ecological research associates

A FINAL REPORT

WINTER 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

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FOR:
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NORTHWEST ALASKAN PIPELINE COMPANY
FAIRBANKS, ALASKA 99701

NOVEMBER 1979

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ABSTRACT

The natural gas pipeline proposed by Northwest Alaskan Pipeline Company traverses hundreds of waterbodies in Beaufort Sea and Yukon River drainages. This report describes the fish overwintering status of these waterbodies based on a review of available information and a field survey of streams selected for initial examination. Over fifty sources of information (including reports, unpublished documents, agency memoranda and personal communications) were examined for winter fisheries data in 490 streams and lakes along the pipeline alignment. An assessment of these data is listed in Appendix II.

New winter fisheries data are presented for 64 waterbodies at 75 proposed pipeline crossings in Alaska. The streams were surveyed in late winter (16 March to 26 April 1979); biological, chemical and physical data gathered during these surveys are listed in a stream catalogue. Approximately half of the sites examined provided no overwintering habitat for fish. Fish were caught at six sites: Tanana River, Jim River side channel #1, Jim River #3, Beaver Springs #1, Dietrich River and an unnamed slough off the Salcha River. Species caught were burbot, king salmon and slimy sculpin. Two additional overwintering areas (Drainage Material Site 106 and an unnamed spring on the Dietrich River) were identified based on the presence of grayling during previous surveys. Twenty-four waterbodies were identified as potential overwintering areas but no fish were captured; potential overwintering habitat in five of these waterbodies was judged to be good while 19 were considered marginal.

ACKNOWLEDGEMENTS

We would like to acknowledge the timely assistance provided by several people during the course of this project: Brian Tomlinson and Ross Robinson for their field assistance, Hugh Bain for directing one field team, and Benny Gallaway for administrative perseverance.

INTRODUCTION

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

On 4 January 1979, LGL Ecological Research Associates (LGL) was awarded a contract by Northwest Alaskan Pipeline Company through Fluor Northwest, Inc. to conduct fisheries surveys along the NAPLINE route. The major purposes of this study were to identify the waterbodies crossed or potentially affected by the NAPLINE project and to assess the fish utilization of these waterbodies during winter, spring and fall seasons.

This report presents the results of the first phase of the winter program: (1) a provisional list of 490 waterbodies crossed or potentially affected by the NAPLINE with an evaluation of existing winter fisheries data for each, and (2) a winter (fish overwintering) assessment of waterbodies selected for initial field examination during the late winter period, 16 March-26 April 1979. A second phase of the winter program is scheduled for winter 1979-1980.

Winter Studies

Objectives and Justification

The purpose of the 1979 Overwintering Field Study is to determine the presence or absence of overwintering areas in selected locations having both the potential for supporting overwintering fish and potentially being affected by construction and/or operation of the Northwest Alaskan Pipeline Project. Overwintering areas are defined as any location in a drainage system, either placid or flowing, providing fish (any life history stage, egg to adult) with at least their minimum survival needs for the period from freeze-up to break-up.

The importance of overwintering areas to northern fish populations and the land-use conflicts that have arisen between overwintering fish and industrial developments (e.g., pipeline trenching, winter water withdrawal, gravel removal, contaminants) have been described in recent studies and reviews (References 24, 51, 52, 53). It is generally thought that fish are very vulnerable to adverse impacts during the winter period, perhaps more so than at any other stage of their life cycle. Overwintering areas are considered critical habitats because fish and their eggs may be concentrated in small, sometimes isolated pockets of water which remain unfrozen during the extended winter period. Many northern streams, particularly the smaller ones, freeze to bottom substrate by late winter when ice thickness commonly reaches 2 m; consequently, the amount of unfrozen water becomes very limited. Fish must either vacate these streams or reside in deep pools or areas supplied by groundwater.

As ice thickness increases, fish may become crowded in small areas and stressful conditions may be compounded by a depletion of under-ice dissolved oxygen by late winter (References 44, 45, 46, 47). Thus, it is during late winter that habitat conditions for fish can become severe and any additional disturbance from instream construction projects may be most harmful at that time. It is therefore essential to identify which streams support overwintering fish populations so that appropriate mitigative measures can be taken.

An assessment of overwintering areas must recognize that these sites may be dynamic temporally and spatially. Fish distributions presumably change through the winter as increasing ice thickness reduces the amount and extent of unfrozen water. A concern frequently raised by fisheries biologists involves the possibility of year-to-year variation in the specific locations of overwintering pools, but few data are available on this topic. Another unanswered question is the extent to which fish are periodically killed through natural winter processes such as an unusually severe winter which causes a site to freeze solid. One such event possibly occurred during the present study (see Dietrich River in stream catalogue).

Selection of Streams for Field Investigation

An evaluation of available overwintering 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 and Sport Fish Divisions) and U.S. Fish and Wildlife (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).

In order to capitalize on the short period of winter remaining after awardance and finalization of the contract to LGL Ltd. (February 1979), a winter field program was initiated in March 1979. Streams examined were those identified during a preliminary review of available information and discussions with state and federal personnel. With certain exceptions, streams known to support overwintering fish (Table 1, Criteria 1) were excluded from further field examination at this time. Instead, emphasis was placed on those streams where winter fisheries data were incomplete. Waterbodies examined during this phase of the winter program are presented in this report.

During the course of the winter field survey, and through continued literature review and agency contact, additional waterbodies requiring winter work were identified (Appendix II). It is recognized that additional winter sampling efforts will be needed if problem areas are identified or alternative pipeline alignments are considered.

Table 1. Criteria for evaluating available winter fisheries data.

Number*	Winter Criteria
1	Overwintering Area--waterbody investigated and fish overwintering areas documented.
2	No Overwintering--waterbody investigated and found unsuitable for fish overwintering.
3	No Overwintering Inferred--absence of overwintering habitat inferred and supported by indirect evidence: a) small drainage, probably freezes solid in winter, and/or b) intermittent or no winter flow and low dissolved oxygen, and/or c) no fall spawners in waterbody, and/or d) fish blockage present
4	Additional Data Needed--waterbody investigations incomplete or lacking for winter season: a) waterbody has not been surveyed for fish overwintering areas, or b) previous investigations found or suspected overwintering habitat but did not sample for fish, or c) previous investigations did not find overwintering habitat but effort was considered inadequate

*Cited in Appendix II

Report Format

This report combines historical information together with data generated during field surveys in order to provide an interim assessment of overwintering potential in streams affected by the NAPLINE route. A provisional list of 490 streams 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 winter fisheries data and the current status of this information are indicated.

Data gathered during the winter field survey are presented on a stream-by-stream basis ("Stream Catalogue"). In addition, assessments of fish overwintering potential for each stream surveyed are summarized for convenient reference in 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 workpad and extends from Prudhoe Bay to Delta Junction. Between Prudhoe Bay and Atigun Pass, a distance of approximately 250 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 it several times. Larger streams like the Sagavanirktok characteristically are fast flowing, clear and have wide, extensively braided, gravel flood plains. They support residents 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. These drainages usually freeze to the bottom in the winter and generally do not provide overwintering habitat.

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 100 km south of Atigun Pass are wide, braided and fast flowing throughout the summer. Flood plains 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 100 km south of Atigun Pass, the NAPLINE route enters the Yukon Valley where most streams exhibit a high degree of meandering. Although some of the larger streams are clear, most are stained brown

Table 2. Summary of fish overwintering potential in selected streams crossed by the NAPLINE Route. Abbreviations used are: OW (overwintering), NPSI (Northwest Pipeline Stream Identification Number), NAPLINE (Northwest Alaskan Pipeline).

Waterbody	NPSI	Known OW Area, Fish spp. Present	Potential OW Area, But No Fish Caught	No OW At NAPLINE Crossing	Text Page
Scottie Creek	6-227		Marginal habitat*		19
Desper Creek	6-226			X	22
Sweetwater Creek	6-225			X	25
Unnamed Creek	6-222			X	28
Gardiner Creek	6-219			X	31
Tenmile Creek	6-218			X	34
Unnamed Creek	6-216			X	37
Beaver Creek	6-215			X	40
Tanana River	6-207A/B	Burbot			43
Tanana River ALT.#1	6-207C	Burbot			46
Tanana River ALT.#2	6-208	Burbot			49
Tok River	6-205			X	52
Crystal Springs	6-203.02		Marginal habitat		55
Yerrick Creek	6-201		Marginal habitat		58
Unnamed Creek	6-193.01			X	61
Robertson River	5-187		Marginal habitat		64
Bear Creek	5-185		Good habitat		67
Sam Creek	5-180			X	70
Unnamed Creek	5-179			X	73
Berry Creek	5-178		Marginal habitat		76
Sears Creek	5-177		Marginal habitat		80
Johnson River	5-175		Good habitat		83
Little Gerstle River	5-174			X	86
Gerstle River	5-172			X	89
Delta Junction	-	-	-	-	-

Table 2 (cont'd)

Waterbody	NPSI	Known OW Area, Fish spp. Present	Potential OW Area, But No Fish Caught	No OW At NAPLINE Crossing	Text Page
Shaw Creek	5-165		Marginal habitat		92
Rosa Creek	5-162			X	95
South Fork Minton Creek	5-161			X	98
North Fork Minton Creek	5-161			X	101
Gold Run Creek	5-160			X	104
Redmond Creek	5-159		Marginal habitat		107
TAPS Slough	4-158.02			X	111
Unnamed Slough	4-158.01	Slimy sculpin			114
Two-Nineteen Creek	4-157.01			X	117
Little Salcha River	4-157		Good habitat**		120
Million Dollar Creek #1	4-156.03			X	123
Million Dollar Creek #2	4-156.02			X	126
Million Dollar Creek #3	4-156.01			X	129
Million Dollar Creek #4	4-156			X	132
French Creek #0	4-155			X	135
Knokanpeover Creek	4-154			X	138
French Creek #1	4-153		Marginal habitat		141
French Creek #2	4-152		Marginal habitat		144
French Creek #3	4-151		Marginal habitat		147
French Creek #4	4-150		Marginal habitat		150
French Creek #5	4-149		Marginal habitat		153
Moose Creek #1	4-148		Marginal habitat		156
Moose Creek #2	4-147		Marginal habitat		156
Moose Creek #3	4-146		Marginal habitat		156
Steele Creek	4-143			X	159
Engineer Creek	4-142		Marginal habitat		162
Goldstream Creek	4-141			X	165
Treasure Creek	4-140			X	168
Washington Creek	4-137		Good habitat		171
Tatalina River	4-132			X	174

Table 2 (cont'd)

Waterbody	NPSI	Known OW Area, Fish spp. Present	Potential OW Area, But No Fish Caught	No OW At NAPLINE Crossing	Text Page
Tolovana River	4-128			X	177
Hess Creek	4-123A.04			X	180
North Fork Ray River	3-110			X	183
West Fork Dall River(S. Branch)	3-108			X	186
Kanuti River	3-103			X	189
South Fork Fish Creek	3-100		Marginal habitat		192
Middle Fork Fish Creek	3-99			X	195
Fish Creek	3-98			X	198
South Fork Bonanza Creek	3-95		Marginal habitat		201
North Fork Bonanza Creek	3-94			X	205
Prospect Creek	3-91		Marginal habitat		208
Jim River Side Channel #1	3-90.02	Slimy sculpin			211
Jim River Side Channel #2	3-90.01		Marginal habitat		214
Beaver Springs #1	3-87.02	King salmon			217
Jim River #3	3-87	Slimy sculpin			220
Slate Creek	3-72			X	223
Hammond River	2-55			X	226
Dietrich River	2-48	Fish spp. sighted***			229
Brockman Creek	2-46			X	236
Drainage Material Site 106	2-36.01	Grayling†			239
Unnamed Spring	2-32.05	Grayling†			242
Mosquito Lake	2-22.01		Good habitat		245
Kuparuk River	1-21			X	248

* Marginal habitat includes no measurable flow, low dissolved oxygen for available conditions.

** Good habitat includes measurable flow, combined with high oxygen concentrations, clear water, clean gravel substrate and possibly the occurrence of invertebrates.

*** See Text

† Data from previous survey.

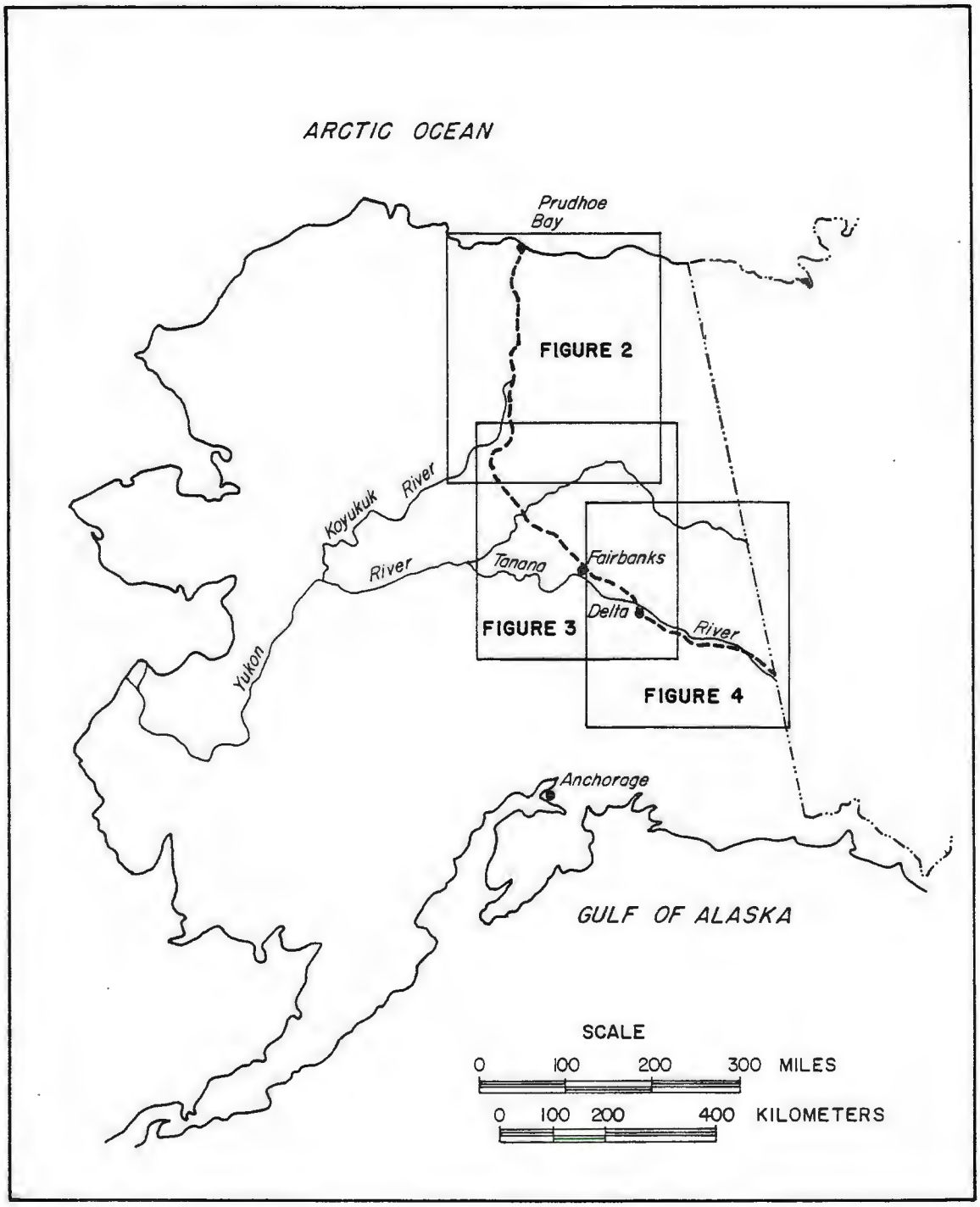

Fig. 1. Route of the proposed NAPLINE from Prudhoe Bay to the Alaska/Yukon border.

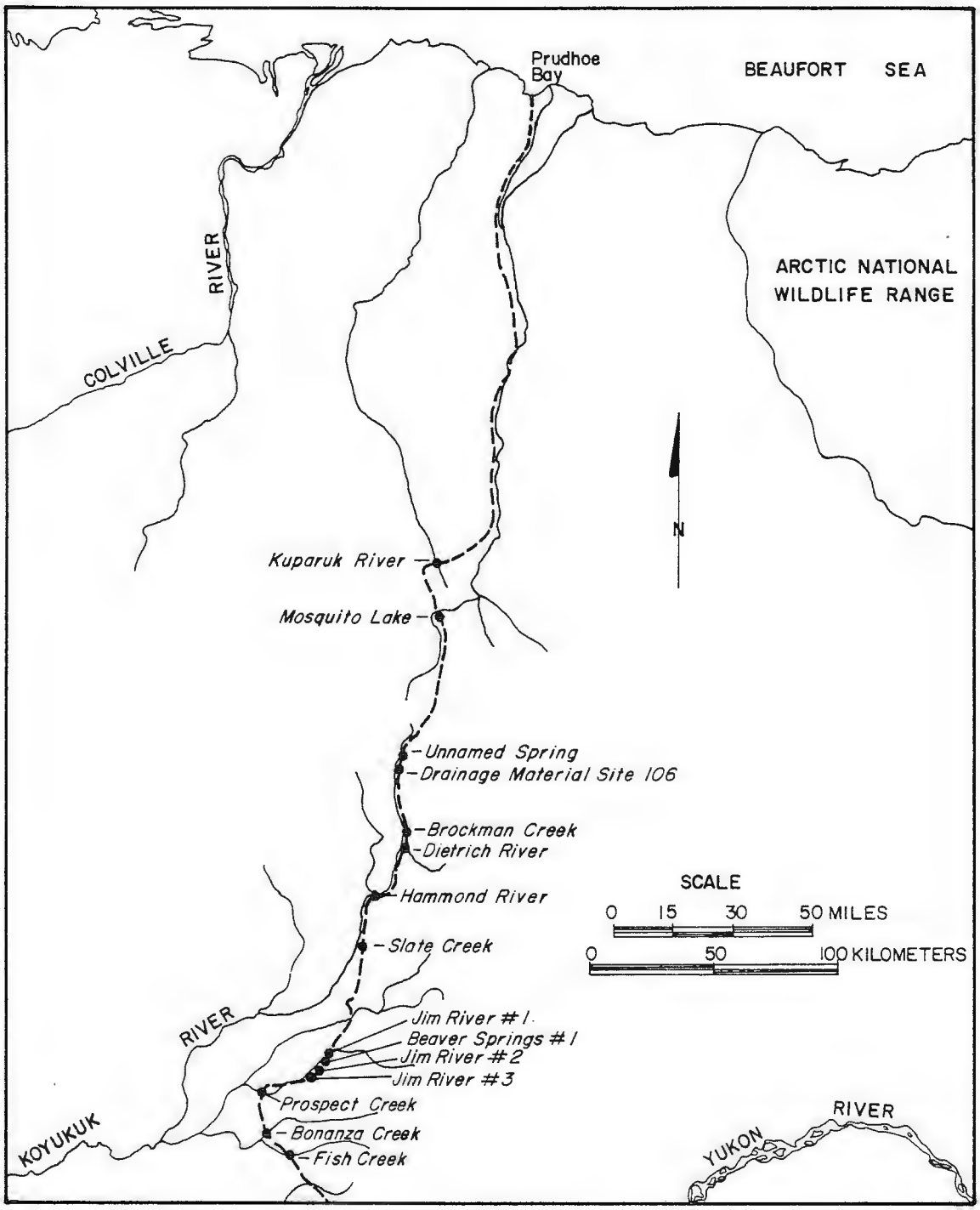

Fig. 2. NAPLINE route from Prudhoe Bay to the headwaters of the Koyukuk River.

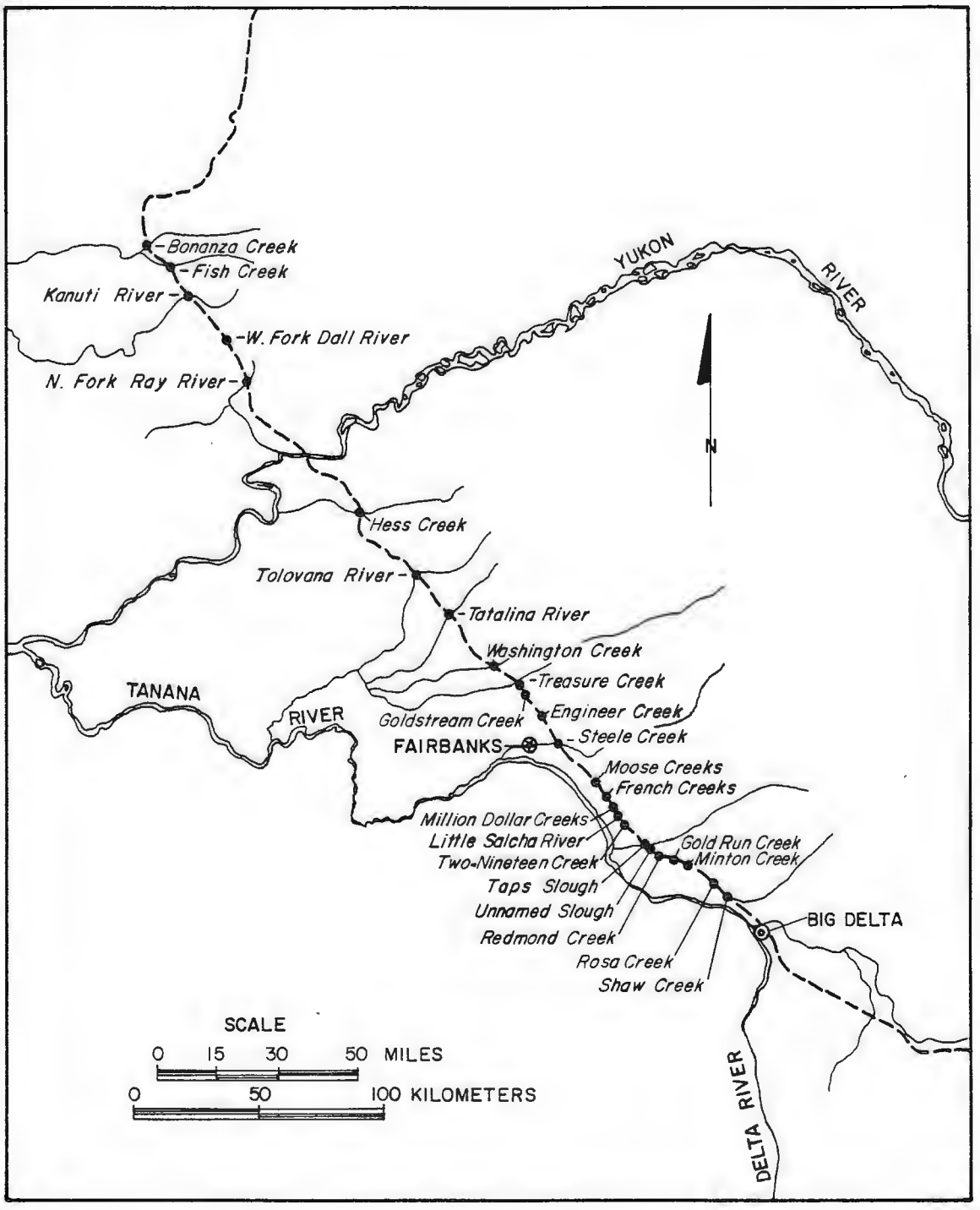

Fig. 3. NAPLINE route from the headwaters of the Koyukuk River to Big Delta.

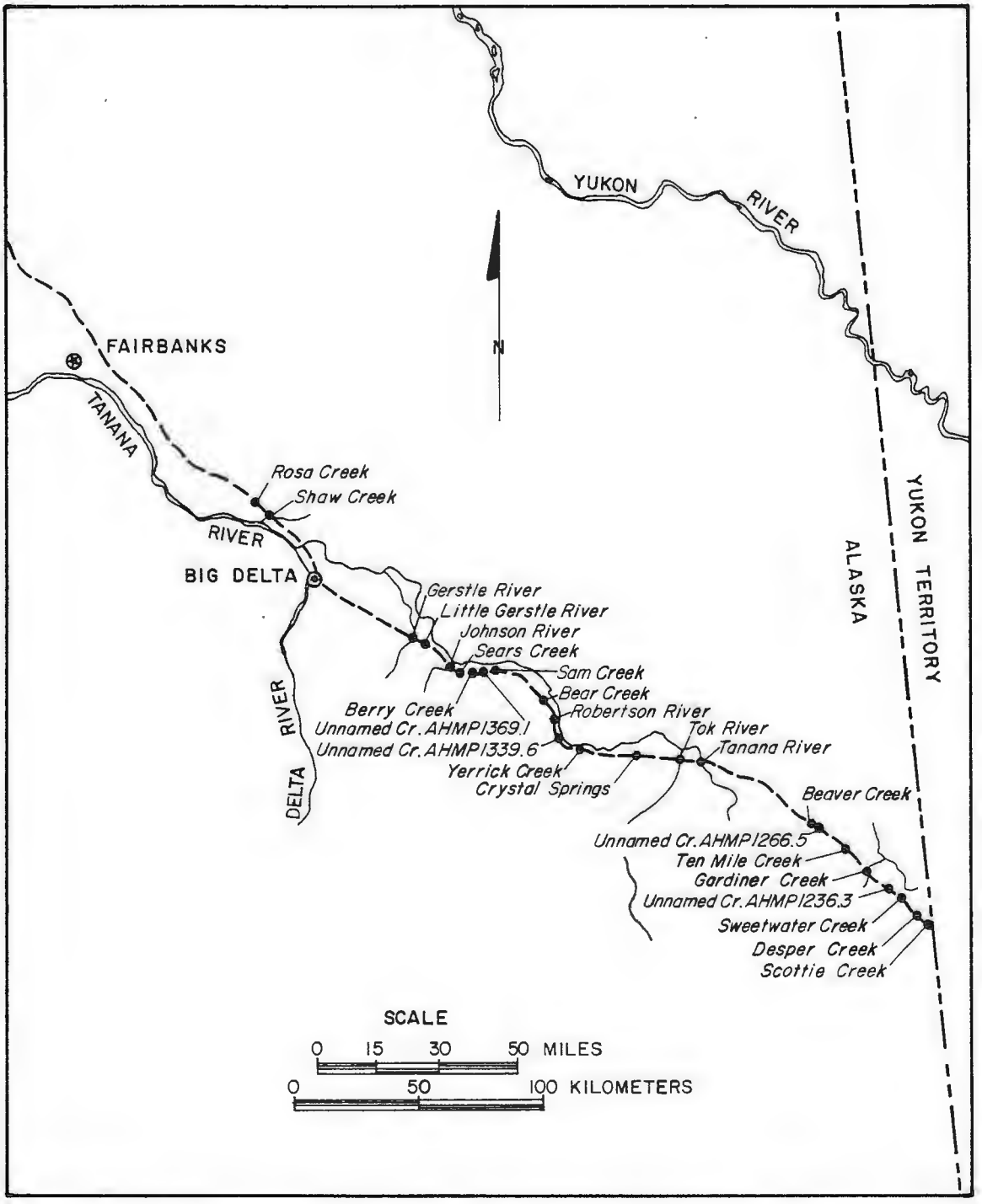

Fig. 4. NAPLINE route from Big Delta to the Alaska/Yukon border.

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.

After crossing the Yukon River, the NAPLINE continues to follow the TAPS oil line through the White Mountains and into the Fairbanks area. Here the northern segment routing turns east and travels up the Tanana River Valley to Big Delta.

