water depth (15-20 cm minimum), measureable flow (at least 0.1-0.3 m^3/sec), and high dissolved oxygen concentration (5 mg/ℓ minimum). These sites were typically characterized by a pH which ranged from 6.5-8.5, adequate cover and no major barriers to fish movement.

Marginal fish habitat--generally had water depths less than 15-20 cm with negligible or intermittent flow. Potential barriers to fish movements were common at these sites.

Patterns of Fish Movements and Stream Usage

After breakup has occurred, fish are normally found in three general types of streams along the NAPLINE route: (1) small beaded tundra streams, (2) large-size creeks, and (3) large rivers. The small beaded tundra stream (e.g., Shocker Creek and S.F. Minton Creek) is usually frozen solid during winter and breaks up between late March and early June. These streams vary from 0.5-1.5 m in width and seldom exceed 1 m in depth. Substrates are variable but contain gravel, sand, silt and detritus. Although the water is usually clear, it is frequently stained from tannins

and lignins leached from surrounding vegetation. Stream banks are often 0.5-1.5 m in height, undercut and vegetated with dwarf willow and birch.

Within the proposed NAPLINE corridor, small beaded tundra streams like Shocker Creek are used primarily by grayling, but round whitefish and/or char may occasionally be present depending on geographical location of the stream. Adult grayling may move into these streams at spring breakup, spawn and then move some distance back downstream. During the egg incubation period (early May to early July) juvenile grayling, juvenile whitefish and/or juvenile char may also move upstream into these areas. After the grayling eggs have hatched in late June to early July, emergent fry remain in the general vicinity until freeze-up. As fall approaches and water temperature drops, all fish begin moving downstream to overwintering areas. Small beaded tundra streams generally do not provide spawning habitat for fall spawning species.

The large creeks or small rivers (e.g., Prospect Creek, Moose Creek or Beaver Creek) are usually 5-10 m in width, with stained or clear water, and a substrate consisting primarily of gravel and sand. Banks, 0-2 m in height, are seldom incised. These drainages typically exhibit alternating stretches of deep, slow-moving water and shallow, rapid riffles. Some pools, especially in lower reaches, may be deep enough to provide overwintering habitat.

Within the proposed NAPLINE corridor, medium size streams receive more intense use by fish than small beaded tundra streams. Excluding overwintering, these drainages generally serve as major spring and fall migration routes for many species. Some, especially those with perennial spring sources, may be used for spawning by spring and fall spawning species. Young-of-the-year of fall spawning species (primarily whitefish and char) and eggs of spring spawning species (primarily grayling, northern pike, longnose sucker and slimy sculpin) may be present during spring. By late June or early July fry of spring spawners have emerged and may remain in the vicinity until freeze-up. Many streams are used intensively as nursery areas throughout the open-water season by juvenile grayling, whitefish, sculpin, pike, chub, char and others. Adult fish of several species are commonly present throughout the season. Some of the most northerly medium-sized streams may also support an anadromous fish run during the open water season. As fall approaches, fish generally begin moving downstream to overwintering areas.

Large rivers similar to the Tanana, Yukon, Koyukuk and others vary from 100-1000 m in width and 1-10 m in depth. Floodplains are usually braided and consist of gravel, sand, and silt, depending on river origin. Large rivers usually do not freeze solid and so they provide year-round habitat for fish.

Large rivers are the primary migration pathways for all species of anadromous fish. During spring, many juvenile salmon migrate downstream to enter the ocean; others may remain in freshwater for one or two years, depending on the species. A variety of freshwater fish also use large rivers as migration routes, spawning sites and nursery areas the year-round. Virtually all large rivers provide overwintering habitat for fish.

Stream Catalogue

The purpose of the following stream catalogue is to provide a ready access to fisheries data available for waterbodies examined during the fall survey (15 September-3 October 1979). For each stream entered in this catalogue, the following information is provided:

Waterbody	- Location of waterbody, section surveyed and applicable identification numbers.
Assessment	- A brief description of the waterbody and assessment of its potential for fish in fall.
Fish	- Description and results of fish sampling efforts.
Physical Conditions	- Description and results of chemical and physical measurements.

Several reference systems have been used to identify the location of each waterbody along the NAPLINE route:

NPSI	- The Northwest Alaskan Pipeline Stream Identification (NPSI) numbering system.
Highway Milepost	- Highway milepost numbers indicate the point of intersection between the waterbody and the indicated highway. When these do not intersect, milepost designations refer to the point on the highway which is closest to the sampling location.
Pipeline Milepost	- Pipeline mileposts for the Northwest Alaskan Pipeline are indicated on the Fluor 1979 alignment sheet series (Ref. 42).
USGS Map	- United States Geological Survey maps are the 1:250,000 scale series. Township, range and section number of specific sampling locations are indicated.

Abbreviations used in the catalogue are listed:

Identification

NPSI	- Northwest Alaskan Pipeline stream identification number.

Milepost

AHMP	- Alaska Highway Milepost
NPMP	- Northwest Alaskan Pipeline Milepost (Ref. 42)

Pipeline

NAPLINE	- Northwest Alaskan Pipeline (Ref. 42)
TAPS	- Trans-Alaskan Pipeline System

Fishing Method

GN	- Gillnet
SL	- Setline
MT	- Minnow Trap
EF	- Electrofished
AN	- Angler
DN	- Dipnet

Units

km	- Kilometer
m	- Meter
h	- Hour

Stream Crossings

CMP	- Corregated metal pipe
LWC	- Low water crossing

Other

NA	- Not applicable

Abbreviations have been combined to present a simple and concise means of representing sampling gear and fishing effort expended at a specific sampling location. The number or size and type of sampling gear is given first, followed by effort in parentheses. For example, a 15 m gillnet fished for 20 hours would be presented as follows: 15mGN(20h). Effort in parentheses is always given as a cumulative total; effort for electrofishing refers to the distance of stream fished.

FALL SURVEY FORM

WATERBODY

Waterbody Unnamed Creek 1222.6

Main Drainage Chisana River Tributary to Scottie Creek

Figure 4 Northwest Alignment Sheet 131

Identification Nos: NPSI 6-227.02 NPMP 738.3

Alaska Highway Milepost 1222.6

USGS Map Reference Nabesna, Ak. T 10N R 23E Sec 24

Site Access On foot from Alaska Highway

Section Surveyed From NAPLINE crossing downstream approximately 400 m

ASSESSMENT

Unnamed Creek 1222.6 is a slow-flowing, humic-stained stream which meanders through a large marshland area before emptying into Scottie Creek. Sedges is abundant along its low banks and throughout the marsh area. Willows lined the outer margins of the floodplain. This stream is not crossed by the proposed NAPLINE but flows within 50 m of current alignment and therefore has potential for impact by construction and/or operation of the NAPLINE.

Fall fish habitat is good and utilization high in Unnamed Creek 1222.6. Fish were abundant in several habitats: shallow ponds connected to the stream, shallow inundated shelf areas along its banks and in the stream proper. This stream is a fall feeding and rearing area for northern pike and humpback whitefish and a migration route for the fish present. Examination of adult whitefish captured during the 1979 fall survey revealed that these fish would not have spawned this fall.

FISH

Date: 27-28 September 1979

Fish Present: Yes

Gear/Effort: 20mGN(21h)
4mGN(21h)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Humpback whitefish		16		324-429
Northern pike		4		216-394

PHYSICAL CONDITION

Date	27-28 September 1979
Channel Width (m)	2-4
Floodplain Width (m)	50
Water Depth (cm)	43-113
Discharge (m^3/s)	0.68
D.O. (mg/ℓ)	9.0
Temperature (°C)	4.0
Conductivity (μmhos/cm)	70
pH	7.0
Color	Humic-stained
Turbidity	Slightly turbid
Bottom Type	Mud
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Scottie Creek

Main Drainage Tanana River Tributary to Chisana River

Figure 4 Northwest Alignment Sheet 131

Identification Nos: NPSI 6-227 NPMP 737.5

Alaska Highway Milepost 1223.4

USGS Map Reference Nabesna, Ak. T 10N R 23E Sec 24

Site Access On foot and via zodiac raft from Alaska Highway bridge

Section Surveyed 350 m upstream of NAPLINE to 100 m downstream

ASSESSMENT

Scottie Creek is a deep, meandering stream 15-20 m wide. Its earthen banks are steep, grassy and lined with willow, alder and spruce. The channel is relatively uniform in size upstream and downstream from the NAPLINE with sunken logs and abundant debris. At the time of the fall survey large quantities of bark and leaves were also present in the water.

Scottie Creek was a rearing and feeding area for burbot and longnose sucker during present fall investigations. Although few fish appeared to be utilizing this stream during present investigations, Scottie Creek should be considered an important avenue of fall migration since humpback whitefish were abundant and northern pike were present in Unnamed Creek 1222.6, a nearby tributary to Scottie Creek (Ref. 57).

FISH

Date: 25-26 September 1979

Fish Present: Yes

Gear/Effort: 5SL(117.5h)
20mGN(24.5h)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Burbot		2		435-529(TL)
Longnose sucker		1		399

PHYSICAL CONDITION

Date	25-26 September 1979
Channel Width (m)	15-20
Floodplain Width (m)	15-20
Water Depth (cm)	120-300
Discharge (m^3/s)	13.0
D.O. (mg/ℓ)	9
Temperature (°C)	5.5
Conductivity (µmhos/cm)	60
pH	6.8
Color	Brown
Turbidity	Slightly
Bottom Type	Mud
Fish Block(s)	None observed

FALL SURVEY FORM

WATERSBODY

Waterbody Desper Creek

Main Drainage Chisana River Tributary to Scottie Creek

Figure 4 Northwest Alignment Sheet 130

Identification Nos: NPSI 6-226 NPMP 735.6

Alaska Highway Milepost 1225.6

USGS Map Reference Nabesna, Ak. T 10N R 23E Sec 11

Site Access On foot from Alaska Highway

Section Surveyed From Alaska Highway downstream 200 m; restricted access to upstream areas

ASSESSMENT

The humic-stained waters of Desper Creek flow slowly through a moderately deep (40-60 cm) and narrow (4-8 m) channel. This creek originates at Island Lake and feeds into Scottie Creek 2.5 km downstream from the Alaska Highway. Leaf debris, snags and aquatic vegetation are abundant in the channel. Adequate cover for fish and excellent fish habitat are present. (Ref. 54).

Juvenile northern pike were captured during present investigations indicating that Desper Creek provides a feeding and rearing area for this species during the open water period. No other species were observed or captured. Local residents reported that northern pike and round and humpback whitefish use Desper Creek as a migration pathway during spring and fall (Ref. 10).

FISH

Date: 25 September 1979

Fish Present: Yes

Gear/Effort: EF(200 m)
10mGN(18h)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Northern pike		4		212-247

PHYSICAL CONDITION

Date	25 September 1979
Channel Width (m)	5-7
Floodplain Width (m)	7-12
Water Depth (cm)	40-60
Discharge (m^3/s)	0.28
D.O. (mg/ℓ)	8.8
Temperature (°C)	6.0
Conductivity (μmhos/cm)	75
pH	7.0
Color	Brown
Turbidity	Slightly turbid
Bottom Type	Silty mud
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Sweetwater Creek

Main Drainage Tanana River Tributary to Chisana River

Figure 4 Northwest Alignment Sheet 129

Identification Nos: NPSI 6-225 NPMP 728.4

Alaska Highway Milepost 1234.2

USGS Map Reference Nabesna, Ak. T 11N R 22E Sec 13

Site Access On foot from Alaska Highway

Section Surveyed Downstream from NAPLINE approximately 300 m

ASSESSMENT

Sweetwater Creek is a small muskeg drainage of humic-stained water in a narrow (0.5-1.5 m), poorly defined channel that is intermittently ponded between the Alaska Highway and the NAPLINE crossing. The proposed NAPLINE crosses near the headwaters of this stream. Substrate varies from mud and detritus to gravel and cobble near the highway.

Fall fish utilization of Sweetwater Creek is considered to be low to non-existent. Fish were not observed or captured in this stream during present investigations. Other fall and spring investigations have also reported the absence of fish in the vicinity of the NAPLINE crossing (Ref. 2 and 9).

FISH

ate 25 September 1979

ish Present: None

ear/Effort: EF(125 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	25 September 1979
Channel Width (m)	0.5-1.5
Floodplain Width (m)	NA
Water Depth (cm)	15-45
Discharge (m^3/s)	<0.01 Estimated
D.O. (mg/ℓ)	10
Temperature (°C)	4.0
Conductivity (umhos/cm)	25
pH	6.3
Color	Slightly humic-stained
Turbidity	Clear
Bottom Type	Mud/detritus; some gravel below Alaska Highway
Fish Block(s)	Highway CMP probable fish block during periods of low flow

FALL SURVEY FORM

WATERBODY

Waterbody Unnamed Creek 1236.3

Main Drainage Chisana River Tributary to Sweetwater Creek

Figure 4 Northwest Alignment Sheet 129

Identification Nos: NPSI 6-222 NPMP 726.5

Alaska Highway Milepost 1236.3

USGS Map Reference Nabesna, Ak. T 11N R 22E Sec 2

Site Access On foot from Alaska Highway

Section Surveyed From 15 m upstream of Alaska Highway to 60 m downstream of NAPLINE crossing (~375 m)

ASSESSMENT

Unnamed Creek 1236.3 has a poorly defined channel (2-4 m wide) through which water flows, with intermittent ponding, southwest into Sweetwater Creek. Mud substrate is dominated by thick growths of aquatic vegetation. Dwarf birch, willow, grass and sedge are predominant in surrounding lowlying areas while spruce and poplar are found on adjoining hillsides.

Although fish utilization of Unnamed Creek 1236.3 was considered to be low or nonexistent in the past (Ref. 54), the 1979 fall survey revealed that young-of-the-year grayling were present in the stream. Unnamed Creek provides good fall fish habitat but present evidence suggests that it is only occasionally used by fishes.

FISH

te 27 September 1979

sh Present: Yes

ar/Effort: EF(125 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Grayling	3		71-88	

PHYSICAL CONDITION

Date	27 September 1979
Channel Width (m)	2-4
Floodplain Width (m)	60-100
Water Depth (cm)	15-20
Discharge (m^3/s)	0.03
D.O. (mg/ℓ)	9.0
Temperature (°C)	3.0
Conductivity (μmhos/cm)	60
pH	6.9
Color	Humic-stained
Turbidity	Clear
Bottom Type	Mud
Fish Block(s)	Channel poorly defined in some areas may serve as fish block

FALL SURVEY FORM

WATERBODY

Waterbody Gardiner Creek

Main Drainage Tanana River Tributary to Chisana River

Figure 4 Northwest Alignment Sheet 127

Identification Nos: NPSI 6-219 NPMP 716.8

Alaska Highway Milepost 1246.7

USGS Map Reference Nabesna, Ak. T 12N R 21E Sec 3

Site Access On foot from Alaska Highway

Section Surveyed ~300 m section between Alaska Highway bridge and NAPLINE

ASSESSMENT

Gardiner Creek is a deep darkly-stained, slow-flowing stream that meanders southwest across the Alaska Highway to the Chisana River through mature stands of spruce, birch and aspen. Steep banks of silt and sand 3-6 m high are vegetated primarily with willow and spruce. The stream was approximately 10 to 15 m wide at the time of the 1979 fall survey. Substrates are generally mud and sand although gravel and cobble are present immediately below the Alaska Highway. Good cover for fish is provided by sunken logs, and long, deep pools provide excellent fish habitat. The macroinvertebrate fauna of Gardiner Creek includes blackflies, siphlonurid mayflies and cranefly larvae (Ref. 6).

Gardiner Creek provides good fall habitat for fish and serves as a fall downstream migration route. Young-of-the-year and adult grayling as well as juvenile longnose sucker were found to be present during the 1979 fall survey. Northern pike and round and humpback whitefish are also reported to be present (Ref. 7).

Gardiner Creek is a high public use area. A state campground and excellent sport angling opportunities attract tourists and local residents to the stream. Numerous anglers were observed on this stream as well as evidence of their success (fish remains) during present investigations.

FISH

Date: 26-27 September 1979

Fish Present: Yes

Gear/Effort: 10mGN(25.5h)
EF(50 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Longnose sucker		1		81
Grayling	1	4	65	303-324

PHYSICAL CONDITION

Date	26-27 September 1979
Channel Width (m)	10-15
Floodplain Width (m)	NA
Water Depth (cm)	100-200
Discharge (m^3/s)	2.4
D.O. (mg/ℓ)	10
Temperature (°C)	3.0
Conductivity (umhos/cm)	40
pH	6.6
Color	Humic-stained
Turbidity	Clear
Bottom Type	Sand/mud
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Tenmile Creek

Main Drainage Tanana River Tributary to Chisana River

Figure 4 Northwest Alignment Sheet 126

Identification Nos: NPSI 6-218 NPMP 710.7

Alaska Highway Milepost 1252.8

USGS Map Reference Nabesna, Ak. T 13N R 20E Sec 11

Site Access On foot from Alaska Highway

Section Surveyed From 30 m upstream of Alaska Highway to 10 m downstream NAPLINE (~400 m)

ASSESSMENT

Tenmile Creek is a small, humic-stained stream that flows southwest through a 0.5-4.0 m wide channel choked with *Equisteum, Carex* and other emergent vegetation. This stream is a tributary to the Chisana River and supports a number of macroinvertebrates including baetid mayflies, veliids and amphipods (Ref. 6). The gradually sloping vegetated banks of this mud channel are bordered by spruce and dense willow. The portion of the stream surveyed in the fall of 1979 winds through low tundra marsh, forms pools at the Alaska Highway culvert and then becomes narrow and shallow.

At the time of the survey, fish habitat in Tenmile Creek appeared to be good but no fish were captured during gillnetting and electrofishing efforts. Fish utilization of the stream is therefore considered to be low or non-existent in the fall.

FISH

Date: 26 September 1979

Fish Present: None

Gear/Effort: EF(60 m)
10mGN(24h)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	26 September 1979
Channel Width (m)	1-4
Floodplain Width (m)	30-40
Water Depth (cm)	15-30
Discharge (m^3/s)	0.04
D.O. (mg/ℓ)	9.0
Temperature (°C)	4.5
Conductivity (umhos/cm)	50
pH	6.8
Color	Light brown
Turbidity	Slightly turbid
Bottom Type	Mud/occasional cobbles and boulders
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Beaver Creek

Main Drainage Yukon River Tributary to Tanana River

Figure 4 Northwest Alignment Sheet 124

Identification Nos: NPSI 6-215 NPMP 697.4

Alaska Highway Milepost 1268.0

USGS Map Reference Tanacross, Ak. T 15N R 19E Sec 29

Site Access On foot from Alaska Highway

Section Surveyed 150 m upstream to 200 m downstream of NAPLINE

ASSESSMENT

Beaver Creek is a small stream which flows southwest across the Alaska Highway to its confluence with the Tanana River. This slow-flowing stream is a series of shallow riffles and pools up to 1.5 m deep with predominantly sand and small gravel substrates. It lies in a gorge with incised, mud banks which are 2-3 m high. The channel is bordered by stands of willow, birch and spruce and has accumulated a number of fallen logs and snags which provide considerable cover for fish.

Beaver Creek provides important habitat for fish in the fall as well as a probable fall migration route. Fall sampling efforts in 1979 yielded young-of-the-year and juvenile grayling and longnose sucker near the proposed NAPLINE. Northern pike may also be present (Ref. 6)., however, none were captured or observed during this survey.

FISH

Date: 26-27 September 1979

Fish Present: Yes

Gear/Effort: EF(350 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other
Grayling	17	1	55-85	114
Longnose sucker	15	1	25-48	98

PHYSICAL CONDITION

Date	26-27 September 1979
Channel Width (m)	5-10
Floodplain Width (m)	4.5-15
Water Depth (cm)	15-90
Discharge (m^3/s)	0.20
D.O. (mg/ℓ)	11
Temperature (°C)	2.0
Conductivity (μmhos/cm)	70
pH	6.8
Color	Humic-stained brown
Turbidity	Clear
Bottom Type	Sand/small gravel
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Bitters Creek

Main Drainage Yukon River Tributary to Tanana River

Figure 4 Northwest Alignment Sheet 122

Identification Nos: NPSI 6-212 NPMP 686.5

Alaska Highway Milepost 1280.2

USGS Map Reference Tanacross, Ak. T 16N R 17E Sec 24

Site Access On foot from Alaska Highway

Section Surveyed From NAPLINE crossing downstream 400 m

ASSESSMENT

Bitters Creek flows into the Tanana River 1.6 km downstream from the Alaska Highway. Its waters are stained light brown and confined to a narrow (3-5 m), steep walled (10 m) gorge. Substrates upstream of the highway culvert are sand and silt, whereas downstream substrates are cobbles and boulders. Although stream gradient is steep, numerous pools are present behind large boulders. Creek banks and side pockets of water were ice-covered during the 1979 fall survey. A perched highway culvert with low water levels and rapid flow probably prevents upstream fish migration.

Although good fish habitat is present above the Alaska Highway near the NAPLINE, investigations have failed to document fish utilization in this area at any time of the year. However, sampling efforts during the 1979 fall survey yielded juvenile and young-of-the-year grayling downstream of the Alaska Highway where Bitters Creek provides good fall habitat and is utilized by grayling for rearing and feeding.

FISH

Date: 28 September 1979

Fish Present: Yes

Gear/Effort: EF(400 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other
Grayling	6	1	62-93	107

PHYSICAL CONDITION

Date	28 September 1979
Channel Width (m)	3-5
Floodplain Width (m)	5-10
Water Depth (cm)	30-90
Discharge (m^3/s)	0.11
D.O. (mg/ℓ)	10
Temperature (°C)	0.0
Conductivity (umhos/cm)	50
pH	7.4-7.5
Color	Light brown
Turbidity	Clear
Bottom Type	Above Alaska Highway culvert gravel/sandy silt.
	Below Alaska Highway gravel/boulder
Fish Block(s)	Alaska Highway culvert is effective fish block

FALL SURVEY FORM

WATERBODY

Waterbody Tanana River at Tok

Main Drainage Yukon River Tributary to Yukon River

Figure 4 Northwest Alignment Sheet 118

Identification Nos: NPSI 6-207A,B&C NPMP 664.3

Alaska Highway Milepost 1303.3

USGS Map Reference Tanacross, Ak. T 18N R 14E Sec 25

Site Access By boat from boat launch 50 m upstream of Alaska Highway bridge

Section Surveyed Upstream 50 m from Alaska Highway bridge to 1000 m downstream near alternate crossing #1

ASSESSMENT

The Tanana River is a large braided glacial river formed by the junction of the Chisana and Nabesna Rivers near the Alaska/Canada border. The Tanana River crosses the Alaska Highway at AHMP 1303.3 and flows northwest into central Alaska where it joins the Yukon River. Fish species reported to be present include: grayling, round whitefish, humpback whitefish, lake whitefish, northern pike, burbot, slimy sculpin, longnose sucker, lake chub, least cisco, sheefish, Dolly Varden, coho salmon, chum salmon and king salmon (Ref. 5, 11 and 26). Some of these species probably do not occur as far upstream as the Alaska Highway.