The southern segment of the study area begins at Big Delta where the NAPLINE route diverges from the oil line. The proposed gas line continues east from Big Delta parallel to the Fairbanks-Haines pipeline to the Yukon border. Throughout most of the 275 km between Delta and the Yukon border, the alignment 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 Big Delta, 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 flood plains. 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 many 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

Late winter field investigations were conducted between 16 March and 26 April 1979 when ice thickness would be expected to reach its maximum. Two two-man field crews, assisted by a Fluor representative, began the surveys on 16 March and worked generally south to north along the proposed NAPLINE route. Fisheries surveys in the southern segment from Delta Junction to the Canadian border, as well as that portion of the northern segment from Delta Junction to the Yukon River, were complete by 4 April. Fisheries surveys conducted north of the Yukon River were conducted from 5 April to 10 April and the Dietrich River was revisited on 26 April 1979.

Existing public transportation routes (primarily the Alaska, Richardson, Steese and Elliot highways, the TAPS Haul Road, Alyeska Pipeline access roads and the Alyeska Pipeline workpad) provided access to winter sampling sites. Pickup trucks, snowmachines and snowshoes were used for transportation.

The series of Northwest Pipeline alignment sheets used throughout this report to identify stream locations is indicated in Reference 4.

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 NAPLINE crossing. Sample sites were chosen on the basis of proximity to the NAPLINE and channel configurations which were indicative of deep water (i.e., high cut banks on the outside of meanders etc.). It was often necessary to sample as far as 800 m from the proposed crossing. Where appropriate, data describing biological, chemical and physical conditions were collected; these are described below.

Fish

A variety of sampling techniques were used to sample fish. In open-water areas, fish were sampled by electroshocker (Smith-Root Type VIII-A). Under-ice techniques included the use of gill nets, baited and unbaited minnow traps, baited set lines and angling equipment. Monofilament gill nets, with 2.5 cm (1 inch) and 3.8 cm (1.5 inch) stretched mesh, were in 7.6 m (25 feet) and 15 m (50 feet) lengths. A power auger was used to drill through ice and an ice jigger was used to set gill nets under the ice.

Captured fish were measured and released if possible. Fork lengths were recorded for king salmon and total lengths for burbot and slimy sculpin.

Physical and Chemical Measurements

When free water was encountered in open channels or under the ice, current was measured with a Gurley Pygmy Current meter. The lower detection limit of this meter is approximately 0.005 m/sec when stream flow is measured for a standard time of 60 sec. An estimate of stream discharge was calculated based on stream current and the cross-sectional area of unfrozen water. To define the extent of under-ice unfrozen water, a transect of holes was drilled across the stream. Drill holes were typically spaced at 0.3 to 0.6 m in intervals across small streams and 0.6 to 1.5 m across large streams. The depth profiles obtained in this manner were filed with Northwest Alaskan Pipeline Company and Fluor Northwest, Inc.

Dissolved oxygen (Hach Kit Model OX-2P), pH (Hach Kit Model 17-N), conductivity and temperature (YSI Model 33 S-C-T) were measured when free water was present. The Hach Kits and S-C-T meter were calibrated and

tested for quality control. With the exception of temperature measurements, the degree of error in measurements was small and within the limits of precision for methods used (Appendix I). At low temperatures, the readings varied 2-3 degrees celsius from the laboratory control.

Water color, bottom type 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

Winter is unquestionably the most difficult time to gather data on fish and related features of aquatic habitats. In addition to adverse weather conditions, sampling sites may vary from shallow open-water channels to isolated pools of water under 2 m of ice. For this reason, a variety of sampling gear were used but factors such as fish catchability under surface ice, gear effectiveness and sampling intensity all affect the success of sampling efforts. Thus it is recognized that the most useful data gathered in the present survey, as well as in previous surveys recorded in the literature, are those which demonstrate positively that (1) no fish were present because the stream was dry or frozen solid, or (2) fish were present because some were caught. Other streams, which were sampled but where fish were not caught, may require further field efforts if a review of indirect evidence (such as the amount of flowing water and dissolved oxygen levels) suggests that the site is a potential overwintering area for fish.

RESULTS AND DISCUSSION

The phenomenon of fish overwintering in northern watercourses and the vulnerability of overwintering areas to industrial developments and related activities (e.g., pipeline trenching, winter water withdrawal, gravel removal, contaminants) have been the subjects of several field studies and review papers (e.g., References 24, 51, 52, 53). What is important at this stage of the NAPLINE project is an evaluation of winter fisheries conditions on a case-by-case basis so that specific problem areas can be identified. Towards this end, results of the literature review and winter field survey are presented for each waterbody in the following sections of this report.

Provisional List of Waterbodies

In a large-scale project such as the NAPLINE, it is essential for reference purposes to maintain an up-dated list of waterbodies crossed or potentially affected by the pipeline. To date, the provisional list contains 490 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.

The list serves a second purpose. References which contain winter fisheries data are listed for each waterbody and this information is evaluated according to the criteria listed in Table 1. By far the largest category of streams in the provisional lists are those where the absence of overwintering habitat was inferred based on indirect evidence (Table 1, Criteria 3). Complete evidence was not often encountered in the literature to confidently identify a stream as either a known overwintering area or a stream known not to support overwintering fish (Table 1, Criteria 1 or 2). Additional information was considered necessary to settle the overwintering status of 115 stream crossings (new data are presented for many of these crossings in this report).

General Results of Winter Field Survey

The timing of the late winter survey (16 March to 26 April 1979) was several weeks prior to spring break-up, although a few streams, particularly those south of Fairbanks, were subject to some preliminary thawing. During this survey, 63 streams or springs (some with multiple crossings) and one lake were examined along the NAPLINE route. Seventy-five crossings were sampled.

Approximately half of the sites examined provided no overwintering habitat for fish. Most of these were small streams which were dry or frozen solid by late winter.

Overwintering fish were caught under the ice or in open water channels in six streams:

Stream	Fish Species
Tanana River	burbot
Jim River side channel #1	slimy sculpin
Jim River #3	slimy sculpin
Beaver Springs #1	king salmon
Dietrich River	unidentified
Unnamed slough off Salcha River	slimy sculpin

In addition, two other overwintering areas (Drainage Material Site 106 and an unnamed spring on the Dietrich River) were identified based on the presence of grayling during earlier surveys. One of these sites was frozen solid during the present survey, thus indicating some annual variability in suitable overwintering areas.

Twenty-four waterbodies were identified as potential overwintering areas even though fish were not caught during this field effort. Potential overwintering habitat was judged to be either good or marginal based on the following guidelines:

Good overwintering habitat generally had an adequate depth of free water (15-20 m minimum), measurable flow (at least 0.1-0.3 m^3/sec or 0.5-1 ft^3/sec) and high dissolved oxygen concentrations (5 mg/ℓ minimum). These sites were typically characterized by clear water, gravel substrates and a pH which ranged from 6.5-8.0.

Marginal overwintering habitat also contained free water, but there was often no measurable flow or, dissolved oxygen concentrations were low (measurable but less than 5 mg/ℓ; sites with 0 mg/ℓ were not considered in this category). Water depths and pH were variable. In general, if any important criterion (water depth, flow, dissolved oxygen concentration) appeared limiting for overwintering fish, the habitat was considered marginal.

Results of the late winter survey are summarized in Table 2 and presented in detail in the Stream Catalogue.

Stream Catalogue

The purpose of the following stream catalogue is to provide a ready access to winter fisheries data available for waterbodies examined during the late winter survey (16 March to 26 April 1979). For each stream entered in this catalogue, the following information is provided:

Waterbody	-	Location of the waterbody and applicable identification numbers.
Assessment	-	A brief description of the waterbody and assessment of its overwintering potential for fish.
Sampling Locations	-	Specific sampling sites in relationship to the NAPLINE route.
Fish	-	Description and results of fish sampling efforts.
Winter Conditions	-	Description and results of chemical and physical measurements.
Map	-	Detailed figure showing sampling sites and site-specific methods.

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 refers to those numbers on the Fluor 1978 alignment sheet series (Reference 4).

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 1978 alignment sheet series (Reference 4).
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 Pipeline Milepost (Reference 4)
EHMP	-	Elliot Highway Milepost
HRMP	-	Haul Road Milepost

Pipeline

NAPLINE	-	Northwest Alaskan Pipeline (Reference 4)
TAPSLINE	-	Trans-Alaskan Pipeline System

Fishing Method

GN	-	Gillnet (s)
SL	-	Setline (s)
MT	-	Minnow Trap (s)
EF	-	Electrofished
AN	-	Angle

Units

m	-	Meter (s)
h	-	Hour (s)

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.

WINTER SURVEY FORM

WATERBODY

Waterbody Scottie Creek

Main Drainage Tanana River Tributary to Chisana River

Figure(s) 4 and 5 Northwest Alignment Sheet 123

Ident. Nos: NPSI 6-227 Applicable Milepost AHMP 1223.4

USGS Map Reference Nabesna, Alaska T-10N R-23E Sec 24

Site Access on foot from Alaska Highway

ASSESSMENT

Scottie Creek is a deep, slow meandering stream 15-30 m wide. Its banks are steep (1.8-2.4 m during winter months), grassy and lined with overhanging willow and alder.

The overwintering potential of Scottie Creek during present winter investigations was low. No fish were caught, although some deep pools of water (up to 5 m) were located. However, discharge was only 0.6 m^3/sec and dissolved oxygen was low. Presumably water depths were lower in 1978 when ice thickness was about twice that recorded in the present study (Ref. 9).

Large runs of humpback whitefish are reported in Scottie Creek during fall (Valdez 1976). Planned fall investigations should verify their presence and determine the potential for overwintering whitefish eggs.

SAMPLING LOCATIONS

SITE Figure 5

A 75 m upstream from NAPLINE

B 10 m upstream from NAPLINE

C 90 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	18 Mar 79					
Species						
Quantity	0					
Size (mm)						
Gear/Effort	15mGN(22h) 2SL (21h)					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	18-20 Mar 79	18 Mar 79	18 Mar 79			
Snow Depth (cm)		52	52			
Ice Depth (cm)	46-55	55	55			
Air Space (cm)	0	0	0			
Water Depth (cm)	0-500	37	287			
Discharge (m^3/s)	0.6*					
D. O. (mg/l)	1.6					
Temperature (°C)	1.8					
Conduct. ($\mu mhos/cm^2$)	138					
pH	7.5					
Color/Turbidity	clear stained					
Bottom Type	mud					

REMARKS

A local resident, Dorothy Thompson, had ice fished in Scottie Creek during three winters and caught no fish.

*Water was under pressure at Site A during 18 Mar 79 and flowed out over ice cover. Pressure had subsided by 20 Mar 79 when discharge estimates were made.

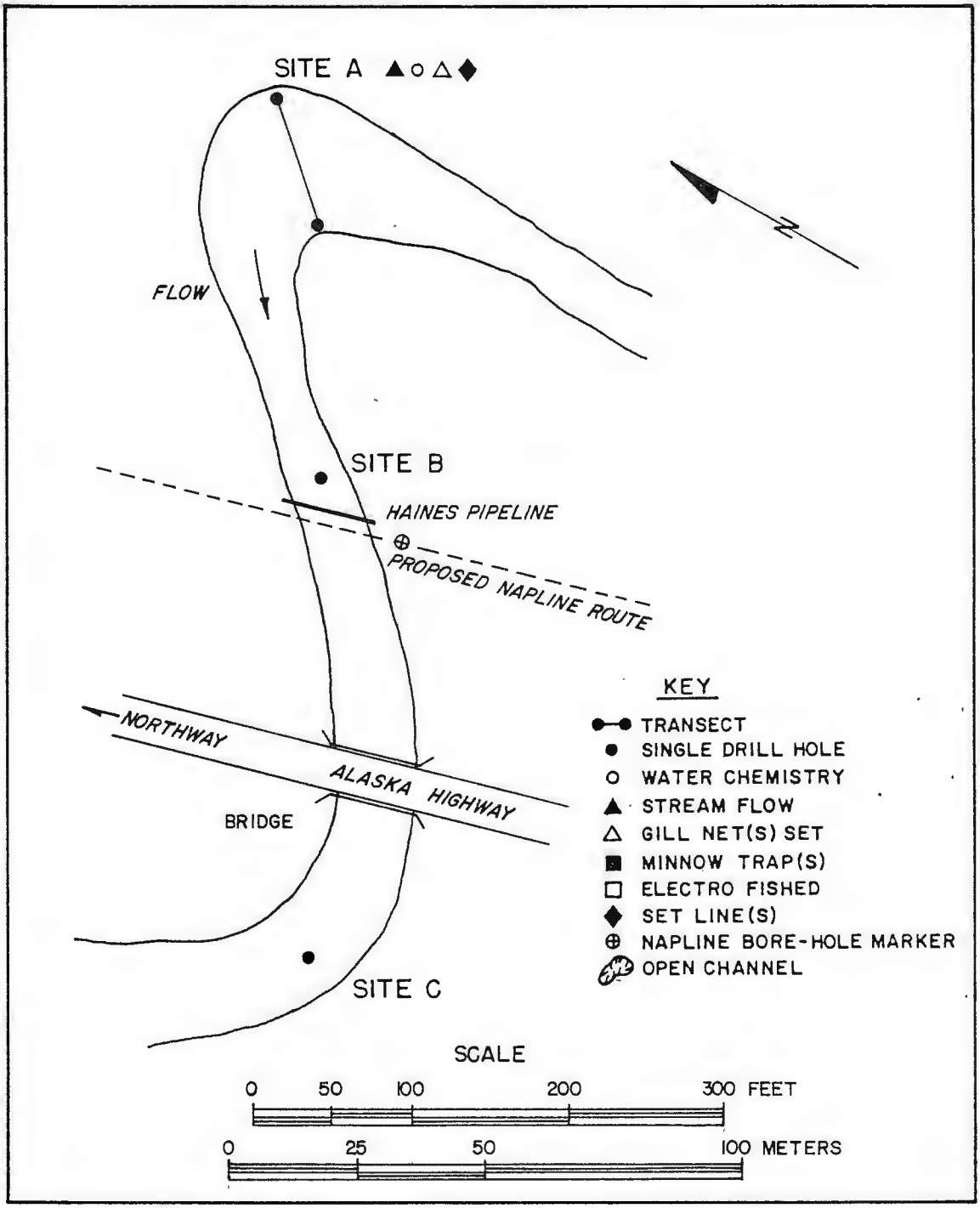

Fig. 5. Winter survey. Scottie Creek, 18 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Desper Creek

Main Drainage Chisana River Tributary to Scottie Creek

Figure(s) 4 and 6 Northwest Alignment Sheet 123

Ident. Nos: NPSI 6-226 Applicable Milepost AHMP 1225.6

USGS Map Reference Nabesna, Alaska T-10N R-23E Sec 11

Site Access On foot from Alaska Highway

ASSESSMENT

Desper Creek, a deep slow-flowing stream, drains Island Lake and flows into Scottie Creek approximately four miles below the Alaska Highway. The stream channel is 5-10 m wide and banks are steep and lined with willow, alder and small spruce. The waters of Desper Creek are typically humic-stained.

Desper Creek was not an overwintering area at or near the NAPLINE crossing during present winter investigations. The stream was generally frozen solid; stagnant, anoxic water was found at one site. Other studies have also found the stream to be dry or frozen to the bottom during winter (Ref. 6 & 9).

SAMPLING LOCATIONS

SITE Figure 6

A 45 m upstream from NAPLINE

B NAPLINE crossing

C 35 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	18 Mar 79	18 Mar 79	18 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort		No fish present; stream frozen to bottom or only stagnant anoxic water found.				

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	18 Mar 79	18 Mar 79	18 Mar 79			
Snow Depth (cm)	23	24	23			
Ice Depth (cm)	107	122	76			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	0	30			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity			brown			
Bottom Type						

REMARKS

SITE C: Water quite stagnant, smelled of rotting algae.

Apparent fish block at Alaska Highway culverts.

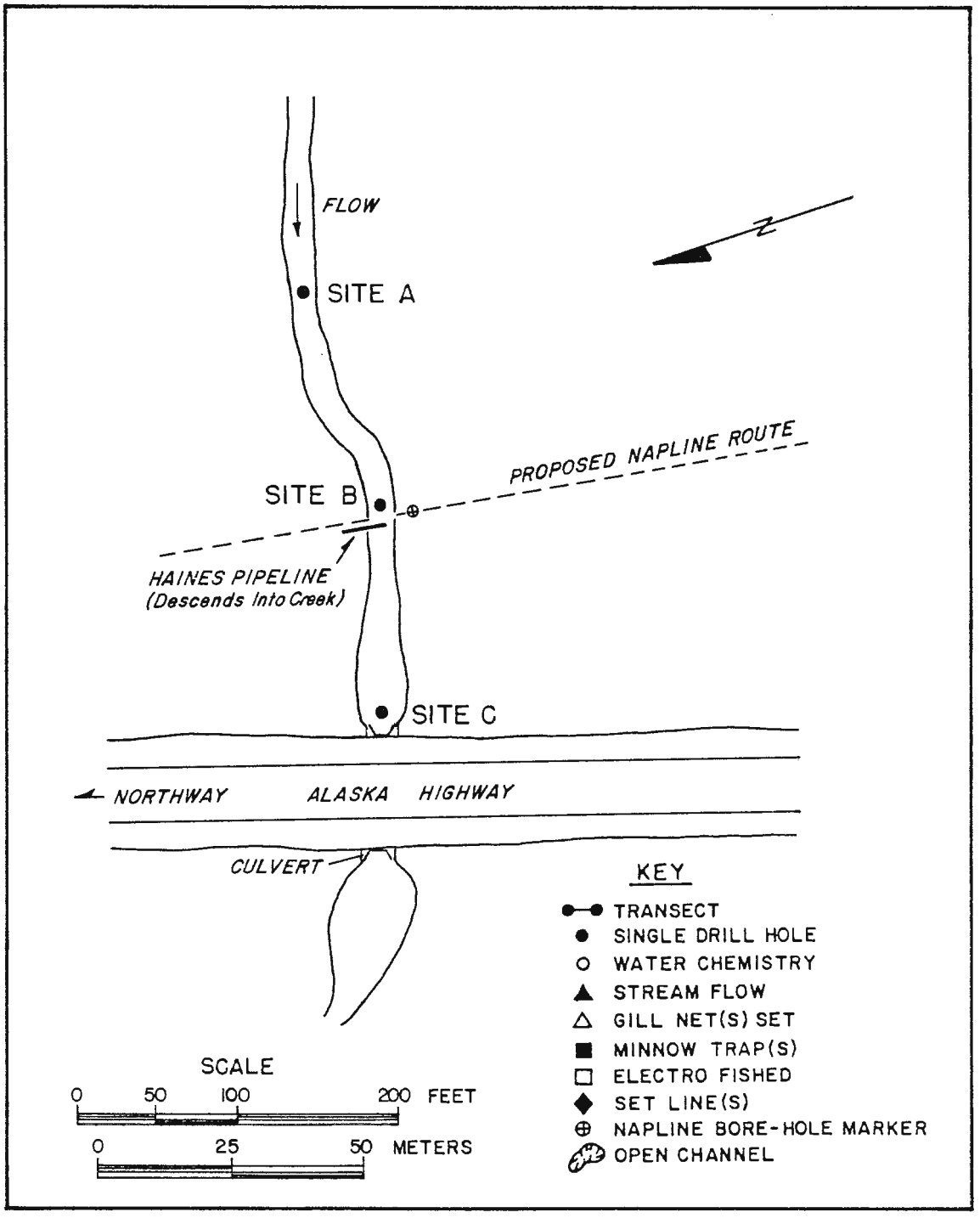

Fig. 6. Winter survey. Desper Creek, 18 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Sweetwater Creek

Main Drainage Tanana River Tributary to Chisana River

Figure(s) 4 and 7 Northwest Alignment Sheet 121

Ident. Nos: NPSI 6-225 Applicable Milepost AHMP 1234.2

USGS Map Reference Nabesna, Alaska T- 11N R- 22E Sec 13

Site Access On foot from the Alaska Highway

ASSESSMENT

Sweetwater Creek is a small humic-stained stream where it flows through a muskeg area at AHMP 1234.2. Its channel is not well-defined and varies from 0.6-1.5 m in width.

Sweetwater Creek was not an overwintering area at or near the NAPLINE crossing during present winter investigations. The stream was frozen solid.

SAMPLING LOCATIONS

SITE Figure 7

A 50 m upstream from NAPLINE

B NAPLINE crossing

C 100 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	18 Mar 79	18 Mar 79	18 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen to the bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	18 Mar 79	18 Mar 79	18 Mar 79			
Snow Depth (cm)	55	23	58			
Ice Depth (cm)	30	30	27			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type		silt detritus				

REMARKS

Culvert at Alaska Highway crossing may be a barrier to fish passage.

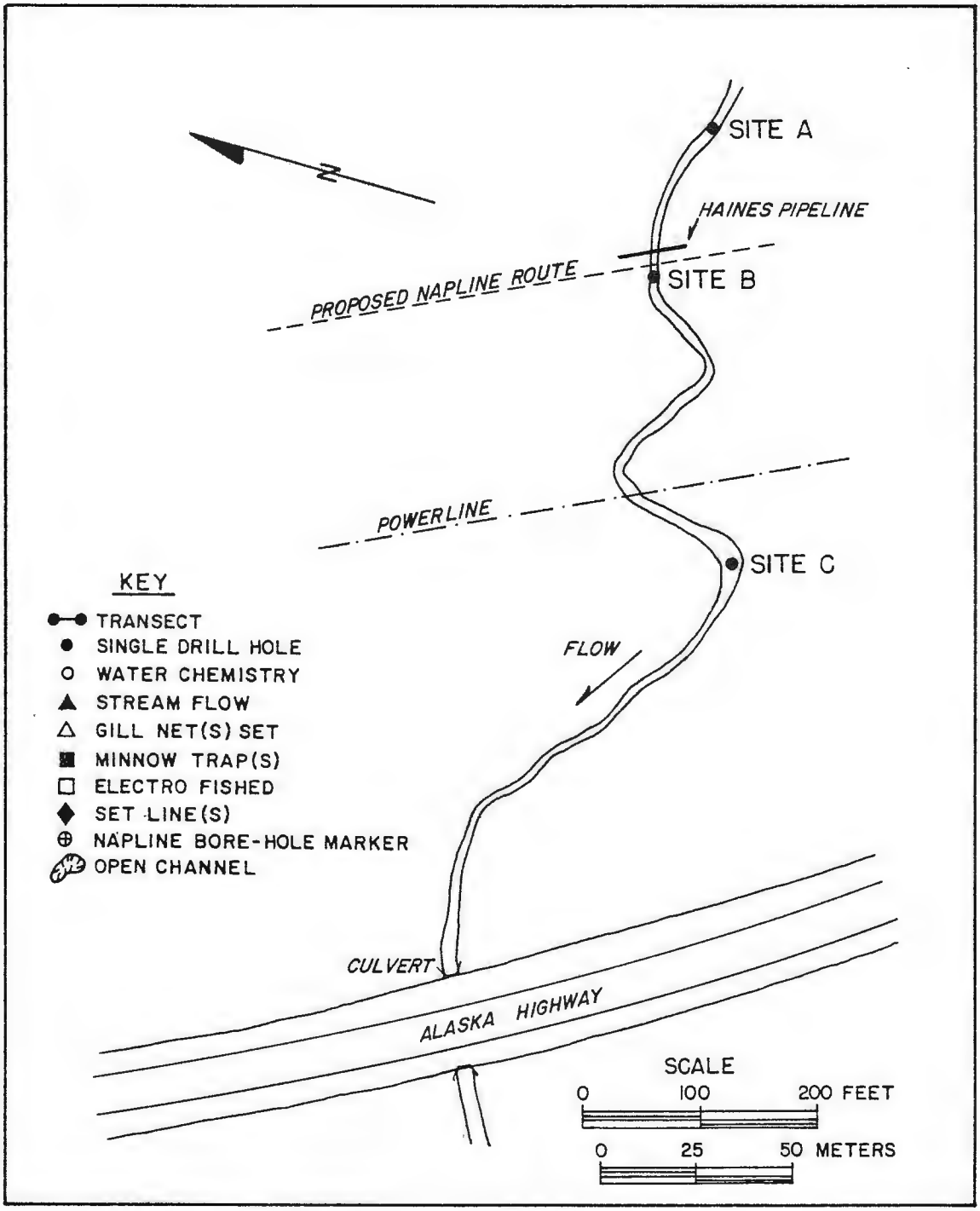

Fig. 7. Winter survey. Sweetwater Creek, 18 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Unnamed Creek AHMP 1236.3

Main Drainage Tanana River Tributary to Chisana River

Figure(s) 4 and 8 Northwest Alignment Sheet 121

Ident. Nos: NPSI 6-222 Applicable Milepost AHMP 1263.3

USGS Map Reference Nabesna, Alaska T-11N R- 22E Sec 2

Site Access On foot from the Alaska Highway

ASSESSMENT

Unnamed Creek AHMP 1236.3 is a small humic-stained stream, 1.0-3.0 m in width. Its poorly defined channel flows through a low swampy area at the NAPLINE crossing.

The stream was not an overwintering area at or near the NAPLINE crossing during present winter investigations. No flowing water was found.

SAMPLING LOCATIONS

SITE Figure 8

A 80 m upstream from NAPLINE

B NAPLINE crossing

C 75 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	19 Mar 79	19 Mar 79	19 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stagnant water present or stream frozen to the bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	19 Mar 79	19 Mar 79	19 Mar 79			
Snow Depth (cm)	61	55	52			
Ice Depth (cm)	0-55	53	98			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	12	6			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)		-0.2				
Conduct. ($\mu mhos/cm^2$)		940				
pH		7.5				
Color/Turbidity		yellow				
Bottom Type	silt detritus	mud	mud detritus			

REMARKS

Culvert at Alaska Highway may be a barrier to fish migration.
Flammable gases were present under ice at Site C.