A variety of fish species were caught in fall: grayling, northern pike, burbot, longnose sucker, lake chub, slimy sculpin, round whitefish and humpback whitefish. Young-of-the-year grayling and slimy sculpin were also present. This area should be considered an adult humpback whitefish spawning area and an overwintering area for their eggs (Ref. 54). The Tanana River at Tok is also an important avenue for migration of fishes moving to overwintering locations in the river from clearwater tributaries during fall.

The Tanana River is an important waterbody for spawning and migrating anadromous fishes (Ref. 13). Utilization by anadromous fishes as far upstream as the Alaska Highway has not been confirmed.

FISH

Date: 28-29 September 1979

Fisr Present: Yes

Gear/Effort: 5m Seine(13 hauls @ 15-20 m haul); shoreline

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Grayling	2	2	75-92	175-278
Longnose sucker		52		*30-104
Burbot		3		108-301
Northern pike		2		168-169
Humpback whitefish		2		102-124
Round whitefish		4		99-133
Slimy sculpin	1	2	33	60-68
Lake chub		75		**25-90

* 43 lengths estimated not measured
** All lengths estimated not measured

PHYSICAL CONDITION

Date	28-29 September 1979
Channel Width (m)	150-300
Floodplain Width (m)	200-600
Water Depth (cm)	200-500
Discharge (m^3/s)	Average September 1978 flow=292 (Ref. 58)
D.O. (mg/ℓ)	10
Temperature (°C)	4.0
Conductivity (µmhos/cm)	140
pH	8.3
Color	Brown
Turbidity	Highly turbid
Bottom Type	Silt/sand
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Tok River

Main Drainage Yukon River Tributary to Tanana River

Figure 4 Northwest Alignment Sheet 117

Identification Nos: NPSI 6-205 NPMP 658.2

Alaska Highway Milepost 1300.4

USGS Map Reference Tanacross, Ak. T 18 R 13 Sec 24

Site Access On foot from Tok State Campground at Alaska Highway

Section Surveyed From 100 m upstream of Alaska Highway bridge downstream to NAPLINE crossing (~1000 m)

ASSESSMENT

Tok River is a semi-glacial stream that is crossed by the Alaska Highway about five miles east of Tok and flows northeast into the Tanana River. Springs and clear-water tributaries reduce the level of turbidity in this stream in contrast to purely glacier fed streams. Water was brown and highly turbid in the spring but olive green and moderately turbid in the fall.

Fish utilization of the Tok River during fall appears to be high. Fall sampling yielded young-of-the-year grayling and round whitefish, as well as adult and juvenile grayling, round whitefish and slimy sculpin. The presence of grayling and round whitefish fry indicate that fish use the lower reaches of the Tok River near the NAPLINE crossing as a nursery area and there is increasing evidence that grayling also use this area for spawning (Ref. 54).

The Tok River is a major migration pathway for many species during the spring and fall since most of the stream freezes to bottom substrates during winter (Ref. 9 and 55). It is unknown if major grayling populations found in the Tok overflow and the Little Tok River (upstream tributaries of the Tok River) migrate downstream into the Tanana River or remain upstream to overwinter (Ref. 54). High recreational use of the Tok River has been promoted by the state campground at the Alaska Highway bridge, not far upstream from the NAPLINE. A well-traveled path follows the stream bank from the campground downstream to the NAPLINE crossing.

FISH

Date: 29 September 1979

Fish Present: Yes

Gear/Effort: 5m Seine(8 hauls @ 15 m/haul); shoreline

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other
Grayling	23	1	62-85	123
Round whitefish	7	1	61-78	112
Slimy sculpin		3		31-35

PHYSICAL CONDITION

Date	29 September 1979
Channel Width (m)	15-30
Floodplain Width (m)	24-45
Water Depth (cm)	60-80
Discharge (m^3/s)	12
D.O. (mg/ℓ)	10
Temperature (°C)	1.0
Conductivity (umhos/cm)	190
pH	8.5
Color	Olive green
Turbidity	Moderately turbid
Bottom Type	Gravel/cobble underlain with sand/silt
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Crystal Springs

Main Drainage Yukon River Tributary to Tanana River

Figure 4 Northwest Alignment Sheet 114

Identification Nos: NPSI 6-203.03 NPMP 639.0

Alaska Highway Milepost 1328.2

USGS Map Reference Tanacross, Ak. T 18N R 10E Sec 11

Site Access On foot from Alaska Highway

Section Surveyed From NAPLINE crossing to 30 m downstream of Alaska Highway (~1 km)

ASSESSMENT

Crystal Springs originates, in part, from an upwelling source which flows north across the Alaska Highway and joins additional springs near the Tanana River. Between the proposed NAPLINE crossing and the Alaska Highway, it flows through a large muskeg area vegetated with willow, dwarf birch and scattered spruce. Crystal Springs is relatively shallow (usually less than 0.5 m deep), clear and in some areas remains open year-round. The stream channel is well-defined but often hidden from view by overhanging vegetation.

Ice was forming over pools at the time of the 1979 fall survey. Juvenile and young-of-the-year grayling and juvenile northern pike were captured indicating use of the stream as a fall rearing and feeding area for these species.

FISH

Date: 29 September 1979

Fish Present: Yes

Gear/Effort: EF (100 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Northern pike		1		146
Grayling	4	1	64-85	136

PHYSICAL CONDITION

Date	29 September 1979
Channel Width (m)	0.5-1.5
Floodplain Width (m)	NA
Water Depth (cm)	10-30
Discharge (m^3/s)	0.06
D.O. (mg/ℓ)	10
Temperature (°C)	2.0
Conductivity (umhos/cm)	40
pH	7.5
Color	Clear
Turbidity	Clear
Bottom Type	Primarily sand; some cobble/gravel
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Yerrick Creek

Main Drainage Yukon River Tributary to Tanana River

Figure 4 Northwest Alignment Sheet 113

Identification Nos: NPSI 6-201 NPMP 633.0

Alaska Highway Milepost 1333.7

USGS Map Reference Tanacross, Ak. T 19N,18N R 9E,9E Sec 36,1

Site Access On foot from Alaska Highway

Section Surveyed From 150 m above NAPLINE crossing to Alaska Highway bridge (~400 m)

ASSESSMENT

Yerrick Creek is a swift, clear-water stream flowing northerly from the Alaska Range to its confluence with the Tanana River. The 10-15 m wide and sometimes braided channel follows a steep gradient floodplain consisting of boulders, cobble and gravel. Gravel, sand and mud banks up to 2.5 m high are vegetated by alder, cottonwood and aspen. A higher discharge of water has been reported approximately 1.5 km upstream of the NAPLINE crossing than at the Alaska Highway which indicates the presence of some subterranean flow (Ref. 6).

Good fall fish habitat in Yerrick Creek provides a feeding and rearing area for juvenile round whitefish and grayling present near the NAPLINE crossing during the 1979 fall survey.

FISH

Date: 30 September 1979

Fish Present: Yes

Gear/Effort: EF(500m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Round whitefish		1		146
Grayling		4		111-140

PHYSICAL CONDITION

Date	30 September 1979
Channel Width (m)	10-15
Floodplain Width (m)	100
Water Depth (cm)	18-35
Discharge (m^3/s)	1.2
D.O. (mg/ℓ)	11
Temperature (°C)	3.0
Conductivity (µmhos/cm)	90
pH	7.7
Color	Clear
Turbidity	Clear
Bottom Type	Cobble boulder over sand
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Unnamed Creek 1339.8

Main Drainage Yukon River Tributary to Tanana River

Figure 4 Northwest Alignment Sheet 112

Identification Nos: NPSI 6-193.01 NPMP 627.5

Alaska Highway Milepost 1339.8

USGS Map Reference Tanacross, Ak. T 19N R 8E Sec 25

Site Access On foot from Alaska Highway

Section Surveyed From NAPLINE downstream 150 m below Alaska Highway

ASSESSMENT

Unnamed Creek 1339.8 flows northwesterly through a heavily vegetated bog in the vicinity of the proposed NAPLINE. Its lowermost portion is flooded by the Tanana River during periods of high water (Ref. 54), forming a shallow, temporary slough. During present investigations the slough was dry and littered with logs and debris. Only isolated small ponds remained in this area. Above the Alaska Highway the stream channel was undefined and dry. A wooden culvert at the highway is perched (0.6 m) and unsuitable for fish passage.

During present investigations, fish habitat in Unnamed Creek 1339.8 was poor due to the scarcity of water. However, this slough provides good fish habitat whenever Tanana River water levels are high enough to cause inundation. No fish habitat is available above the Alaska Highway.

FISH

Date: 30 September 1979

Species Present: None

Gear/Effort: EF in isolated ponded water in channel

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	30 September 1979
Channel Width (m)	2-3
Floodplain Width (m)	4-20
Water Depth (cm)	NA
Discharge (m^3/s)	Streambed dry
D.O. (mg/ℓ)	11*
Temperature (°C)	2.0*
Conductivity (umhos/cm)	120*
pH	8.2*
Color	Clear*
Turbidity	Clear*
Bottom Type	Mud/silt; gravel/cobble either side of culvert
Fish Block(s)	Culvert is perched relative to slough area downstream

*Measurements and observations taken from ponded water.

FALL SURVEY FORM

WATERBODY

Waterbody Unnamed Creek 1343.7

Main Drainage Yukon River Tributary to Tanana River

Figure 4 Northwest Alignment Sheet III

Identification Nos: NPSI 5-190 NPMP 623.5

Alaska Highway Milepost 1343.7

USGS Map Reference Tanacross, Ak. T 19N R 8E Sec 11

Site Access On foot from Highway

Section Surveyed From 100 m upstream of Alaska Highway to 50 m downstream of Highway

ASSESSMENT

The narrow (2-3 m) channel of Unnamed Creek 1343.7 was dry during the 1979 fall investigation. Occasional or intermittent flow of this stream is suggested since its mud substrate was overgrown with terrestrial plants and scattered with leaf debris from nearby diciduous trees. This creek provided poor fish habitat and fall fish utilization is low to non-existent.

FISH

Date: 30 September 1979

Fish Present: None

Gear/Effort: No effort - stream bed dry

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	30 September 1979
Channel Width (m)	2-3
Floodplain Width (m)	25-30
Water Depth (cm)	Stream bed dry
Discharge (m^3/s)	NA
D.O. (mg/ℓ)	NA
Temperature (°C)	NA
Conductivity (umhos/cm)	NA
pH	NA
Color	NA
Turbidity	NA
Bottom Type	Cobble and gravel
Fish Block(s)	Perched culvert

FALL SURVEY FORM

WATERBODY

Waterbody Robertson River

Main Drainage Yukon River Tributary to Tanana River

Figure 4 Northwest Alignment Sheet 110

Identification Nos: NPSI 5-187 NPMP 619.6

Alaska Highway Milepost 1347.6

USGS Map Reference Tanacross, Ak. T 20N R 8E Sec 23

Site Access On foot from Alaska Highway

Section Surveyed From NAPLINE downstream 500 m (200 m below Alaska Highway bridge)

ASSESSMENT

Robertson River is a large braided glacial stream which originates in the Alaska Range and flows northeast into the Tanana River. Its waters are highly turbid during spring and summer but clear by late fall. Flow is sustained year-round. Substrate at the survey site was gravel underlain with sand and silt.

The Robertson River provides good fall fish habitat in backwater and slough areas. Regions near the NAPLINE may be used by fall spawning fish (e.g. Dolly Varden, whitefish), but such use has not been documented--only lake chub were captured during the 1979 fall survey. Numerous grayling, approximately 120-250 mm in total length, were sited near the NAPLINE crossing in September 1978 (Ref. 75).

FISH

Date: 30 September-1 October 1979

Fish Present: Yes

Gear/Effort: 20mGN(16h)
EF(150 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Lake chub		13		74-124

PHYSICAL CONDITION

Date	30 September-1 October 1979
Channel Width (m)	Braided, 5-30 m channels
Floodplain Width (m)	300-800 m
Water Depth (cm)	15-60
Discharge (m^3/s)	22
D.O. (mg/ℓ)	11
Temperature (°C)	3.5
Conductivity (μmhos/cm)	380
pH	8.5
Color	Glacial blue
Turbidity	Clear
Bottom Type	Gravel/cobble underlain with sand/silt
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Bear Creek

Main Drainage Yukon River Tributary to Tanana River

Figure 4 Northwest Alignment Sheet 109

Identification Nos: NPSI 5-185 NPMP 609.9

Alaska Highway Milepost 1357.3

USGS Map Reference Tanacross, Ak. T 21N R 7E Sec 12

Site Access On foot from Alaska Highway

Section Surveyed From 30 m upstream of NAPLINE crossing 100 m downstream

ASSESSMENT

Bear Creek is a glacial stream that originates in the Alaska Range and flows into the Tanana River. At the time of the 1979 survey the stream was 5-15 m wide and up to 2.0 m deep. Ice was accumulating along stream banks and waters were moderately turbid. The stream bottom was composed primarily of gravel and cobble with some scattered boulders. Silt and sand were present in standing or slow moving waters.

Grayling, Dolly Varden, longnose sucker and slimy sculpin have been reported from Bear Creek (Ref. 6, 10 and 54). The present fall investigation revealed that young-of-the-year and juvenile grayling were present in the vicinity of the proposed NAPLINE crossing. Bear Creek provides good fall habitat for fish and is probably used as a downstream fall migration route for fish that overwinter in the Tanana River.

FISH

Date: 1 October 1979

Fish Present: Yes

Gear/Effort: EF(200 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other
Grayling	6	1	62-89	141

PHYSICAL CONDITION

Date	1 October 1979
Channel Width (m)	5-15
Floodplain Width (m)	5-15
Water Depth (cm)	25-200
Discharge (m^3/s)	0.48
D.O. (mg/ℓ)	12
Temperature (°C)	0.5
Conductivity (μmhos/cm)	275
pH	7.7
Color	Milky green
Turbidity	Moderately turbid
Bottom Type	Primarily gravel/cobble; scattered boulders; silt and sand in standing water
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Chief Creek

Main Drainage Tanana River Tributary to Bear Creek

Figure 4 Northwest Alignment Sheet 108

Identification Nos: NPSI 5-184 NPMP 608.6

Alaska Highway Milepost 1358.6

USGS Map Reference Mt. Hayes, Ak. T 21N R 7E Sec 2

Site Access On foot via Alaska Highway

Section Surveyed 50 m upstream of Alaska Highway culvert downstream to NAPLINE crossing (~100 m)

ASSESSMENT

Chief Creek is a small humic-stained stream which drains a portion of Knob Ridge and flows north across the Alaska Highway into Bear Creek. Chief Creek is reported to be fed by an occasional spring (Ref. 10) but depends primarily on surface runoff to sustain its flow. Flow is seasonal and intermittent; extreme fluctuations occur throughout the open-water months. Its channel was 1.5-5 m wide at the time of the 1979 fall survey and ice was forming in pool areas. The bottom is composed of gravel and silt. Shallow banks (0.2-2 m) are vegetated with willow, alder and grass.

Although habitat appeared to be fair in the fall of 1979, no fish were captured by electrofisher in 200 m of stream. At least one grayling has been captured in the stream (Ref. 10), but other investigations have failed to document the presence of fish (Ref. 6, 54 and 57). Evidence to date indicates that fish utilization of Chief Creek near the proposed NAPLINE is low or non-existent. The highly irregular flow characteristics of this stream do not facilitate fish utilization.

FISH

Date: 1 October 1979

Fish Present: None

Gear/Effort: EF(200 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	1 October 1979
Channel Width (m)	1.5-5
Floodplain Width (m)	NA
Water Depth (cm)	10-20
Discharge (m^3/s)	0.07
D.O. (mg/ℓ)	12
Temperature (°C)	0.0
Conductivity (μmhos/cm)	80
pH	7.5
Color	Olive-green
Turbidity	Moderately turbid
Bottom Type	Cobble/gravel; silt bed at NAPLINE crossing
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Unnamed Creek 1369.1

Main Drainage Yukon River Tributary to Tanana River

Figure 4 Northwest Alignment Sheet 106

Identification Nos: NPSI 5-179 NPMP 598.4

Alaska Highway Milepost 1369.1

USGS Map Reference Mt. Hayes, Ak. T 22N R 6E Sec 17

Site Access On foot via Alaska Highway

Section Surveyed From NAPLINE crossing downstream 150 m to pool just below Alaska Highway crossing

ASSESSMENT

Unnamed Creek 1369.1 is a narrow (2-5 m), humic-stained stream that drains the north face of Knob Ridge and empties into Sam Creek north of the Alaska Highway. Substrate is composed of mud and silt and banks are steep (1.5-2.5 m) and well vegetated. This stream flows through a perched highway culvert that is a barrier to upstream fish passage. Below this culvert, there is a pool approximately 20 m wide and 2 m in depth. At the time of this survey, ice had formed over the pool and intermittently over the surface of the narrow stream that flows from the pool.

No fish were observed or captured upstream of the highway culvert near the NAPLINE crossing; however, young-of-the-year grayling and round whitefish as well as adult slimy sculpin were captured in the culvert outfall pool. Past investigations have recorded large numbers of fish captured in the same area (Ref. 6). Farther downstream from the Alaska Highway, the stream is a fall rearing and feeding area for the aforementioned species as well as longnose sucker (Ref. 6 and 54). Little is known about fish utilization downstream of the outfall pool due to: (1) emphasis of previous surveys on the pool and upstream areas, and (2) past and present investigations were limited by access restrictions.

FISH

Date: 1 October 1979

Fish Present: Yes

Gear/Effort: EF(80 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Round whitefish	1		83	
Grayling	1		68	
Slimy sculpin		2		69-88

PHYSICAL CONDITION

Date	1 October 1979
Channel Width (m)	2-5
Floodplain Width (m)	NA
Water Depth (cm)	15-20
Discharge (m^3/s)	0.07
D.O. (mg/ℓ)	11
Temperature (°C)	0.0
Conductivity (μmhos/cm)	80
pH	7.6
Color	Brown
Turbidity	Clear
Bottom Type	Cobble/gravel over silt downstream from highway.
	Mud/detritus upstream of Alaska Highway
Fish Block(s)	Perched highway culvert

FALL SURVEY FORM

WATERBODY

Waterbody Berry Creek

Main Drainage Tanana River Tributary to Johnson Slough

Figure 4 Northwest Alignment Sheet 106

Identification Nos: NPSI 5-178 NPMP 596.2

Alaska Highway Milepost 1371.4

USGS Map Reference Mt. Hayes, Ak. T 22N R 5E Sec 13

Site Access On foot from Alaska Highway

Section Surveyed From 150 m upstream of NAPLINE crossing to 150 m downstream of Alaska Highway bridge (~400 m)

ASSESSMENT

Berry Creek originates from glaciers located southeast of the Macomb Plateau and flows northerly across the Alaska Highway into Johnson slough. Discharge of this stream fluctuates seasonally, with reduced winter flow (Ref. 10 and 55). Berry Creek flows over cobble and gravel substrates and through a channel bordered by 1-2 m high banks. Stream bank vegetation includes willow, alder and spruce. The benthic macroinvertebrate fauna of Berry Creek is extremely rich (Ref. 6) and numerous deep pools and shallow riffles provide excellent fish habitat. The water was clear at the time of the 1979 fall survey.

Berry Creek provides important fall rearing habitat for fish and is a fall migration route. During present investigations slimy sculpin, longnose sucker and grayling were captured. All specimens were young-of-the-year with the exception of seven adult slimy sculpin. Although fall spawning fish species occur in the stream (Ref. 6, 10 and 54), no evidence of spawning was apparent in early October.

FISH

Date: 2 October 1979

Fish Present: Yes

Gear/Effort: EF(200 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Slimy sculpin	1	7	19	42-92
Longnose sucker	1		63	
Grayling	1		74	

PHYSICAL CONDITION

Date	2 October 1979
Channel Width (m)	3-10
Floodplain Width (m)	15-25
Water Depth (cm)	20-40
Discharge (m^3/s)	1.2
D.O. (mg/ℓ)	12
Temperature (°C)	1.0
Conductivity (umhos/cm)	80
pH	7.5
Color	Clear
Turbidity	Clear
Bottom Type	Cobble/gravel over sand/silt
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Sears Creek

Main Drainage Tanana River Tributary to Johnson Slough

Figure 4 Northwest Alignment Sheet 106

Identification Nos: NPSI 5-177 NPMP 593.1

Alaska Highway Milepost 1374.4

USGS Map Reference Mt. Hayes, Ak. T 22N R 5E Sec 16

Site Access On foot from Alaska Highway

Section Surveyed From 150 m upstream to 100 m downstream of Alaska Highway culvert

ASSESSMENT

Sears Creek is a small, slightly humic-stained stream which flows north from the foothills of the Macomb Plateau to its confluence with Johnson slough. Channel width varies from 3-5 m. It is a predominantly shallow, slow-flowing stream with gravel substrates in riffle areas and sand, mud and detritus in pools. Banks are 0.5-1.5 m high and bordered by alder and willow. The channel has numerous log jams that may impede fish movement within the stream. A beaver dam is located 5 m downstream of the Alaska Highway. Water upstream of the dam exceeds 1.5 m deep and was ice-covered at the time of the 1979 fall survey. Evidence of recent beaver activity (fresh cuttings) was noted.

Young-of-the-year grayling were captured downstream of the beaver dam during present investigations, but no fish were caught upstream of the dam. The beaver dam appears to be a major fish block for upstream migration and it could also impede downstream movements, particularly during periods of low flow. Fall utilization of the region below the beaver dam is considered to be moderate. Fish previously reported to use this stream include grayling, longnose sucker and Dolly Varden (Ref. 6, 9, 10 and 54).