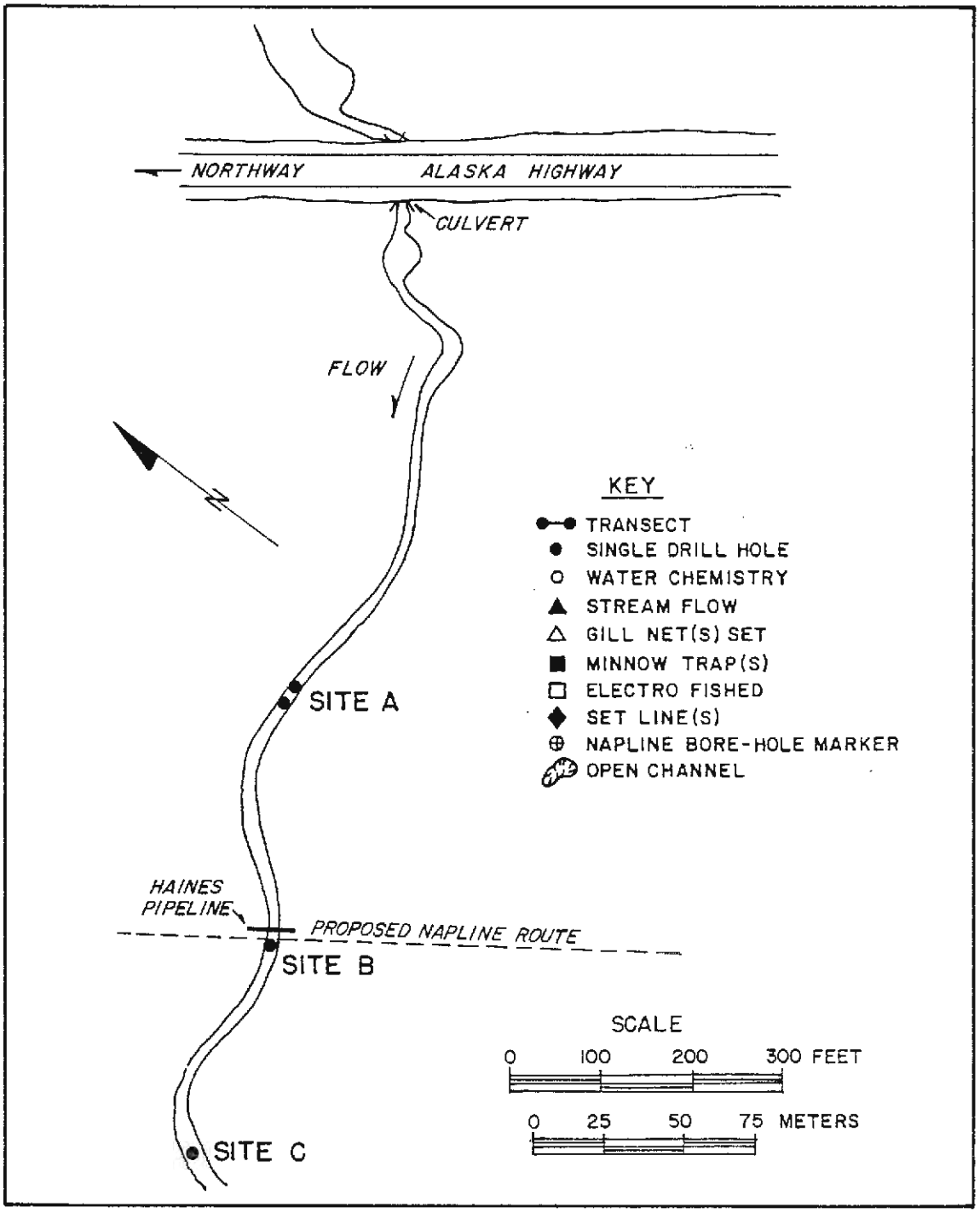

Fig. 8. Winter survey. Unnamed Creek, AHMP 1236.3, 19 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Gardiner Creek

Main Drainage Tanana River Tributary to Chisana River

Figure(s) 4 and 9 Northwest Alignment Sheet 119

Ident. Nos: NPSI 6-219 Applicable Milepost AHMP 1246.7

USGS Map Reference Nabesna, Alaska T-12N R-21E Sec 3

Site Access On foot from the Alaska Highway

ASSESSMENT

Gardiner Creek is a deep meandering stream that drains a large bog and marsh area northeast of the Chisana River. Its humic-stained waters are confined by steep banks displaying block slumpage and lined with overhanging alder, willow and spruce. The channel is 6-10 m in width and littered with snags and fallen logs.

Gardiner Creek was not an overwintering area at or near the NAPLINE crossing during present winter investigations. Under-ice water appeared stagnant and the dissolved oxygen content was low.

Gardiner Creek was reported to be frozen to the bottom in February 1978 (Ref. 9) and contained 0.0 mg/ℓ dissolved oxygen in February 1971 (as reported in Ref. 9).

SAMPLING LOCATIONS

SITE Figure 9

A 20 m upstream from NAPLINE

B NAPLINE crossing

C 55 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	19 Mar 79	19 Mar 79	19 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort		2SL(36h) Fish presence unlikely; low dissolved oxygen and negligible flow.				

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	19 Mar 79	19 Mar 79	19 Mar 79			
Snow Depth (cm)	6	51	9			
Ice Depth (cm)	58	0-107	76			
Air Space (cm)	0	0	0			
Water Depth (cm)	18	0-107	21			
Discharge (m^3/s)	0*	0	0			
D. O. (mg/l)		0.8				
Temperature (°C)		-0.2				
Conduct. ($\mu mhos/cm^2$)		93				
pH		7.5				
Color/Turbidity		brown colored				
Bottom Type	mud silt	mud silt				

REMARKS

A water lens 12-15 cm thick was present in ice column at Sites A and C.

*Water in Gardiner Creek was flowing slightly but the velocity was too low to register on our equipment. (see Methods).

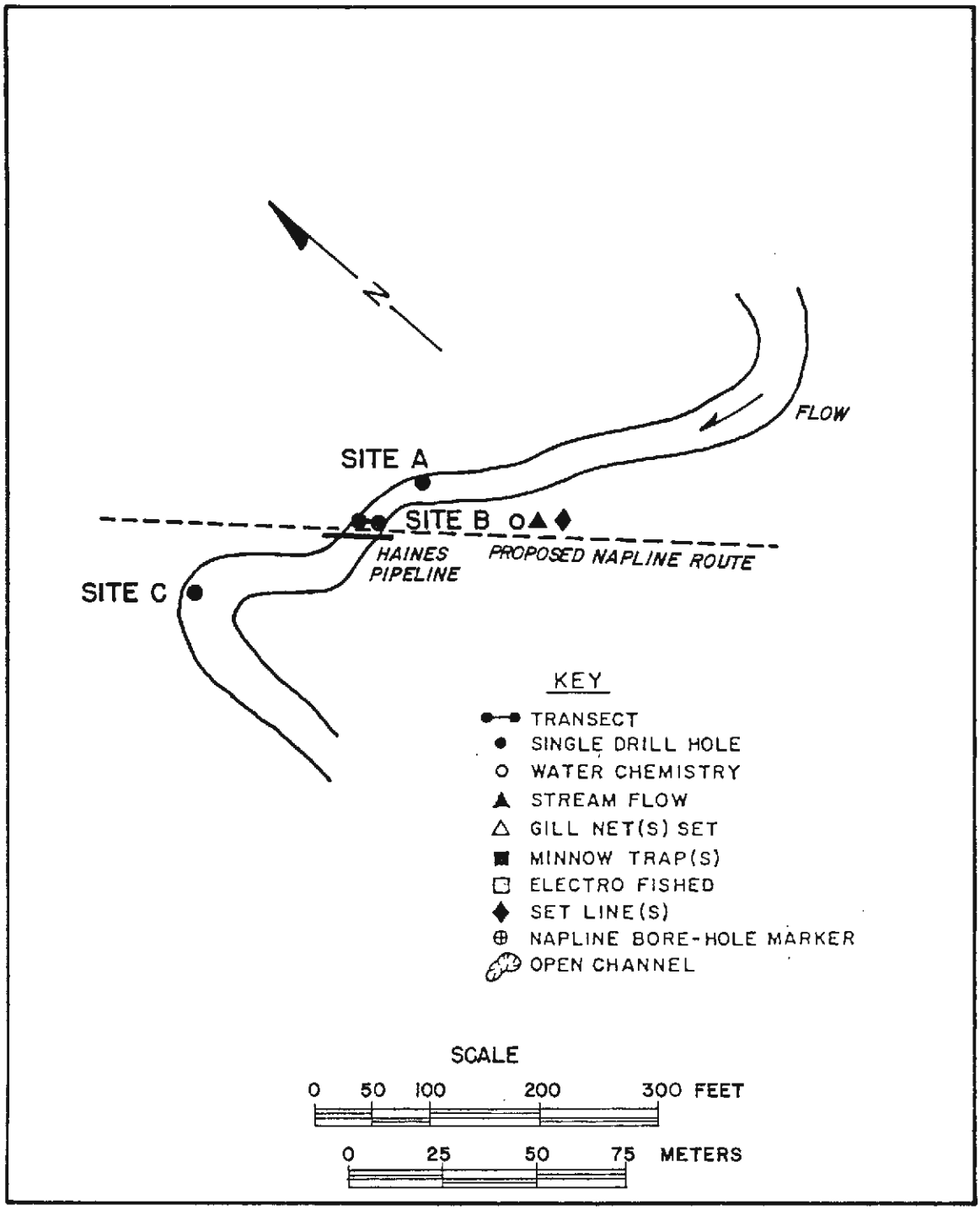

Fig. 9. Winter survey. Gardiner Creek, 19 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Tenmile Creek

Main Drainage Tanana River Tributary to Chisana River

Figure(s) 4 and 10 Northwest Alignment Sheet 118

Ident. Nos: NPSI 6-218 Applicable Milepost AHMP 1252.8

USGS Map Reference Nabesna, Alaska T- 13N R- 20E Sec 11

Site Access On foot from the Alaska Highway

ASSESSMENT

Tenmile Creek is a small dark-colored stream which flows through a low lying muskeg area near the NAPLINE crossing. The channel width in this area is 1.5-3.0 m. The stream bottom is primarily mud with abundant aquatic vegetation present during summer months. Silt to gravel is reported in some fast-flowing stretches.

Tenmile Creek was frozen to the bottom at all sampling sites during the present overwintering investigations. This stream was not an overwintering area at or near the proposed NAPLINE crossing. Tenmile Creek was also reported to be dry 30 October 1977 (Ref. 9).

SAMPLING LOCATIONS

SITE Figure 10

A 240 m upstream from NAPLINE crossing (pond at culvert outfall)

B NAPLINE crossing (270 m downstream from the Alaska Highway)

C 100 m downstream from NAPLINE crossing

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	20 Mar 79	20 Mar 79	20 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen to bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	20 Mar 79	20 Mar 79	20 Mar 79			
Snow Depth (cm)		40	50			
Ice Depth (cm)	80	50	30			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type			sand detritus			

REMARKS

No free-flowing water was found at any of the sampling sites.

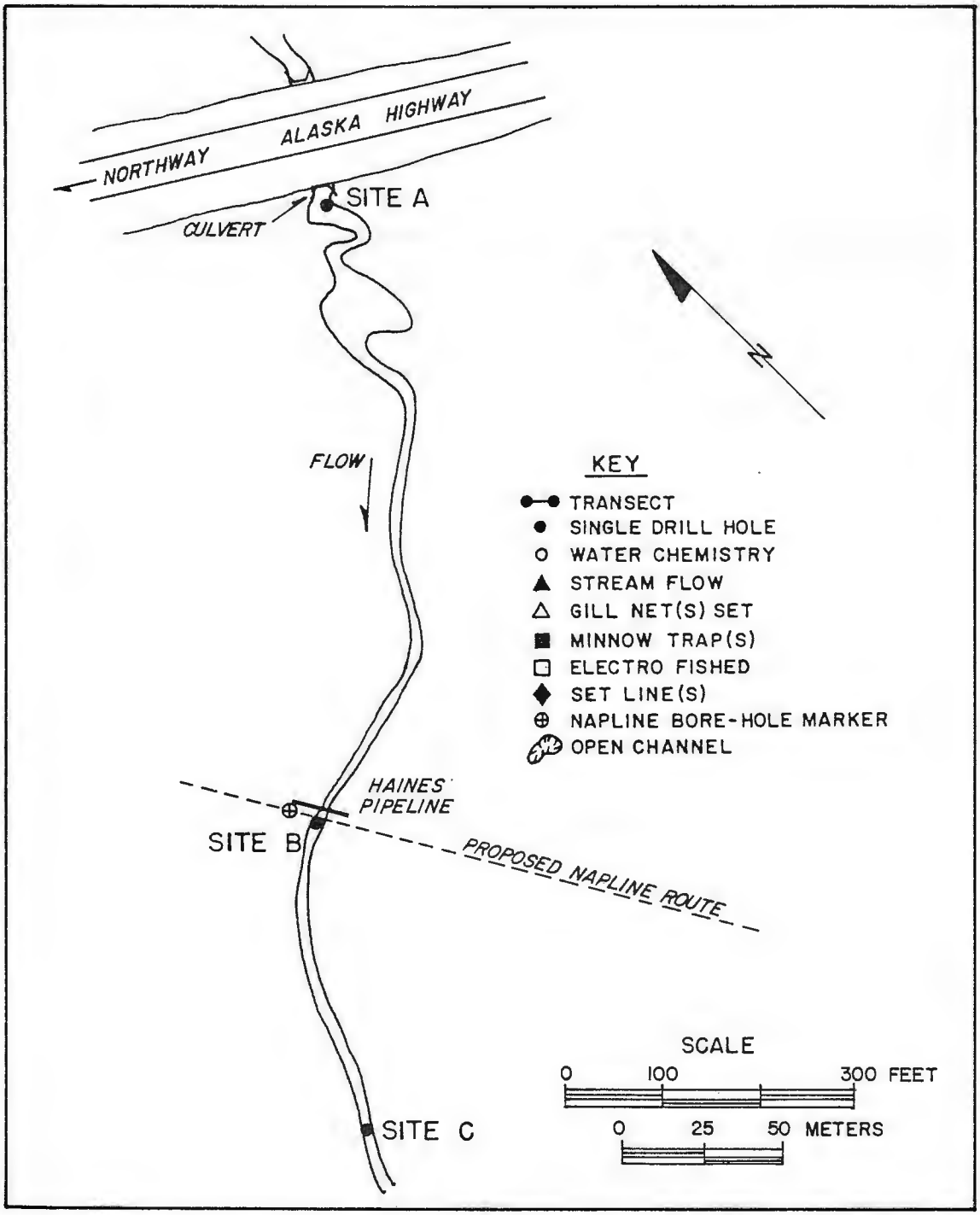

Fig. 10. Winter survey. Tenmile Creek, 20 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Unnamed Creek AHMP 1266.5

Main Drainage Tanana River Tributary to Chisana River

Figure(s) 4 and 11 Northwest Alignment Sheet 116

Ident. Nos: NPSI 6-216 Applicable Milepost AHMP 1266.5

USGS Map Reference Tanacross, Alaska T-15N R-19E Sec 33

Site Access On foot from the Alaska Highway

ASSESSMENT

Unnamed Creek AHMP 1266.5 is a small stream with approximately 1.2 m banks that are lined with willow, alder and small black spruce. Channel width is 1.5-3.0 m.

This stream was not an overwintering area at or near the NAPLINE crossing during present winter investigations. It was either frozen to the bottom or dry at all sampling locations.

SAMPLING LOCATIONS

SITE Figure 11

A 85 m upstream from NAPLINE

B 15 m downstream from NAPLINE

C 100 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	21 Mar 79	21 Mar 79	21 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen to the bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	21 Mar 79	21 Mar 79	21 Mar 79			
Snow Depth (cm)	34	46	37			
Ice Depth (cm)	12	27	27			
Air Space (cm)	0	0	30			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	detritus	detritus	moss			

REMARKS

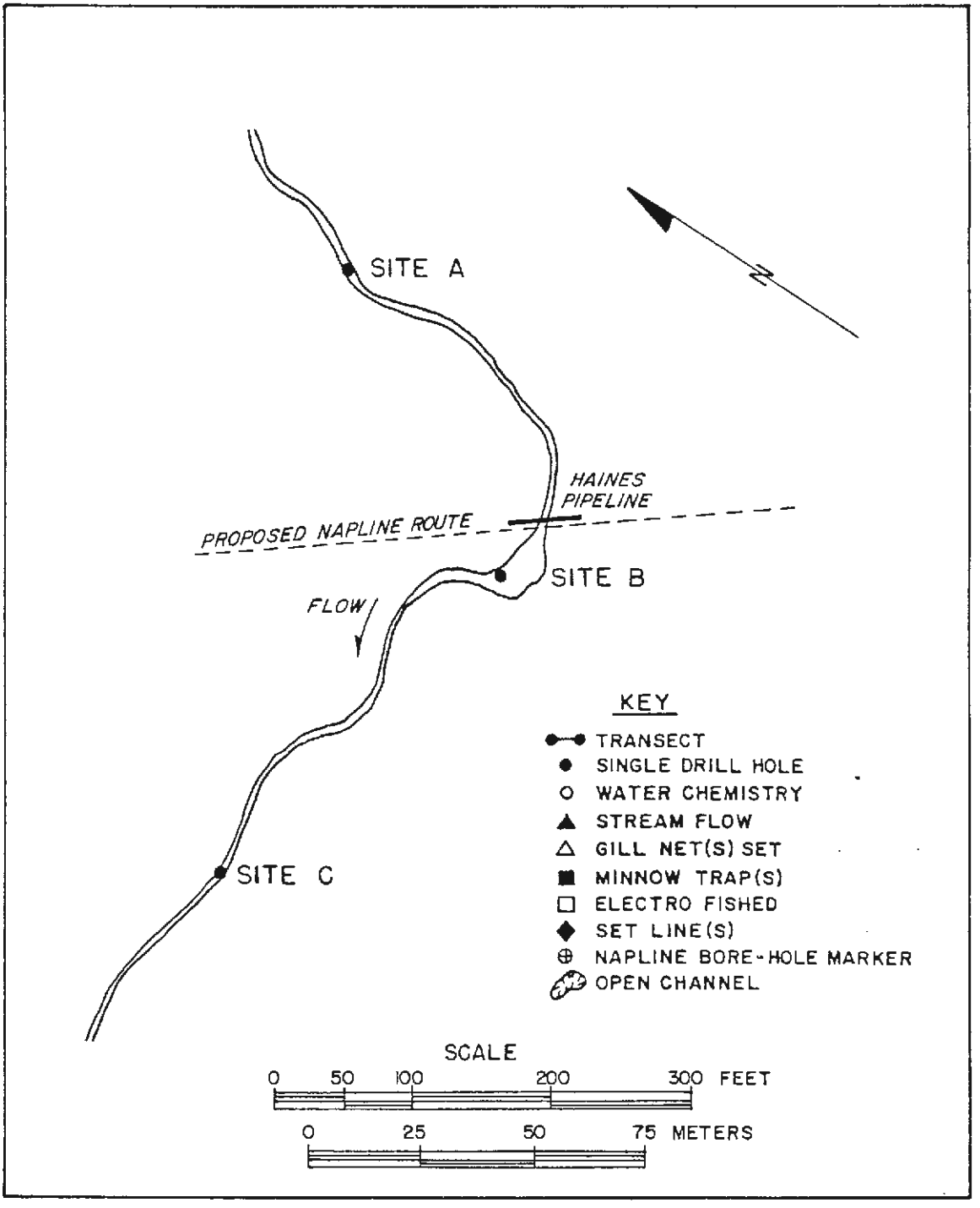

Fig. 11. Winter survey. Unnamed Creek AHMP 1266.5, 21 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Beaver Creek

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 4 and 12 Northwest Alignment Sheet 116

Ident. Nos: NPSI 6-215 Applicable Milepost AHMP 1268.1

USGS Map Reference Tanacross, Alaska T- 15N R- 19E Sec 29

Site Access On foot from the Alaska Highway

ASSESSMENT

Beaver Creek is a slow-flowing, humic-stained stream draining a large bog area north of the Tanana River. Its channel width varies from 6-12 m and mud, sand and fine gravel are the primary bottom substrates. Banks are steep and display block-slumpage. The banks are lined with alder, willow and a few small spruce.

Beaver Creek was not an overwintering area at or near the NAPLINE crossing during present winter investigations. The stream was frozen to the bottom on the present survey and also in late October 1977 (Ref. 9).

SAMPLING LOCATIONS

SITE Figure 12

A 40 m upstream from NAPLINE

B NAPLINE crossing

C 130 m downstream from NAPLINE

D 175 m downstream from NAPLINE

E 200 m downstream from NAPLINE

F

FISH

SITE	A	B	C	D	E	F
Date	20 Mar 79	20 Mar 79	20 Mar 79	20 Mar 79	20 Mar 79	
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen to the bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	20 Mar 79	20 Mar 79	20 Mar 79	20 Mar 79	20 Mar 79	
Snow Depth (cm)	34	25	38	38	43	
Ice Depth (cm)	82	76-113	79	43	73	
Air Space (cm)	0	0	0	0	0	
Water Depth (cm)	0	0	0	0	0	
Discharge (m^3/s)	0	0	0	0	0	
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	sand gravel	sand, fine gravel	sand, fine gravel	sand, fine gravel	sand, fine gravel	

REMARKS

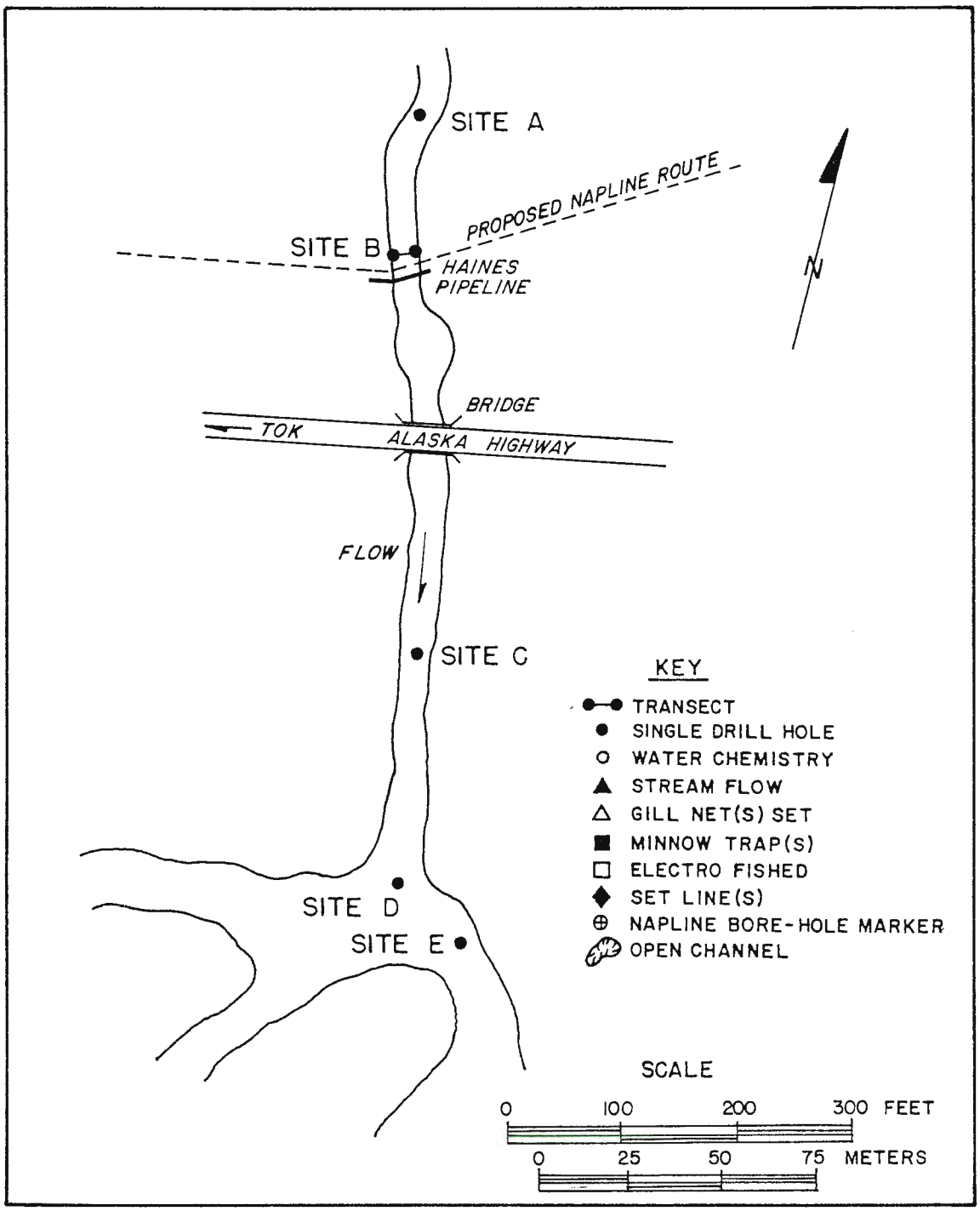

Fig. 12. Winter survey. Beaver Creek, 20 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Tanana River at Tok

Main Drainage Yukon River Tributary to Yukon River

Figure(s) 4 and 13 Northwest Alignment Sheet 111

Ident. Nos: NPSI 6-207A Applicable Milepost AHMP 1303.3

USGS Map Reference Tanacross, Alaska T-18N R-14E Sec 25

Site Access Snowmachine from the Alaska Highway

ASSESSMENT

The Tanana River is a large braided glacial river formed by the junction of the Nabesna and Chisana 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. The Tanana River is a single channel at the NAPLINE crossing.

The Tanana River at Tok is an overwintering area for burbot and probably provides suitable overwintering habitat for other species as well. This area of the Tanana River has a high potential as a winter sport fishery.

SAMPLING LOCATIONS

SITE Figure 13

A 250 m upstream from NAPLINE crossing (10 m upstream from AK Hwy bridge)

B NAPLINE crossing (original proposed)

C 60 m downstream from NAPLINE crossing (shallow cove along NE bank)

D 70 m downstream from NAPLINE crossing

E 120 m downstream from NAPLINE crossing

F 500 m downstream from NAPLINE crossing

FISH

SITE	A	B	C	D	E	F
Date	21 Mar 79	21 Mar 79	30 Mar 79	29 Mar 79	29 Mar 79 22 Mar 79	29 Mar 79
Species			0	burbot	burbot 0	burbot
Quantity			0	1	1 0	1
Size (mm)			0	730	690	450
Gear/Effort	not fished	not fished	15mGN (20.5h)	1SL(16h)	2SL(38h) 15mGN(27h)	1SL(16h)

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	21 Mar 79	21 Mar 79	30 Mar 79	30 Mar 79	21 Mar 79	29 Mar 79
Snow Depth (cm)						
Ice Depth (cm)	70	80-110			60-130	
Air Space (cm)	0	0			0	
Water Depth (cm)	0-230	0-170			0-590	
Discharge (m^3/s)	46.5	51.7			23.2	
D. O. (mg/l)		7.0				
Temperature (°C)		0.5				
Conduct. ($\mu mhos/cm^2$)		151				
pH		7.5				
Color/Turbidity	clear	clear	clear	clear	clear	clear
Bottom Type	sand silt	sand silt	sand silt	sand silt	sand silt	sand silt

REMARKS

Water was slightly cloudy and gray colored. Appeared to be a small amount of suspended material present.

Discharge was probably biased by unrepresentative flow measurements at Site E due to the narrow channel and extreme water depths.

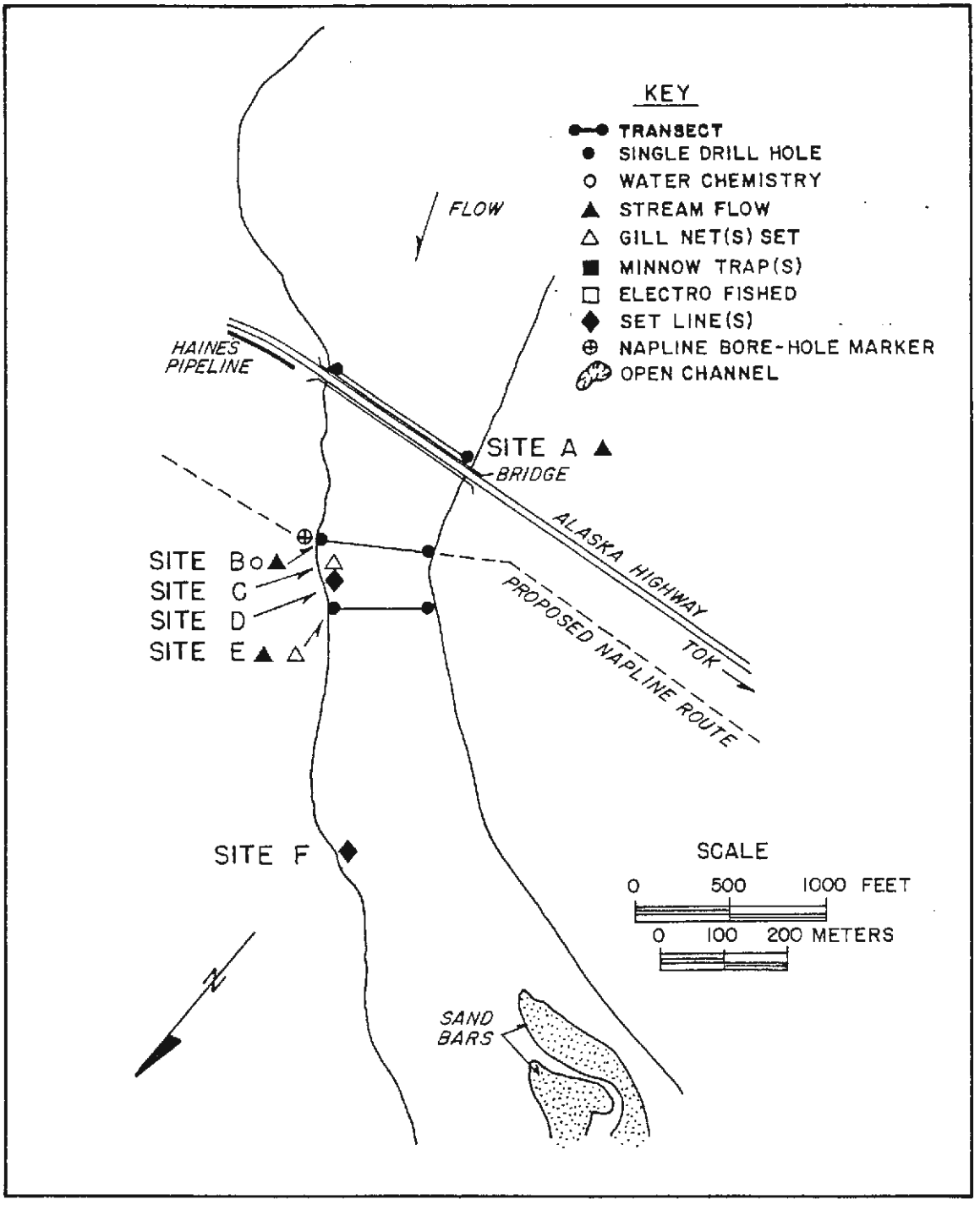

Fig. 13. Winter survey. Tanana River at Tok, 21 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Tanana River at Tok, Alternate Crossing #1

Main Drainage Yukon River Tributary to Yukon River

Figure(s) 4 and 14 Northwest Alignment Sheet 111

Ident. Nos: NPSI 6-207C Applicable Milepost AHMP 1303.3

USGS Map Reference Tanacross, Alaska T- 18N R- 14E Sec 23

Site Access Snowmachine from the Alaska Highway

ASSESSMENT

The Tanana River is a large braided glacial river formed by the junction of the Nabesna and Chisana 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. The Tanana River at this crossing, is separated into 2 channels.

At alternate Crossing #1, the free water channel width was approximately 110 m, while the flood plain width was approximately 460 m. Banks were generally high on the northeast and low and heavily wooded on the southeast.

The Tanana River at Tok, Alternate Crossing #1 is an overwintering area for burbot and probably provides suitable overwintering habitat for other species as well. This area of the Tanana River has a high potential as a winter sport fishery.

SAMPLING LOCATIONS

SITE Figure 14

A 400 m upstream from NAPLINE

B 290 m upstream from NAPLINE

C 95 m upstream from NAPLINE

D NAPLINE crossing

E 150 m downstream from NAPLINE

F

FISH

SITE	A	B	C	D	E	F
Date	29 Mar 79	29 Mar 79	29 Mar 79	29 Mar 79 30 Mar 79	29 Mar 79	
Species	burbot	burbot	burbot	burbot 0		
Quantity	1	1	1	1 0	0	
Size (mm)	585	680	705	500		
Gear/Effort	1SL(16h)	1SL(16h)	1SL(16h)	4SL(64h) 15mGN(7.5h)	1SL(16h)	

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date				31 Mar 79		
Snow Depth (cm)						
Ice Depth (cm)				0-125		
Air Space (cm)				0		
Water Depth (cm)				0-235		
Discharge (m^3/s)				45.9		
D. O. (mg/l)				8.0		
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH				7.8		
Color/Turbidity				clear-cloudy		
Bottom Type				sand silt		

REMARKS

Gillnet at Site D became snagged and was pulled early to avoid loosing it.

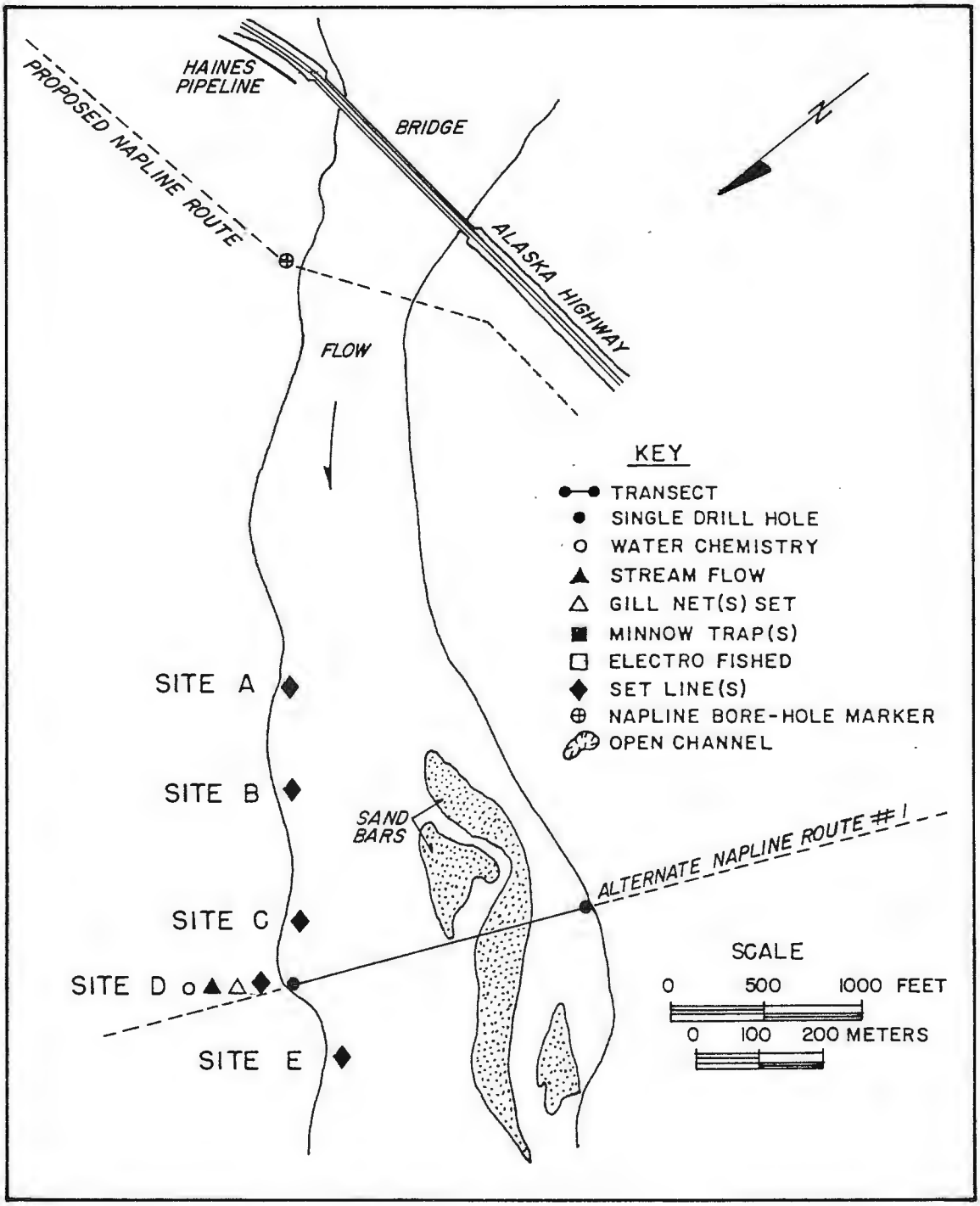

Fig. 14. Winter survey. Tanana River at Tok, Alternate Crossing #1, 29-31 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Tanana River at Tok, Alternate Crossing #2

Main Drainage Yukon River Tributary to Yukon River

Figure(s) 4 and 15 Northwest Alignment Sheet 111

Ident. Nos: NPSI 6-208 Applicable Milepost 1303.3

USGS Map Reference Tanacross, Alsaka T- 18N R- 14E Sec 23

Site Access Snowmachine from the Alaska Highway

ASSESSMENT

The Tanana River is a large braided glacial river formed by the junction of the Nabesna and Chisana 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. The Tanana River at this crossing, consists of 2 main channels.

At Alternate Crossing #2, banks are incised and approximately 2 m in height and heavily wooded on both sides of the river. The flood plain is approximately 460 m in width and divided by an island which is only wooded below the crossing.

The Tanana River at Tok, Alternate Crossing #2 is an overwintering area for burbot and probably provides suitable overwintering habitat for other species as well. This area of the Tanana River has a high potential as a winter sport fishery.

SAMPLING LOCATIONS

SITE Figure 15

A 25 m upstream from NAPLINE

B NAPLINE crossing

C 55 m downstream from NAPLINE

D 115 m downstream from NAPLINE

E

F

FISH

SITE	A	B	C	D	E	F
Date	29 Mar 79	29 Mar 79	29 Mar 79	29 Mar 79		
Species	burbot					
Quantity	2		0	0		
Size (mm)	615-740					
Gear/Effort	2SL(32h)		1SL(16h)	1SL(16h)		

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date		29 Mar 79				
Snow Depth (cm)		15-30				
Ice Depth (cm)		0-112				
Air Space (cm)		0				
Water Depth (cm)		0-271				
Discharge (m^3/s)		49				
D. O. (mg/l)		7.6				
Temperature (°C)		-0.5				
Conduct. ($\mu mhos/cm^2$)		20				
pH		7.8				
Color/Turbidity		clear - cloudy				
Bottom Type		sand silt				

REMARKS

Channel north of island at NAPLINE crossing was frozen to the bottom. All free-flowing water was found south of the large island and distributed in two smaller channels.

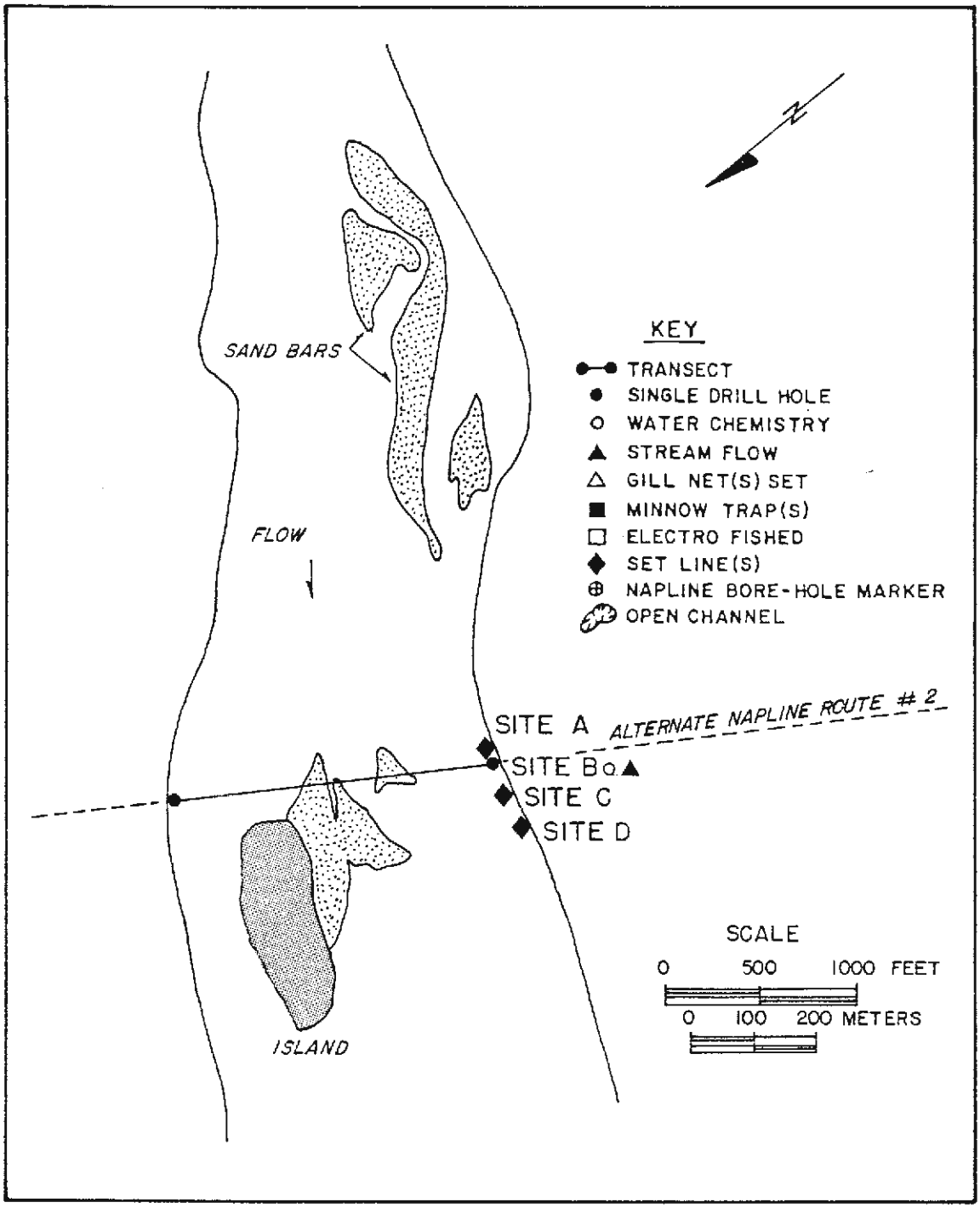

Fig. 15. Winter survey. Tanana River at Tok, Alternate Crossing #2, 29 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Tok River

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 4 and 16 Northwest Alignment Sheet 110

Ident. Nos: NPSI 6-205 Applicable Milepost AHMP 1309.4

USGS Map Reference Tanacross, Alaska T- 18N R-13E Sec 24

Site Access On foot from the Alaska Highway

ASSESSMENT

The Tok River is a semi-glacial stream that crosses the Alaska Highway about five miles east of Tok and flows northeast into the Tanana River. This stream is 25-40 m wide, about 95 km long and originates in the Alaska Range. Its waters are clearer than most typical glacial streams due to contributions by springs and clear water tributaries.

The Tok River was not an overwintering area at or near the NAPLINE crossing during present winter investigations. The stream was frozen to bottom substrates. The Tok River is also reported to be dry at the Alaska Highway bridge during winter (Ref. 6, 7 & 8).

SAMPLING LOCATIONS

SITE Figure 16

A 200 m upstream from NAPLINE

B NAPLINE crossing

C 125 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	22 Mar 79	22 Mar 79	22 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen to the bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	22 Mar 79	22 Mar 79	22 Mar 79			
Snow Depth (cm)	49	34-55	49-55			
Ice Depth (cm)	6	3	3-6			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	sand gravel	silt gravel	coarse sand			

REMARKS

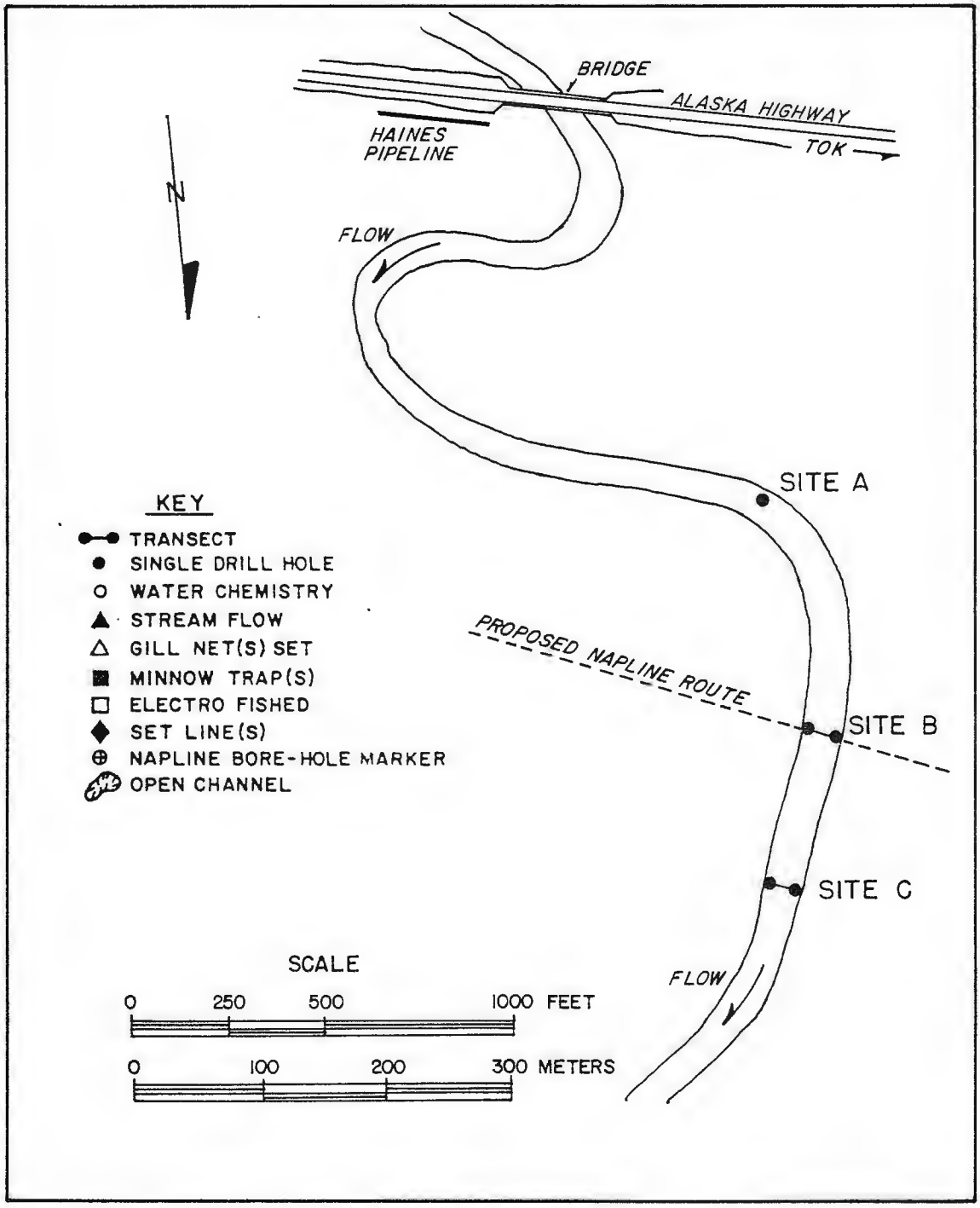

Fig. 16. Winter survey. Tok River, 22 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Crystal Springs

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 4 and 17 Northwest Alignment Sheet 106

Ident. Nos: NPSI 6-203.02 Applicable Milepost AHMP 1328

USGS Map Reference Tanacross, Alaska T-18N R-10E Sec 11, 2&1

Site Access Snowmachine from the Alaska Highway

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, its 1-3 m wide channel flows through a large muskeg area. Aufeis is extensive in this area during winter months and frequently advances across the highway. Crystal Springs is relatively shallow and clear and in some areas remains open year-round.

Crystal Springs was considered to be a potential overwintering area at the NAPLINE crossing during present winter investigations. Although water quality was good and potential food abundant, fish use of Crystal Springs upstream from the Alaska Highway was probably low or non-existant during winter months. Open water channels were extremely shallow and electrofishing failed to catch any fish. Careful consideration should be given to this area, however. Crystal Springs may be an important water source for overwintering areas downstream from the Alaska Highway (Crystal Springs slough and the Tanana River).

SAMPLING LOCATIONS

SITE Figure 17

A 100 m upstream from NAPLINE

B NAPLINE crossing

C 50 m downstream from NAPLINE

D 60 m downstream from NAPLINE

E 900 m downstream from NAPLINE (Haines pipeline crossing)

F

FISH

SITE	A	B	C	D	E	F
Date	30 Mar 79	30 Mar 79	30 Mar 79	30 Mar 79	30 Mar 79	30 Mar 79
Species						
Quantity					0	
Size (mm)						
Gear/Effort	not fished	not fished	not fished	not fished	EF(40m)	not fished

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	30 Mar 79	30 Mar 79	30 Mar 79	30 Mar 79	30 Mar 79	30 Mar 79
Snow Depth (cm)	3	3	0	0	0	
Ice Depth (cm)	88	70-128	131	137	0	49-107
Air Space (cm)	0	0	0	0	0	0
Water Depth (cm)	0	0	0	0	3-15	0
Discharge (m^3/s)	0	0	0	0	0.05	0
D. O. (mg/l)					10	
Temperature (°C)					-0.2	
Conduct. ($\mu mhos/cm^2$)					35	
pH					7.5	
Color/Turbidity					clear	
Bottom Type	silt detritus				mud silt	

REMARKS

Filamentous algae and mayfly larvae were present in open water areas (Site E). Lenses of water were present in ice column at Sites D and E.

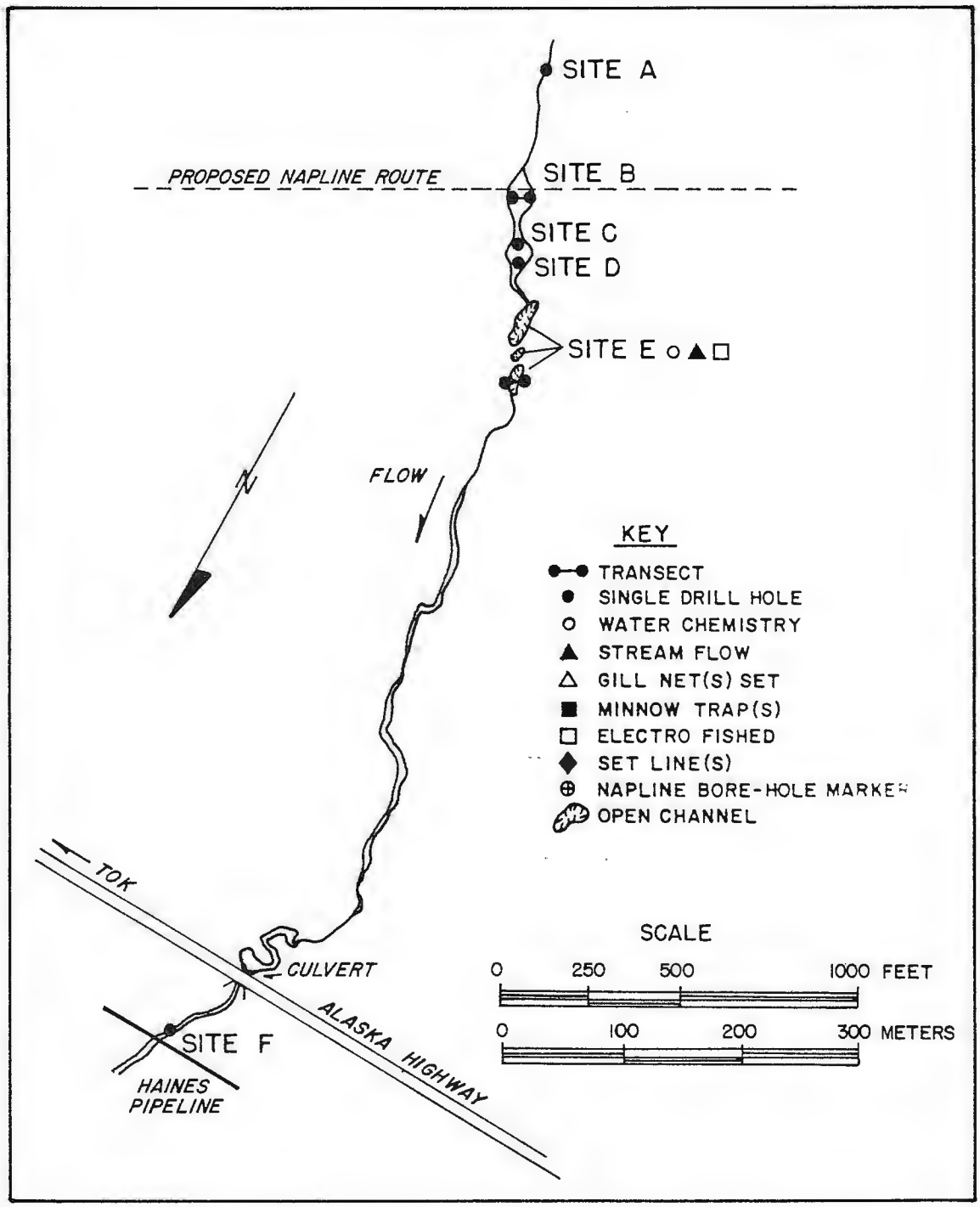

Fig. 17. Winter survey. Crystal Springs, 30 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Yerrick Creek

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 4 and 18 Northwest Alignment Sheet 105

Ident. Nos: NPSI 6-201 Applicable Milepost AHMP 1333.7

USGS Map Reference Tanacross, Alaska T-18N R-9E Sec 1

Site Access On foot from the Alaska Highway

ASSESSMENT

Yerrick Creek is a clear rapid-flowing stream supplied primarily by snow melt and summer runoff. This stream flows within a large channel 30-60 m wide but occupies only 3-10 m during summer months. Yerrick Creek appeared to be intermittently frozen to the bottom, and, though some suitable habitat was found at the crossing, fish use is probably minimal or non-existant. Indigenous species probably migrate downstream in the fall to overwinter in the Tanana River, a short distance away.

Yerrick Creek was also reported to be frozen to the bottom in February 1978 (Ref. 9).

SAMPLING LOCATIONS

SITE Figure 18

A 100 m upstream from NAPLINE (west channel)

B NAPLINE crossing (west channel)

C 100 m downstream from NAPLINE (west channel)

D 110 m upstream from NAPLINE (east channel)

E NAPLINE crossing (east channel)

F 80 m downstream from NAPLINE (east channel)

FISH

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 29	24 Mar 79
Species						
Quantity						
Size (mm)						
Gear/Effort	Probably no fish present; stream intermittently frozen to the bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79
Snow Depth (cm)	43-49	37-55	52	55	30-37	61-64
Ice Depth (cm)	15-36	30-45	0	30	0-3	0
Air Space (cm)	0-12	0-67	0	0	0	0
Water Depth (cm)	0-6	0-12	0	0	0	0
Discharge (m^3/s)		.04	0	0	0	0
D. O. (mg/l)		12				
Temperature (°C)		.05				
Conduct. ($\mu mhos/cm^2$)		82				
pH		8.0				
Color/Turbidity	clear	clear				
Bottom Type	gravel cobble	gravel cobble	sand	cobble	cobble	cobble

REMARKS

Site G: 1350 m downstream from NAPLINE (15 m upstream from Alaska Highway); large aufeis area present.

Date	Ice Depth	Water Depth
24 Mar 79	91 cm	0

Site B: Width of free-flowing water was 0.9 m. Adult stonefly and chironomids were present.