FISH

Date: 2 October 1979

Fish Present: Yes

Gear/Effort: EF(150 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Grayling	2		74-78	

PHYSICAL CONDITION

Date	2 October 1979
Channel Width (m)	3-5
Floodplain Width (m)	5-10
Water Depth (cm)	15-45
Discharge (m^3/s)	0.09
D.O. (mg/ℓ)	12
Temperature (°C)	0.5
Conductivity (μmhos/cm)	100
pH	7.5
Color	Slightly brown
Turbidity	Clear
Bottom Type	Mud/sand downstream of NAPLINE. Cobble upstream where gradient steeper
Fish Block(s)	Beaver dam just below Alaska Highway

FALL SURVEY FORM

WATERBODY

Waterbody Dry Creek

Main Drainage Tanana River Tributary to Johnson Slough

Figure 4 Northwest Alignment Sheet 105

Identification Nos: NFSI 5-176 NPMP 589.5

Alaska Highway Milepost 1378.1

USGS Map Reference Mt. Hayes, Ak. T 14S R 16E Sec 23,24

Site Access On foot from Alaska Highway

Section Surveyed From Alaska Highway to 50 m upstream from NAPLINE crossing (~550 m)

ASSESSMENT

Dry Creek flows north into Johnson Slough through a 6-15 m wide channel bordered by steep, incised, well-vegetated banks 2-3 m high. The bottom consists primarily of gravel with occasional sand bar deposits. At the proposed NAPLINE crossing, flow in Dry Creek is intermittent, restricted to those periods of high spring runoff and heavy rain. Dry Creek is reported to flow year-round farther upstream (Ref. 9).

The stream was found to be dry during the 1979 fall survey. Due to the intermittent nature of the stream flow in the area of the NAPLINE, fall fish use is considered low to non-existent.

FISH

Date: 2 October 1979

Fish Present: None

Gear/Effort: No effort-stream bed dry

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	2 October 1979
Channel Width (m)	10-15
Floodplain Width (m)	NA
Water Depth (cm)	Stream bed dry
Discharge (m^3/s)	NA
D.O. (mg/ℓ)	NA
Temperature (°C)	NA
Conductivity (μmhos/cm)	NA
pH	NA
Color	NA
Turbidity	NA
Bottom Type	Sand with some gravel areas
Fish Block(s)	Snags and fallen trees

FALL SURVEY FORM

WATERBODY

Waterbody Johnson River

Main Drainage Yukon River Tributary to Tanana River

Figure 4 Northwest Alignment Sheet 104

Identification Nos: NPSI 5-175 NPMP 587.0

Alaska Highway Milepost 1380.5

USGS Map Reference Mt. Hayes, Ak. T 14S R 16E Sec 16

Site Access On foot via Alaska Highway

Section Surveyed From NAPLINE downstream ~500 m

ASSESSMENT

Johnson River is a large, braided, glacial stream that originates at the Johnson Glacier in the Alaska Range and flows northward into the Tanana River. Its waters are moderately turbid during fall and clear under winter ice cover. The stream bottom is gravel while the floodplain is composed of sand and silt. The Johnson River is bounded by steep banks 20-30 m high.

Fish utilization of the Johnson River in the vicinity of the Alaska Highway appeared to be high during present investigations. At this time good fall fish habitat provided feeding and rearing areas for young-of-the-year and juvenile round whitefish and grayling and juvenile lake chub. This stream is a probable migration route for fish movement to and from productive feeder streams (Ref. 54).

FISH

Date: 2 October 1979

Fisn Present: Yes

Gear/Effort: 5 m Seine (10 hauls @ 15-20 m/haul); shoreline

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other
Lake chub		5		34-84
Round whitefish	2	1	67-84	95
Grayling	1	1	78	209

PHYSICAL CONDITION

Date	2 October 1979
Channel Width (m)	15-25
Floodplain Width (m)	200-1000
Water Depth (cm)	15-50
Discharge (m^3/s)	14
D.O. (mg/ℓ)	11
Temperature (°C)	4.5
Conductivity (µmhos/cm)	220
pH	8.4
Color	Blue-green
Turbidity	Moderately turbid
Bottom Type	Gravel/cobble; underlying sand/silt
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Gerstle River

Main Drainage Yukon River Tributary to Tanana River

Figure 4 Northwest Alignment Sheet 102

Identification Nos: NPSI 5-172 NPMP 575.0

Alaska Highway Milepost 1393.0

USGS Map Reference Mt. Hayes, Ak. T 13S R 15E Sec 6

Site Access On foot from Alaska Highway

Section Surveyed From ~100 m upstream to ~400 m downstream of NAPLINE

ASSESSMENT

The Gerstle River is a large, braided, glacial stream that originates at the Gerstle and Riley creek glaciers in the Alaska Range. Although the floodplain is approximately 600 m in width, the glacially-turbid water was confined to three small channels with cobble, gravel, sand and silt substrates throughout the broad floodplain. The absence of standing vegetation and presence of scattered deadwood within the floodplain is indicative of flooding and ice scouring characteristic of glacial floodplains. Outside the active floodplain, vegetation consists of poplar and alder intermixed with tundra and spruce forest.

The Gerstle River must be considered a fall rearing area and may provide a migration route for some fish. Two juvenile grayling were collected by seining shoreline regions of the river during the fall survey. Their presence is noteworthy since previous studies have not documented fish use in this river (Ref. 6 and 54).

FISH

Date: 3 October 1979

Fish Present: Yes

Gear/Effort: 4 m Seine(11 hauls @ 5-20 m/haul); shoreline

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other
Grayling		2		84-99

PHYSICAL CONDITION

Date	3 October 1979
Channel Width (m)	15-20
Floodplain Width (m)	600
Water Depth (cm)	15-60
Discharge (m^3/s)	3.9
D.O. (mg/ℓ)	12
Temperature (°C)	3.5
Conductivity (µmhos/cm)	220
pH	8.5
Color	Milky green
Turbidity	Moderately turbid
Bottom Type	Cobble; underlying sand/silt
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Tanana River Side Channel

Major Drainage Yukon River Tributary to Tanana River

Zone 3 Northwest Alignment Sheet 95

Identification Nos: NPSI 5-165.01 NPMP 536.7

Alaska Highway Milepost NA

USGS Map Reference Big Delta, Ak. T 9S R 10E Sec 5

Site Access Helicopter

Section Surveyed Entire length (~2.6 km)

ASSESSMENT

The Tanana River Side Channel is located on the northeast side of the river. The channel is 50 to 60 m in width. Banks vary from gently sloping sand and silt on the inside of meanders to 2-3 m high actively eroding silt banks on the outside of the meanders. Surrounding vegetation includes mature stands of large spruce and birch.

The Tanana River and its side channels are important to many species of fish during the fall. In the past, fish utilization of the Tanana River and its side channels was considered to be low until a late run of spawning chum salmon were discovered during construction of TAPS. Chum salmon in a spawning condition were also found in the Tanana River Side Channel during present investigations. Electrofishing and seining indicated that this side channel is also an important fall rearing area for juvenile humpback whitefish, grayling and longnose sucker. Other unidentified species of fish were also observed. The Tanana River and its side channels are important to many species of fish during the fall.

FISH

Date: 27 September 1979

Fish Present: Yes

Gear/Effort: 15mGN(23.7h)
AN(0.25h)
Seine(20 m)
EF(50 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Humpback whitefish		1		170
Chum salmon-ripe male		1		672
Grayling		1		299
Longnose sucker		1		278

PHYSICAL CONDITION

Date	27 September 1979
Channel Width (m)	50-60
Floodplain Width (m)	Same
Water Depth (cm)	~ 200-300
Discharge (m^3/s)	~6-9 Estimated
D.O. (mg/ℓ)	9.6
Temperature (°C)	4.5
Conductivity (umhos/cm)	145
pH	8.5
Color	Brown
Turbidity	Highly turbid
Bottom Type	Mud/silt
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Shaw Creek

Main Drainage Yukon River Tributary to Tanana River

Figure 3 Northwest Alignment Sheet 93

Identification Nos: NPSI 5-165 NPMP 526.0

Alaska Highway Milepost NA

USGS Map Reference Big Delta, Ak. T 7S R 8E Sec 36

Site Access Helicopter

Section Surveyed 1200 m upstream of NAPLINE to 1000 m downstream

ASSESSMENT

Shaw Creek is a deep (~2 m), slow-flowing stream approximately 15 m wide and shaded by overhanging mature spruce, birch and willow. Bottom substrate is mud, sand and sunken logs and banks are 2-3 m high.

The area near the proposed NAPLINE is a fall use area for whitefish, grayling and possibly other species. Fall investigations found adult and juvenile grayling and juvenile round whitefish at the NAPLINE crossing. One adult male grayling appeared to have spawned in the spring. Past investigations report that Shaw Creek tends to freeze solid in winter (Ref. 11), and therefore, late fall may be an important downstream migration period for fish upstream of the proposed crossing.

FISH

27 September 1979

Present: Yes

Effort: 15mGN(25h)
AN(1h)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Crayling-spawned out male		1		294
Crayling		5		202-212
Round whitefish		1		222

PHYSICAL CONDITION

Date	27 September 1979
Channel Width (m)	~15
Floodplain Width (m)	Same
Water Depth (cm)	24-200
Discharge (m^3/s)	Water too deep to obtain cross section
D.O. (mg/ℓ)	9.4
Temperature (°C)	2.5
Conductivity (μmhos/cm)	87
pH	7.5
Color	Humic-stained
Turbidity	Slightly turbid
Bottom Type	Mud/sand, some sunken logs
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Rosa Creek #2

Main Drainage Tanana River Tributary to Shaw Creek

Figure 3 Northwest Alignment Sheet 92

Identification Nos: NPSI 5-162 NPMP 519.8

Alaska Highway Milepost NA

USGS Map Reference Big Delta, Ak. T 6S R 8E Sec 32-33

Site Access Helicopter

Section Surveyed 75 m upstream of NAPLINE to 75 m downstream

ASSESSMENT

Rosa Creek #2 is a very small headwater drainage in a taiga region dominated by scattered willow and dwarf spruce. The channel (up to 0.5 m wide in some regions) subdivides repeatedly and is intermittently lost in tundra and bog areas.

The upper reaches of Rosa Creek are considered very poor habitat for fish in fall. Limited flow and numerous apparent fish blocks would impede fish movements, although fish may occasionally ascend to this region in times of high flow. Fish utilization of this stream in the vicinity of the proposed NAPLINE crossing is considered to be unlikely.

FISH

27 September 1979

Present: None

Effort: EF(150 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	27 September 1979
Channel Width (m)	Undefined to 0.5
Floodplain Width (m)	Same
Water Depth (cm)	3-15
Discharge (m^3/s)	~0.03 Estimated
D.O. (mg/ℓ)	8.8
Temperature (°C)	1.0
Conductivity (μmhos/cm)	97
pH	7.5
Color	Slightly stained
Turbidity	Clear
Bottom Type	Mud where channel is visible
Fish Block(s)	The stream braids out through tundra and bogs which appear to be fish blocks particularly in low water years

FALL SURVEY FORM

WATERBODY

Waterbody South Fork Minton Creek #7

Main Drainage Salcha River Tributary to McCoy Creek

Figure 4 Northwest Alignment Sheet 92

Identification Nos: NPSI 5-161 NPMP 515.5

Alaska Highway Milepost NA

USGS Map Reference Big Delta, Ak. T 6S R 7E-8E Sec 13

Site Access Helicopter

Section Surveyed From 50 m upstream of NAPLINE to 50 m downstream

ASSESSMENT

The South Fork Minton Creek #7 is a narrow (0.1-1.0 m), shallow (3-18 cm) stream with heavily incised banks overgrown with willows and black spruce. This channel is the farthest downstream of the seven proposed NAPLINE crossings of this waterbody.

Fish were not captured during the 1979 fall survey although the presence of grayling has been documented at crossings #6 and #7 during previous fall and spring investigations (Ref. 11, 30 and 54). Fish in South Fork Minton Creek probably migrate downstream as winter approaches The lower portion of this creek should be considered a fall nursery area for grayling until out migration has terminated. It is not likely that this area is used for overwintering (Ref. 55).

FISH

Date: 28 September 1979

Fish Present: None

Gear/Effort: EF(100 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	28 September 1979
Channel Width (m)	0.1-1 m natural channel, 2.8 at Alyeska LWC
Floodplain Width (m)	2.3
Water Depth (cm)	3-18
Discharge (m^3/s)	0.06
D.O. (mg/ℓ)	10
Temperature (°C)	1.0
Conductivity (umhos/cm)	120
pH	7.5
Color	Clear
Turbidity	Slightly stained
Bottom Type	Mud in natural channel, gravel on the LWC
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Small Creek

Main Drainage Tanana River Tributary to Minton Creek

Figure 3 Northwest Alignment Sheet 91

Identification Nos: NPSI 5-159.02 NPMP 511.3

Alaska Highway Milepost NA

USGS Map Reference Big Delta, Ak. T 6S R 7E Sec 4

Site Access Helicopter

Section Surveyed On foot 50 m upstream of NAPLINE to 75 m downstream. By air 300 m upstream and downstream of NAPLINE crossing

ASSESSMENT

Small Creek is a narrow stream, 0.1-1.0 m in width, with a mud and gravel substrate. The NAPLINE crossing is located in a high elevation region of Small Creek where stream gradient is steep. Waterfalls, 0.3-0.6 m high, are common downstream of the NAPLINE crossing. Stream banks (1.5-2.5 m high) are incised and covered with grass and willow.

No fish were captured or observed during the 1979 fall survey. The area is considered to be poor fish habitat due to numerous natural waterfalls immediately downstream of the proposed NAPLINE. These waterfalls occur frequently--about one every 10 m of stream. Small Creek may periodically offer low quality fish habitat when precipitation causes an increase in water levels, however this stream did not appear to be utilized by fish during present investigations.

FISH

Date: 28 September 1979

Fish Present: None

Gear/Effort: EF(100 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	28 September 1979
Channel Width (m)	0.1-1.1
Floodplain Width (m)	Same
Water Depth (cm)	2-9
Discharge (m^3/s)	0.01
D.O. (mg/ℓ)	12
Temperature (°C)	0.5
Conductivity (μmhos/cm)	340
pH	7.5
Color	Slightly stained
Turbidity	Clear
Bottom Type	Mud/gravel
Fish Block(s)	Numerous 0.3-0.6 m high waterfalls downstream of NAPLINE

FALL SURVEY FORM

WATERBODY

Waterbody Redmond Creek

Main Drainage Tanana River Tributary to Salcha River

Figure 3 Northwest Alignment Sheet 90

Identification Nos: NPSI 5-159 NPMP 505.7

Alaska Highway Milepost NA

USGS Map Reference Big Delta, Ak. T 5S R 6E Sec 22

Site Access Helicopter

Section Surveyed Salcha River upstream to NAPLINE (~10 km)

ASSESSMENT

Redmond Creek is a meandering stream that flows north across the NAPLINE route into the Salcha River. The channel varies from 3-7 m in width and has a gravel/sand substrate. This stream offers a good pool:riffle combination for fish. Pools are deep (>2 m) and provide good cover for fish.

Redmond Creek is considered to be important fall fish habitat. Young-of-the-year, juvenile and possibly adult grayling were present at the proposed NAPLINE crossing during the fall of 1979. The stream is also reported to support spawning salmon in the fall (Ref. 11), but no salmon were found during present investigations. Redmond Creek was completely spanned by a 1.3 m high beaver dam about 200 m upstream from its confluence with the Salcha River. The absence of salmon carcasses downstream of the beaver dam indicated that salmon probably did not spawn in the mouth of Redmond Creek. Salmon carcasses were observed in the Salcha River above the confluence with Redmond Creek. The permanency of the beaver dam is unknown, however, it is an effective block to upstream fall fish movements.

FISH

Date: 28 September 1979

Fish Present: Yes

Gear/Effort: EF(75 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Grayling	10	6	48-65	164-260

PHYSICAL CONDITION

Date	28 September 1979
Channel Width (m)	307
Floodplain Width (m)	Same
Water Depth (cm)	12-40
Discharge (m^3/s)	0.4
D.O. (mg/ℓ)	9.8
Temperature (°C)	3.5
Conductivity (μmhos/cm)	80
pH	7.5
Color	Stained
Turbidity	Clear
Bottom Type	Gravel/sand
Fish Block(s)	A beaver dam over 1.3 m high spans the entire creek 200 m upstream of its confluence with the Salcha River.

FALL SURVEY FORM

WATERBODY

Waterbody Unnamed Tributary to the Salcha River

Main Drainage Tanana River Tributary to Salcha River

Figure 3 Northwest Alignment Sheet 89

Identification Nos: NPSI 4-158.03 NPMP 502.8

Alaska Highway Milepost NA

USGS Map Reference Big Delta, Ak. T 5S R 6E Sec 18

Site Access Helicopter

Section Surveyed Entire length (~3.5 km)

ASSESSMENT

The Unnamed Tributary is a high water channel of the Salcha River that was found dry during the 1979 fall and spring surveys (Ref. 54). Since the channel was formed, the Salcha River has migrated to the west reducing the possibility of flow into this drainage. At the downstream confluence with the Salcha River, a 1.5 m cut bank would prevent fish movement except during periods of extremely high water. This area does not provide fish habitat.

FISH

Date: 28 September 1979

Fish Present: None

Gear/Effort: No effort-stream bed dry

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYS CAL CONDITION

Date	28 September 1979
Channel Width (m)	1-5 where visible
Floodplain Width (m)	Same
Water Depth (cm)	NA
Discharge (m^3/s)	0-stream bed dry
D.O. (mg/ℓ)	NA
Temperature (°C)	NA
Conductivity (μmhos/cm)	NA
pH	NA
Color	NA
Turbidity	NA
Bottom Type	NA
Fish Block(s)	Stream bed dry; 1.5 m high cut bank at confluence with Salcha River would block fish movement if stream bed not dry

FALL SURVEY FORM

WATERBODY

Waterbody TAPS Slough

Main Drainage Tanana River Tributary to Salcha River

Figure 3 Northwest Alignment Sheet 89

Identification Nos: NPSI 4-158.02 NPMP 501.9

Alaska Highway Milepost NA

USGS Map Reference Big Delta, Ak. T 5S R 5E Sec 13

Site Access Helicopter

Section Surveyed Entire length (~1.5 km)

ASSESSMENT

TAPS Slough is an old highwater side channel of the Salcha River. It was dry at the time of the 1979 fall survey, and terrestrial grasses within the channel indicate that flowing water occurs infrequently. A 1 m drop at the confluence of TAPS Slough and the Salcha River would impede fish movement except during periods of high water. This area does not provide fall fish habitat in the vicinity of the proposed NAPLINE.

FISH

Date: 28 September 1979

Fish Present: None

Gear/Effort: No effort-stream bed dry

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	28 September 1979
Channel Width (m)	0.1-2 where visible
Floodplain Width (m)	Same
Water Depth (cm)	NA
Discharge (m^3/s)	Stream bed dry
D.O. (mg/ℓ)	NA
Temperature (°C)	NA
Conductivity (umhos/cm)	NA
pH	NA
Color	NA
Turbidity	NA
Bottom Type	Mud
Fish Block(s)	Stream bed dry; 1 m drop at confluence to Salcha River

FALL SURVEY FORM

WATERBODY

Waterbody Unnamed Slough

Main Drainage Tanana River Tributary to Salcha River

Figure 3 Northwest Alignment Sheet 89

Identification Nos: NPSI 4-158.01 NPMP 501.8

Alaska Highway Milepost NA

USGS Map Reference Big Delta, Ak. T 5S R 5E Sec 13

Site Access Helicopter

Section Surveyed From 100 m upstream of NAPLINE crossing to confluence with Salcha River (~500 m)

ASSESSMENT

Unnamed Slough is an old high water side channel of the Salcha River. Flow is usually absent in the vicinity of the NAPLINE except at a site approximately 200 m downstream where a spring originates and flows south into the Salcha River. Although this spring area provides fish habitat (Ref. 55), upstream areas do not. The drainage was dry at the proposed NAPLINE and upstream from the TAPS workpad during the fall survey.

FISH

Date: 28 September 1979

Fish Present: None

Gear/Effort: No effort - Streambed dry

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	28 September 1979
Channel Width (m)	0.1-1 where visible
Floodplain Width (m)	Same
Water Depth (cm)	NA
Discharge (m^3/s)	Streambed dry
D.O. (mg/ℓ)	NA
Temperature (°C)	NA
Conductivity (umhos/cm)	NA
pH	NA
Color	NA
Turbidity	NA
Bottom Type	Mud
Fish Block(s)	Streambed dry at NAPLINE crossing

FALL SURVEY FORM

WATERBODY

Waterbody: Oxbow Slough

Main Drainage: Tanana River Tributary to: Salcha River

Figure: 3 Northwest Alignment Sheet: 89

Identification Nos: NPSI: 4-157.02 NPMP: 501.3

Alaska Highway Milepost: NA

USGS Map Reference: Big Delta, Ak. T: 5S R: 5E Sec: 12 & 13

Site Access: Helicopter

Section Surveyed: Entire length (0.6 km)

ASSESSMENT

Oxbow Slough is a dry highwater channel of the Salcha River that is overgrown with tall grass and willow. Near the pipeline crossing, channel width varies 0.1-1.5 m with grass covered banks. Abandoned beaver dams are visible downstream of the NAPLINE.

This drainage would not have flowing water at the NAPLINE crossing except during periods of high floods and so it should not be considered fish habitat. Approximately 800 m downstream of the crossing at the confluence with the Salcha, Oxbow Slough forms a small pool 25 m in length and 0.1-0.3 m in depth. This pool offers the only visible fish habitat throughout the length of the slough.

FISH

Date: 27 September 1979

Fish Present: None

Gear/Effort: No effort-stream bed dry

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	27 September 1979
Channel Width (m)	0.1-1.5 where visible
Floodplain Width (m)	Same
Water Depth (cm)	NA
Discharge (m^3/s)	Stream bed dry
D.O. (mg/ℓ)	NA
Temperature (°C)	NA
Conductivity (μmhos/cm)	NA
pH	NA
Color	NA
Turbidity	NA
Bottom Type	Mud
Fish Block(s)	Stream bed dry

FALL SURVEY FORM

WATERBODY

Waterbody Little Salcha River

Main Drainage Yukon River Tributary to Tanana River

Figure 3 Northwest Alignment Sheet 88

Identification Nos: NPSI 4-157 NPMP 496.5

Alaska Highway Milepost NA

USGS Map Reference Big Delta, Ak. T 4E R 5S Sec 32

Site Access Helicopter

Section Surveyed 400 m upstream of NAPLINE to 400 m downstream

ASSESSMENT

Little Salcha River is a small, bog-fed stream of variable width (1-5 m) and depth (0.1-2 m). Its waters are stained red/brown from leachates of surrounding tundra and muskeg. Viewed from the air, the stream is a series of alternating circular pools and narrower straight riffles. Substrate is gravel and sand in fast water and mud in pool or slow water areas. Banks, composed of silt and mud (1-2 m high) were actively eroding, particularly on the outside of river beds.

Fall fishing efforts in the Little Salcha River captured nine juvenile sculpin and eight grayling. Grayling were also observed feeding near the TAPS bridge during a previous fall investigation (Ref. 11). The Little Salcha River near the proposed NAPLINE provides important fall rearing habitat for fish and is also likely used for fall migrations.