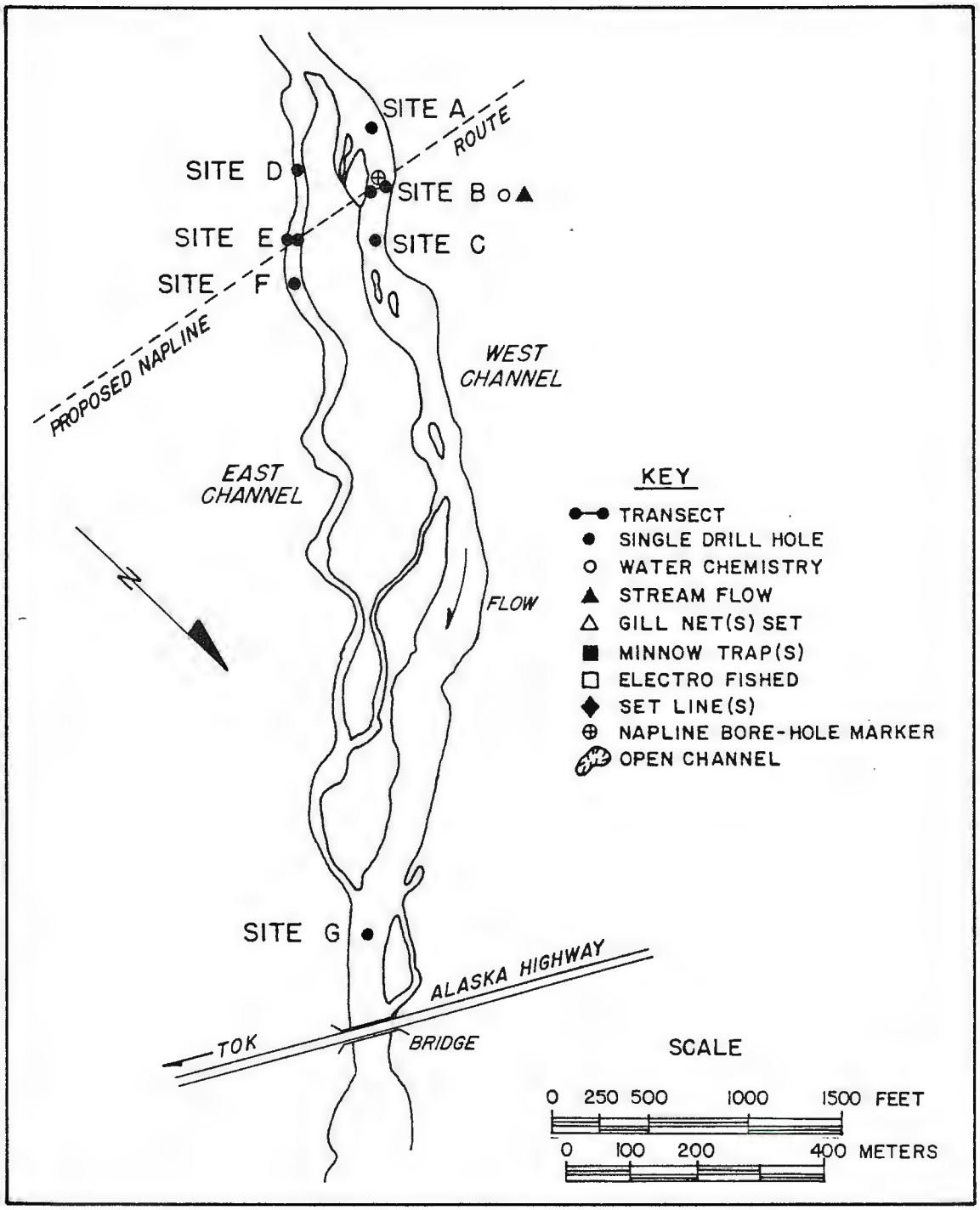

Fig. 18. Winter survey. Yerrick Creek, 24 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Unnamed Creek 1339.8

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 4 and 19 Northwest Alignment Sheet 104

Ident. Nos: NPSI 6-193.01 Applicable Milepost AHMP 1339.8

USGS Map Reference Tanacross, Alaska T-19N R-8E Sec 25

Site Access On foot from the Alaska Highway

ASSESSMENT

Unnamed Creek 1339.8 is a small humic-stained drainage that flows northeast across the Alaska Highway into the Tanana River. Upstream from the Alaska Highway this creek flows only during high runoff periods; below the Alaska Highway, it manifests itself as a canal-like slough. This slough is 0.6-1.5 m deep and has a silt and mud bottom.

Unnamed Creek 1339.8 was not an overwintering area at or near the NAPLINE crossing during present winter investigations. The stream was dry or frozen to bottom substrates. The canal-like slough portion of this drainage below the Alaska Highway may overwinter fish however.

SAMPLING LOCATIONS

SITE Figure 19

A NAPLINE crossing (potential stream channel)

B NAPLINE crossing (45 m northwest of Site A)

C 30 m downstream from NAPLINE (just upstream from Alaska Highway culvert)

D 20 m downstream from Alaska Highway culvert

E 110 m downstream from Alaska Highway culvert

F

FISH

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79	
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream dry or frozen to the bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79	
Snow Depth (cm)	69	69	76	37	43	
Ice Depth (cm)	0	0	0	38	46	
Air Space (cm)	0	0	0	8	0	
Water Depth (cm)	0	0	0	0	0	
Discharge (m^3/s)	0	0	0	0	0	
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	sand	terrestrial vegetation	terrestrial vegetation	sand	sand	

REMARKS

Stream flow south of the Alaska Highway must only occur during periods of extreme runoff.

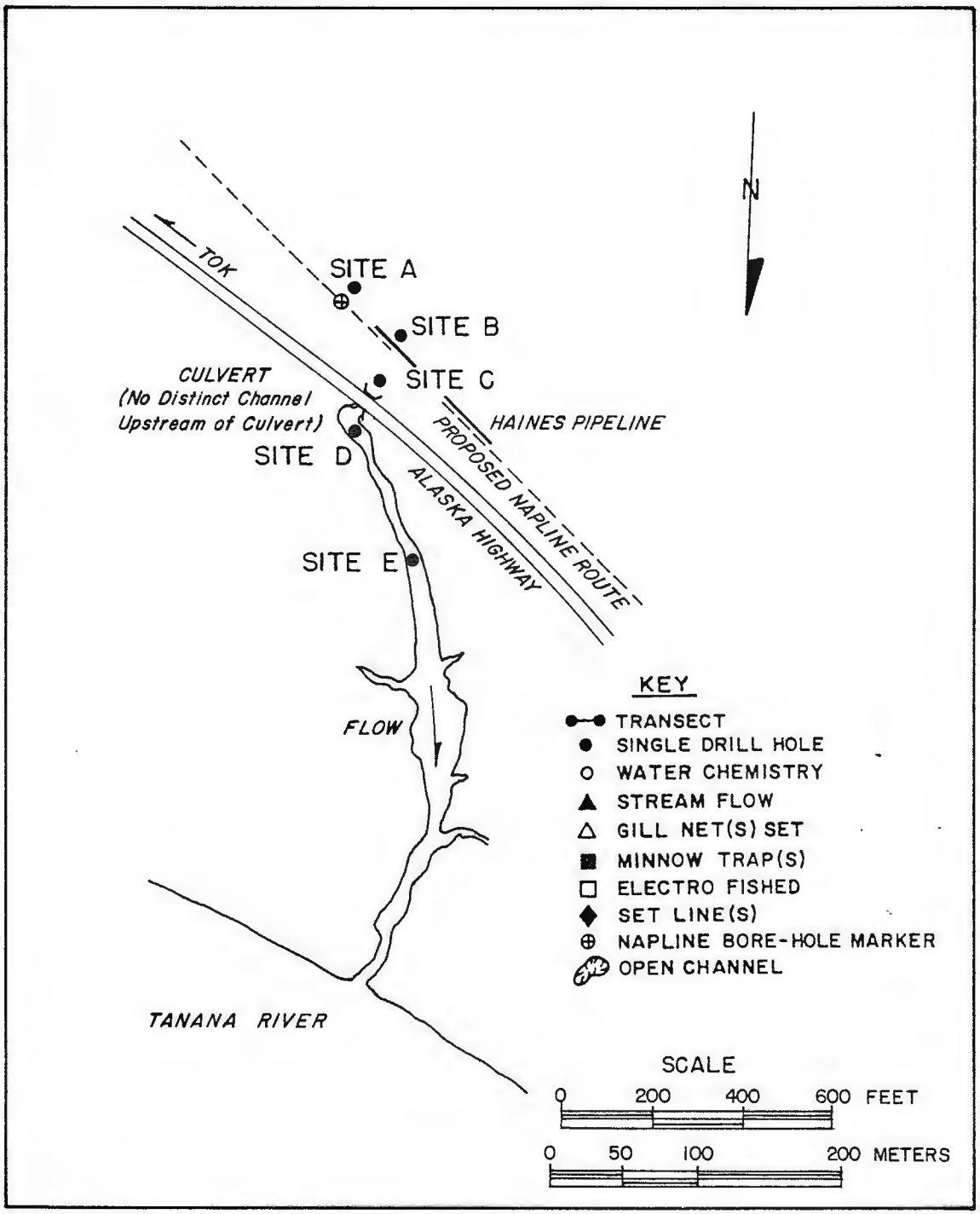

Fig. 19. Winter survey. Unnamed Creek AHMP 1339.8, 24 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Robertson River

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 4 and 20 Northwest Alignment Sheet 103

Ident. Nos: NPSI 5-187 Applicable Milepost AHMP 1347-6

USGS Map Reference Tanacross, Alaska T-20N R-8E Sec 23

Site Access On foot from the Alaska Highway

ASSESSMENT

The Robertson River is a large, braided glacial stream originating in the Alaska Range and flowing northeast into the Tanana River. Its floodplain is 0.4-0.6 km wide and flow is sustained year-round. The waters of the Robertson River are highly turbid during spring and summer but are clear by late fall. The Robertson River is reported to contain grayling, whitefish, Dolly Varden and sculpin (Refs. 6, 9 & 10).

The overwintering potential of the Robertson River at or near the NAPLINE crossing is probably low but more data are needed.

Ice depths in excess of 2.35 m were encountered during present winter investigations without reaching either free-flowing water under ice or the stream bottom. Extensive icing across the entire floodplain makes it difficult to locate stream channels or concentrations of free water under ice unless previously marked prior to freezeup. It is recommended that further winter investigations be conducted on this stream and that potential overwintering sites be marked in the fall.

SAMPLING LOCATIONS

SITE Figure 20

A 100-120 m upstream from NAPLINE

B NAPLINE crossing

C 220 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	30 Mar 79	30 Mar 79	30 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	Not fished--no water on bottom found					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	30 Mar 79	30 Mar 79	30 Mar 79			
Snow Depth (cm)	0	0	0			
Ice Depth (cm)	183+*	107-235*	183+*			
Air Space (cm)		0				
Water Depth (cm)						
Discharge (m^3/s)						
D. O. (mg/l)		10				
Temperature (°C)		0.0				
Conduct. ($\mu mhos/cm^2$)		158				
pH		8.0				
Color/Turbidity		clear				
Bottom Type						

REMARKS

*Stream bottom was not reached during present winter investigations.

Water chemistry data at Site B was recorded for water found in lenses only. Water lenses were encountered at nearly all drill sites.

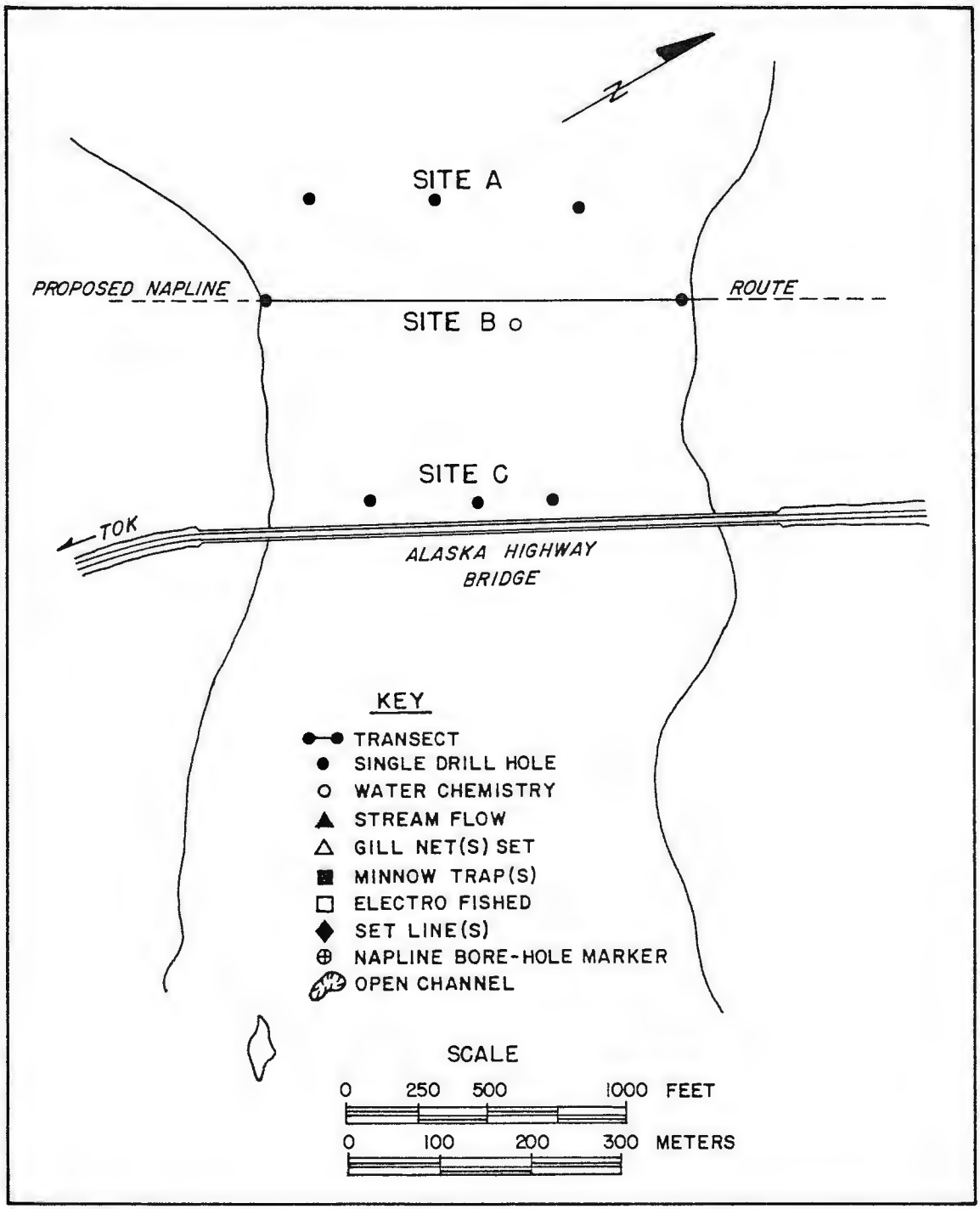

Fig. 20. Winter survey. Robertson River, 30 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Bear Creek

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 4 and 21 Northwest Alignment Sheet 101

Ident. Nos: NPSI 5-185 Applicable Milepost AHMP 1357.3

USGS Map Reference Tanacross, Alaska T- 21N R- 7E Sec 11 & 12

Site Access On foot from the Alaska Highway

ASSESSMENT

Bear Creek is glacial in origin and originates in the Alaska Range. Its main tributary flows from Fish Lake and contributes slightly humic-stained water to the main stream some 15 miles above the Alaska Highway. The stream channel is 4-6 m in width.

Although no fish were captured during the present winter field survey, Bear Creek, near the NAPLINE crossing, is a potential overwintering area for some species. The upper reaches of Bear Creek are known overwintering areas for Dolly Varden and slimy sculpin (Ref. 9). The overwintering potential of Bear Creek may vary from year to year. Bear Creek at the crossing was reportedly frozen to the bottom during the winters of 1976 and 1977 (Refs. 8 & 9).

SAMPLING LOCATIONS

SITE Figure 21

A 160 m upstream from NAPLINE crossing

B NAPLINE crossing

C 20 m downstream from NAPLINE crossing

D 90 m downstream from NAPLINE crossing

E 165 m downstream from NAPLINE crossing

F

FISH

SITE	A	B	C	D	E	F
Date	25 Mar 79	25 Mar 79	25 - 26 Mar 79	25 Mar 79	25 - 27 Mar 79	
Species						
Quantity			0		0	
Size (mm)						
Gear/Effort	not fished	not fished	1SL(15h) 1MT(23h)	not fished	3mGN(38h)	

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	25 Mar 79	25 Mar 79	25 Mar 79	25 Mar 79	25 Mar 79	
Snow Depth (cm)						
Ice Depth (cm)	10-30	10-20		30	30	
Air Space (cm)	0	0		0	0	
Water Depth (cm)	0-20	0-20	20	10	70	
Discharge (m^3/s)	0.08	0.01				
D. O. (mg/l)		11				
Temperature (°C)		0.2				
Conduct. ($\mu mhos/cm^2$)		59				
pH		7.5				
Color/Turbidity		clear				
Bottom Type		cobble gravel sand			boulders	

REMARKS

Some upwelling occurred through cracks in the ice causing water to flow on top of ice.

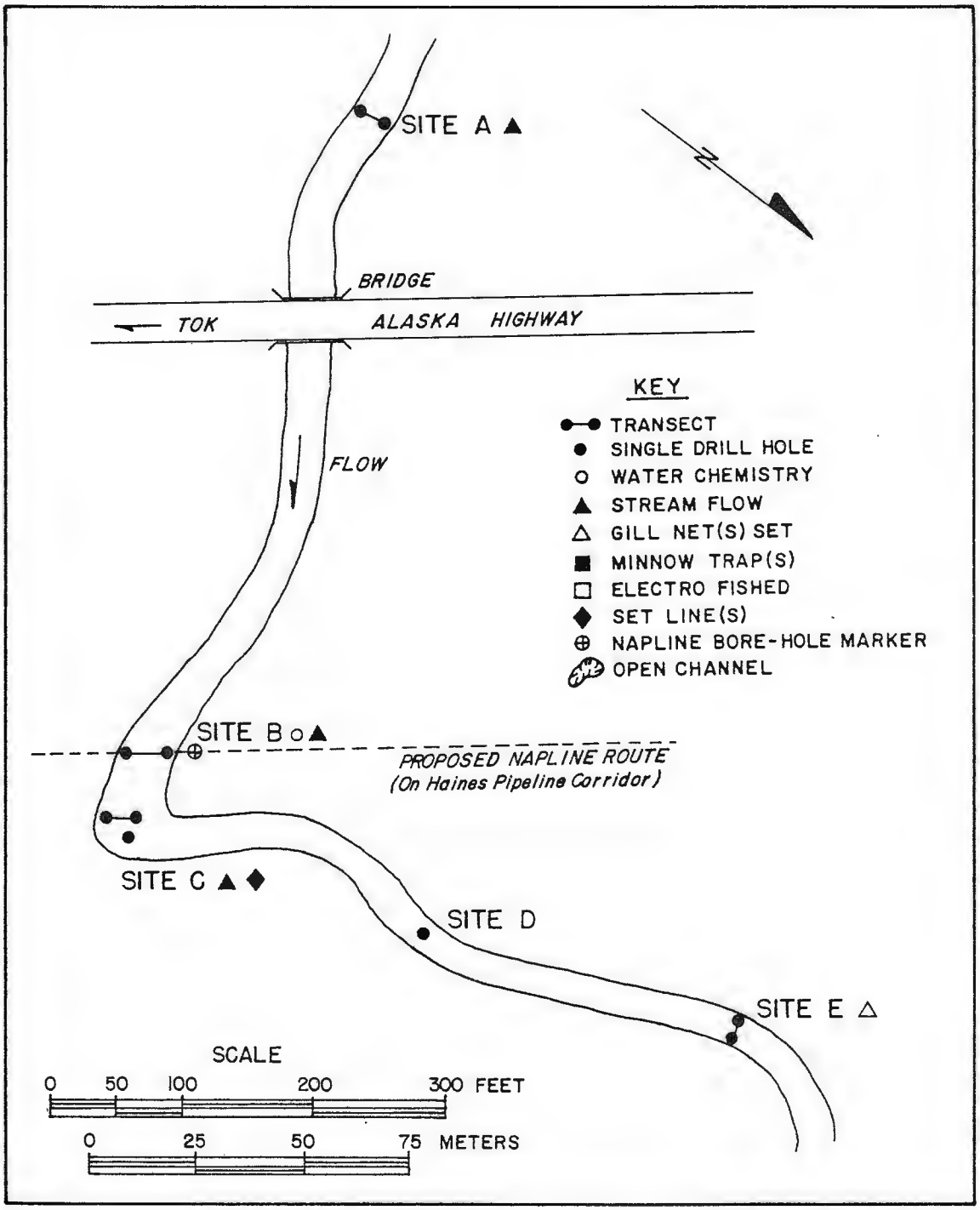

Fig. 21. Winter survey. Bear Creek, 25 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Sam Creek

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 4 and 22 Northwest Alignment Sheet 100

Ident. Nos: NPSI 5-180 Applicable Milepost AHMP 1365.9

USGS Map Reference Mt. Hayes, Alaska T-22N R-6E Sec 14

Site Access On foot from the Alaska Highway

ASSESSMENT

Sam Creek is a small, slow-flowing, spring-fed stream. It crosses the Alaska Highway at AHMP 1365.9 and then parallels the Alaska Highway and Haines pipeline for several miles before emptying into the Tanana River. Sam Creek originates primarily from springs and ponds in a large marsh area north of the highway.

Sam Creek was not an overwintering area at or near the NAPLINE crossing during present winter investigations. Upstream and immediately below the highway, Sam Creek was a relatively obscure dry stream bed. Little evidence of a channel was found during present winter investigations and flow in this area must only occur during periods of high run-off. It is unlikely that fish utilize this creek above the Alaska Highway but grayling, round whitefish, longnose sucker, northern pike, humpback whitefish, sculpin and burbot are reported to be present in its lower reaches (Ref. 5, 6 & 9).

SAMPLING LOCATIONS

SITE Figure 22

A 70 m upstream from NAPLINE

B NAPLINE crossing

C 75 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	26 Mar 79	26 Mar 79	26 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream was dry (no ice cover).					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	26 Mar 79	26 Mar 79	26 Mar 79			
Snow Depth (cm)	34	43	43			
Ice Depth (cm)	0	0	0			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	terrestrial vegetation	terrestrial vegetation	terrestrial vegetation			

REMARKS

Area heavily wooded with aspen and spruce. No culvert could be found for this drainage.

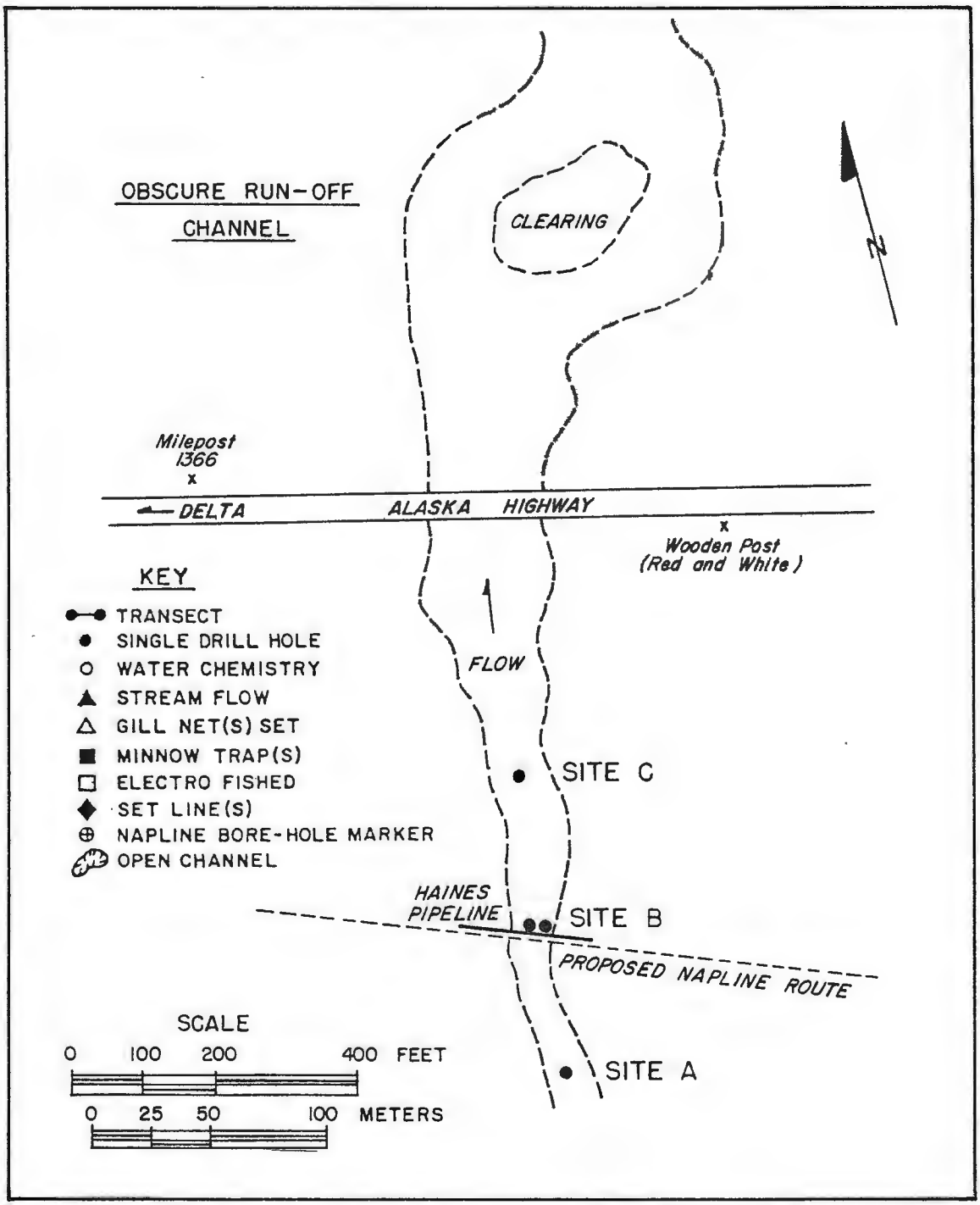

Fig. 22. Winter survey. Sam Creek, 26 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Unnamed Creek 1369.1

Main Drainage Tanana River Tributary to Sam Creek

Figure(s) 4 and 23 Northwest Alignment Sheet 100

Ident. Nos: NPSI 5-179 Applicable Milepost AHMP 1369.1

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

Site Access On foot from the Alaska Highway

ASSESSMENT

Unnamed Creek 1369.1 is a small humic-stained stream which drains the north face of Knob Ridge and empties into Sam Creek north of the Alaska Highway. Its channel is one to two meters wide and its banks are steep, incised and lined with willow, birch and spruce. Grayling, round whitefish, slimy sculpin and longnose sucker are reported to be present downstream from the Alaska Highway (Ref. 5, 6 & 10).

Unnamed Creek 1369.1 was not an overwintering area at or near the NAPLINE crossing during present winter investigations. The stream was frozen to bottom substrates.

SAMPLING LOCATIONS

SITE Figure 23

A 70 m upstream from NAPLINE

B NAPLINE crossing

C 90 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	26 Mar 79	26 Mar 79	26 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen to the bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	26 Mar 79	26 Mar 79	26 Mar 79			
Snow Depth (cm)	30	64	30			
Ice Depth (cm)	12	12	49			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type						

REMARKS

Overflow was advancing downstream during survey.

Highway culvert may be a barrier to fish passage.