FISH

Date: 27 September 1979

Fish Present: Yes

Gear/Effort: EF(100 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Sculpin		9		42-56
Grayling		8		102-125

PHYSICAL CONDITION

Date	27 September 1979
Channel Width (m)	1-5
Floodplain Width (m)	Same
Water Depth (cm)	Up to 200
Discharge (m^3/s)	0.7
D.O. (mg/ℓ)	10
Temperature (°C)	2.0
Conductivity (μmhos/cm)	50
pH	7.5
Color	Humic-stained
Turbidity	Clear
Bottom Type	Gravel/mud
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Million Dollar Creek #4

Main Drainage Tanana River Tributary to French Creek

Figure 3 Northwest Alignment Sheet 87

Identification Nos: NPSI 4-156 NPMP 490.6

Alaska Highway Milepost NA

USGS Map Reference Big Delta, Ak. T 4S R 4E Sec 2

Site Access Helicopter

Section Surveyed 200 m upstream of NAPLINE to 200 m downstream

ASSESSMENT

Of the four proposed NAPLINE crossings on Million Dollar Creek, #4 is the farthest downstream. This is a small tundra stream 1-3 m wide with banks up to 1 m high. The well vegetated banks are bordered by willow and spruce. Downstream of the TAPS workpad the creek has been channelized and parallels the workpad for approximately 50 m. The water was darkly stained and the substrate consisted primarily of mud and detritus. Upstream of the workpad numerous fallen logs cluttered the narrow channel.

This stream provides fish habitat during fall. Present investigations found slimy sculpin in pools formed by the TAPS workpad. Previous studies list grayling, northern pike and unidentified whitefish as also utilizing this stream (Ref. 11 and 31). During the fall this section of the stream would serve as a downstream migration route for these fish, since it is known that no overwintering habitat is provided in upstream regions (Ref. 55).

FISH

Date: 27 September 1979

Fish Present: Yes

Gear/Effort: EF(200 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Slimy sculpin		15-20		*20-50

*Lengths estimated, not measured

PHYSICAL CONDITION

Date	27 September 1979
Channel Width (m)	0.1-2 m
Floodplain Width (m)	Same
Water Depth (cm)	20-48
Discharge (m^3/s)	0.09
D.O. (mg/ℓ)	9.4
Temperature (°C)	2.5
Conductivity (μmhos/cm)	45
pH	7.0
Color	Stained
Turbidity	Clear
Bottom Type	Mud/organic detritus
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody French Creek #0

Main Drainage Tanana River Tributary to Moose Creek

Figure 3 Northwest Alignment Sheet 87

Identification Nos: NPSI 4-155 NPMP 489.6

Alaska Highway Milepost NA

USGS Map Reference Big Delta, Ak. T 3S R 4E Sec 34

Site Access Helicopter

Section Surveyed 500 m upstream to 500 m downstream of NAPLINE crossing

ASSESSMENT

French Creek #0 is the farthest upstream crossing of French Creek. At this location it is a small tundra stream, 0.5-1.1 m in width, with highly stained water. Water depths range up to 45 cm and may occasionally reach 150 cm. Substrate is mud, detritus and some filamentous algae. Logs and debris choke the stream channel approximately 100-250 m upstream of the proposed NAPLINE. Within the surrounding drainage basin, vegetative types include dwarf birch, spruce, willow and other species common to muskeg and bog areas.

During a previous fall investigation three juvenile grayling were observed in French Creek 15 m upstream of crossing #0 (Ref. 11). The 1979 fall electrofishing efforts yielded four sculpin in a 50 m length of stream. French Creek #0 provides good fish habitat in fall.

FISH

Date: 27 September 1979

Fish Present: Yes

Gear/Effort: EF (50 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other
Sculpin		4		50-85

PHYSICAL CONDITION

Date	27 September 1979
Channel Width (m)	0.5-1.1
Floodplain Width (m)	Same
Water Depth (cm)	10-45
Discharge (m^3/s)	0.2
D.O. (mg/ℓ)	11
Temperature (°C)	1.0
Conductivity (μmhos/cm)	50
pH	7.5
Color	Humic-stained
Turbidity	Clear
Bottom Type	Mud/detritus
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Knokanpeover Creek

Main Drainage Tanana River Tributary to French Creek

Figure 4 Northwest Alignment Sheet 86

Identification Nos: NPSI 4-154 NPMP 486.4

Alaska Highway Milepost NA

USGS Map Reference Fairbanks, Ak. T 3S R 4E Sec 20

Site Access Helicopter

Section Surveyed 200 m upstream of NAPLINE to 200 m downstream

ASSESSMENT

Knokanpeover Creek is a moderate size (3-5 m wide) tributary to French Creek. The stream varies in depth to 150 cm. Its stained waters flow over firm sand and gravel substrate and through a series of pools and riffles. Numerous large trees which have fallen into the creek provide excellent cover for fish. Streamside vegetation consists of large mature spruce and birch among weed and willow.

Grayling have been reported to be present in this area in previous years (Ref. 11). During the 1979 fall investigations electrofishing yielded young-of-the-year and juvenile grayling at the proposed pipeline crossing. The presence of young-of-the-year may indicate that grayling spawn in the vicinity of the proposed NAPLINE crossing. Knokanpeover Creek should be considered a migration route, a possible spawning stream, as well as a nursery and rearing area for grayling throughout the open water season.

FISH

Date: 26 September 1979

Fish Present: Yes

Gear/Effort: EF(50 m)
15mGN(25.25h)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Grayling	2	1	64	128

PHYSICAL CONDITION

Date	26 September 1979
Channel Width (m)	3-5 m
Floodplain Width (m)	Same
Water Depth (cm)	10-150
Discharge (m^3/s)	0.23
D.O. (mg/ℓ)	11
Temperature (°C)	3.0
Conductivity (μmhos/cm)	40
pH	7.5
Color	Humic-stained
Turbidity	Clear
Bottom Type	Gravel/sand
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody French Creek #5

Main Drainage Tanana River Tributary to Moose Creek

Figure 3 Northwest Alignment Sheet 85

Identification Nos: NPSI 4-149 NPMP 480.4

Alaska Highway Milepost NA

USGS Map Reference Fairbanks, Ak. T 2S R 3E Sec 27

Site Access Helicopter

Section Surveyed From 100 m upstream to 100 m downstream of the NAPLINE crossing

ASSESSMENT

French Creek #5 is the farthest downstream crossing of French Creek by the proposed NAPLINE route. The channel varies from 6-8 m wide with banks 1.5-2.5 m high bordered by overhanging willows, birch and spruce. The water was darkly humic-stained with numerous floating deciduous leaves at the time of this investigation. The substrate was mud and sand with occasional sunken logs.

No fish were captured during present fall investigations at this crossing. However, since slimy sculpin and grayling were caught at crossing #0 (Ref. 11 and 57), it is conceivable that the area of French Creek #5 serves as a migration route for fish moving downstream in fall.

FISH

Date: 24 September 1979

Fish Present: None

Gear/Effort: 15mGN(23.25h)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	24 September 1979
Channel Width (m)	6-8
Floodplain Width (m)	Same
Water Depth (cm)	20-60
Discharge (m^3/s)	1.0
D.O. (mg/ℓ)	7.8
Temperature (°C)	3.5
Conductivity (μmhos/cm)	105
pH	7.4
Color	Dark stained
Turbidity	Slightly
Bottom Type	Mud/sand
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Bear Lake Outlet

Major Drainage Tanana River Tributary to Moose Creek

Figure 3 Northwest Alignment Sheet 85

Identification Nos: NPSI 4-148.01 NPMP 480.2

Alaska Highway Milepost NA

USGS Map Reference Fairbanks, Ak. T 2S R 3E Sec 27

Site Access Helicopter

Section Surveyed 200 m upstream of NAPLINE to 200 m downstream

ASSESSMENT

Bear Lake Outlet, at the NAPLINE crossing, was a dry stream channel overgrown with grass and willow during the 1979 fall survey. The large quantity of vegetation in the channel indicates that stream flow is extremely infrequent. The culvert presently installed in the Alyeska workpad is perched and would constitute a barrier to fish movement should flowing water be present in Bear Lake Outlet. Alaska Department of Fish and Game approved this fish block to prevent fish from entering Bear Lake (Ref. 11). Bear Lake Outlet does not provide suitable habitat for fish in fall.

FISH

Date: 24 September 1979

Fish Present: None

Gear/Effort: No effort-stream bed dry

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	24 September 1979
Channel Width (m)	1-3
Floodplain Width (m)	Same
Water Depth (cm)	NA
Discharge (m^3/s)	0-stream bed dry
D.O. (mg/ℓ)	NA
Temperature (°C)	NA
Conductivity (umhos/cm)	NA
pH	NA
Color	NA
Turbidity	NA
Bottom Type	Gravel/grass
Fish Block(s)	Culvert perched 60 cm, channel dry

FALL SURVEY FORM

WATERBODY

Waterbody Moose Creek #1

Main Drainage Yukon River Tributary to Tanana River

Figure 3 Northwest Alignment Sheet 85

Identification Nos: NPSI 4-148 NPMP 479.3

Alaska Highway Milepost NA

USGS Map Reference Fairbanks, Ak. T 2S R 3E Sec 28

Site Access Helicopter

Section Surveyed From Tanana River upstream approximately 4.8 km to Moose Creek #1

ASSESSMENT

Moose Creek is a deep, darkly-stained, meandering tributary to the Tanana River. It flows westerly through a mud channel and gently sloping banks covered with grass, willow and spruce. During the fall 1979 investigation, the stream channel was approximately 12 m in width and littered with logs and sunken debris in the vicinity of crossing #1.

Moose Creek Crossing #1 provided fall feeding and rearing habitat for juvenile humpback whitefish and grayling and possibly other species (e.g. round whitefish were found at Moose Creek Crossing #2). This area may also be a fall migration route for fish inhabiting the upstream reaches.

FISH

Date: 24 September 1979

Fish Present: Yes

Gear/Effort: 15mGN(26.5h)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Grayling		1		184
Humpback whitefish		3		178-220

PHYSICAL CONDITION

Date	24 September 1979
Channel Width (m)	~12
Floodplain Width (m)	~12
Water Depth (cm)	Water too deep to obtain measurement
Discharge (m^3/s)	Water too deep to obtain cross section
D.O. (mg/ℓ)	9.2
Temperature (°C)	4.5
Conductivity (μmhos/cm)	85
pH	7.2
Color	Darkly stained
Turbidity	Turbid
Bottom Type	Mud/silt
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Moose Creek #2

Main Drainage Yukon River Tributary to Tanana River

Figure 3 Northwest Alignment Sheet 85

Identification Nos: NPSI 4-147 NPMP 478.0

Alaska Highway Milepost NA

USGS Map Reference Fairbanks, Ak. T 2S R 3E Sec 20

Site Access Helicopter

Section Surveyed From Moose Creek crossing #1 downstream ~2.0 km to Moose Creek crossing #2

ASSESSMENT

In the vicinity of proposed crossing #2, Moose Creek is a deep stream 12-17 m in width. Its meandering channel is contained by steep grassy banks (0.5-2 m high) bordered by a mixture of willow, alder and spruce.

This stream provides good fall habitat and may be considered a migration pathway for fish. Gillnetting at the proposed NAPLINE crossing indicates that this region is used in fall by juvenile burbot, humpback whitefish and round whitefish.

FISH

Date: 24 September 1979

Fish Present: Yes

Gear/Effort: 15mGN(25.5h)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Burbot		1		252
Humpback whitefish		12		160-249
Round whitefish		1		211

PHYSICAL CONDITION

Date	24 September 1979
Channel Width (m)	12-17
Floodplain Width (m)	~12
Water Depth (cm)	Water too deep to obtain measurement
Discharge (m^3/s)	Water too deep to obtain cross section
D.O. (mg/ℓ)	8.6
Temperature (°C)	4.5
Conductivity (μmhos/cm)	75
pH	7.4
Color	Darkly stained
Turbidity	Turbid
Bottom Type	Mud
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Moose Creek #3

Main Drainage Yukon River Tributary to Tanana River

Figure 3 Northwest Alignment Sheet 85

Identification Nos: NPSI 4-146 NPMP 477.3

Alaska Highway Milepost NA

USGS Map Reference Fairbanks, Ak. T 2S R 3E Sec 20

Site Access Helicopter

Section Surveyed From Moose Creek crossing #2 to 1.3 km downstream of Moose Creek crossing #3 (~2.8 km)

ASSESSMENT

Near the NAPLINE crossing of Moose Creek #3, the stream was 10-15 m wide with steep banks (0.5-1.5 m high) vegetated with grass, willow and alder. Fish were not caught at this location during 1979 fall field surveys but were observed feeding at the surface. Grayling, humpback whitefish, round whitefish and burbot were captured in upstream reaches (Moose Creek #1 and #2) of the stream during the present study. Since no barriers to fish movement were observed, it is probable that these species also use Moose Creek #3. The stream near this crossing should be considered a fall feeding and rearing area and a fall migration route.

FISH

Date: 24 September 1979

Fish Present: None

Gear/Effort: 15mGN(25.5h)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	24 September 1979
Channel Width (m)	10-15
Floodplain Width (m)	10-15
Water Depth (cm)	100-300
Discharge (m^3/s)	Water too deep to obtain cross section
D.O. (mg/ℓ)	8.2
Temperature (°C)	4.5
Conductivity (µmhos/cm)	125
pH	7.5
Color	Darkly stained
Turbidity	Turbid
Bottom Type	Mud
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Steele Creek

Main Drainage Tanana River Tributary to Chena River

Figure 3 Northwest Alignment Sheet 82

Identification Nos: NPSI 4-143 NPMP 463.6

Alaska Highway Milepost NA

USGS Map Reference Fairbanks, Ak. T 1N R 1E Sec 35 and 36

Site Access Helicopter

Section Surveyed ~400 m downstream of NAPLINE to 400 m upstream

ASSESSMENT

During the fall survey, Steele Creek was a small, shallow stream 0.5-1.0 m in width with depths to ~0.2 m near the proposed NAPLINE crossing. In this region the stream flows through dense alder and willow thickets growing on unstable, sloughing banks. Substrate consists primarily of mud and silt with an accumulation of sunken logs and debris.

Steele Creek is considered poor fall fish habitat in the vicinity of the proposed NAPLINE. Numerous log jams and bog areas located downstream probably impede fish movement during the fall and likely constitute complete fish blocks during low water years. No fish were caught or seen during present investigations.

FISH

Date: 24 September 1979

Fish Present: None

Gear/Effort: EF(80 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	24 September 1979
Channel Width (m)	0.2-5
Floodplain Width (m)	Same
Water Depth (cm)	15-21
Discharge (m^3/s)	0.03
D.O. (mg/ℓ)	9.4
Temperature (°C)	4.5
Conductivity (µmhos/cm)	125
pH	6.8
Color	Clear
Turbidity	Clear
Bottom Type	Mud
Fish Block(s)	Numerous bogs and log jams downstream may impede fish movement during low water

FALL SURVEY FORM

WATERBODY

Waterbody Engineer Creek

Main Drainage Chatanika River Tributary to Goldstream Creek

Figure 3 Northwest Alignment Sheet 81

Identification Nos: NPSI 4-142 NPMP 457.5

Alaska Highway Milepost NA

USGS Map Reference Fairbanks, Ak. T 1N R 1E Sec 8

Site Access Helicopter

Section Surveyed From NAPLINE, approximately 800 m downstream to Steese Highway

ASSESSMENT

Engineer Creek had minimal flow (<0.01 m^3/sec) at the time of the fall survey. The stream has cut a large and deep V-channel 4-5 m deep through ice rich, unstable tundra at the proposed pipeline crossing. At this location, the stream is a combination of shallow dish-like depressions (0.2-1.0 m wide) where water collects and then spills over 0.2-1.0 m waterfalls into the next depression. This morphology continues 3-4 km downstream of the proposed pipeline crossing. Substrate in the dish-like depressions is primarily silt and mud contributed by sloughing of ice-rich banks.

Engineer Creek offers poor fish habitat during fall due to numerous waterfalls and limited flow. A culvert at the Steese Highway crossing is also a barrier to fish passage in the fact that it is perched (1 m) above the natural level of stream flow and at this point all flow is beneath the culvert through the highway road fill.

FISH

Date: 26 September 1979

Fish Present: None

Gear/Effort: No effort - poor habitat, stream blocks

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	26 September 1979
Channel Width (m)	0.05-0.3
Floodplain Width (m)	0.2-0.3
Water Depth (cm)	3-10
Discharge (m^3/s)	<0.01
D.O. (mg/ℓ)	3.4
Temperature (°C)	1.5
Conductivity (umhos/cm)	120
pH	7.7
Color	Stained
Turbidity	Clear
Bottom Type	Mud/detritus
Fish Block(s)	Numerous natural waterfalls; Steese Highway culvert perched; water flowing through road fill below culvert, culvert dry.

FALL SURVEY FORM

WATERBODY

Waterbody Goldstream Creek

Main Drainage Tanana River Tributary to Chatanika River

Figure 3 Northwest Alignment Sheet 81

Identification Nos: NPSI 4-141 NPMP 454.7

Alaska Highway Milepost NA

USGS Map Reference Fairbanks, Ak. T 1N R 1W Sec 1

Site Access Helicopter

Section Surveyed From 200 m upstream of TAPS to 200 m downstream

ASSESSMENT

Goldstream Creek originates approximately 32 km north of the proposed NAPLINE crossing and flows southerly through gold dredge tailings of the Fox Mining District before reaching the proposed crossing. As a result, the substrate of this stained, narrow (~3 m) stream consists of gravel and rocks with minimal accumulation of silt or mud. Stream channel configuration and banks are in their natural condition at the point of crossing. Banks (0.2-1.0 m high) consist of gravel, sand and some silt. Stream side vegetation is mature birch, willow and spruce.

Grayling young-of-the-year were captured immediately downstream of the proposed NAPLINE during the fall investigation. Since no fish were caught here during the spring survey, either unhatched eggs were present at that time or young-of-the-year moved to this region in summer or fall. Other fish may have been present prior to the date of the fall survey, however, approaching winter and colder water temperatures may have begun annual downstream migration to overwintering grounds. Goldstream Creek should be considered a nursery area and fall migration route.

FISH

Date: 26 September 1979

Fish Present: Yes

Gear/Effort: EF(250 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Grayling	2		58-63	

PHYSICAL CONDITION

Date	26 September 1979
Channel Width (m)	3
Floodplain Width (m)	~6
Water Depth (cm)	20-42
Discharge (m^3/s)	0.43
D.O. (mg/ℓ)	8.6
Temperature (°C)	1.5
Conductivity (umhos/cm)	80
pH	7.3
Color	Slightly stained
Turbidity	Slightly turbid
Bottom Type	Sand/gravel
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Treasure Creek

Main Drainage Chatanika River Tributary to Vault Creek

Figure 3 Northwest Alignment Sheet 80

Identification Nos: NPSI 4-140 NPMP 448.6

Alaska Highway Milepost NA

USGS Map Reference Livengood, Ak. T 2N R 1W Sec 3

Site Access Helicopter

Section Surveyed From 1.5 km downstream to 1 km upstream of NAPLINE

ASSESSMENT

In fall, Treasure Creek is a small stream with occasionally incised silt and mud banks (0.5-1.5 m) vegetated with birch, dwarf spruce and willow. Substrate consists of soft mud, many sunken logs and an abundance of detritus. Upstream placer mining may account partially for the extensive deposits of mud, silt and sunken logs.

Treasure Creek appears to be suitable fish habitat and would probably be utilized if downstream fish blocks were removed. Three active beaver dams, 800-1200 m downstream of the proposed crossing, are complete stream blocks. The largest is 1.5 m in height. At the present time, these dams would provide good settling ponds for any upstream silt-causing activities. Fish are probably present downstream of these dams during open water seasons.

FISH

Date: 26 September 1979

Fish Present: None

Gear/Effort: EF(50 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	26 September 1979
Channel Width (m)	0.1-1.0
Floodplain Width (m)	Same
Water Depth (cm)	5-18
Discharge (m^3/s)	0.02
D.O. (mg/ℓ)	10
Temperature (°C)	1.5
Conductivity (μmhos/cm)	170
pH	7.5
Color	Stained
Turbidity	Clear
Bottom Type	Mud/detritus, sunken logs
Fish Block(s)	Numerous beaver dams 0.8-1.7 m high beginning 0.8 km downstream from NAPLINE

FALL SURVEY FORM

WATERBODY

Waterbody Shocker Creek

Main Drainage Tanana River Tributary to Chatanika River

Figure 3 Northwest Alignment Sheet 79

Identification Nos: NPSI 4-138 NPMP 443.7

Alaska Highway Milepost NA

USGS Map Reference Livengood, Ak. T 3N R 1W Sec 19

Site Access Helicopter

Section Surveyed From 200 m upstream of NAPLINE to 200 m downstream

ASSESSMENT

Shocker Creek is a small tundra stream 1.0-1.5 m in width, with 1-1.5 m high banks. The banks are silt and tundra covered with willow, birch and berry bushes. This drainage is a braided tundra stream with highly stained water. Substrates consisted of gravel and mud with emergent grass abundant in shallow water.

Shocker Creek, at the proposed NAPLINE crossing, provides good fall fish habitat. It is a rearing area for young-of-the-year and juvenile grayling and feeding area for sculpin. Previous surveys of this stream also recorded that grayling were present (Ref. 11 and 54).

FISH

Date: 26 September 1979

Fish Present: Yes

Gear/Effort: EF(60 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Grayling	4	1	.64-94	115
Sculpin		5		61-87

PHYSICAL CONDITION

Date	26 September 1979
Channel Width (m)	1-1.5
Floodplain Width (m)	1-2.0
Water Depth (cm)	30-45
Discharge (m^3/s)	0.09
D.O. (mg/ℓ)	9.0
Temperature (°C)	3.0
Conductivity (umhos/cm)	88
pH	7.5
Color	Stained
Turbidity	Slightly turbid
Bottom Type	Primarily mud
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Washington Creek

Main Drainage Tanana River Tributary to Tolovana River

Figure 3 Northwest Alignment Sheet 78

Identification Nos: NPSI 4-137 NPMP 438.2

Alaska Highway Milepost NA

USGS Map Reference Livengood, Ak. T 3N R 2W Sec 4

Site Access Helicopter

Section Surveyed From 400 m upstream to 400 m downstream of the NAPLINE

ASSESSMENT

Washington Creek, in the vicinity of the NAPLINE crossing, was 5-8 m wide with well defined banks 1.0-2.5 m in height. This stream meanders through mature stands of birch and spruce and also muskeg areas. Washington Creek was clear and humic-stained in late September 1979. Substrates are gravel and sand with small amounts of mud or silt.

During present investigations, juvenile and adult grayling were abundant near the proposed NAPLINE crossing. In addition, many small feeder streams and over 25 km of the main stem of Washington Creek are located above the proposed crossing, and these upstream regions probably support fish in the fall which will migrate downstream. Thus, the section of Washington Creek near the NAPLINE crossing is a fall migration route as well as a fall rearing and feeding grounds for fish.

FISH

Date: 27 September 1979

Fish Present: Yes

Gear/Effort: 15mGN(~24h)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Grayling		14		180-278

PHYSICAL CONDITION

Date	27 September 1979
Channel Width (m)	5-8
Floodplain Width (m)	15
Water Depth (cm)	30-200
Discharge (m^3/s)	0.52
D.O. (mg/ℓ)	10
Temperature (°C)	2.0
Conductivity (umhos/cm)	120
pH	7.5
Color	Humic stained
Turbidity	Clear
Bottom Type	Gravel/sand/mud
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody South Fork Aggie Creek

Main Drainage Tanana River Tributary to Washington Creek

Figure 3 Northwest Alignment Sheet 76

Identification Nos: NPSI 4-136 NPMP 430.9

Alaska Highway Milepost NA

USGS Map Reference Livengood, Ak. T 4N R 3W Sec 10

Site Access Helicopter

Section Surveyed 30 m upstream to 30 m downstream of NAPLINE

ASSESSMENT

The South Fork of Aggie Creek is a clear-water stream which flows west from the Elliot Highway to the proposed NAPLINE crossing. This headwater portion of the South Fork is confined to a narrow channel 0.1-0.5 m in width. The substrate consists of gravel at the TAPS workpad and sand with little detritus or algae elsewhere. Predominant streamside vegetation includes willow and dwarf birch scattered through surrounding tundra and muskeg.

The proposed NAPLINE crossing is at high elevation and the steep stream gradient in this area appears generally unsuitable for fish use. Water velocities over 0.3 m/s were common. A 1.0 m high waterfall has been created at the Aleyska workpad which would block upstream fish movement if fish were present. In addition, numerous willow and brush falls in the channel would impede fish movement. Fall utilization of South Fork Aggie Creek is therefore considered unlikely.

FISH

Date: 25 September 1979

Fish Present: None

Gear/Effort: No effort - poor habitat

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	25 September 1979
Channel Width (m)	3 at TAPSLINE, 0.1-0.5 elsewhere
Floodplain Width (m)	Same
Water Depth (cm)	2-6
Discharge (m^3/s)	0.04
D.O. (mg/ℓ)	9.4
Temperature (°C)	2.0
Conductivity (umhos/cm)	Not taken
pH	7.7
Color	Clear
Turbidity	Clear
Bottom Type	Gravel at workpad; tundra elsewhere
Fish Block(s)	Numerous willow and brush falls, workpad is a 1.0 m high LWC which serves as fish barrier Alyeska LWC is a 1.0 m high fish block

FALL SURVEY FORM

WATERBODY

Waterbody North Fork Aggie Creek

Main Drainage Tanana River Tributary to Washington Creek

Figure 3 Northwest Alignment Sheet 76

Identification Nos: NPSI 4-135 NPMP 430.1

Alaska Highway Milepost NA

USGS Map Reference Livengood, Ak. T 4N R 3W Sec 3

Site Access Helicopter

Section Surveyed 40 m downstream to 30 m upstream of NAPLINE

ASSESSMENT

The North Fork of Aggie Creek originates near the Elliott Highway and flows westerly 3-5 km through tundra and muskeg to the proposed NAPLINE crossing. The NAPLINE crosses Aggie Creek in its headwater regions where the stream gradient drops about 200-300 m per mile. Despite the steep gradient and mud substrate, Aggie Creek water was clear during the 1979 fall survey. The stream channel varied from 0.2-1.5 m in width and banks were vegetated with birch and willow.

In the vicinity of the proposed NAPLINE construction, the North Fork of Aggie Creek does not provide suitable fish habitat due to its steep gradient and the presence of numerous natural waterfalls. The Alyeska workpad also creates a 1.0 m high waterfall which would impede movements of fish to upstream areas. Areas below this blockage may provide suitable habitat for fish use.

FISH

Date: 25 September 1979

Fish Present: None

Gear/Effort: No effort - poor habitat

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	25 September 1979
Channel Width (m)	3 at workpad, 0.1-0.8 elsewhere
Floodplain Width (m)	Same
Water Depth (cm)	6-9
Discharge (m^3/s)	0.02
D.O. (mg/ℓ)	9.6
Temperature (°C)	2.5
Conductivity (μmhos/cm)	78
pH	7.6
Color	Clear
Turbidity	Clear
Bottom Type	Gravel at workpad, tundra/willow elsewhere
Fish Block(s)	Numerous willow and tundra stream blocks downstream. Alyeska LWC is a 1.0 m high fish block

FALL SURVEY FORM

WATERBODY

Waterbody Tolovana River

Main Drainage Yukon River Tributary to Tanana River

Figure 3 Northwest Alignment Sheet 72

Identification Nos: NPSI 4-128 NPMP 405.1

Alaska Highway Milepost NA

USGS Map Reference Livengood, Ak. T 7N R 5W Sec 5

Site Access Helicopter

Section Surveyed 1 km downstream of NAPLINE to 0.5 km upstream

ASSESSMENT

The Tolovana River is a medium size, highly-stained stream that is characterized by long, wide channels (200-300 m in length) separated by narrow, fast riffles. Water depths seldom excede 2 m in this area. Substrate is silt and mud intermixed with gravel, providing a semi-firm bottom. Banks are 0-2 m high and composed of silt, sand and mud covered with large spruce and birch. The outside of river bends are actively eroding causing many large trees to slough into the stream. The upstream end of the Tolovana River is annually mined for placer gold creating highly turbid water throughout most of the summer season, but the river was clear during this fall survey.

During 1979 fall investigations, grayling young-of-the-year were numerous in the vicinity of the proposed NAPLINE. This area should be considered a fall nursery area and perhaps a fall migration pathway.

FISH

Date: 25 September 1979

Fish Present: Yes

Gear/Effort: EF(400 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other
Grayling	24		75-85	

PHYSICAL CONDITION

Date	25 September 1979
Channel Width (m)	3-4
Floodplain Width (m)	Same
Water Depth (cm)	10-35
Discharge (m^3/s)	0.93
D.O. (mg/ℓ)	9.0
Temperature (°C)	3.5
Conductivity (µmhos/cm)	110
pH	7.5
Color	Stained
Turbidity	Clear
Bottom Type	Silt/mud, some gravel and detritus
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Roche Moutonee Creek

Main Drainage Sagavanirktok River Tributary to Atigun River

Figure 2 Northwest Alignment Sheet 28

Identification Nos: NPSI 2-24 NPMP 153.3

Alaska Highway Milepost NA

USGS Map Reference Philip Smith Mountains, Ak. T 12S R 12E Sec 28

Site Access On foot from TAPS Haul Road

Section Surveyed From 100 m upstream of NAPLINE, downstream to its confluence with the Atigun River (~600 m)

ASSESSMENT

Roche Moutonee Creek is a small (3-6.5 m) slightly turbid stream which flows west across the haul road and NAPLINE into the Atigun River. This stream flows through a large (100-150 m) gravel and cobble floodplain and has a braided channel with low, gradual sloping banks lined with willow. Approximately 75% of the stream surface was ice-covered during present investigations.

A young-of-the-year and adult grayling were captured near the proposed NAPLINE during the fall survey. Other species may have been present but ice cover limited fishing efforts.

FISH

Date: 19 September 1979

Fish Present: Yes

Gear/Effort: EF(80 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other
Grayling	1	1	52	257

PHYSICAL CONDITION

Date	19 September 1979
Channel Width (m)	3-6.5
Floodplain Width (m)	100-150
Water Depth (cm)	15-60
Discharge (m^3/s)	0.34
D.O. (mg/ℓ)	11
Temperature (°C)	-0.2
Conductivity (μmhos/cm)	130
pH	8.0
Color	Slightly green
Turbidity	Slightly turbid
Bottom Type	Gravel/cobble
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Mainline Spring

Main Drainage Sagavanirktok River Tributary to Atigun River

Figure 2 Northwest Alignment Sheet 27

Identification Nos: NPSI 2-23.02 NPMP 152.2

Alaska Highway Milepost NA

USGS Map Reference Philip Smith Mountains, Ak. T 12S R 12E Sec 21

Site Access On foot from TAPS Haul Road

Section Surveyed 100 m upstream from NAPLINE downstream to confluence with the Atigun River (1.1 km)

ASSESSMENT

Mainline Spring, a tributary to the Atigun River, is a small (1-3 m), shallow (to 15 cm) stream in the vicinity of the NAPLINE. Slightly turbid water flows over sand, silt and gravel substrate. The stream is confined by low, gradually sloping banks vegetated with willows, grasses and sedges.

Most of Mainline Spring had frozen over prior to the fall survey providing poor fish habitat at this time. Surface ice was sufficiently clear to visually inspect for fish. No fish were observed through the ice although it is probable that fish use this stream during fall prior to ice formation. One juvenile arctic char was caught in a small area of open water at the confluence of Mainline Spring and the Atigun River.

FISH

Date: 19 September 1979

Fish Present: Yes

Gear/Effort: EF(40 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Arctic char		1		130

PHYSICAL CONDITION

Date	19 September 1979
Channel Width (m)	1-3
Floodplain Width (m)	3-10
Water Depth (cm)	10-18
Discharge (m^3/s)	0.05
D.O. (mg/ℓ)	9
Temperature (°C)	0.0
Conductivity (μmhos/cm)	160
pH	7.4
Color	Clear
Turbidity	Slightly turbid
Bottom Type	Sand/silt, some small gravel
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Mosquito Lake

Main Drainage Atigun River Tributary to Mosquito Lake Outlet

Figure 2 Northwest Alignment Sheet 27

Identification Nos: NPSI 2-22.01 NPMP 148.9

Alaska Highway Milepost NA

USGS Map Reference Philip Smith Mountains, Ak. T 11S R 12E Sec 32

Site Access On foot from the TAPS Haul Road

Section Surveyed North, west and south shores of lake and Mosquito Lake Outlet from lake to Atigun River (800 m)

ASSESSMENT

Mosquito Lake is a small clear tundra lake of unknown depth. Lake outflow is through an undefined channel in a low swampy area on the southern shore. Outflow was not apparent in late September and fish movement between Mosquito Lake and the Atigun River is believed to be improbable, except during unusually high water periods.

Mosquito Lake provides year-round habitat for fish. Fifteen round whitefish and one burbot were caught in the lake during the present investigation. Two of the larger whitefish were near a spawning condition. Although large numbers of grayling have been reported to occur in Mosquito Lake, none were captured during the present survey.

FISH

Date: 19-20 September 1979

Fish Present: Yes

Gear/Effort: 20mGN(24h)
2MT(48h)
EF(100 m); shoreline

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Burbot		1		960
Round whitefish		15		132-400

PHYSICAL CONDITION

Date	19-20 September 1979
Channel Width (m)	NA
Floodplain Width (m)	NA
Water Depth (cm)	Maximum depth unknown; see Ref. 55
Discharge (m^3/s)	NA
D.O. (mg/ℓ)	10
Temperature (°C)	2.0
Conductivity (µmhos/cm)	95
pH	8.0
Color	Slightly green
Turbidity	Slightly turbid
Bottom Type	Mud
Fish Block(s)	NA

FALL SURVEY FORM

WATERBODY

Waterbody Oksrukuyik Creek

Main Drainage Sagavanirktok River Tributary to Sagavanirktok River

Figure 2 Northwest Alignment Sheet 22

Identification Nos: NPSI 1-19 NPMP 122.7

Alaska Highway Milepost NA

USGS Map Reference Philip Smith Mountains, Ak. T 9S R 13E Sec 4

Site Access On foot from the TAPS Haul Road

Section Surveyed From 75 m upstream of the NAPLINE to 200 m downstream

ASSESSMENT

Oksrukuyik Creek is a tributary to the Sagavanirktok River approximately 5-10 m wide. In the vicinity of the NAPLINE the clear, brown waters flow down a steep gradient over cobble and boulder substrate. A dense growth of green algae covers the stream bottom and willow and tundra grass line 0.3-1.0 m banks.

Results of the 1979 fall sampling efforts indicated low to non-existent fall fish utilization of Oksrukuyik Creek. However, adequate flow and cover appeared to provide good fall fish habitat.

FISH

Date: 18 September 1979

Fish Present: None

Gear/Effort: EF(150 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	18 September 1979
Channel Width (m)	5-10 m
Floodplain Width (m)	NA
Water Depth (cm)	18-33
Discharge (m^3/s)	0.46
D.O. (mg/ℓ)	10
Temperature (°C)	0.5
Conductivity (μmhos/cm)	20
pH	7.0
Color	Slightly brown
Turbidity	Clear
Bottom Type	Large cobble/boulder
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Shifish Creek #2

Main Drainage Sagavanirktok River Tributary to Oksrukuyik Creek

Figure 2 Northwest Alignment Sheet 22

Identification Nos: NPSI 1-18.03 NPMP 120.5

Alaska Highway Milepost NA

USGS Map Reference Philip Smith Mountains, Ak. T 8S R 13E Sec 27

Site Access On foot from APL 119-1

Section Surveyed From TAPSLINE crossing to NAPLINE and to confluence with Oksrukuyik Creek (~250 m)

ASSESSMENT

At the proposed NAPLINE crossing Shifish Creek #2 is a narrow (0.3-0.6 m) tundra stream with stained red/brown water. Stream substrate is composed of gravel and boulders with attached green algae. Low tundra banks less than 0.5 m high are vegetated with dwarf willow. The stream was approximately 80% ice covered at the time of the 1979 fall survey.

This section of Shifish Creek provides potential habitat for fish in fall, but none was caught during present investigations or earlier in fall (Ref. 64). The small size of this stream apparently limits its suitability for fish in fall.

FISH

Date: 18 September 1979

Fish Present: None

Gear/Effort: EF(165 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	18 September 1979
Channel Width (m)	0.3-0.6
Floodplain Width (m)	NA
Water Depth (cm)	5-12
Discharge (m^3/s)	0.02
D.O. (mg/ℓ)	12
Temperature (°C)	-0.2
Conductivity (umhos/cm)	80
pH	6.8
Color	Red-brown
Turbidity	Clear
Bottom Type	Cobble/boulders
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Lower Oksrukuyik Creek #1

Main Drainage Sagavanirktok River Tributary to Sagavanirktok River

Figure 2 Northwest Alignment Sheet 20

Identification Nos: NPSI 1-18.01 NPMP 109.5

Alaska Highway Milepost NA

USGS Map Reference Philip Smith Mountains, Ak. T 7S R 14E Sec 10

Site Access On foot from the TAPS Haul Road

Section Surveyed From NAPLINE downstream to confluence with the Sagavanirktok River (~2500 m)

ASSESSMENT

Lower Oksrukuyik Creek is a large (6-16 m wide) clear water stream with gravel/cobble substrate. It is characterized by large, deep pools (2 m) and shallow riffles. The 1.5-3.0 m high banks are lined with willow and are actively eroding. Green algae was abundant on gravel and cobble portions of the substrate in mid-September 1979.

This stream appears to provide excellent fall fish habitat. Adequate flow, water depth and cover were available and fish were caught. The presence of young-of-the-year grayling indicates spawning probably occurs in the stream. Lower Oksrukuyik Creek is likely to be a fall migration route. Arctic char, grayling and sculpin were caught in this region during a survey conducted in early October 1979 (Ref. 64). Arctic char may use the area in fall for spawning although none were observed during the present study.

Evidence of sport fishermen was apparent near the stream's confluence with the Sagavanirktok River where a large, deep pool is present.

FISH

Date: 17 September 1979

Fish Present: Yes

Gear/Effort: EF(250 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other
Grayling	4	2	50-59	118-116
Sculpin		8		89-112

PHYSICAL CONDITION

Date	17 September 1979
Channel Width (m)	6-16
Floodplain Width (m)	10-20
Water Depth (cm)	30-90
Discharge (m^3/s)	0.43
D.O. (mg/ℓ)	11
Temperature (°C)	3.0
Conductivity (umhos/cm)	85
pH	7.8
Color	Blue green
Turbidity	Clear
Bottom Type	Gravel/cobble
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Clark's Lake

Main Drainage Sagavanirktok River Tributary to Stump Creek

Figure 2 Northwest Alignment Sheet 17

Identification Nos: NPSI 1-12.03 NPMP 98.4-98.2

Alaska Highway Milepost NA

USGS Map Reference Sagavanirktok, Ak. T 5S R 14E Sec 16

Site Access On foot through 122APL-3

Section Surveyed Lakeshore from both sides of workpad; from outlet to 300 m downstream

ASSESSMENT

Clark's Lake is a small, brownish-stained lake 600 m in length and about 120 m in width. The TAPS workpad bisects the lake, forming two distinct waterbodies connected by one culvert. This culvert appears adequate for fish passage. The west half of the lake is the deeper of the two and it is bordered by dwarf willow and tundra vegetation. Shallows of the east half support abundant sedges. At the time of this survey the shallow, weed choked outlet appeared to prevent fish passage between Clark's Lake and Stump Creek.

Numerous snails and cladocerans were observed, indicating favorable habitat, but no fish were seen or captured in Clark's Lake during present investigations. Ninespine stickleback are reported to be present in the lake (Ref. 11 and 30).

FISH

Date: 17-20 September 1979

Fish Present: None

Gear/Effort: EF(50 m)
2-20mGN(98.5h)
2MT(48h)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other

PHYSICAL CONDITION

Date	17-20 September 1979	
Channel Width (m)	NA	
Floodplain Width (m)	NA	
Water Depth (cm)	Unknown	
Oischarge (m^3/s)	NA	
D.O. (mg/ℓ)	East Side: 11	West Side: 12
Temperature (°C)	East Side: 2.0	West Side: 0.5
Conductivity (μmhos/cm)	East Side: 110	West Side: 70
pH	East Side: 7.5	West Side: 7.0
Color	Brown	
Turbidity	Clear	
Bottom Type	Mud; cobble/boulders near workpad	
Fish Block(s)	NA	

FALL SURVEY FORM

WATERBODY

Waterbody Stump Creek

Main Drainage Sagavanirktok River Tributary to Sagavanirktok River

Figure 2 Northwest Alignment Sheet 17

Identification Nos: NPSI 1-12.02 NPMP 98.0

Alaska Highway Milepost NA

USGS Map Reference Sagavanirktok, Ak. T 5S R 14E Sec 9 & 16

Site Access On foot through 122APL-3

Section Surveyed From Clark's Lake to 300 m downstream and from HR to 300 m downstream (~600 m)

ASSESSMENT

Stump Creek is a small stream which drains Clark's Lake. It flows approximately 3 km to its confluence with the Sagavanirktok River. Humic-stained waters follow gentle gradient through low tundra connecting a series of muskeg marshes and ponds. Channel width varies from 0.3-3.0 m and consists of mud and detritus in ponded areas with occasional cobbles and boulders in faster water. Rooted aquatic vegetation was abundant in areas of slow flowing water, while filamentous green algae covered the cobbles and boulders in riffle areas. Numerous caddis fly larvae were observed at the time of the fall survey.

Stump Creek provides good fish habitat in fall. Young-of-the-year grayling and ninespine stickleback were caught during present investigations. Juvenile grayling and lake trout are also reported to be present in this stream (Ref. 11 and 30).

FISH

Date: 17 September 1979

Fish Present: Yes

Gear/Effort: EF(200 m)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Grayling	3		55-74	
Ninespine stickleback		9		40-62

PHYSICAL CONDITION

Date	17 September 1979
Channel Width (m)	0.3-3.0
Floodplain Width (m)	NA
Water Depth (cm)	20-40
Discharge (m^3/s)	0.06
D.O. (mg/ℓ)	Analysis not performed
Temperature (°C)	Analysis not performed
Conductivity (umhos/cm)	Analysis not performed
pH	Analysis not performed
Color	Brown
Turbidity	Clear
Bottom Type	Mud/cobble, boulders
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Sagavanirktok River Side Channel #1

Main Drainage Sagavanirktok River Tributary to Mark Creek

Figure 2 Northwest Alignment Sheet 14

Identification Nos: NPSI 1-7.10 NPMP 78.8

Alaska Highway Milepost NA

USGS Map Reference Sagavanirktok, Ak. T 2S R 14E Sec 16

Site Access Truck via workpad and 125 APL/AMS 4

Section Surveyed From 50 m upstream to 50 m downstream of NAPLINE crossing

ASSESSMENT

A network of braided channels drain the Sagavanirktok River floodplain. Within the study area, these channels are confined by low banks vegetated with dwarf willow and tundra flora. Stream substrate is gravel and/or mud and silt.

Sagavanirktok River Side Channel #1 is the farthest upstream of six channel crossings surveyed. An isolated shallow pool (0.4 m deep) upstream of the TAPS workpad was the only water present in this channel. Surface ice was forming at the time of the fall survey and it is likely that this shallow pool freezes to bottom substrate in winter.

Fish use of the Sagavanirktok River Side Channel #1 is probably low and confined to those periods when water levels in the Sagavanirktok River are high.

FISH

Date 16 September 1979

Fish Present: None

Gear/Effort:

Species present:

	Quantity		Siz
	Fry	Other	Fr

PHYSICAL CONDITION

Date	16 September 1979
Channel Width (m)	3-10
Floodplain Width (m)	2000-2500
Water Depth (cm)	NA
Discharge (m^3/s)	NA
D.O. (mg/ℓ)	NA
Temperature (°C)	NA
Conductivity (μmhos/cm)	NA
pH	NA
Color	NA
	Gravel

FALL SURVEY FORM

WATERBODY

Waterbody Sagavanirktok River Side Channel #2

Main Drainage Sagavanirktok River Tributary to Mark Creek

Figure 2 Northwest Alignment Sheet 14

Identification Nos: NPSI 1-7.08 NPMP 78.6

Alaska Highway Milepost NA

USGS Map Reference Sagavanirktok, Ak. T 2S R 14E Sec 16

Site Access Truck from workpad and 125 APL/AMS 4

Section Surveyed From 50 m upstream to 50 m downstream of NAPLINE crossing

ASSESSMENT

A network of braided channels drain the Sagavanirktok River floodplain. Within the study area, these channels are confined by low banks vegetated with dwarf willow and tundra flora. Stream substrate is gravel and/or mud and silt.

Sagavanirktok River Side Channel #2 was dry during the fall survey. Fish use of this area would be restricted to periods of high water.