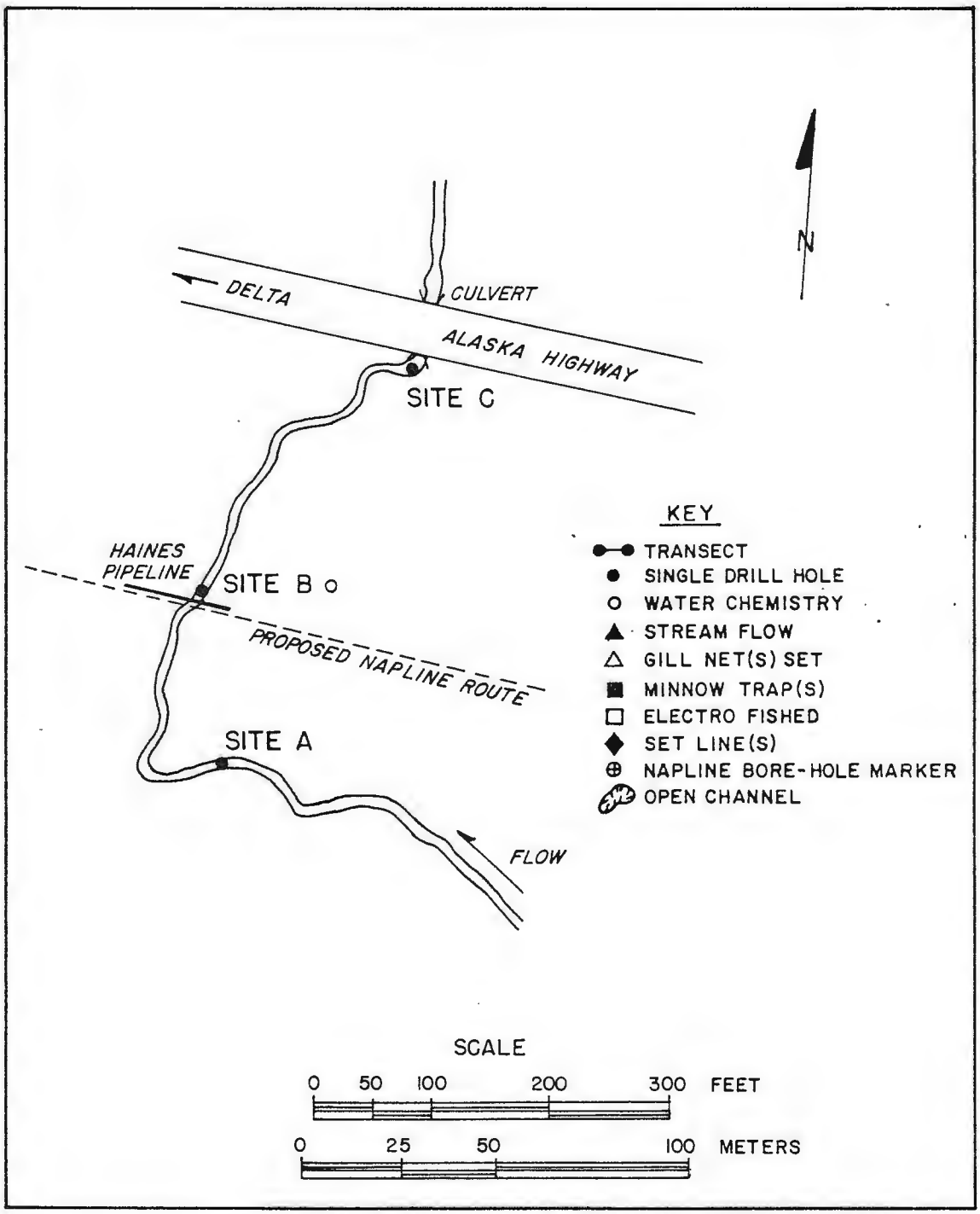

Fig. 23. Winter survey. Unnamed Creek 1369.1, 26 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Berry Creek

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 4 and 24 Northwest Alignment Sheet 99

Ident. Nos: NPSI 5-178 Applicable Milepost AHMP 1371.4

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

Site Access On foot from the Alaska Highway

ASSESSMENT

Berry Creek is a small, slightly humic stained stream which originates from glaciers behind the Macomb Plateau and is fed by springs and summer runoff. The stream channel is 10-15 m wide and banks are lined with willow, alder and large spruce. Berry Creek is highly productive and known to contain grayling, round whitefish, longnose sucker, slimy sculpin, burbot and Dolly Varden (Ref. 6, 9 & 10).

The overwintering potential of Berry Creek in the section surveyed during present winter investigations was marginal or nil. The stream appeared to be frozen to the bottom with free water found in lenses only. Aufeis was extensive covering the entire stream and encroaching upon areas beyond its banks.

Attempts to locate water underneath the ice at the Alaska Highway bridge and downstream were unsuccessful in February and March 1978 (Ref. 9).

..../2

SAMPLING LOCATIONS

SITE Figure 24

A 170 m upstream from NAPLINE

B NAPLINE crossing

C 135 m downstream from NAPLINE

D 245 m downstream from NAPLINE

E

F

WINTER SURVEY FORM

WATERBODY

Waterbody Berry Creek (continued)

Main Drainage _____ Tributary to _____

Figure(s) _____ Northwest Alignment Sheet _____

Ident. Nos: NPSI _____ Applicable Milepost _____

USGS Map Reference _____ T- R- Sec

Site Access _____

ASSESSMENT

(continued)

Although overwintering habitat was considered marginal, Berry Creek may be used by overwintering fish in some years. Open water and probable overwintering areas were located about 1.5 km upstream from the NAPLINE crossing during winter months of 1978 (Ref. 9). By 15 April of that same year, 30% of Berry Creek was flowing ice free about 4.5 km upstream, and fish were present at that time (Ref. 9). It was suggested that grayling and round whitefish migrate downstream during fall while Dolly Varden and slimy sculpin remain in some areas of Berry as overwintering residents (Ref. 9).

SAMPLING LOCATIONS

SITE Figure _____

A _____

B _____

C _____

D _____

E _____

F _____

FISH

SITE	A	B	C	D	E	F
Date	26 Mar 79	26 Mar 79	26 Mar 79	26 Mar 79		
Species						
Quantity		0				
Size (mm)						
Gear/Effort	not fished	1SL(14h)**	not fished	not fished		

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	26 Mar 79	26 Mar 79	26 Mar 79	26 Mar 79		
Snow Depth (cm)	0	0	0	0		
Ice Depth (cm)	134	107-198+*	192	167		
Air Space (cm)	0	0	0	0		
Water Depth (cm)	0	0	0	0		
Discharge (m^3/s)	0	0	0	0		
D. O. (mg/l)		12				
Temperature (°C)		-0.2				
Conduct. ($\mu mhos/cm^2$)		51				
pH		7.0				
Color/Turbidity		clear				
Bottom Type		mud silt				

REMARKS

*Two distinct water lenses were found within the ice column at Site B. These lenses varied from 6-23 cm deep. Water chemistry analysis was recorded for water found in lenses only. One core in this transect did not reach bottom at 198 cm.

**Setline at Site B was fished in a water lense.

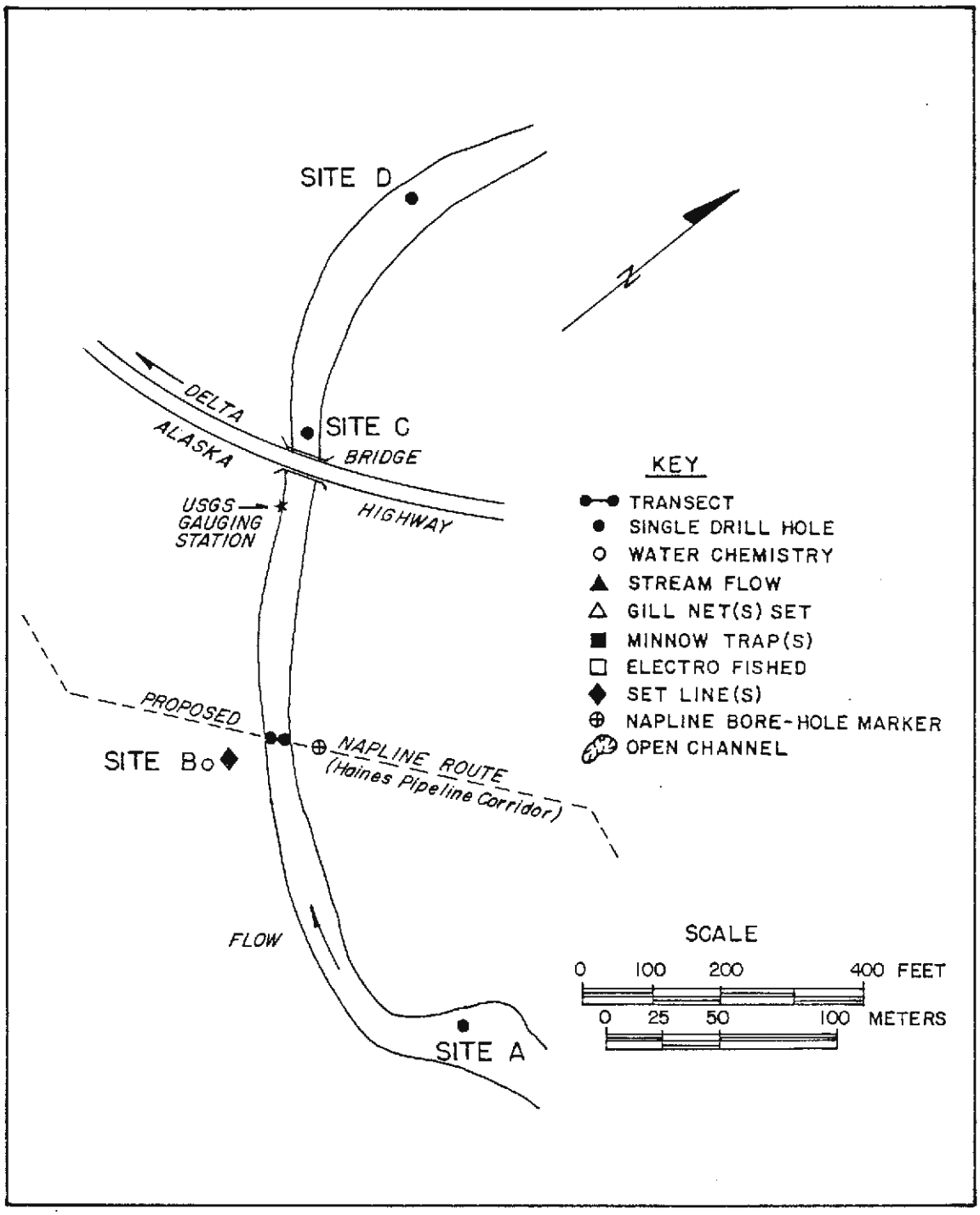

Fig. 24. Winter survey. Berry Creek, 26 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Sears Creek

Main Drainage Tanana River Tributary to Johnson River

Figure(s) 4 and 25 Northwest Alignment Sheet 99

Ident. Nos: NPSI 5-177 Applicable Milepost AHMP 1374.4

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

Site Access On foot from the Alaska Highway

ASSESSMENT

Sears Creek is a small, humic-stained stream fed by springs and summer runoff. It drains the foothills of the Macomb Plateau and flows north into Johnson Slough. The stream bottom consists of gravel, sand and mud while the banks are lined with dense willow and alder. This stream is slow-flowing near the NAPLINE crossing and the channel is 3-10 m wide.

The overwintering potential of Sears Creek at or near the NAPLINE crossing during present winter investigations is not completely known. Aufeis was extensive and extended beyond the banks at the NAPLINE crossing. Ice depths in excess of two meters were encountered without reaching bottom. Free water was found in lenses in the ice column only.

A minnow trap set overnight on 26 February 1978 caught no fish (Ref. 9).

SAMPLING LOCATIONS

SITE Figure 25

A 100 m upstream from NAPLINE

B NAPLINE crossing

C 100 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	27 Mar 79	27 Mar 79	27 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	Not fished; no bottom or water reached					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	27 Mar 79	27 Mar 79	27 Mar 79			
Snow Depth (cm)	3	0	0			
Ice Depth (cm)	137+	198+	137+			
Air Space (cm)						
Water Depth (cm)						
Discharge (m^3/s)						
D. O. (mg/l)		10*				
Temperature (°C)		0.2				
Conduct. ($\mu mhos/cm^2$)		30				
pH		7.5				
Color/Turbidity	clear	clear	clear			
Bottom Type						

REMARKS

Water lenses in ice column were found at all sampling locations.

*Water chemistry analysis was recorded for water found in lenses only.

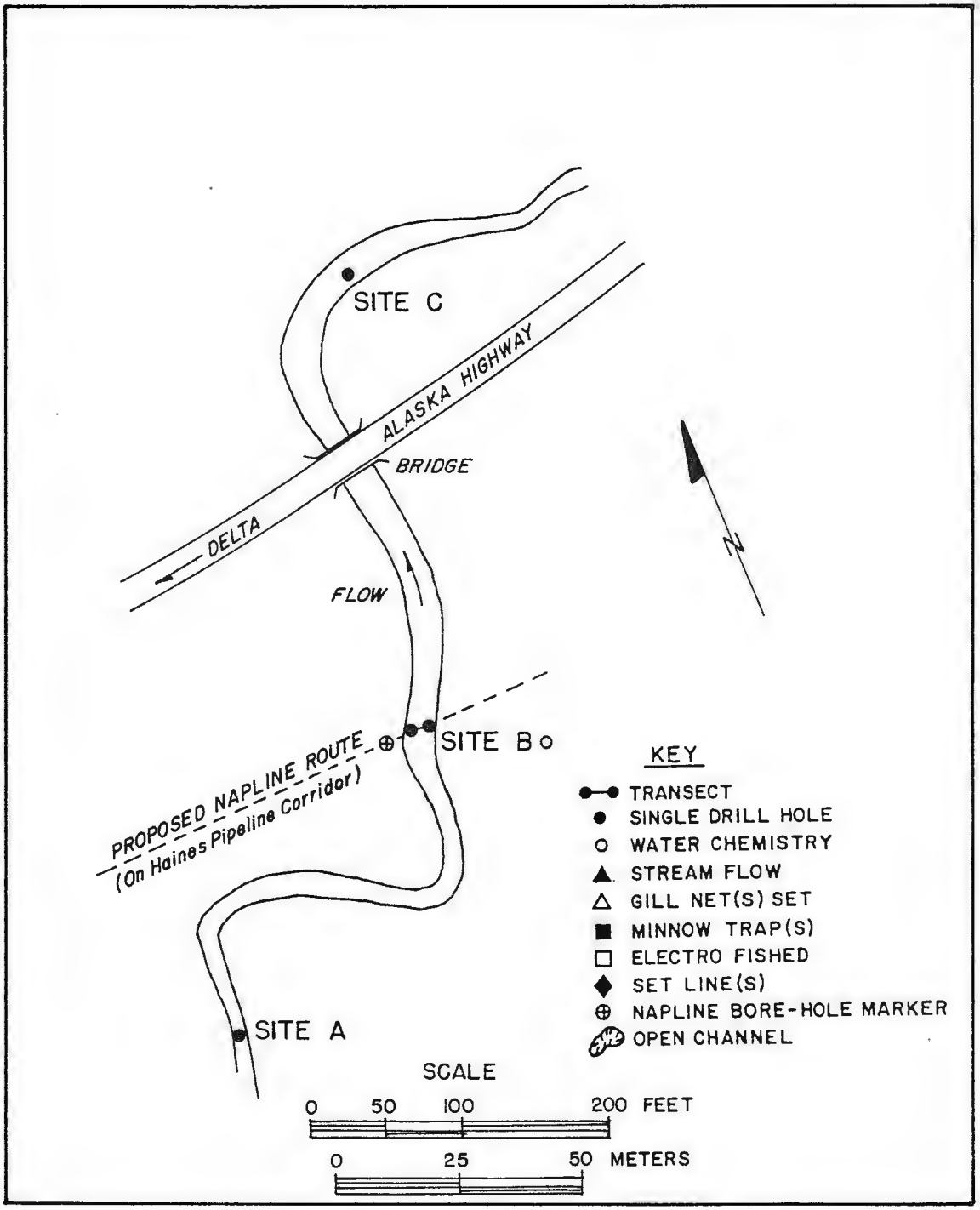

Fig. 25. Winter survey. Sears Creek, 27 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Johnson River

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 4 and 26 Northwest Alignment Sheet 98

Ident. Nos: NPSI 5-175 Applicable Milepost AHMP 1380.5

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

Site Access On foot from the Alaska Highway

ASSESSMENT

The Johnson River is a large, braided glacial stream originating from the Johnson Glacier in the Alaska Range and flowing north and northeast into the Tanana River. Waters are highly turbid in spring and summer but clear by late fall. The Johnson River floodplain is approximately 250 m wide while the free water channel width during present winter investigations was 10-14 m. The Johnson River is bounded by steep banks 20-30 m high.

The Johnson River was a potential overwintering area near the proposed NAPLINE crossing during present winter investigations. Suitable overwintering habitat was found but no fish were captured.

The productivity of this glacial stream may be low. About 100 m of stream above the Alaska Highway bridge was electrofished in April 1978, but no fish were captured (Ref. 9).

SAMPLING LOCATIONS

SITE Figure 26

A 120 m upstream from NAPLINE

B NAPLINE crossing (320 m upstream from Alaska Highway bridge)

C 90 m downstream from NAPLINE

D 300 m downstream from NAPLINE

E

F

FISH

SITE	A	B	C	D	E	F
Date	28 Mar 79	28 Mar 79	28 Mar 79			
Species		0	0			
Quantity						
Size (mm)						
Gear/Effort	not fished	EF(150m)	EF(150m)			

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	28 Mar 79	28 Mar 79	28 Mar 79	28 Mar 79		
Snow Depth (cm)	6	0-6	0	6		
Ice Depth (cm)	101	1-162	0	37-101		
Air Space (cm)	0	0	0	0		
Water Depth (cm)	0	0-46	3-46	0		
Discharge (m^3/s)	0	2.6	2.6	0		
D. O. (mg/l)			10			
Temperature (°C)			1.0			
Conduct. ($\mu mhos/cm^2$)			165			
pH			8.0			
Color/Turbidity		clear	clear			
Bottom Type	gravel	cobble gravel silt	gravel cobble	cobble gravel silt		

REMARKS

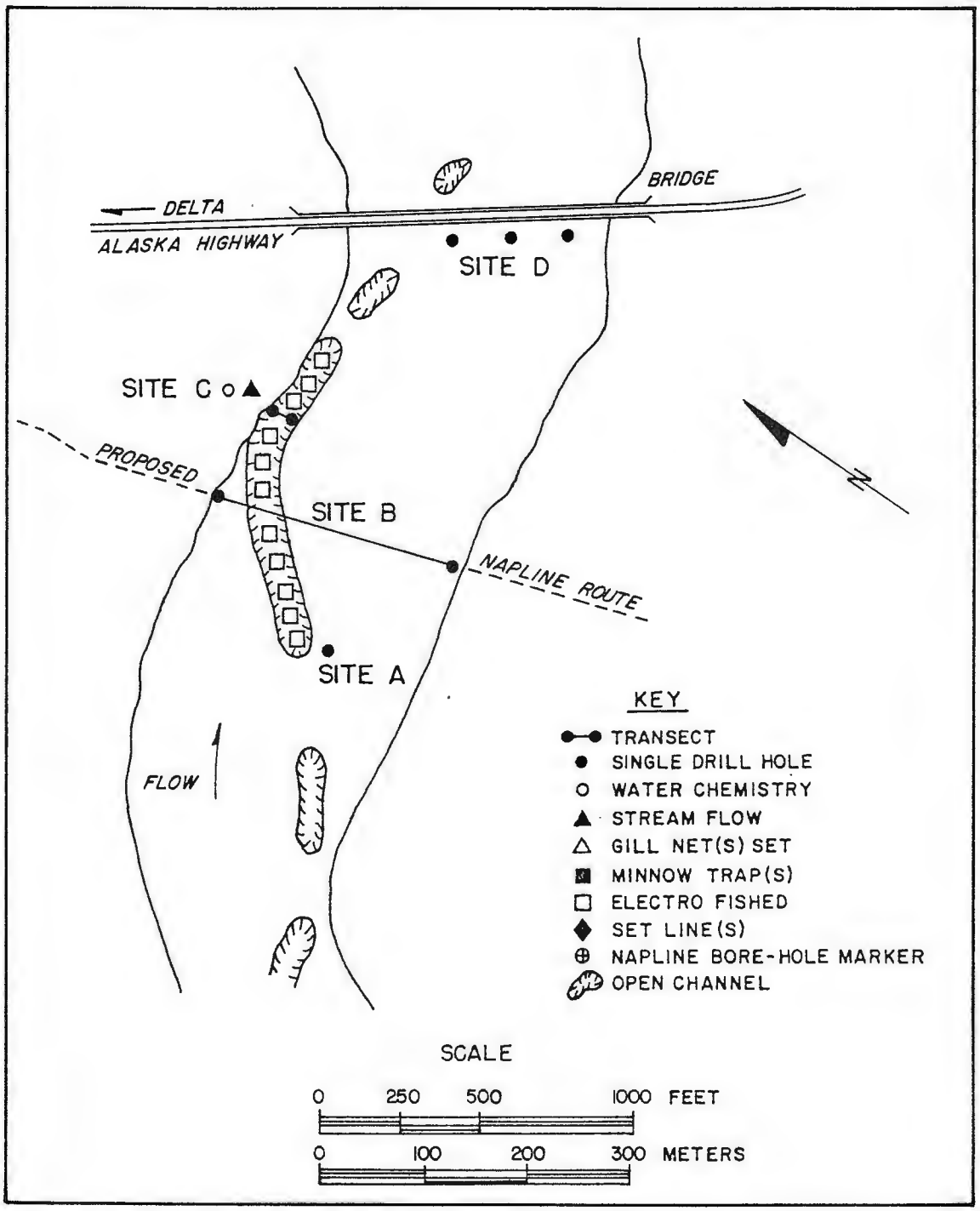

Fig. 26. Winter survey. Johnson River, 28 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Little Gerstle River

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 4 and 27 Northwest Alignment Sheet 96

Ident. Nos: NPSI 5-174 Applicable Milepost AHMP 1388.4

USGS Map Reference Mt. Hayes, Alaska T-13S R-15E Sec 14

Site Access On foot from the Alaska Highway

ASSESSMENT

The Little Gerstle River is a moderately turbid stream that flows north from the Alaska Range into the Tanana River. It is less turbid than other glacial streams due to its clear-water tributaries. The channel is approximately 10 meters wide. The stream flows over a gravel to boulder channel with some silt deposits. It is reported to contain grayling, round whitefish, longnose sucker, sculpin and Dolly Varden (Ref. 5, 6, 7 & 10).

The Little Gerstle River was not an overwintering area at or near the NAPLINE crossing during present winter investigations. This stream was dry and had relatively little ice cover. The stream was also reported to be dry 1 November 1977 and 19 April 1979 (Ref. 9).

SAMPLING LOCATIONS

SITE Figure 27

A 90 m upstream from NAPLINE

B NAPLINE crossing (downstream from Alaska Highway bridge)

C 70 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	28 Mar 79	28 Mar 79	28 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream was dry.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	28 Mar 79	28 Mar 79	28 Mar 79			
Snow Depth (cm)	21	43-53	43			
Ice Depth (cm)	23	9-15	15			
Air Space (cm)	6	6-15	9			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	cobble	gravel cobble	cobble			

REMARKS

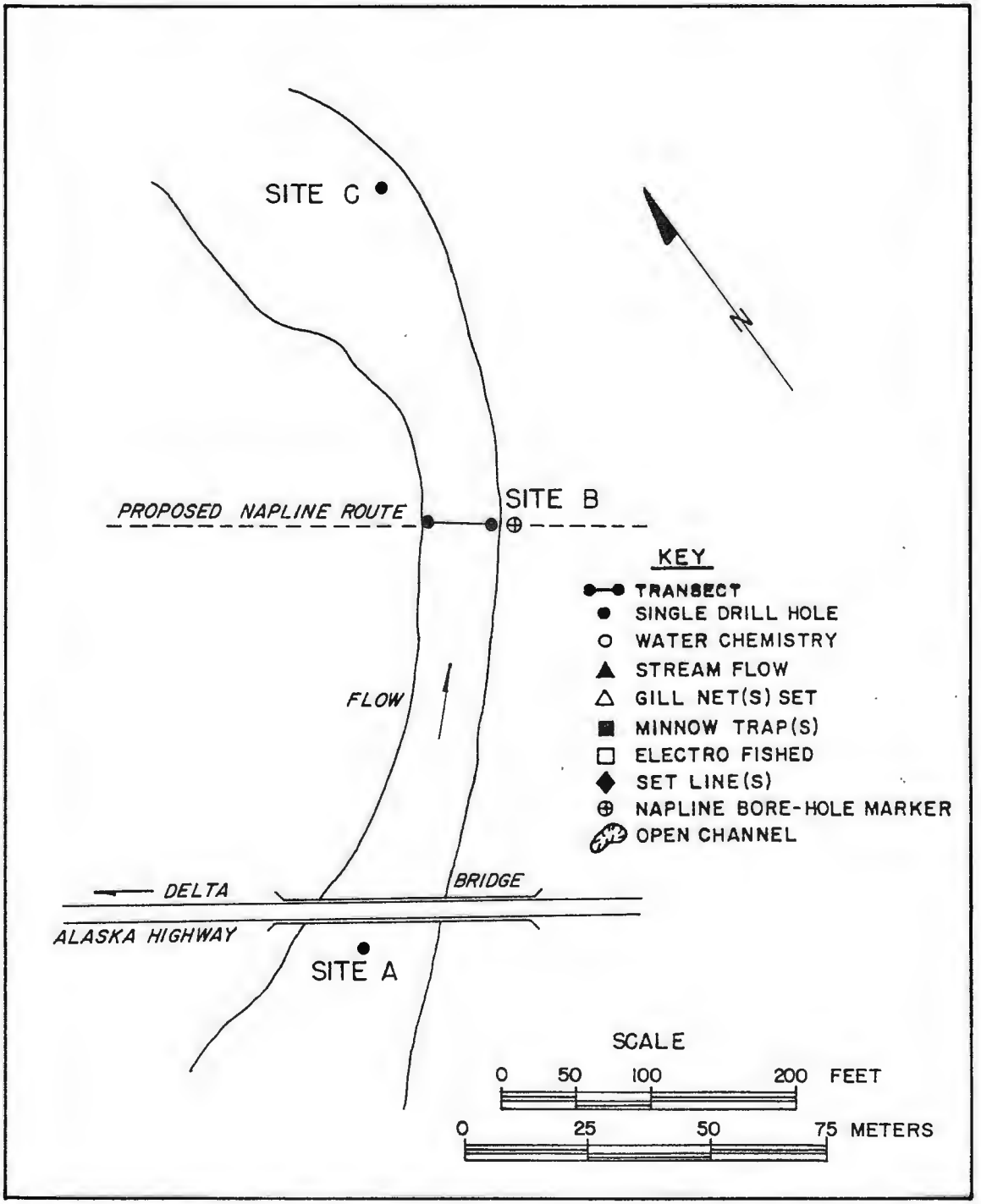

Fig. 27. Winter survey. Little Gerstle River, 28 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Gerstle River

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 4 and 28 Northwest Alignment Sheet 96

Ident. Nos: NPSI 5-172 Applicable Milepost AHMP 1393

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

Site Access On foot from the Alaska Highway

ASSESSMENT

The Gerstle River is a large braided glacial stream which flows from the Gerstle Glacier in the Alaska Range north to the Tanana River. It has an extensive floodplain approximately 0.6 km wide. The productivity of this stream is probably low due to swift and highly turbid waters; to date, no data are available which would indicate that fish utilize the Gerstle River.

The Gerstle River was not an overwintering area at or near the NAPLINE crossing during present winter investigations. Free water found under ice was believed to be a result of recent warm temperatures and melting groundwater. The shallow ice cover of the Gerstle River would indicate that this stream possessed relatively little water at the time of freezeup.