FISH

Date: 16 September 1979

Fish Present: None

Gear/Effort:

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	16 September 1979
Channel Width (m)	2-5
Floodplain Width (m)	2000-2500
Water Depth (cm)	NA
Discharge (m^3/s)	NA
D.O. (mg/ℓ)	NA
Temperature (°C)	NA
Conductivity (μmhos/cm)	NA
pH	NA
Color	NA
Turbidity	NA
Bottom Type	Gravel
Fish Block(s)	No water during present investigation

FALL SURVEY FORM

WATERBODY

Waterbody Sagavanirktok River Side Channel #3

Main Drainage Sagavanirktok River Tributary to Mark Creek

Figure 2 Northwest Alignment Sheet 14

Identification Nos: NPSI 1-7.07 NPMP 78.2

Alaska Highway Milepost NA

USGS Map Reference Sagavanirktok, Ak. T 2S R 14E Sec 16

Site Access Truck from workpad and 125 APL/AMS 4

Section Surveyed From 50 m upstream to 50 m downstream of NAPLINE crossing

ASSESSMENT

A network of braided channels drain the Sagavanirktok River floodplain. Within the study area, these channels are confined by low banks vegetated with dwarf willow and tundra flora. Stream substrate is gravel and/or mud and silt.

The Sagavanirktok River Side Channel #3 in the vicinity of the NAPLINE crossing is 3-6 m wide. This side channel provides fish habitat during periods of high water as evidenced by observation of unidentified fish in this area (Ref. 11). During present investigations this stream was dry.

FISH

Date: 16 September 1979

Fish Present: None

Gear/Effort:

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	16 September 1979
Channel Width (m)	2-5
Floodplain Width (m)	2000-2500
Water Depth (cm)	NA
Discharge (m^3/s)	NA
D.O. (mg/ℓ)	NA
Temperature (°C)	NA
Conductivity (μmhos/cm)	NA
pH	NA
Color	NA
Turbidity	NA
Bottom Type	Gravel
Fish Block(s)	No water during present investigations

FALL SURVEY FORM

WATERBODY

Waterbody Sagavanirktok River Side Channel #4

Main Drainage Sagavanirktok River Tributary to Mark Creek

Figure 2 Northwest Alignment Sheet 14

Identification Nos: NPSI 1-7.04 NPMP 77.3

Alaska Highway Milepost NA

USGS Map Reference Sagavanirktok, Ak. T 2S R 14E Sec 9

Site Access On foot from 125 APL/AMS 4

Section Surveyed 50 m upstream to 50 m downstream of workpad

ASSESSMENT

A network of braided channels drain the Sagavanirktok River floodplain. Within the study area these channels are confined by low banks vegetated with dwarf willow and tundra flora. Stream substrate is gravel and/or mud and silt.

Side Channel crossing #4 is the most upstream of three proposed NAPLINE crossings of the same channel. Waters of this side channel drain a number of spring sources in the Sagavanirktok floodplain although during high water periods water may flow directly into the channel from the Sagavanirktok River.

The channel at crossing #4 is 2-5 m wide and substrate overlain with filamentous algae. Water depth was 10-30 cm at the time of the 1979 fall survey.

Sagavanirktok River Side Channel #5 provides good fall fish habitat. Although fall sampling efforts did not yield fish from this area, grayling and ninespine stickleback were captured 600 m downstream (see Sagavanirktok River Side Channel #5 and #6). Fish blocks that would impede upstream movement to this area were not observed.

FISH

Date: 16 September 1979

Fish Present: None

Gear/Effort: EF(60m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	16 September 1979
Channel Width (m)	2.5
Floodplain Width (m)	NA
Water Depth (cm)	10-30
Discharge (m^3/s)	0.03 Estimated
D.O. (mg/ℓ)	7.0
Temperature (°C)	4.0
Conductivity (umhos/cm)	250
pH	7.3
Color	Clear
Turbidity	Colorless
Bottom Type	Cobble/gravel/mud
Fish Block(s)	None visible

FALL SURVEY FORM

WATERBODY

Waterbody Sagavanirktok River Side Channel #5

Main Drainage Sagavanirktok River Tributary to Mark Creek

Figure 2 Northwest Alignment Sheet 14

Identification Nos: NPSI 1-7.03 NPMP 77.0

Alaska Highway Milepost NA

USGS Map Reference Sagavanirktok, Ak. T 2S R 14E Sec 4

Site Access On foot from 125 APL/AMS 4

Section Surveyed 50 m downstream of NAPLINE to 30 m upstream

ASSESSMENT

A network of braided channels drain the Sagavanirktok River floodplain. Within the study area, these channels were confined by low banks vegetated with dwarf willow and tundra flora. Stream substrate is gravel and/or mud and silt.

Side Channel #5 is approximately 300 m downstream of Sagavanirktok River Side Channel #4. Waters of this side channel drain a number of spring sources in the Sagavanirktok River floodplain, although during high water periods water may flow directly into the channel from the river.

The channel at crossing #5 is 0.6-12 m in width and 0.3-1.0 m in depth. Upstream of TAPS workpad LWC the channel is wide, the predominant substrate is mud with abundant equisetum and sedge flora and the water is slow flowing.

The Sagavanirktok River Side Channel #5 is a nursery area for young-of-the-year grayling and a rearing area for ninespine stickleback.

FISH

Date: 16 September 1979

Fish Present: Yes

Gear/Effort: EF(80m)
11mGN(20h)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Grayling	1		69	
Ninespine stickleback		1		51

PHYSICAL CONDITION

Date	16 September 1979
Channel Width (m)	0.6-12
Floodplain Width (m)	NA
Water Depth (cm)	30-100
Discharge (m^3/s)	0.014
D.O. (mg/ℓ)	11
Temperature (°C)	2.0
Conductivity (μmhos/cm)	230
pH	8.1
Color	Clear
Turbidity	Clear
Bottom Type	Cobble/gravel, mud
Fish Block(s)	Grassy area below LWC may impede fish passage

FALL SURVEY FORM

WATERBODY

Waterbody Sagavanirktok River Side Channel #6

Main Drainage Sagavanirktok River Tributary to Mark Creek

Figure 2 Northwest Alignment Sheet 14

Identification Nos: NPSI 1-7.02 NPMP 76.7

Alaska Highway Milepost NA

USGS Map Reference Sagavanirktok, Ak. T 2S R 14E Sec 3

Site Access Truck from workpad and 125 APL/AMS 4

Section Surveyed 50 m downstream of NAPLINE to 20 m upstream

ASSESSMENT

A network of braided channels drain the Sagavanirktok River floodplain. Within the study area these channels are confined by low banks vegetated with dwarf willow and tundra flora. Stream substrate is gravel and/or mud and silt.

Side Channel crossing #6 is the most downstream of three proposed NAPLINE crossings of the same channel. Waters of this side channel drain a number of spring sources in the Sagavanirktok floodplain although during high water periods water may flow directly into the channel from the Sagavanirktok River.

Channel width at crossing #6 varied from 6-10 m. The stream was slow flowing with depths to 2.0 m. At this location the LWC on the workpad forces the water into shallow riffles over a gravel and cobble substrate. In the slower water the predominant substrate is mud.

The Sagavanirktok River Side Channel #6 is a rearing area for ninespine stickleback during the fall and a nursery area for young-of-the-year grayling.

FISH

Date: 16 September 1979

Fish Present: Yes

Gear/Effort: EF(50 m)
6mGN(21h)
MT(22h)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Ninespine stickleback		2		43-48

PHYSICAL CONDITION

Date	16 September 1979
Channel Width (m)	6-10
Floodplain Width (m)	2000-2500
Water Depth (cm)	30-150
Discharge (m^3/s)	0.01
D.O. (mg/ℓ)	12
Temperature (°C)	1.0
Conductivity (μmhos/cm)	220
pH	8.3
Color	Clear
Turbidity	Colorless
Bottom Type	Mud/gravel/cobble
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Little Putuligayuk River

Main Drainage Prudhoe Bay Tributary to Putuligayuk River

Figure 2 Northwest Alignment Sheet 2

Identification Nos: NPSI 1-3 NPMP 10.2

Alaska Highway Milepost NA

USGS Map Reference Beechy Point, Ak. T 10N R 14E Sec 29

Site Access By truck via workpad from Pump Station #1

Section Surveyed 25 m upstream to 150 m downstream of NAPLINE

ASSESSMENT

Little Putuligayuk River is a typical beaded tundra stream characterized by alternating channels and pools to 1.5 m deep. In the area of the NAPLINE, the low tundra banks are lined with sedges and the bottom consists of mud and gravel. Grasses are abundant in the streambed. The water of the Little Putuligayuk River was clear at the time of the 1979 fall survey.

Although fish habitat appeared favorable, fall use of the stream by fish is apparently low or non-existent. Electrofishing efforts did not capture any fish in the vicinity of the NAPLINE crossing.

FISH

Date: 15 September 1979

Fish Present: None

Gear/Effort: EF(75 m)

Species Present:	Quantity		Size Range (mm)	
	Fry	Other	Fry	Other

PHYSICAL CONDITION

Date	15 September 1979
Channel Width (m)	0.3-3.0
Floodplain Width (m)	Same
Water Depth (cm)	10-36
Discharge (m^3/s)	0.07
D.O. (mg/ℓ)	11
Temperature (°C)	-0.5
Conductivity (µmhos/cm)	215
pH	8.0
Color	Clear
Turbidity	Clear
Bottom Type	Mud/gravel
Fish Block(s)	None observed

FALL SURVEY FORM

WATERBODY

Waterbody Putuligayuk River

Main Drainage Prudhoe Bay Tributary to Prudhoe Bay

Figure 2 Northwest Alignment Sheet 1

Identification Nos: NPSI 1-1 NPMP 3.2

Alaska Highway Milepost NA

USGS Map Reference Beechy Point, Ak. T 11N R 14E Sec 28

Site Access Truck-access road to material site near Pump Station #1

Section Surveyed From 300 m upstream of the proposed NAPLINE to 1000 m downstream

ASSESSMENT

The Putuligayuk River is a broad (10-20 m), shallow stream of brown-stained water that drains into Prudhoe Bay. Previous excavation has altered the gravel floodplain (30-100 m) in the vicinity of the NAPLINE crossing, causing the formation of large, shallow pools. Banks of tundra muskeg vegetation exhibit block slumpage. Anchor ice was forming in the river and surface ice was present in the main channel of the river during the 1979 fall survey.

The stream provides fair fish habitat in the fall. Only ninespine sticklebacks have been reported in this stream (Ref. 11) and a single ninespine stickleback was caught during present investigations.

FISH

Date: 15 September 1979

Fish Present: Yes

Gear/Effort: 2MT(63h)
EF(200 m)
20mGN(32h)
10mGN(20h)

Species Present:	Quantity Fry	Quantity Other	Size Range (mm) Fry	Size Range (mm) Other
Ninespine stickleback		1		38

PHYSICAL CONDITION

Date	15 September 1979
Channel Width (m)	10-20
Floodplain Width (m)	30-100
Water Depth (cm)	20-48
Discharge (m^3/s)	1.7
D.O. (mg/ℓ)	12
Temperature (°C)	-0.5
Conductivity (μmhos/cm)	205
pH	8.1
Color	Brown
Turbidity	Clear
Bottom Type	Gravel/mud
Fish Block(s)	None observed

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APPENDIX I

Calibration of Field Equipment

and

Accuracy of Measurements

ENVIRONMENTAL SERVICES Ltd

May 8, 1979

LGL Limited U.S., Inc.
P.O. Box 80607
Fairbanks, Alaska 99708

Attention: Mr. Mike Chihuly

Gentlemen:

For the purpose of quality control, field equipment used by LGL was brought to Environmental Services, Limited's laboratory for calibration. Following is a report of results.

YSI S-C-T Meters Model 3300

Upon receipt, each of 2 meters and 2 probes were labeled and carried through calibration procedure as described in the 14th edition of Standard Methods for the Examination of Water and Wastewater. Temperature at 25°C was found to be accurate within the limits of the one degree increments provided on the meter when checked against an ASTM certified thermometer.

Conductivity in each meter, using a Potassium Chloride solution of known conductivity, deviated slightly from the known. However, calculated cell constants ranged between 1 and 2, which is acceptable accuracy.

Each probe was cleaned with a solution recommended by the manufacturer. At the same time the meters were calibrated and batteries tested.

The meters were again tested and found to have cell constants of 2 at 1000 level and .1 at 100 level, again acceptable according to Standard Methods. When compared to a laboratory meter of same make and model, the laboratory meter performed with equivalent accuracy.

The meters, finally, were tested for accuracy at low temperatures similar to those encountered during field surveys in winter months. The temperatures were found to vary 2-3 degrees celsius. It is suggested that hand thermometers be carried to verify accuracy of temperature rather than relying solely on the S-C-T meter.

Hach Dissolved Oxygen Test Kit Model OX-2P

Two field Hach Dissolved Oxygen kits were tested for precision against a YSI Model 57 Dissolved Oxygen Meter. The kits were found to deviate, using low level method, approximately 0.2 mg/l to 0.4 mg/l at 22-25°C as well as 3.2°. This deviation is close to the precision of the dissolved oxygen test of 0.1 mg/l as described in Standard Methods.

Hach pH Wide Range Test Kit Model 17-N

Both colorimetric pH kits were found to be accurate within the limits of the 0.5 pH unit increments when checked against an Orion 801A digital ionalyzer using pH buffers 4.00, 7.00, and 10.00. Temperatures included 0°C to 25°C. Distilled water as well as river water were also used to ensure that sample interferences were limited.

Should you have any further questions regarding this report, please do not hesitate to contact our laboratory at 479-3115.

Very truly yours,
Environmental Services, Ltd.

Theresa J. Olson,
Environmental Scientist

TJO:taf

cc: Mr. Brian Tomlinson

ENVIRONMENTAL SERVICES Ltd.

February 4, 1980

LGL Alaska
P. O. Box 80607
Fairbanks, Alaska 99708

Attention: Mr. Mike Chihuly

Dear Sir:

For the purpose of quality control, six Taylor hand thermometers, two Hach pH kits (model 17-F), two YSI conductivity/salinity meters and two Hach portable water analysis pH meters were brought to our laboratory for calibration. The thermometers and the YSI conductivity/salinity meters were calibrated according to Standard Methods.* The pH kits and pH meters were calibrated using our Orion digital ionalyzer model 801A which had previously been standardized using the procedures described in Standard Methods.

The two Hach pH kits were calibrated before and after LGL's project. Both times they were found to be within the plus or minus 5% accurary range as specified by Hach Chemical Co.

The six themometers were found to be accurate within the limits of the 1.0 degree increments except for one which was subsequently discarded.

The Hach portable water analysis pH meter (No. 16049T "A") was found to be accurate to plus or minus 0.1 pH units which is acceptable accuracy for this instrument. During calibration the second pH probe was broken. As a result of this delay, we were unable to calibrate the pH meter. The replacement was delivered to LGL after two weeks.

In the YSI conductivity/salinity meters, the temperature probes were found to be accurate within the specifications for the instruments. The calculated cell constants were between 1 and 2 as requred by standard methods.

If you have any questions, please call at 479-3115.

Very truly yours,

ENVIRONMENTAL SERVICES, LIMITED

Carol J. Brown

Carol J. Brown,
Laboratory Supervisor
CJB/cno
* 14th Edition, Standard Methods.

APPENDIX II

Provisional List of Waterbodies Crossed or Potentially Affected by the NAPLINE

APPENDIX II. Provisional list of 492 waterbodies crossed or potentially affected by the Northwest Alaskan Pipeline including an evaluation of existing fall fisheries data for each. Data sources (see Literature Reviewed) and fall criteria (see Table 1) are listed by number. Primary data sources are underlined. Abbreviations: NPSI (Northwest Alaskan Pipeline Stream Identification Number), NPAS (Northwest Pipeline Alignment Sheet), NPMP (Northwest Pipeline Milepost), AHMP (Alaska Highway Milepost), Alyeska AS (Alyeska Assignment Sheet), Sta. (Station). Reference 42 identified the alignment sheet series used.

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
Unnamed Creek	6-227.03	131	738.7	1222.2				3	2,54
Unnamed Creek	6-227.02	131	738.3	1222.6				1	54,57
Unnamed Pond	6-227.01	131	737.5	1223.4				1	2,54
Scottie Creek	6-227	131	737.5	1223.4				1	5,6,7,8,9,10,17,22,26,29, 54,55,57,59,60
Desper Creek	6-226	130	735.6	1225.6				1	5,6,7,9,10,17,26,29,54, 55,57,59,60,72,73
Unnamed Creek	6-225.01	129	730.6	1232.1				3	2,54
Sweetwater Creek	6-225	129	728.4	1234.2				3	2,9,29,54,57,59,60,68,72,73
Unnamed Creek	6-224	129	728.0	1234.7				3	2,29,54,59,60
Unnamed Creek	6-223	129	726.8	1235.9				3	2,29,54
Unnamed Creek	6-223	129	726.8	1235.9				3	2,29,54
Unnamed Creek	6-222	129	726.5	1236.3				1	2,29,54,57,59,60
Gardiner Creek	6-219	127	716.8	1246.7				1	5,6,7,8,9,10,17,22,26,29, 54,57,59,60,68,72,73
Tenmile Creek	6-218	126	710.7	1252.8				2	2,5,6,9,10,17,26,29,54,57, 59,60,73
Silver Creek	6-217	125	704.8	1258.7				4	2,5,6,9,10,26,29,54,59,60, 73
Unnamed Creek	6-216.01	124	701.9	1262.3				3	2,54
Unnamed Creek	6-216.01	124	701.9	1262.3				3	2,54
Unnamed Creek	6-216	124	699.2	1266.5				3	2,29,54,59,60
Beaver Creek	6-215	124	697.4	1268.0				1	5,6,7,8,9,10,17,22,26,29, 54,57,60,72
Unnamed Creek	6-214.01	123	695.2	1270.4				3	2,54
Unnamed Creek	6-213.01	123	692.8	1273.0				3	2,59,60
Unnamed Creek	6-213	122	688.3	1278.3				3	2,9,29,59,60
Bitters Creek	6-212	122	686.5	1280.2				1	5,6,9,10,26,29,54,57,59, 60,69,72,73
Unnamed Creek	6-210.02	121	683.9	1283.2				3	2
Unnamed Creek	6-210.01	121	681.8	1285.4				3	2
Unnamed Creek	6-210	119	671.0	1296.7				3	2,29
Unnamed Creek	6-209	119	669.9	1297.9				3	2,29,59,60
Tanana River	6-207 A/B	118	664.3	1303.3				1	3,5,6,7,9,10,13,17,22,26, 29,54,57,60,69,72
Tanana River Alt #1	6-207C	118	664.3	1303.3				1	3,5,6,7,9,10,17,22,26,29, 54,57,60
Tanana River Alt #2	6-208	118	664.3	1303.3				1	3,5,6,7,9,10,17,22,26,29, 54,57,60
Tok River	6-205	117	658.2	1309.4				1	3,5,6,7,9,10,17,22,26,29, 54,57,59,60,72,73
Crystal Springs	6-203.03	114	639.0	1328.2				1	2,9,26,54,55,57,60,73
Unnamed Creek	6-203.02	114	638.8	1328.2				3	54,60
Unnamed Creek	6-203.01	113	637.6	1329.5				3	2,60
Unnamed Creek	6-203	113	636.5	1330.5				3	2,54,59,60
Moon Lake Tributary	6-202	113	635.2	1331.9				3	2,6,29,59,69

APPENDIX II. (cont'd)

Waterbody	MPSI	MPAS	MPMP	AKMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
Moon Lake Tributary	6-202	113	635.2	1331.9				3	2,6,29,59,69
Terrick Creek	6-201	113	633.0	1333.7				1	1,5,6,7,8,9,10,17,22,26,29,54,55,57,64,68,69,72,73
Unnamed Creek	6-200.01	112	630.8	1336.9				3	2,29,54,59,60
Unnamed Creek	6-200	112	630.7	1336.9				3	2,29,54,59,60,69
Cathedral Rapids Creek #1	6-199	112	629.2	1338.1				3	2,4,7,22,29,60,68,69
Cathedral Rapids Creek #2	6-198	112	628.6	1338.7				3	2,4,7,22,29,59,60,68,69
Cathedral Rapids Creek #3	6-197B	112	628.6	1338.7				3	2,4,7,22,29,59,60,68,69
Cathedral Rapids Creek #4	6-197A	112	628.5	1338.8				3	2,4,7,22,29,59,60,68,69
Cathedral Rapids Creek #5	6-197	112	628.4	1338.9				3	2,4,7,22,29,60,68,69
Cathedral Rapids Creek #6	6-196	112	628.2	1339.0				3	2,4,7,22,29,59,60,68,69
Cathedral Rapids Creek #7	6-195	112	628.0	1339.2				3	2,4,7,22,29,60,68,69
Unnamed Creek	6-193.01	112	627.5	1339.8				3	2,5,6,10,26,29,54,57,69,72
Unnamed Creek	6-192.01	111	626.2	1340.5				3	2,54
Sheep Creek	6-191	111	625.1	1342.2				3	3,5,6,7,8,10,22,29,59,68,69,72
Unnamed Creek	5-190	111	623.5	1343.7				2	2,29,54
Robertson River	5-187	110	619.6	1347.6				1	3,5,6,7,8,9,10,17,22,26,29,54,57,73
Unnamed Creek	5-185.03	110	617.2	1350.1				3	2,54
Unnamed Creek	5-185.02	110	617.0	1350.2				3	2,54
Unnamed Creek	5-185.01	109	615.1	1352.3				3	2,54
Bear Creek	5-185	109	609.9	1357.3				1	3,5,6,7,8,9,10,17,22,26,29,54,55,57,59,60,69,72,73
Chief Creek	5-184	108	608.6	1358.6				1	3,5,6,7,8,9,10,17,22,26,29,54,57,59,60,72
Unnamed Creek	5-183	108	605.4	1361.7				3	2,5,10,26,29,54
Unnamed Creek	5-182	108	605.2	1362.0				3	2,5,54
Unnamed Creek	5-181	107	603.1	1364.4				3	2,29,54,59,60,73
Sam Creek	5-180	107	601.6	1365.9				3	3,5,6,7,8,9,10,26,29,54
Unnamed Creek	5-179	106	598.4	1369.1				1	3,5,6,9,10,26,29,54,57,59,60,73
Berry Creek	5-178	106	596.2	1371.4				1	3,5,6,7,8,9,10,22,29,54,57,59,60,69,72,73
Sears Creek	5-177	106	593.1	1374.4				1	3,5,6,7,8,9,10,17,22,29,54,57,59,60,64,69,72,73
Unnamed Creek	5-176.01	105	590.6	1377.0				3	2
Dry Creek	5-176	105	589.5	1378.1				3	3,5,6,7,8,9,10,22,29,54,57,59,60,68,69,72,73

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
Johnson River	5-175	104	587.0	1380.5				1	3,5,6,7,8,9,10,17,22,26,29,54,57,60,69,72,73
Little Gerstle River	5-174	103	579.3	1388.4				1	3,5,6,7,8,9,10,17,22,26,29,54,72,73
Gerstle River	5-172	102	575.0	1393.0				1	3,5,6,7,8,9,10,17,22,26,29,54,57,72,73
Sawmill Creek	5-171	100	563.8	1403.9				3	3,5,6,7,8,9,10,29,54
Rhoads Creek	5-170	100	560.1	1407.6				3	3,5,6,9,10,29,54
Granite Creek	5-169	99	558.4	1409.2				3	3,5,6,7,9,10,22,29,54
Tanana River	5-166	96	537.3		47	9215+00		1	3,5,11,13,15,16,27,29,32
Side Channel of Tanana River	5-165.01	95	536.7					1	3,11,13,42,43,57
Shaw Creek	5-165	93	526.0		49	9789+15		1	3,5,11,29,30,57,65
Rosa Creek #1	5-164	93	525.8		49	9800+40		1	5,11,29,30
West Branch Keystone Creek	5-163	93	525.2		49	9830+70		1	5,11,29,30
Rosa Creek #2	5-162	92	519.8		50	10110+50		3	5,11,29,57
Rosa Creek #3	5-162	92	519.2		50	10142+74		3	5,11,29
Rosa Creek #4	5-162	92	518.9		50	10165+25		3	5,11,29
South Fork Minton Creek #1	5-161	92	518.0		51	10214+80		3	5,11,29,32,54,60,66
South Fork Minton Creek #2	5-161	92	517.4		51	10244+06		3	5,11,29,32,54,66
South Fork Minton Creek #3	5-161	92	517.0		51	10258+12		3	5,11,29,32,54,66
South Fork Minton Creek #4	5-161	92	516.3		51	10298+63		3	5,11,29,32,54,66
South Fork Minton Creek #5	5-161	92	516.0		51	10305+90		3	5,11,29,32,54,66
South Fork Tributary Minton Creek	5-161	92	515.8		51	10316+00		3	5,11,29,32,54,66
South Fork Minton Creek #6	5-161	92	515.8		51	10316+98		1	5,11,29,30,32,54,66
South Fork Minton Creek #7	5-161	91	515.5		51	10343+09		1	5,11,29,30,32,54,57,66
North Fork Minton Creek #1	5-161	91	515.4		51	10346+68		1	5,11,32,54
North Fork Minton Creek #2	5-161	91	514.8		51	10374+14		1	5,11,32,54
North Fork Minton Creek #3	5-161	91	514.5		51	10393+01		3	5,11,32,54
North Fork Minton Creek #4	5-161	91	514.4		51	10394+88		3	5,11,32,54
Gold Run Creek	5-160	91	512.7		51	10487+62		1	3,5,11,29,54
Small Creek	5-159.02	91	511.3		52	10561+41		2	11,54,57
Tributary to Small Creek	5-159.01	91	510.7		52	10589+47		3	11
Redmond Creek	5-159	90	505.7		53	10855+33		1	3,5,11,14,29,30,32,35,38,54,57
Unnamed Tributary to Salcha River	4-158.03	89	502.8		53	11037+79		2	11,54
TAPS Slough	4-158.02	89	501.9		53A	2+00		1	11,54,55,57
Unnamed Slough	4-158.01	89	501.8		53A	7+50		1	11,55,57
Salcha River	4-158	89	501.5		53A	19+00		1	3,5,11,13,14,25,29,32,35,38

APPENDIX II. (cont'd)

Waterbody	MPSI	MPAS	MPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
Oxbow Slough	4-157.02	89	501.3		53A	33+00		2	11,54,57
Two-Nineteen Creek	4-157.01	88	497.6		54	223+50		4	11,54
Little Salcha River	4-157	88	496.5		54	281+71		1	3,5,11,13,29,31,38,57
Tributary to Little Salcha River	4-156.05	88	495.3		54	345+50		3	11,54
Tributary to Million Dollar Creek	4-156.04	88	493.9		54	417+00		3	11,29,31,54
Million Dollar Creek #1	4-156.03	87	491.5		55	545+00		1	5,11,29,31,64
Million Dollar Creek #2	4-156.02	87	491.2		55	558+60		1	5,11,29,57
Million Dollar Creek #3	4-156.01	87	491.0		55	568+00		1	5,11,29,57
Million Dollar Creek #4	4-156	87	490.6		55	592+00		1	5,11,29,31,57
French Creek #0	4-155	87	489.6		55	643+55		1	3,5,11,19,29,31,38,57
Knokanpeover Creek	4-154	86	486.4		56	809+40		1	3,5,11,19,29,31,57
French Creek #1	4-153	86	483.7		56	942+85		1	3,5,11,19,29,38
French Creek #2	4-152	86	483.0		56	993+69		1	3,5,11,19,29,38
French Creek #3	4-151	86	482.5		56	1018+95		1	3,5,11,19,29,38
French Creek #4	4-150	85	482.2		56	1035+43		1	3,5,11,19,29,38
French Creek #5	4-149	85	480.4		57	1125+18		1	3,5,11,19,29,38,57
Bear Lake Outlet	4-148.01	85	480.2		57	1134+40		3	11,31,54,57
Moose Creek #1	4-148	85	479.3		57	1188+02		1	5,11,29,31,38,54,57
Moose Creek #2	4-147	85	478.0		57	1250+70		1	5,11,29,31,38,54,57
Moose Creek #3	4-146	85	477.3		57	NA		1	5,11,29,31,38,54,57
Unnamed Creek	4-145.04	84	473.7		58	1495+15		3	11,54
Unnamed Creek	4-145.03	84	473.5		58	1505+00		3	11,54
Ess Shaped Slough	4-145.02	84	471.9		58	1570+00		3	11,31
Seventeen-twenty Slough	4-145.01	83	468.2		59	1720+20		3	11,31,54
Seventeen-thirty Slough	4-145	83	468.0		59	1730+50		3	11,29,31,54
Isolated Slough	4-144.01	83	465.9		59	1845+55		3	11,31,54
Chena River	4-144	83	465.8		59	1849+50		1	3,5,11,13,17,27,29,31,38,39
Steele Creek	4-143	82	463.6		60	1962+80		2	11,29,54,57
Engineer Creek	4-142	81	457.5		61	210+00		3	11,17,29,31,54,57
Goldstream Creek	4-141	81	454.7		61	336+01		1	3,5,11,17,29,54,57
Treasure Creek	4-140	80	448.6		62	659+43		3	3,5,11,17,29,54,57
Chatanika River	4-139	79	444.5		63	873+63		1	3,5,11,17,29,31,38

APPENDIX II. (cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
Shocker Creek	4-138	79	443.7		63	914+00		1	5,11,29,54,57
Unnamed Tributary to Shocker Creek #1	4-137.06	79	443.5		63			3	54
Unnamed Tributary to Shocker Creek #2	4-137.05	79	443.4		63			3	54
Unnamed Tributary to Shocker Creek #3	4-137.04	79	443.3		63			3	54
Unnamed Tributary to Chatanika River #1	4-137.03	78	441.7		63	1025+70		3	11
Unnamed Tributary to Chatanika River #2	4-137.02	78	441.7		63	1027+70		3	11
Unnamed Tributary to Chatanika River #3	4-137.01	78	441.7		63	1032+20		3	11
Washington Creek	4-137	78	438.2		64	1209+62		1	1,3,5,11,17,29, 31,38,54,57
Unnamed Tributary to Washington Creek	4-136.01	78	438.0		64	1220+00		3	11
South Fork Aggie Creek	4-136	76	430.9		65	1595+00		3	1,3,5,11,17,29, 31,38,54,57
North Fork Aggie Creek	4-135	76	430.1		65	1635+00		3	1,3,5,11,17,29, 31,38,48,54,57
Tributary to Little Globe Creek	4-134.01	76	428.3		66	1740+00		4	11
Little Globe Creek	4-134	76	427.2		66	1759+00		4	11,17,29
Unnamed Tributary to Little Globe Creek	4-133.01	76	427.0		66	1798+00		4	11
Globe Creek	4-133	75	423.8		66	1966+75		1	1,3,5,11,17,29, 38,48,66
Unnamed Tributary to Globe Creek	4-132.02	75	423.4		67	1988+80		4	11,66
Unnamed Tributary to Tatalina River	4-132.01	74	420.0		67	2167+00		3	11,30,48
Tatalina River	4-132	74	419.0		67	2241+80		1	1,3,5,11,17,29, 48
Tributary of Slate Creek	4-131.01	73	415.0		68	2456+31		4	11
Slate Creek	4-131	73	414.9		68	2459+35		1	3,5,11,17,29, 30,38,48
Ski Jump Ramp Creek	4-130	73	413.1		68	2550+00		4	11,29
Wilber Creek	4-129	73	412.1		68-69	2608+00		4	3,5,11,17,29,48
Tributary of Wilber Creek	4-128.04	73	410.6		69	2666+35		4	11
Shorty Creek	4-128.03	72	407.0		69	2855+73		4	11
Tributary of Shorty Creek	4-128.02	72	406.8		69	2865+11		4	11
Tributary to Tolovana River	4-128.01	72	405.7		70	2924+55		4	11
Tolovana River	4-128	72	405.1		70	2957+90		1	1,3,5,11,13,17, 29,40,57
Unnamed Tributary to West Fork Tolovana River	4-127.01	71	402.0		70	3122+16		4	11
Lost Creek	4-127	71	398.6		71	104+33		1	3,5,11,17,29,30, 31,48

APPENDIX II. (cont'd)

Waterbody	MPSI	MPAS	MPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
Erickson Creek Tributary	4-126	70	394.3		72	337+66		3	3,11,29
Erickson Creek #1	4-125	69	390.9		72	513+62		4	3,5,11,17,29,30, 31
Unnamed Lake Outlet	4-124.01	69	390.0		73	562+98		4	11
Erickson Creek #2	4-124	69	389.1		73	611+95		4	3,5,11,17,29,30, 31,48
Hess Creek Tributary	4-123.05	68	385.5		73	800+02		4	11,17
Hess Creek	4-123A.04	68	385.2		73,74W	820+00		1	1,3,5,11,17,29, 31,48
Fish Creek	4-123.03	68	385.0		73	829+65		1	11
Unnamed Creek	4-123.02	68	381.0		74	1040+40		3	11
Unnamed Creek	4-123.01	68	380.4		74	1071+47		3	11
Unnamed Creek	4-123	67	379.9		74	1096+85		4	11,29
Unnamed Creek	3-122.05	67	378.8		75	1150+15		3	11,17
Unnamed Creek	3-122.04	67	378.3		75	1181+44		3	11
Hot Cat Creek	3-122.03	67	377.1		75	1242+94		4	5,11,17,31,48,61
Unnamed Creek	3-122.02	67	374.7		75	1367+33		4	11,17
Unnamed Creek	3-122.01	66	373.2		75	1447+20		4	11,17
Isom Creek #1	3-122	66	369.5		76	1642+50		4	3,5,11,29,30,31, 48
Isom Creek #2	3-121.02	66	368.4		76	1549+50		1	3,5,11,17,29,30, 31,48
Isom Creek #3	3-121.01	66	369.4		76	1651+34		4	3,5,11,30,31,48
Tributary to Isom Creek	3-121	66	368.8		76	1682+08		4	11
Yukon River	3-120	64	360.0		77-78	58+00		1	1,3,5,11,13,17, 20,21,29,38,48
Burbot Creek	3-119	64	358.3		78	158+21	IHR168+10	4	5,11,20,21,29,48
Wood Chopper Creek	3-118	63	357.2		78	215+30	IHR235+20	4	5,11,20,21,29,48
Phelps Creek	3-117	62	351.7		79	508+70	IHR501+00	1	5,11,20,21,29, 48,64
Unnamed Creek	3-112	61	344.3		80	899+15	IHR892+15	4	11,17,20,21,29
Fort Hamlin Hills Creek	3-111	61	342.9		81	971+50	IHR1011+08	4	5,11,20,21,29, 30,48,61,70
Unnamed Creek	3-110.01	60	340.0		81	1123+25	IHR1158+45	4	11,20,21
North Fork Ray River	3-110	59	336.0		82	58+49	IHR1337+34	1	1,5,11,17,20,21, 29,38,48,64,74
Fed Creek	3-109	59	332.0		82	270+25	IHR1600+24	1	11,29,30,48
South Branch West Fork Dall River	3-108	57	324.3		84	673+00	IHR2001+50	1	1,5,11,20,21,29 38,48
Middle Branch West Fork Dall River	3-107	57	321.9		84	798+00	IHR2125+39	4	1,5,11,20,21,29, 30,38,48
Smoky Creek	3-106.02	57	321.4		84	818+75	IHR2163+02	4	11,20,21
Unnamed Creek	3-106.01	56	319.7		85	915+75	IHR2245+45	4	11,20,21
Finger Mountain Creek	3-106	56	318.8		85	961+66	IHR2291+88	4	5,11,20,29,30,48
Olson's Lake Creek	3-105	55	315.3		85	1149+38	IHR2469+77	4	5,11,29,30,48,70
Caribou Mountain Lake	3-104	55	312.9		86	56+03	IHR2609+50	4	5,11,29,30,31,48
Kanuti River	3-103	54	309.7		86	231+00	IHR2777+75	3	1,3,5,11,13,17, 20,21,29,30,37, 38,48,67,74

APPENDIX II. (cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
Netsch's Creek Tributary #1	3-102	54	307.7		87	331+60	1HR2875+98	4	11,29
Netsch's Creek Tributary #2	3-101	54	307.4		87	349+00	1HR2894+96	4	11,29
Netsch's Creek Tributary #3	3-100.01	54	307.0		87	370+80	1HR2944+05	4	11
South Fork Fish Creek	3-100	53	304.1		87	520+50	1HR3255	1	1,3,5,11,20,21 29,30,48
Middle Fork Fish Creek	3-99	53	303.1		87	577+90	1HR3255	1	1,3,5,11,20,21 29,30,48
Fish Creek	3-98	53	301.7		88W	653+50	1HR3255+12	1	1,3,5,11,17,20, 21,29,30,34,37, 38,48,64,67
Alder Mountain Creek	3-97	53	300.0		88W	742+50	2HR115+00	4	5,11,20,21,29,30 48
Pung's Crossing Creek #1	3-96.01	52	296.5		89	932+40	2HR363+36	4	5,11,20,21
Pung's Crossing Creek #2	3-96	52	296.5		89	931+40	2HR363+36	4	5,11,20,21,29
South Fork Bonanza Creek	3-95	52	292.8		89	1123+60	2HR550+59	1	1,3,5,11,17,20, 21,29,30,31,34, 37,38,48
Unnamed Bonanza Creek Channel	3-94.02	52	292.8		89	1128+50	2HR547	4	11,20,21
Oxbow Lake System	3-94.01	51	292.3		89	1148+00	2HR561+64	4	11,20,48
North Fork Bonanza Creek	3-94	51	291.2		89	1208+32	2HR606+69	1	1,3,5,11,17,20, 21,29,30,31,34, 38,48,67
South Fork of the Little Nasty	3-93	51	289.0		90	1327+15	2HR759+84	4	5,11,20,21,29, 30,48,67
The Little Nasty	3-92	51	288.6		90	1340+25	2HR767+82	1	1,5,11,20,21,29 30,48,61,64
Prospect Creek	3-91	50	284		91	1590+00	2HR1099+52	1	1,3,5,11,17,20, 21,29,30,31,34, 37,38,48,70,74
Little Piddler Creek	3-90.03	49	279		91	241+60	2HR1376+57	4	11,30
Jim River Side Channel #1	3-90.02	49	278.9		91	257+00	2HR1379+45	1	1,5,11,17,29,31, 34,48,55,62,64, 74
Jim River Side Channel #2	3-90.01	49	278.0		92	272+49	2HR1425+40	1	1,5,11,17,29,31 34,48,55,62,74
Douglas Creek	3-89	49	277.2		92	330+00	2HR1470+34	1	1,3,5,11,17,20, 21,29,34,48,62, 74
Dee Creek	3-88	49	275.8		92	407+00	2HR1544+97	4	5,11,20,21,29, 48,62,74
Beaver Springs #1	3-87.02	49	275.5		92	435+84	2HR1557+06	1	11,20,21,55,62
Beaver Springs #2	3-87.01	49	275.5		92	436+23	2HR1565+32	1	11,20,21,55,62
Jim River Side Channel #3	3-87	49	274.9		92	453+50	2HR1579+80	1	1,3,5,11,13,17, 20,21,29,34,38, 48,62
Inlet to Grayling Lake	3-86.04	47	268.3		93	798+30	2HR1926+00	4	11,20,48
Avoided Lake Inlet	3-86.03	47	267.7		93	832+75	2HR1960	2	11,20
Grayling Lake Creek	3-86.02	47	267.3		93	849+00	2HR1949+14	4	11,20,21,48,70
Unnamed Creek	3-86.01	47	266.7		94	884+80	2HR2017	4	11,20
Abba-dabba Creek	3-86	47	265.2		94	963+28	2HR2098+18	1	1,5,11,20,21,29, 48,61,64,70,74
South Fork Koyukuk River	3-85	46	263.0		94-95	1073+00	2HR2206+88	1	1,3,5,11,13,17, 20,21,29,48
Cross Roads Creek #1	3-82.03	46	258.6		95	222+50	3HR129+23	4	11,20,21,29

APPENDIX II. (cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
Cross Roads Creek #2	3-82.02	46	258.4		95	228+75	3HR129+58	4	11,20,21,29
Cross Roads Creek #3	3-82.01	46	258.4		95	232+25	3HR129+58	4	11,20,21,29
Cross Roads Creek #4	3-82	46	258.4		95	233+60	3HR129+58	4	11,20,21,29
Chapman Creek	3-81	46	257.2		96	295+17	3HR205+23	1	1,5,11,20,21,29, 30,48
South Fork Windy Arm Creek	3-80	45	256.3		96	343+75	3HR255+64	1	1,11,20,21,29,30 48
North Fork Windy Arm Creek	3-79	45	254.9		96	417+25	3HR326+94	1	1,5,11,20,21,29, 48,64,74
Unnamed Creek	3-78.01	45	254.1		96	458+70	3HR369+59	4	11,20,21
Trent's Trickle	3-78	45	253.0		96	518+39	3HR413+47	4	5,11,20,21,29,30 48,61,62,70
Jackson Slough East Channel #1	3-77.02	45	252.2		97	555+85	3HR452+15	1	5,11,34,48,61,62 64
Jackson Slough Cross Channel	3-77.01	44	252.0		97	570+70	3HR464+00	1	5,11,29,34,48,61 62,64,74
Jackson Slough East Channel #2	3-77	44	251.9		97	593+00	3HR483+00	1	5,11,34,48,61,62 64
Rosie Creek	3-74	44	249.4		97		3HR599+00	4	3,5,11,17,20,21, 29,31,48,74
First Creek #1	3-72.06	44	247.3		97		3HR727+14	4	11,20,21
First Creek #2	3-72.05	44	247.1		97		3HR727+14	4	11,20,21
East Fork Spring Slough	3-72.04	44	245.8		97-98		3HR776+84	4	5,11
Spring Slough #1	3-72.03	44	245.5		98		3HR783+98	1	3,11
Spring Slough #2	3-72.02	44	245.4		98		3HR790+14	1	5,11
Spring Slough #3	3-72.01	43	245.3		98		3HR797+60	1	5,11,48
Slate Creek	3-72	43	243.7		98	976+83	3HR876+86	1	1,3,5,11,17,20, 21,29,31,34,38
Calf Creek	3-71	43	243.2		98	1004+75	3HR910+70	4	5,11,29,31,48
South Fork Clara Creek Overflow	3-70.01	43	243.0		98	1015+80	3HR925+49	4	5,11,29,31,48
Clara Creek Overflow	3-70	43	242.9		98	1019+50	3HR933+34	1	5,11,29,48,64
Clara Creek #1	3-69.01	43	242.6		98	1033+70	3HR941+85	4	5,11,17,29,31, 34,48
Clara Creek #2	3-69	43	242.6		98	1036+20	3HR941+85	4	5,11,17,29,31, 34,48
Equisetum Creek	3-68	43	242.3		98		3HR944	4	5,11,29,48,64
Organo Creek	3-67	43	242.2		98		3HR946	1	5,11,29,31,34, 48,62,64,70
Unnamed Creek	3-65.01	43	240.8		98		3HR1037+00	4	11
South Fork Mary Angel Creek	3-65	43	240.4		98-99	4+30	3HR1052+04	1	5,11,29,31,48,64
Mary Angel Creek	3-63.04	43	240.3		99	8+40	3HR1055+57	1	3,11,34,48,61,64 70,74
South Fork Sharon Creek	3-63.03	43	239.8		99	38+70	3HR1076+29	4	5,11
Sharon Creek #1	3-63.02	43	239.7		99	45+00	3HR1097	4	5,11,31,48,61
Sharon Creek #2	3-63.01	42	239.4		99	55+00	3HR1097	4	3,11,31,48,61
Marion Creek	3-63	42	239.3		99	59+85	3HR1114+14	1	1,3,5,11,20,21 29,31,34,38,48, 74

APPENDIX II. (cont'd)