SAMPLING LOCATIONS

SITE Figure 28

A 100 m upstream from NAPLINE

B NAPLINE crossing

C 200 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	29 Mar 79	29 Mar 79	29 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely; observed flow probably due to recent warm weather and groundwater melt.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	29 Mar 79	29 Mar 79	29 Mar 79			
Snow Depth (cm)	0	0	0			
Ice Depth (cm)	24	6-30	9			
Air Space (cm)	0	0	0			
Water Depth (cm)	3	0-30	15			
Discharge (m^3/s)	0	0.75	0			
D. O. (mg/l)		9				
Temperature (°C)		-0.1				
Conduct. ($\mu mhos/cm^2$)		26				
pH		8.0				
Color/Turbidity	clear	clear	clear			
Bottom Type	sand	silt sand gravel	gravel			

REMARKS

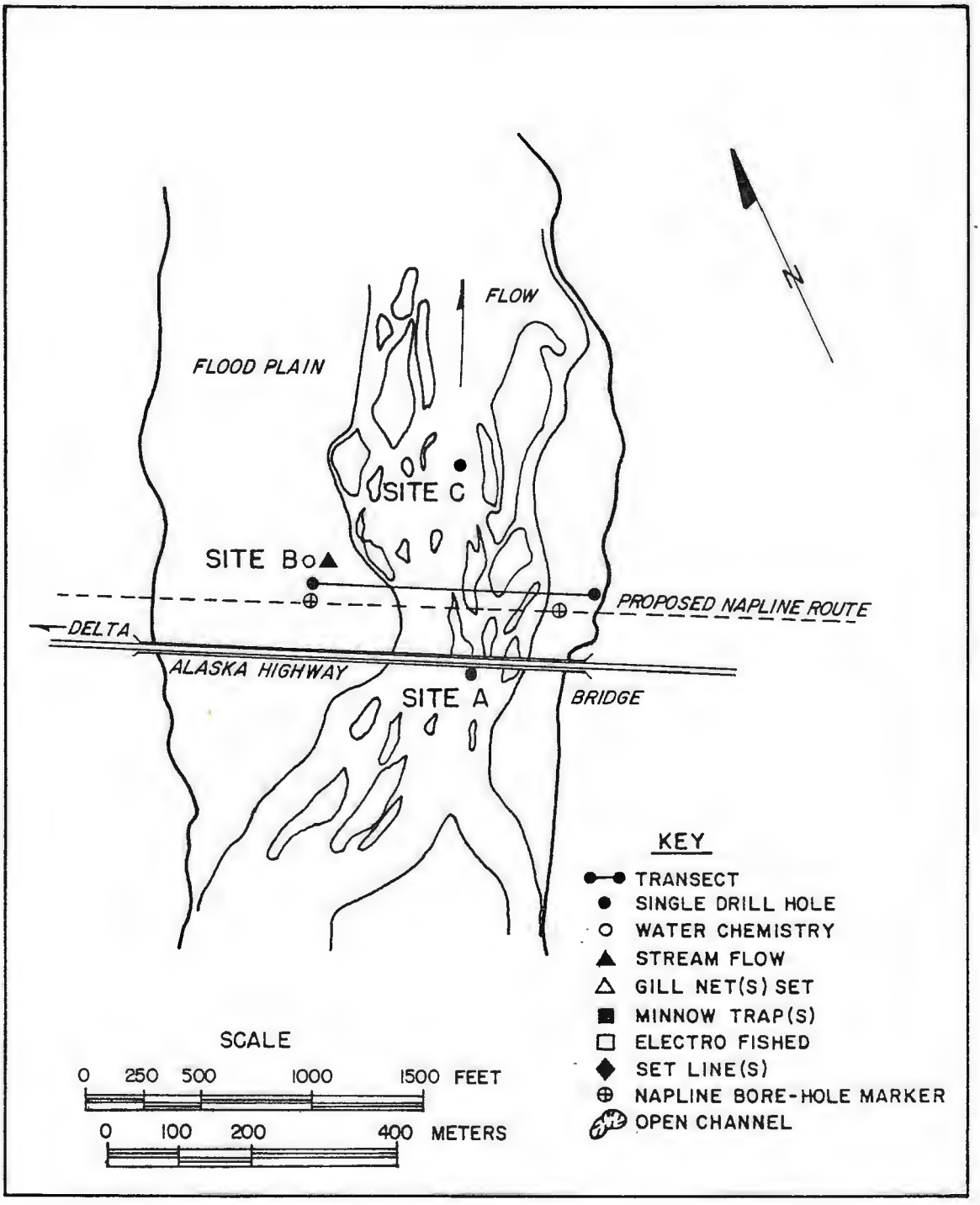

Fig. 28. Winter survey. Gerstle River, 29 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Shaw Creek

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 3, 4 and 29 Northwest Alignment Sheet 87

Ident. Nos: NPSI 5-165 Applicable Milepost NWAP 517.3

USGS Map Reference Big Delta, Alaska T- 7S R-8E Sec 36

Site Access Snowmachine from Shaw Creek access road

ASSESSMENT

Shaw Creek is a deep, slow meandering stream approximately 15 m wide. The bottom substrate is primarily mud. Banks are often incised, 2-3 m in height and lined with mature spruce and willow. Shaw Creek is reported to contain grayling, burbot, northern pike, round whitefish and stickleback (Ref. 11).

The overwintering potential of Shaw Creek at or near the NAPLINE crossing during present winter investigations was marginal. Approximately 30 gillnet hours and 630 setline hours were expended in this area without catching fish. Dissolved oxygen was marginal at 3 mg/ℓ and flow was negligible. Other sources report that Shaw Creek tends to freeze solid in winter (Ref. 11).

SAMPLING LOCATIONS

SITE Figure 29

A	30 m upstream from NAPLINE
B	NAPLINE crossing
C	100 m downstream from NAPLINE
D	700 m downstream from NAPLINE
E	1000 m downstream from NAPLINE
F	1200 m downstream from NAPLINE

FISH

SITE	A	B	C	D	E	F
Date	16 Mar 79	16 Mar 79	16 Mar 79	19 Mar 79	19 Mar 79	19 Mar 79
Species						
Quantity			0	0	0	0
Size (mm)						
Gear/Effort	not fished	not fished	7mGN(30h) 4SL(76h)	3SL(128h)	3SL(128h)	4SL(170h)

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	16 Mar 79	16 Mar 79	16 Mar 79	19 Mar 79	19 Mar 79	19 Mar 79
Snow Depth (cm)						
Ice Depth (cm)			85-140			
Air Space (cm)			0			
Water Depth (cm)	present	present	24-137	present	present	present
Discharge (m^3/s)			0			
D. O. (mg/l)			3.0			
Temperature (°C)			0.0			
Conduct. ($\mu mhos/cm^2$)			80			
pH			7.0			
Color/Turbidity	rust - brown	rust - brown	rust - brown	rust - brown	rust - brown	rust - brown
Bottom Type			mud			

REMARKS

Three additional setlines were fished just upstream from the Alaska Highway bridge. No fish were caught in 128 total setline hours.

Iron content of water appeared to be high due to its rust color and iron compounds that were found on the gillnet.

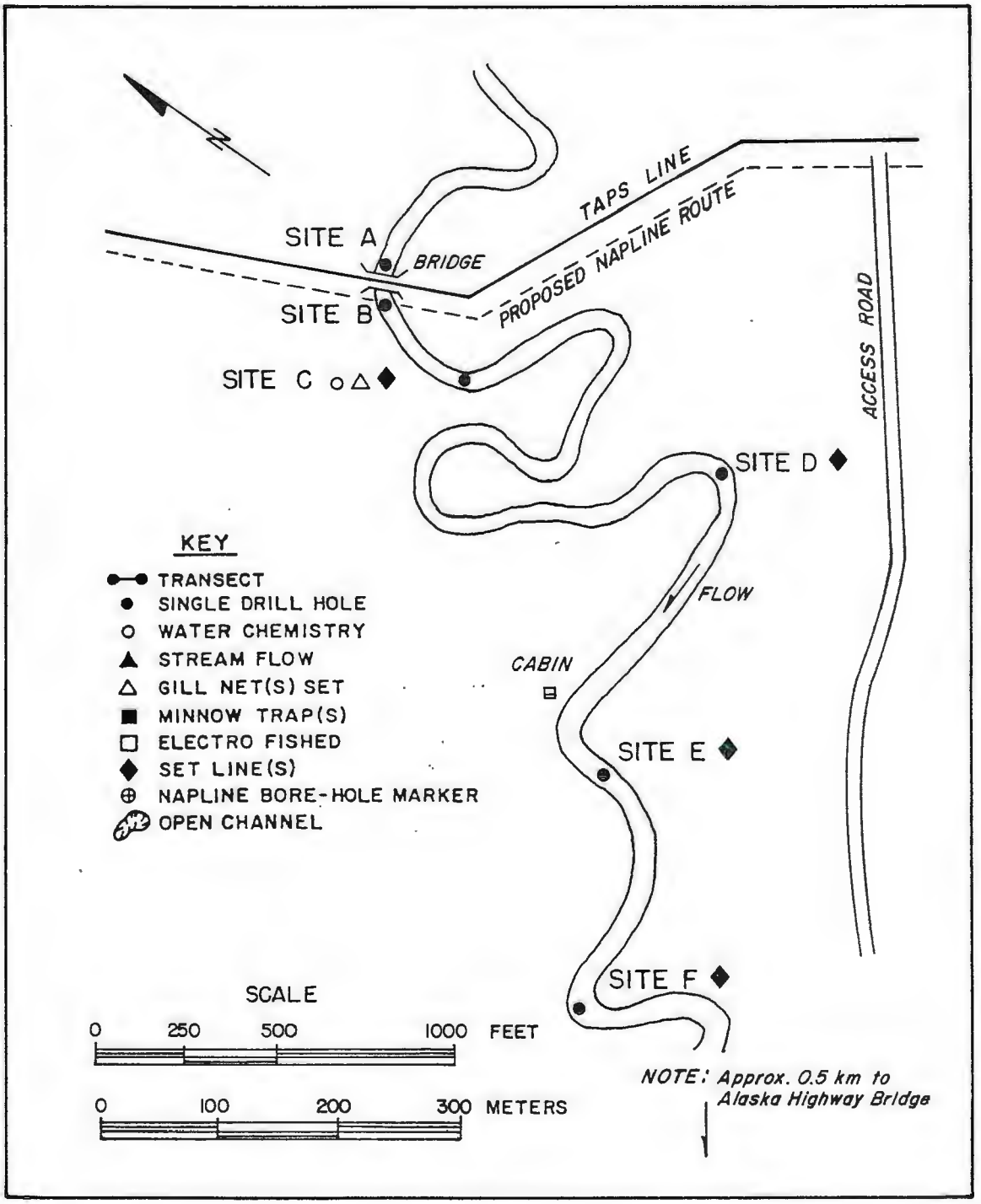

Fig. 29. Winter survey. Shaw Creek, 16-19 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Rosa Creek 2 & 3

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 3, 4 and 30 Northwest Alignment Sheet 86

Ident. Nos: NPSI 5-162 Applicable Milepost NPMP 511.1

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

Site Access Workpad via Shaw Creek

ASSESSMENT

Rosa Creek is a small tundra drainage 1-1.5 m wide. The channel is often unidentifiable especially in muskeg or bog areas. Overwintering habitat was not available in this region. The stream was dry or frozen to the bottom.

SAMPLING LOCATIONS

SITE Figure 30

A 50 m downstream from upper NAPLINE

B 50 m upstream from lower NAPLINE

C

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	16 Mar 79	16 Mar 79				
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	16 Mar 79	16 Mar 79				
Snow Depth (cm)		63				
Ice Depth (cm)	96	0				
Air Space (cm)	0	0				
Water Depth (cm)	0	0				
Discharge (m^3/s)	0	0				
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type						

REMARKS

Site A: Icing over TAPS workpad.

Site B: Alyeska Station #'s 10142+80 LWC.

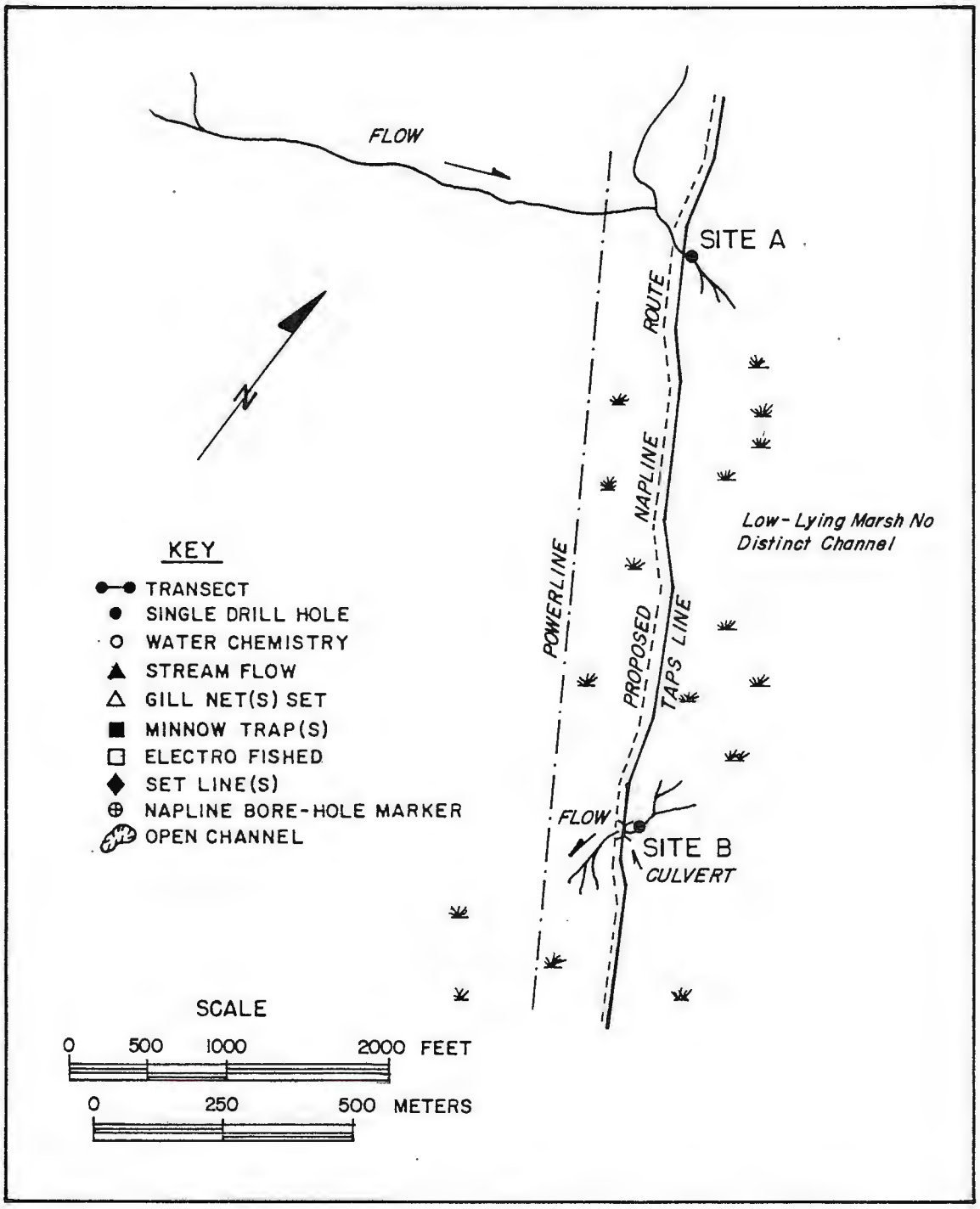

Fig. 30. Winter survey. Rosa Creek, 16 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody South Fork Minton Creek #2,3,4,5,6 & 7

Main Drainage Salcha River Tributary to McCoy Creek

Figure(s) 3 and 31 Northwest Alignment Sheet 85-86

Ident. Nos: NPSI 5-161 Applicable Milepost NPMP 508-510

USGS Map Reference Big Delta, Alaska T-6S R-7E,8E Sec 19,20 29,13

Site Access Snowmachine on workpad and GVEA line via Shaw Creek access road

ASSESSMENT

The South Fork Minton Creek is a small stream 0.5-1.5 m wide. Bottom substrate included mud, sand and gravel. This stream is reported to contain grayling (Ref. 11). The proposed NAPLINE crosses eight of its headwater tributaries in fairly steep terrain.

The South Fork Minton Creek was not an overwintering area at or near the NAPLINE crossing during present winter investigations. This stream was frozen to the bottom at all sampling locations.

SAMPLING LOCATIONS

SITE Figure 31

A NAPLINE crossing (multiple crossings)

B NAPLINE crossing (multiple crossings)

C NAPLINE crossing (multiple crossings)

D 100 m north of NAPLINE (between TAPSLINE AND NAPLINE)

E

F

FISH

SITE	A	B	C	D	E	F
Date	17 Mar 79	17 Mar 79	17 Mar 79	17 Mar 79		
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen to the bottom					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	17 Mar 79	17 Mar 79	17 Mar 79	17 Mar 79		
Snow Depth (cm)	122					
Ice Depth (cm)	0	76	122	76		
Air Space (cm)	0	0	0	0		
Water Depth (cm)	0	0	0	0		
Discharge (m^3/s)	0	0	0	0		
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type						

REMARKS

Visual observations were made at five additional NAPLINE crossings. These crossings were very small and generally dry. Stream channels were obscure and poorly defined.

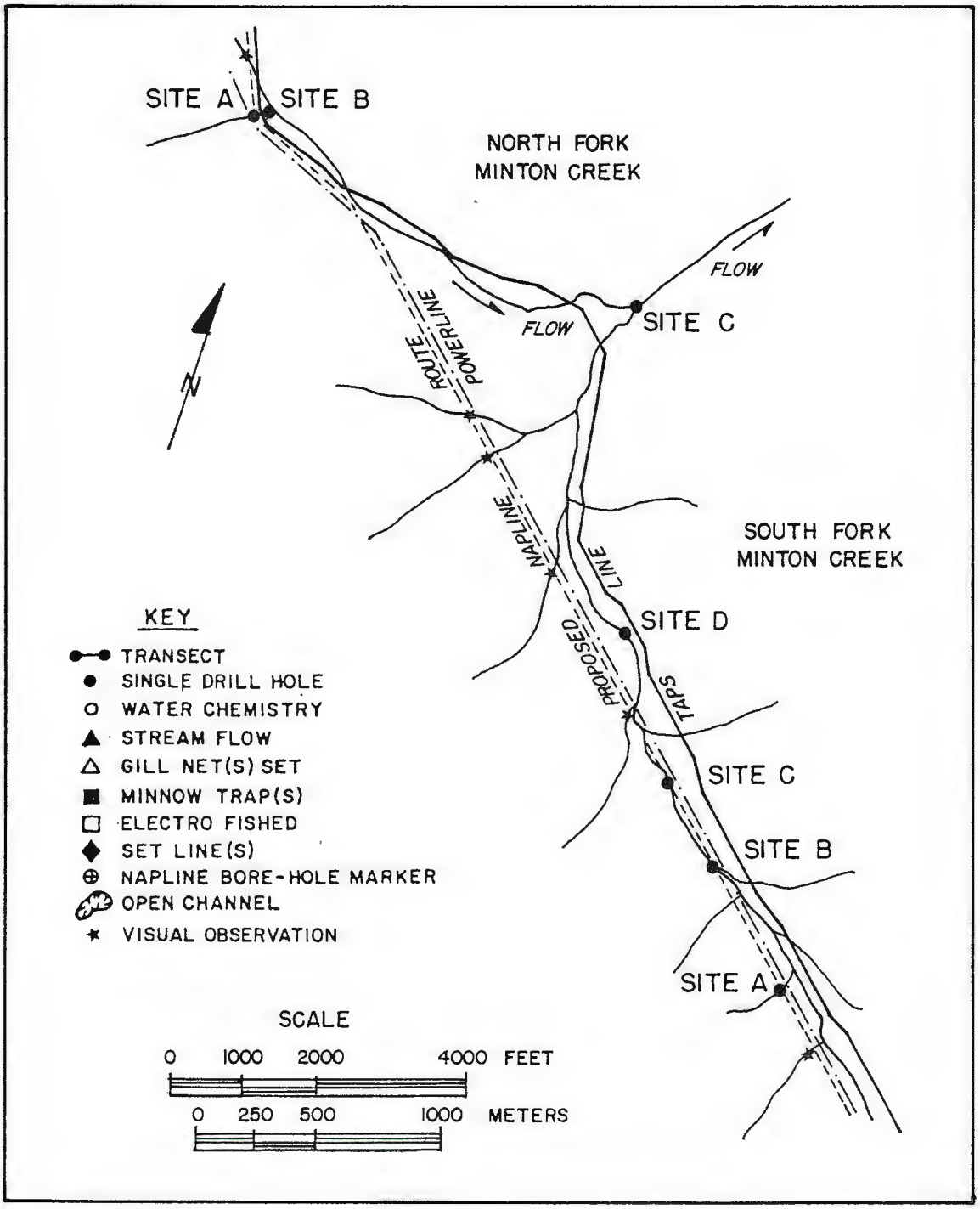

Fig. 31. Winter survey. North and South Forks Minton Creek, 17 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody North Fork Minton Creek #2

Main Drainage Salcha River Tributary to McCoy Creek

Figure(s) 3 and 31 Northwest Alignment Sheet 85

Ident. Nos: NPSI 5-161 Applicable Milepost NPMP 507-508

USGS Map Reference Big Delta, Alaska T- 6S R- 7E Sec 13 & 14

Site Access Snowmachine on workpad and GVEA line via Shaw Creek access road

ASSESSMENT

The North Fork Minton Creek is a very small stream 0.3-1.0 m wide with a mud bottom. In some areas its channel is poorly defined. Extensive icing was present at the NAPLINE crossing during present investigations.

The North Fork Minton Creek was not an overwintering area at or near the NAPLINE crossing during present winter investigations. This stream was frozen to the bottom at all sampling locations.

SAMPLING LOCATIONS

SITE Figure 31

A NAPLINE crossing

B 35 m downstream from NAPLINE

C Confluence of the North and South Forks

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	18 Mar 79	18 Mar 79	18 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen to the bottom					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	18 Mar 79	18 Mar 79	18 Mar 79			
Snow Depth (cm)						
Ice Depth (cm)	76	76	107			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	mud	mud	mud			

REMARKS

Visual observation of alternate fork of North Fork Minton Creek revealed a very small drainage with a poorly defined channel and little ice. No flow was apparent.

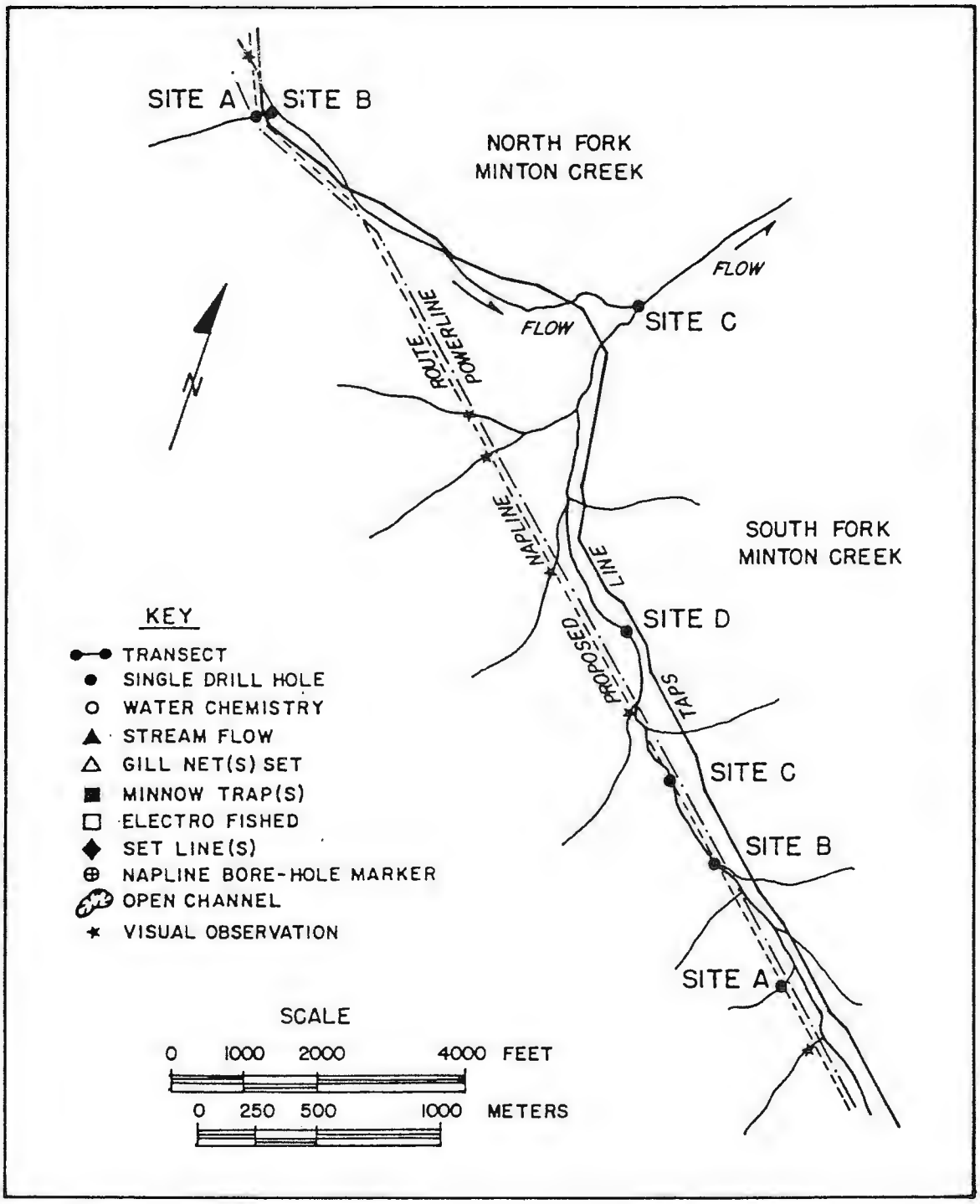

Fig. 31. Winter survey. North and South Forks Minton Creek, 17 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Gold Run Creek

Main Drainage Salcha River Tributary to McCoy Creek

Figure(s) 3 and 32 Northwest Alignment Sheet 85

Ident. Nos: NPSI 5-160 Applicable Milepost NPMP 504.2

USGS Map Reference Big Delta, Alaska T- 6S R- 7E Sec 3

Site Access Workpad via Shaw Creek access road

ASSESSMENT

Gold Run Creek, in the vicinity of the NAPLINE crossing and the TAPS workpad, does not have a clearly defined channel. Winter surveys indicate that this creek flows through dwarf willows and other dense vegetation. All areas drilled were frozen to the bottom. This area does not provide suitable overwintering habitat.