Waterbody	MPSI	MPAS	MPMP	AHKP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
North Marion Creek Overflow #1	3-62.04	42	239.2		99	68+60	3HR1135	3	11
North Marion Creek Overflow #2	3-62.03	42	239.2		99	70+75	3HR1120+33	3	11
North Marion Creek Overflow #3	3-62.02	42	239.0		99	78+00	3HR1122+90	3	11
Pence's Pond Creek	3-62.01	42	238.9		99	85+50	3HR1143+81	4	5,11,20,21,31,48
Confusion Creek	3-61.02	41	233.5		100	369+00	3HR1439+92	4	5,11,20,31,48
North Fork Confusion Creek	3-61.01	41	233.0		100	91+70	3HR1443	4	5,11,20,31,48
Minnie Creek	3-61	41	231.8		100	454+46	3HR1519+34	1	1,3,5,11,17,20, 21,29,34,38,48
North Fork Koyukuk River	2-60.19	41	231.0		100	495+50	3HR1588+80	1	1,3,5,11,13,17, 20,21
Union Gulch Creek #1	2-60.18	41	230.7		100	516+65	3HR1600	1	5,11,20,21,31
Union Gulch Creek #2	2-60.17	41	230.2		100	536+00	3HR1600	1	5,11,20,21,31,48
Confederate Gulch Creek	2-60.16	41	229.3		100	590+75	3HR1655+00	1	11
North Fork Confederate Gulch Creek	2-60.15	41	228.8		100	607+90	3HR1675	4	11, 48
Hammond River	2-55	40	228.3		101	635+60	3HR1711+42	1	1,3,5,11,17,20, 21,29,37,48,67
Middle Fork Koyukuk River Anabranch	2-60.14	40	227.5		101		3HR1823	4	1,11
Middle Fork Koyukuk River	2-60.13	40	227.1		101			1	1,5,11,13,20,21 29,38,48
Richardson's Slough #1	2-60.12	40	225.2		101	778+30	3HR1861+03	1	5,11,48
Richardson's Slough #2	2-60.11	40	225.2		101	781+90	3HR1865+68	1	5,11,48
Over Creek #1	2-60.10	40	224.8		101	796+70		4	1,11,48
Over Creek #2	2-60.09	40	224.8		101	800+50		4	1,11,48
Over Creek #3	2-60.08	40	224.7		101	803+10	3HR1891+44	4	1,11,48
Over Creek #4	2-60.07	40	224.7		101	805+39	3HR1896+30	4	1,11,48
Alignment Slough #1	2-60.06	40	222.1		101	836+40	3HR1945+13	4	5,11,48,61,62
Alignment Slough #2	2-60.05	40	222.0		101	841+20	3HR1945+13	4	5,11,48,61,62
Alignment Slough #3	2-60.04	40	221.9		101	845+28	3HR1945+13	4	5,11,48,61,62
Alignment Slough #4	2-60.03	40	221.8		101	849+30	3HR1945+13	4	5,11,48,61,62
Alignment Slough #5	2-60.02	40	221.7		101	855+70	3HR1945+13	4	5,11,48,61,62
Alignment Slough #6	2-60.01	40	221.6		101	860+00	3HR1945+13	4	5,11,48,61,62
Nugget Creek	2-60	40	221.1		101	886+60	3HR1969+70	1	5,11,20,21,34,48
Wolf Pup Creek	2-59	39	220.7		102	906+50	3HR1990+56	4	5,11,20,34,48
Sheep Creek	2-53	39	220.2		102	933+00	3HR2010+85	1	5,11,20,21,29, 34,48
Cushing Creek	2-52.01	39	219.9		102	948+60	3HR2033+06	4	5,11,20,48
Gold Creek	2-52	39	219.4		102	976+00	3HR2059+11	1	3,5,11,17,20,21, 29,31,34,48,64
Linda Creek	2-51	39	218.8		102	1001+18	3HR2087+21	1	5,11,17,20,21,29 31,34,48
Valve Site Creek	2-49.07	39	216.6		102	1121+05	3HR2203+04	3	11,20
Rocky Creek #1	2-49.06	38	214.4		103	1250+60	3HR2326	1	11,64
Rocky Creek #2	2-49.05	38	214.0		103	1258+30	3HR2326	1	11,64
Rocky Creek #3	2-49.04	38	213.8		103	1269+10	3HR2326	1	11,64
Sukakpak Creek	2-49.03	38	213.1		103	1305+00	3HR2373+80	1	5,11,20,21,31,61 62

Waterbody	NPSI	NPAS	MPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
North Fork Sukakpak Creek	2-49.02	38	212.7		103	1332+20	3HR2447+70	4	11,20,21
Unnamed Creek	2-49.01	38	212.3		103	1353+23	3HR2440	4	11
Middle Fork Koyukuk River	2-49	38	212.2		103	1361+45	3HR2460+47	1	1,3,5,11,13,17, 20,21,29,31,38, 48,74
Way Back Creek	2-48.04	38	211.3		103	1408+00	3HR2485	1	11,48
Millie's Meander	2-48.03	38	211.0		103	1418+76	3HR2489+68	4	11,31,48,64,70
Unnamed Creek	2-48.02	38	210.6		103	1444+19	3HR2528+00	4	11,20
Eva's Alv	2-48.01	38	209.4		103	1507+08	3HR2583+84	4	11,20,48
Dietrich River	2-48	38	209.0		104	1526+55	3HR2604+66	1	1,3,5,11,17,20, 21,29,31,37,38, 48,61,62
1415 Lake Inlet	2-46.01	37	208.4		104	1556+18	3HR2631+80	4	11
Brockman Creek	2-46	37	207.7		104	1581+87	3HR2662+07	1	11,20,21,29,48, 64
Stoltz Lake Outlet	2-45.04	37	206.2		104	1607+52	3HR2703	1	11,20,21,48,64, 70
South Branch Airport Creek	2-45.03	37	206.7		104	1637+70	3HR2728+26	4	11,20
Middle Tributary Airport Creek	2-45.02	37	206.5		104	1644+93	3HR27+36+41	4	11,20
Airport Creek	2-45.01	37	205.8		104	1681+92	3HR2775+58	4	11,20,48
Disaster Creek	2-45	37	205.1		104	1719+41	3HR2809+90	3	3,5,11,20,29,48, 64
Unnamed Creek	2-43.07	37	204.7		104	1736+51	3HR2826+88	4	11
Trap Slough	2-43.06	37	204.6		104	1747+44	3HR2847+57	4	11
Dietrich River	2-43.05	37	204.2		104	1756+00		1	1,3,5,11,17,20, 21,29,31,37,38, 48
Dietrich River	2-43.04	37	205.7		104			1	1,3,5,11,17,20, 21,29,31,37,38, 48,61,62
Sahr's Slough	2-43.03	37	205.6		104	1795+99	3HR2889+08	4	5,11
Meadow Slough	2-43.02	37	205.4		104	1801+00	3HR2892+78	4	11
Unnamed Creek	2-43.01	37	204.8		104	1831+09	3HR2925+28	4	11
Snowden Creek	2-43	36	204.1		105	1870+20	3HR2959+42	4	3,5,11,17,20,21, 29,34,48,64
Unnamed Creek	2-41.05	36	203.6		105	1897+49	3HR2978+20	4	11
Snowden Pond Outlet	2-41.04	36	203.4		105	1906+65	4HR1984	4	5,11,20
Numbers Lake Creek	2-41.03	36	202.7		105	1941+95	4HR3026+13	1	1,5,11,20,31, 48,62
Dunder's Dribble	2-41.02	36	202.6		105	1947+73	4HR3036	4	5,11,31,48
Stanzla Creek	2-41.01	36	202.5		105	1952+70	4HR3060	4	11,20,31,48
Ugh Creek	2-41	36	201.6		106	2123+20	4HR2333+30	4	11,20,48
Unnamed Creek	2-39.01	36	199.2		106	2123+20	4HR2333+30	4	11
Steep Creek	2-39	35	197.2		106	2235+00	4HR3309+86	4	11,29,30
Buff Creek	2-38	35	195.8		106	52+10	4HR3375+85	4	11,29,30
Burger's Bayou	3-36.02	35	195.5		106	72+50	4HR3414+01	1	1,5,11,20,30,48
Drainage Material Site #106	2-36.01	35	195.3		106		4HR3447	1	1,11,30,48,64
Unnamed Creek	2-36	35	193.0		107	212+40	4HR3543+02	4	11

APPENDIX II. (cont'd)

Waterbody	MPSI	MPAS	MPMP	AIMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
Dietrich River Floodplain	2-34.06	34	192.4-191.3		107	248+79 - 302+00	4HR3579 - 257+00	1	1,3,5,11,30,31, 61,62
Beaver Dam Brook #1	2-34.05	34	191.7		107	295+10	4HR255+58	1	11,20,21,30,64
Beaver Dam Brook #2	2-34.04	34	191.1		107	321+32	4HR280+97	4	11,30
Beaver Dam Brook #3	2-34.03	34	190.9		107	329+88	4HR290+66	4	11,30
Beaver Dam Brook #4	2-34.02	34	190.8		107	334+05	4HR293+50	4	11,30
Beaver Dam Brook #5	2-34.01	34	190.7		107	336+75	4HR296+15	4	11,30
Kutirwik Creek	2-34	34	189.8		107	375+54	4HR343+00	4	3,5,11,17,20,21, 30,38,48,64,67
Dietrich River Floodplain	2-32.06	34	189.8-188.1		107	379+39 - 457+37	4HR349+31 - 481+82	1	1,3,5,11,20,21 48,62
Unnamed Spring	2-32.05	34	187.8			496+00		4	41
Dietrich River	2-32.04	33	187.4-187.2		107	500+36 - 513+36		1	1,3,5,11,21,31
Dietrich River Floodplain	2-32.03	33	187.0-186.4		108	525+75 - 556+00	4HR503+72 - 547+00	1	1,3,5,11,21
Unnamed Spring	2-32.02	33	185.9		108		4HR553+73	1	30,40,41
Dietrich River Floodplain	2-32.01	33	186.0-184.9		108	578+00 - 621+69		1	1,3,5,11,21
Oskar's Eddy	2-31	33	184.3		108	662+80	4HR632+98	4	5,11,30
Unnamed Creek	2-30.02	33	184.1		108	675+00	4HR649+00	3	11,20,30
Bear Track Creek	2-30.01	33	183.6		108	705+50	4HR678+00	4	11,20,30
Dietrich River Floodplain	2-29.03	33	183.3-182.9		108			1	1,3,5,11,20,30, 62
Dietrich River Floodplain	2-29.02	33	182.4-181.1		109			1	1,3,5,11,20,30, 62
Andy's Creek	2-29.01	32	180.9		109	840+52	4HR817+50	1	11,20,21,30,48
West Fork of North Fork Chandalar River	2-29	32	179.0-178.7		109	945+23 - 957+00		1	1,3,5,11,20,21, 30,48,64
West Fork of North Fork Chandalar River Floodplain	2-28	32	177.3-176.1		109	1030+00 - 1093+00		1	1,3,5,11,20,21 30,42,64
West Fork of North Fork Chandalar River Floodplain	2-28	31	174.6-174.2		109	55+00 - 78+72		1	1,3,5,11,20,21 30,42,64
Atigun River Floodplain	2-27	30-31	171.0-165.1		110-112	247+32	4HR1360-5HR431+54	1	1,3,5,11,30,31 48,67
Unnamed Creek	2-26	29	162-161		111		5HR520+00	1	11
Unnamed Creek	2-25.03	29	162-161		111-112		5HR541+66	1	11
Unnamed Creek	2-25.02	29	162-161		112		5HR550+80	1	11
Unnamed Creek	2-25.01	29	162-161		112		5HR552+37	1	11
Trevor Creek	2-25	29	159.8		112	837+00	5HR709+72	1	11,30,48,64,70
Tyler Creek #1	2-24.03	29	159.3		112	871+00	5HR717+90	1	11,30,48
Tyler Creek #2	2-24.02	29	159.0		112	878+65	5HR717+90	1	11,30,48
Tyler Creek #3	2-24.01	29	159.0		112	881+00	5HR717+90	1	11,30,48
Roche Moutonee	2-24	28	153.3		113	1170+91	5HR1053+28	1	3,11,30,48,57, 62,64
One-one-three Creek	2-23.03	28	153.2		113	1176+95		4	11,62
Mainline Spring	2-23.02	27	152.2		113	1226+50	5HR1097	1	11,30,48,57,62, 64
Muldon Creek	2-23.01	27	151.5		114	30+44	5HR1176+47	1	11,30,48,62,64
Vanish Creek	2-23	27	151.4		114	35+24	5HR1161	1	11,30,48,62,70
Unnamed Creek	2-22.05	27	151.3		114	38+70	5HR1164	1	11
Tad Creek	2-22.04	27	151.1		114	44+00	5HR1169	1	11
Tee Lake Outlet #1	2-22.03	27	148.9		114	153+63	5HR1280+85	1	1,5,11,30,31,48, 62,64,70
Tee Lake Outlet #2	2-22.02	27	148.9		114	155+29	5HR1280+85	1	1,5,11,30,31,48, 62,64,70

APPENDIX II. (cont'd)

Waterbody	MPSI	MPAS	MPMP	AMMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
Mosquito Lake	2-22.01	27	148.9		114		SHR1334	1	11,30,48,57
Atigun River	2-22	27	147.6		114	20+94	SHR1364+44	1	1,3,5,11,31,48
Jill Creek	1-21.11	25	140.7		115	380+60	6HR229+00	4	11,48,64
Jill Creek Tributary	1-21.10	25	140.4		115	395+24	6HR234+75	4	11,48
Ed Creek	1-21.09	25	140.0		115	421+74	6HR436+25	4	11,30,48
Mack Creek	1-21.08	25	139.6		115	438+29	6HR452+00	4	11,30,48
Terry Creek	1-21.07	25	139.1		115	466+12	6HR490+00	1	11,30,48,64
Moss Creek	1-21.06	25	138.6		115	494+00	6HR500+41	4	11,30,48
Hallock Creek	1-21.05	25	138.4		115	504+27	6HR512+00	4	11,30,48
Yan Creek	1-21.04	25	136.0			629+06	6HR641+00	4	11,30,48
Becky Creek #1	1-21.03	24	134.2		116	721+63	6HR684	1	1,11,30,48,64
Becky Creek #2	1-21.02	24	132.8		116	797+80	6HR984	1	1,11,30,48,64
Holt Creek	1-21.01	24	132.6		116	804+36	6HR985	1	11,30,48
Kuparuk River	1-21	24	131.9		117	842+00	6HR986+50	1	1,3,5,11,29,30, 36, 48,64,67
East Fork Kuparuk River	1-20.01	23	130.4		117	921+55	6HR911+80	1	5,11,30,48,64
Toolik River	1-20	23	129.5		117	968+30	6HR948+50	1	3,5,11,29,30,48,64
East Fork Toolik River	1-19.01	23	129.4		117	973+30	6HR970+25	4	11,48
Oksrukuyik Creek	1-19	22	122.7		118	1325+64	6HR1285+32	1	1,3,5,11,29,30,48,64
Shiftish Creek #1	1-18.04	22	121.3		118	1395+51		1	11,30,48
Shiftish Creek #2	1-18.03	22	120.5		119	1441+26		1	11,30,48,57
Thiele's Trickle	1-18.02	21	119.1		119	1512+60	6HR1518	4	1,11,30,48
Lower Oksrukuyik Creek #1	1-18.01	20	109.5					1	1,11,30,48,57,64,70
Lower Oksrukuyik Creek #2	1-18	20	109.4					1	1,11,30,48,64
Unnamed Creek	1-17.02	20	109.2		120	911+80		4	11
Unnamed Creek	1-17.01	20	108.9		120	924+50		4	11
Rudy Creek	1-17	19	108.5		120	947+99	6HR2153	1	3,11,29,30,48
Bassett Creek	1-16.03	19	106.9		121	1029+20	6HR2228+14	4	11,30,48
Dennis Creek	1-16.02	19	106.8		121	1033+60	6HR2234+80	1	11,30,48
Climb Creek	1-16.01	19	106.3		121	1060+34	6HR2262+60	1	11,30,48,64
Poison Pipe Creek	1-16	19	106.0		121	1077+10	6HR2318+92	4	11,29,30,48
Polygon Creek	1-15	19	105.1		121	1125+00	6HR2351+97	1	11,30,48,64
Gustafson Gulch	1-14	18	102.2		122	1280+00	6HR2517+85	4	11,30,48,63
Arthur Creek	1-13	18	101.8		122	1297+50	6HR2536+20	4	11,29,30,48
Sagavanirktok River Side Channel	1-12.05	18	99.4		122	1424+79	6HR2657+20	1	11,48,64
Sagavanirktok River Side Channel	1-12.04	18	99.0		122	1445+85	6HR2684+43	1	11,48
Clark's Lake	1-12.03	17	98.4-98.2		122	1481+00-1489+28	6HR2770+86	1	11,30,48,57
Stump Creek	1-12.02	17	98.0		122	1499+00	6HR2770+86	1	11,30,48,57,63
Lori Creek	1-12.01	17	93.0		123	1719+50	6HR2974+15	4	11,30,48,63,70
Charlotte Creek	1-12	16	91.0		123		6HR3083+19	4	11,29,64
Happy Valley Camp Creek	1-11	16	87.3		124		6HR3259+77	4	3,5,11,29,48,63,64
Milke Creek	1-10	16	86.6		124		6HR3296+20	4	3,11,29,48,63,64
Stout Creek	1-9	15	83.1		124		6HR3471+69	4	11,48,64,70
Sagavanirktok River Side Channel	1-8.03	15	81.9-81.5		125	469+75		1	11,30,48
Sagavanirktok River Side Channel	1-8.02	15	81.9-81.5		125	489+35		1	11,30,48
Sagavanirktok River Side Channel	1-8.01	15	81.9-81.5		125	492+70		1	11,30,48
Spoiled Mary Creek	1-8	15	81.5		125	493+95	6HR3535+62	1	11,29,30,48

APPENDIX II. (cont'd)

Waterbody	NPSI	NPAS	NPMP	ANMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
Sagavanirktok River Side Channel	1-7.11	14	79.2		125	616+70		3	11,48
Sagavanirktok River Side Channel	1-7.10	14	78.8		125	632+50		3	11,48
Sagavanirktok River Side Channel	1-7.09	14	78.7		125	637+00		3	11,48
Sagavanirktok River Side Channel	1-7.08	14	78.6		125	643+50		3	11,48
Sagavanirktok River Side Channel	1-7.07	14	78.2		125	666+00		3	11,48
Sagavanirktok River Side Channel	1-7.06	14	77.7		125	696+00		3	11,48
Sagavanirktok River Side Channel	1-7.05	14	77.7		125	697+50		3	11,48
Sagavanirktok River Side Channel	1-7.04	14	77.3		125	714+00		1	2,11,48,57
Sagavanirktok River Side Channel	1-7.03	14	77.0		125	734+30		1	11,48,57
Sagavanirktok River Side Channel	1-7.02	14	76.7		125	747+12		1	11,48,57
Sagavanirktok River Side Channel	1-7.01	14	75.9		126	790+40		4	11,48
Mark Creek	1-7	14	75.8		126	791+40	6HR3840+41	1	3,11,29,30,48,63
Unnamed Creek	1-6.49	13	69.2		126W		6HR4195+99	3	11,42,43
Unnamed Creek	1-6.48	12	63.9		126W		6HR4481+00	4	11,42,43
Wood Creek #1	1-6.47	11	59.0		128	210+92	7HR486+16	1	11,30,64
Wood Creek #2	1-6.46	11	58.9		128	215+96		3	11,30,48,64
Wood Creek #3	1-6.45	11	58.5		129	233+50		1	11,30,48
Wood Creek #4	1-6.44	11	58.4		129	242+80		1	11,30
Wood Creek #5	1-6.43	11	58.3		129	246+20		1	11,30
Wood Creek #6	1.6.42	11	58.1		129	258+60		1	11,30
Wood Creek #7	1-6.41	11	58.0		129	265+76		1	11,30
Wood Creek #8	1-6.40	11	57.7		129	281+50		1	11,30,48
Wood Creek #9	1-6.39	11	57.1		129	322+66		1	11,30,48,64
Wood Creek #10	1-6.38	10	56.6		129	355+07		1	11,30
Wood Creek #11	1-6.37	10	56.4		129	360+60		1	11,30
Wood Creek #12	1-6.36	10	55.8		129	395+41		1	11,30,48
Extension Creek #1	1-6.35	10	55.4		129	410+52		4	11,30,48
Extension Creek #2	1-6.34	10	55.4		129	412+57		1	11,30,48
Extension Creek #3	1-6.33	10	55.1		129	430+57		1	11,30
Extension Creek #4	1-6.32	10	55.1		129	432+00		4	11,30,48
Extension Creek #5	1-6.31	10	53.9		129	492+35		1	11,30,48
Extension Creek #6	1-6.30	10	53.8		129	499+16		1	11,30,48
Extension Creek #7	1-6.29	10	53.2		129	531+00		4	11,30,48
Extension Creek #8	1-6.28	10	53.0		129	539+10		4	11,30
Unnamed Pond	1-6.27	9	50.0		130	702+00		4	11
Ghost Creek #1	1-6.26	9	49.5		130	728+68		1	11,30,48
Ghost Creek #2	1-6.25	9	49.3		130	736+81		4	11,30,48
Ghost Creek #3	1-6.24	9	48.9		130	756+49		4	11
Ghost Creek #4	1-6.23	9	48.7		130	768+86		4	11
Ghost Creek #5	1-6.22	9	48.0		130	804+68		4	11,30,48
Ghost Creek #6	1-6.21	9	47.6		130	826+22		1	11,30,48
Ghost Creek #7	1-6.20	9	47.5		130	831+23		1	11,30,48
Ghost Creek #8	1-6.19	9	47.3		130	843+08		4	11
Ghost Creek #9	1-6.18	9	47.2		130	846+16		1	11
Ghost Creek #10	1-6.17	9	47.1		130	853+25		1	11

APPENDIX II. (cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Fall Criteria	Data Source
Ghost Creek #11	1-5.16	9	46.7		131	871+81		1	11,30,48
Ghost Creek #12	1-5.15	9	46.3		131	892+55		1	11,30,48,64
Ghost Creek #13	1-5.14	9	46.1		131	905+20		1	11,30,48
Ghost Creek #14	1-5.13	8	45.7		131	924+58		4	11
Ghost Creek #15	1-5.12	8	45.6		131	937+85		1	11,30,48
Ghost Creek #16	1-5.11	8	45.3		131	957+04		1	11,30,48
Ghost Creek #17	1-5.10	8	45.1		131	958+00		1	11
Sagavanirktok River Side Channel	1-5.09	8	43.5		131	1042+70		1	11,43,48
Sagavanirktok River Side Channel	1-5.08	8	42.9		131	1076+42		1	11,43,48
Sagavanirktok River	1-5.07	8	42.6		131	1095+00		1	11,43,48
Sagavanirktok River	1-5.06	8	42.4		131	1106+70		1	11,43,48
Silvia Creek	1-5.05	7	38.4		132	1316+45	7HR1624+77	1	11,30,48
Unnamed Pond	1-5.04	7	38.1		132			4	11,43
Sagavanirktok River Side Channel	1-5.03	7	37.9		132	4822+81	7HR1655+59	1	11,30,48
Sagavanirktok River Side Channel	1-5.02	7	37.9		132	4827+89		4	11,30,43,48
Unnamed Creek	1-5.01	7	35.4		132	4951+44		4	11,30,48
Sagavanirktok River Floodplain	1-5	6-7	35.4-32.7		132-133	4951+44-5103+20		4	11,30,48
Sagavanirktok River Side Channel	1-4.05	6	30.6		133	5211+48		1	11,43,48
Sagavanirktok River Side Channel	1-4.04	6	30.5		133	5215+30		1	11,43,48
Sagavanirktok River Side Channel	1-4.03	6	30.1		133	5238+76		1	11,43,48
Sagavanirktok River Side Channel	1-4.02	6	30.0		133	5243+53		1	11,43,48
Sagavanirktok River Side Channel	1-4.01	6	29.9		133	5251+05		1	11,43,48
Sagavanirktok River Floodplain	1-4	5	27.3-25.5		134	5396+10-5459+93		1	11,43,48
Unnamed Creek	1-3.02	5	23.0		135	806	7HR2482+36	4	11
Unnamed Lake	1-3.01	4	17.2		137			4	11
Little Putuligayuk River	1-3	2	10.2			1478+52		4	11,48,57
Pump Station #1 Drainage Ditch	1-2	1	4.8					4	42,43,48
Putuligayuk River	1-1	1	3.2					1	27,42,43,48,57