SAMPLING LOCATIONS

SITE Figure 32

A 30 m downstream from NAPLINE

B 125 m downstream from NAPLINE

C

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	18 Mar 79	18 Mar 79				
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; frozen to bottom					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	18 Mar 79	18 Mar 79				
Snow Depth (cm)						
Ice Depth (cm)	30	30				
Air Space (cm)	0	0				
Water Depth (cm)	0	0				
Discharge (m^3/s)	0	0				
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type						

REMARKS

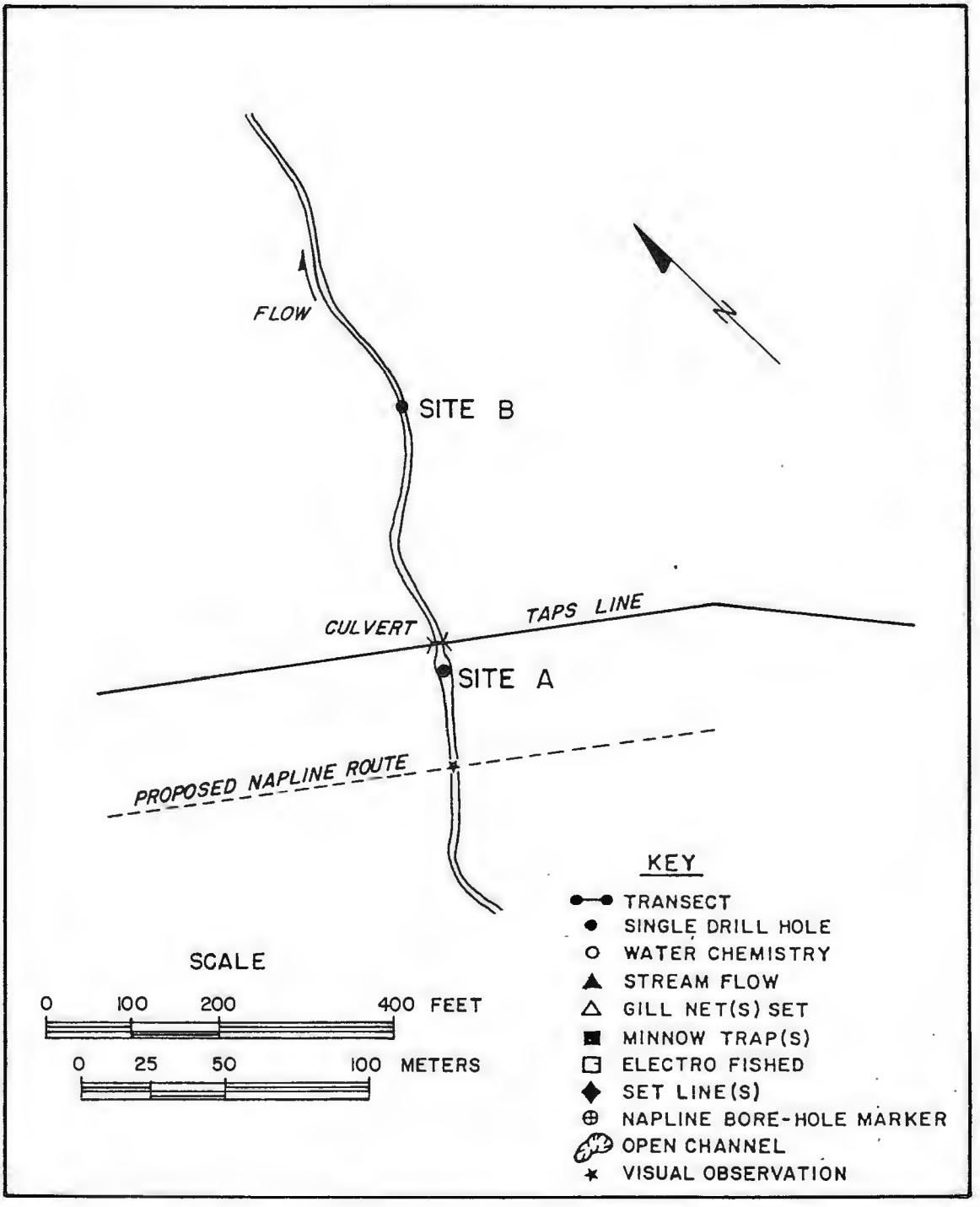

Fig. 32. Winter survey. Gold Run Creek, 18 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Redmond Creek

Main Drainage Tanana River Tributary to Salcha River

Figure(s) 3 and 33 Northwest Alignment Sheet 84

Ident. Nos: NPSI 5-159 Applicable Milepost NPMP 497.4

USGS Map Reference Big Delta, Alaska T- 5S R-6E Sec 22

Site Access Snowmachine on Salcha River to workpad

ASSESSMENT

Redmond Creek is a clear to brown stained meandering stream which flows into the Salcha River and drains approximately 193,000 km^2. Its channel is 3-6 m in width and the stream bottom is primarily silt and mud with some gravel in pool and riffle areas.

The overwintering potential of Redmond Creek appears marginal. The stream was intermittently frozen to the bottom during present investigations. Where free water (under ice or open channel) were found, no flow could be detected. Low dissolved oxygen levels were recorded and only dead invertebrates (blackfly, caddisfly and stonefly larvae) were observed. In December 1974, Redmond Creek appeared to be intermittently frozen to the bottom and dissolved oxygen values varied between 1-2 mg/ℓ. During that same period, no fish were captured in four baited minnow traps that were fished a total of 432 hours in Redmond Creek from its confluence with the Salcha River to the TAPSLINE crossing (Ref. 25).

...../2

SAMPLING LOCATIONS

SITE Figure 33

A 60 m upstream from NAPLINE

B 40 m upstream from NAPLINE

C 60 m downstream from NAPLINE

D 140 m downstream from NAPLINE

E

F

WINTER SURVEY FORM

WATERBODY

Waterbody Redmond Creek (Continued)

Main Drainage _____ Tributary to _____

Figure(s) _____ Northwest Alignment Sheet _____

Ident. Nos: NPSI _____ Applicable Milepost _____

USGS Map Reference _____ T- R- Sec

Site Access _____

ASSESSMENT

(continued)

It should be noted, however, that late summer and fall spawning species (king salmon, chum salmon and round whitefish) are reported to be present in Redmond Creek (Ref. 11), and, therefore, this stream may harbor overwintering eggs. It is important that fall fisheries investigations be conducted to determine the presence or absence of these species and their utilization of the creek for spawning. Spawning areas and potential overwintering pools could be marked for future winter investigations.

Redmond Creek is probably used primarily as a rearing area during open water months for young-of-the-year and/or juveniles of the anadromous species known to be present in this stream.

SAMPLING LOCATIONS

SITE Figure _____

A _____

B _____

C _____

D _____

E _____

F _____

FISH

SITE	A	B	C	D	E	F
Date	20 Mar 79	20 Mar 79	20 Mar 79	20 Mar 79		
Species						
Quantity	0					
Size (mm)						
Gear/Effort	Visual	not fished	not fished	not fished		
	No fish observed in small shallow pools; gravels were disturbed but no eggs or fry located.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	20 Mar 79	20 Mar 79	20 Mar 79	20 Mar 79		
Snow Depth (cm)						
Ice Depth (cm)	0	8	30	20-46		
Air Space (cm)	0	30	0	0		
Water Depth (cm)	0-20	0-20	0	0-8		
Discharge (m^3/s)	0	0	0	0		
D. O. (mg/l)	1.8	1.8				
Temperature (°C)	2.0	1.0				
Conduct. ($\mu mhos/cm^2$)	82	50				
pH	6.3	6.3				
Color/Turbidity	clear	clear				
Bottom Type	gravel	gravel	mud	mud gravel		

REMARKS

Dimensions of open water pool at Site A were approximately 1.5 x 2.0 m.

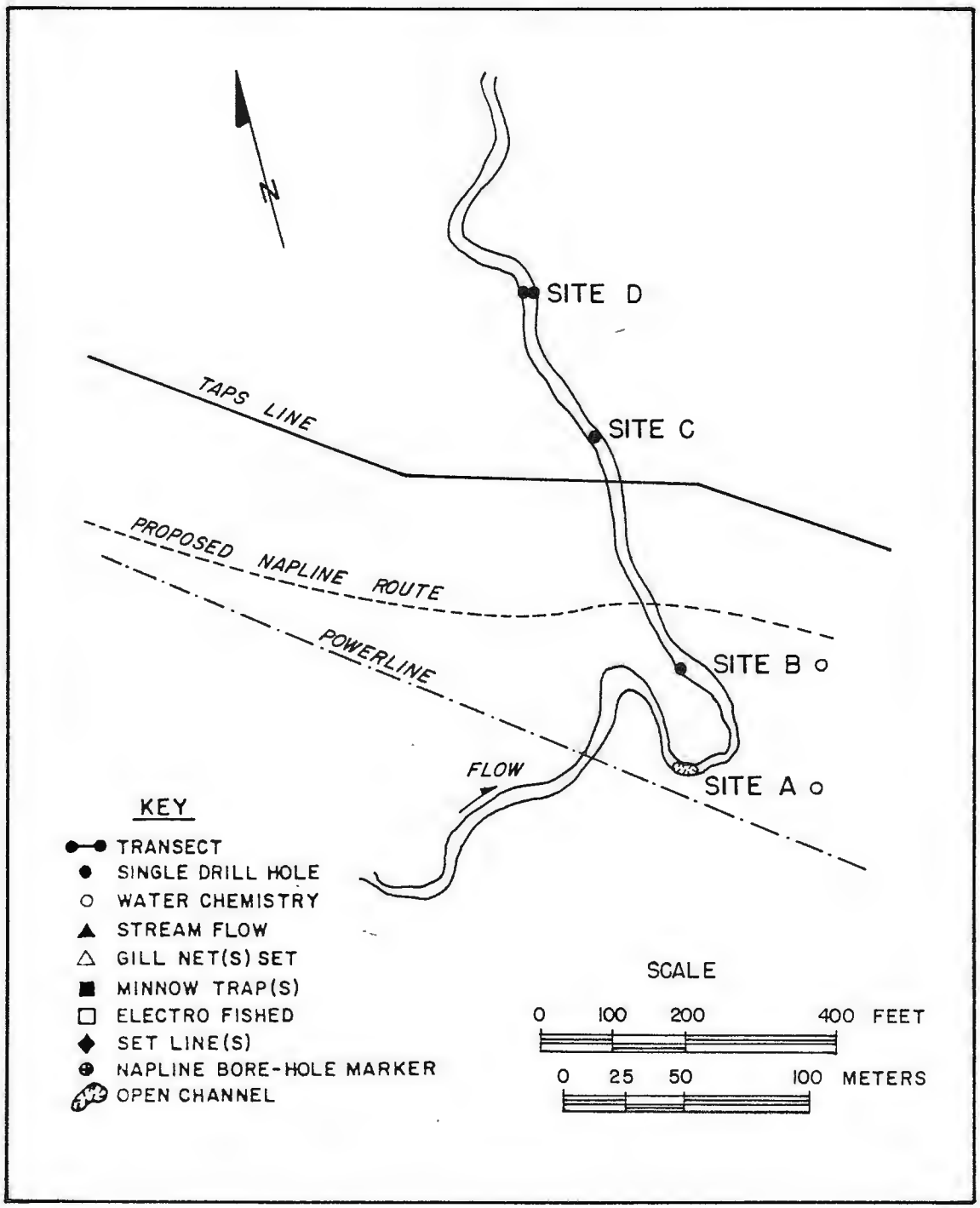

Fig. 33. Winter survey. Redmond Creek, 20 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody TAPS Slough

Main Drainage Tanana River Tributary to Salcha River

Figure(s) 3 and 34 Northwest Alignment Sheet 83

Ident. Nos: NPSI 4-158.02 Applicable Milepost NPMP 493.5

USGS Map Reference Big Delta, Alaska T- 5S R- 5E Sec 13

Site Access Workpad via Salcha River

ASSESSMENT

TAPS Slough is an old highwater channel which cuts through a large Salcha River oxbow.

No overwintering habitat is present in the vicinity of the proposed NAPLINE. Both sites drilled during the winter survey were frozen to the bottom.

SAMPLING LOCATIONS

SITE Figure 34

A 80 m upstream from NAPLINE

B 50 m upstream from NAPLINE

C

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	20 Mar 79	20 Mar 79				
Species						
Quantity						
Size (mm)						
Gear/Effort	Stream frozen to the bottom; no fish present					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	20 Mar 79	20 Mar 79				
Snow Depth (cm)						
Ice Depth (cm)	15	6				
Air Space (cm)	0	0				
Water Depth (cm)	0	0				
Discharge (m^3/s)	0	0				
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type						

REMARKS

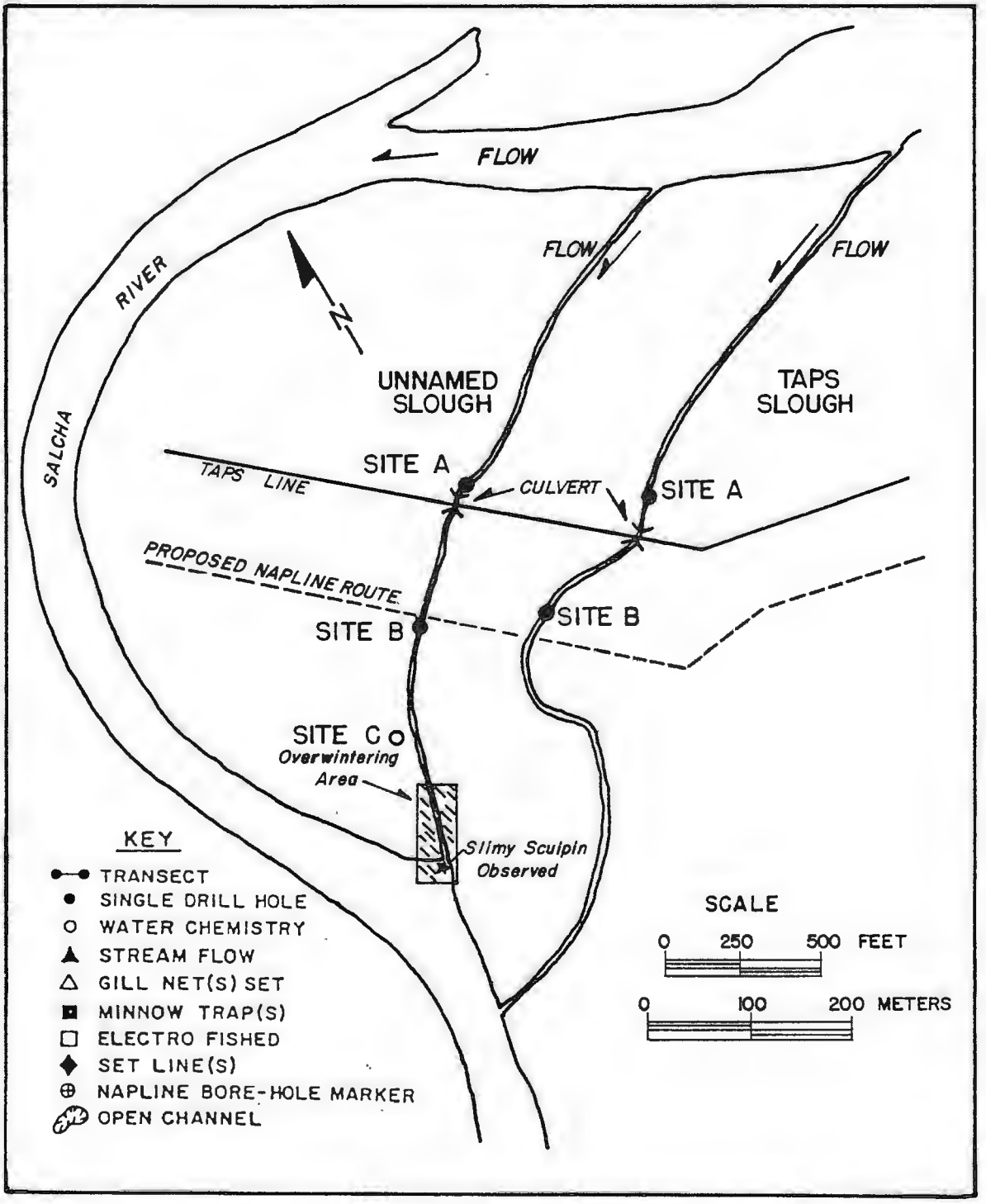

Fig. 34. Winter survey. TAPS Slough, 20 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Unnamed Slough

Main Drainage Tanana River Tributary to Salcha River

Figure(s) 3 and 34 Northwest Alignment Sheet 83

Ident. Nos: NPSI 4-158.01 Applicable Milepost NPMP 493.5

USGS Map Reference Big Delta, Alaska T- 5S R- 5E Sec 13

Site Access Workpad via Salcha River

ASSESSMENT

Unnamed Slough is an old high water channel which cuts through a large Salcha River oxbow. The upstream 700 m of this slough, including the NAPLINE crossing, does not provide overwintering habitat since free water was not present. The lower 200 m, including the confluence with the Salcha River, was identified as an overwintering site for slimy sculpin (visual observation).

SAMPLING LOCATIONS

SITE Figure 34

A 130 m upstream from NAPLINE

B 20 m downstream from NAPLINE

C 225 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	20 Mar 79	20 Mar 79	20 Mar 79			
Species			sculpin			
Quantity			1			
Size (mm)						
Gear/Effort	not fished	not fished	visual observation			

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	20 Mar 79	20 Mar 79	20 Mar 79			
Snow Depth (cm)			0			
Ice Depth (cm)	0	37	0			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	12	8			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)			6.2			
Temperature (°C)			2.0			
Conduct. ($\mu mhos/cm^2$)			280			
pH			6.5			
Color/Turbidity		black oily	clear			
Bottom Type		mud	mud gravel			

REMARKS

Site B water had a strong oily odor. Auger bit brought an oil soaked burlap bag out of the water. An overwintering site was identified 240 m downstream of the proposed NAPLINE and at the confluence with the Salcha.

D.O.: 6.4 Temp: 0.5 Cond: 255

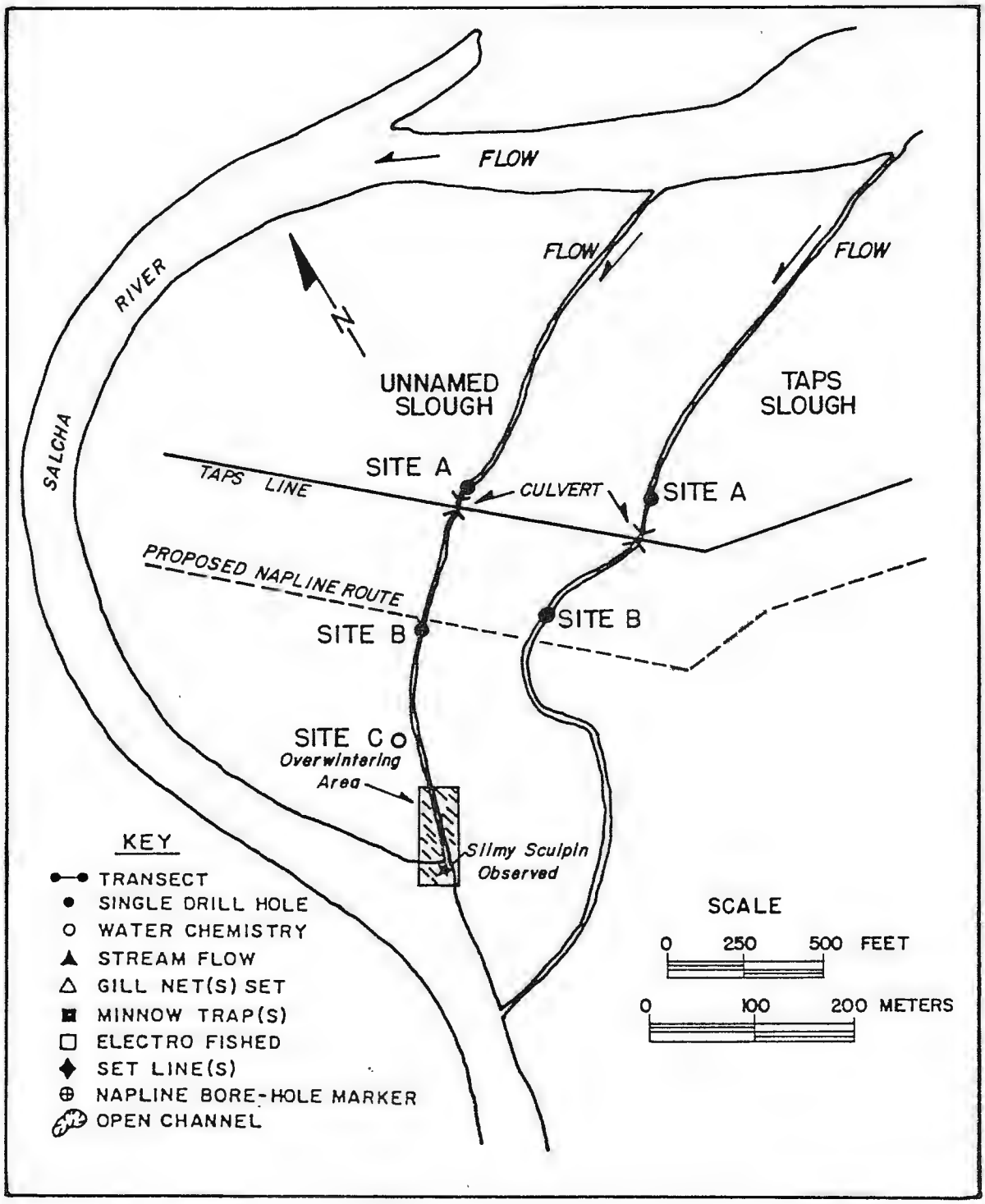

Fig. 34. Winter survey. TAPS Slough, 20 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Two-Nineteen Creek

Main Drainage Tanana River Tributary to Little Salcha River

Figure(s) 3 and 35 Northwest Alignment Sheet 83

Ident. Nos: NPSI 4-157.01 Applicable Milepost NPMP 489.4

USGS Map Reference Big Delta, Alsaka T- 5S R-5E Sec 3 & 4

Site Access Workpad via Pump Station #8

ASSESSMENT

Two-Nineteen Creek, at the NAPLINE, is a small creek less than 2 m in width. The stream flows through tundra and muskeg. Stream banks were low and frequently not visible. Predominant vegetation included black spruce and willow.

This stream does not provide overwintering habitat due to the absence of free water.

SAMPLING LOCATIONS

SITE Figure 35

A 225 m upstream from NAPLINE

B 110 m upstream from NAPLINE

C 90 m downstream from NAPLINE

D 190 m downstream from NAPLINE

E

F

FISH

SITE	A	B	C	D	E	F
Date	23 Mar 79	23 Mar 79	23 Mar 79	23 Mar 79		
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream either dry or frozen solid					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	23 Mar 79	23 Mar 79	23 Mar 79	23 Mar 79		
Snow Depth (cm)						
Ice Depth (cm)	99	106	0	0		
Air Space (cm)	0	0	0	0		
Water Depth (cm)	0	0	0	0		
Discharge (m^3/s)	0	0	0	0		
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	mud	mud	mud	mud		

REMARKS

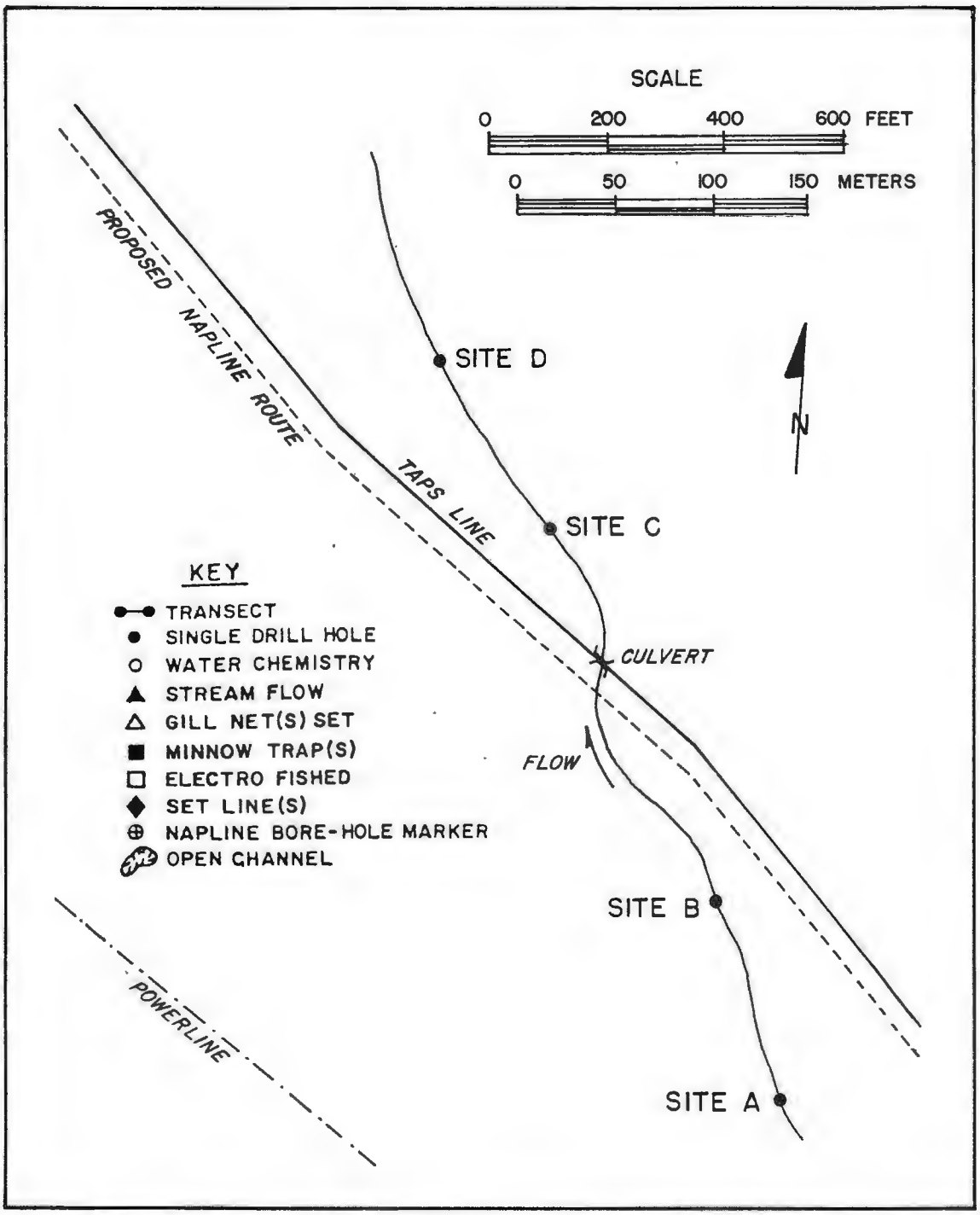

Fig. 35. Winter survey. Two-Nineteen Creek, 23 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Little Salcha River

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 3 and 36 Northwest Alignment Sheet 83

Ident. Nos: NPSI 4-157 Applicable Milepost NPMP 488.3

USGS Map Reference Big Delta, Alaska T- 4S R- 5E Sec 32

Site Access Snowmachine on workpad via Pump Station #8

ASSESSMENT

The Little Salcha River is a small, deep meandering stream which drains an area of approximately 130 km^2. It is largely bog fed and its humic-stained waters flow primarily over a sand and mud bottom. Channel width is approximately 6 m. Banks are moderately steep (1.8-2.4 m) and heavily wooded with alder and spruce in the area of the NAPLINE crossing.

Although stream flow was found to be discontinuous, suitable over-wintering habitat was located near the NAPLINE crossing. Late summer and fall spawning species (dog salmon, king salmon and whitefish) present in the Little Salcha River (Ref. 11) necessitate the presence of overwintering sites for developing eggs in this stream. A fall survey is necessary to verify the presence or absence of the aforementioned species in the area of the NAPLINE crossing. Flagging deep pools and spawning sites for future winter investigations is recommended.

SAMPLING LOCATIONS

SITE Figure 36

A 130 m upstream from NAPLINE

B 60 m upstream from NAPLINE

C NAPLINE crossing

D 45 m downstream from NAPLINE

E 70 m downstream from NAPLINE

F

FISH

SITE	A	B	C	D	E	F
Date	21 Mar 79	21 Mar 79	21 Mar 79	21 Mar 79	22 Mar 79 23 Mar 79	
Species						
Quantity						
Size (mm)						
Gear/Effort	Sites A-D not fished; had stagnant or no water				1MT(26h) 5mGN(22h)	

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	21 Mar 79	21 Mar 79	21 Mar 79	21 Mar 79	23 Mar 79	
Snow Depth (cm)						
Ice Depth (cm)	76	76	60-80	60-80	40-52	
Air Space (cm)	0	0	0	0	0	
Water Depth (cm)	15	3-30	0-2	0-2	0-67	
Discharge (m^3/s)	0	0	0	0	0.15	
D. O. (mg/l)		8.4			7.0	
Temperature (°C)		0.5			0.5	
Conduct. ($\mu mhos/cm^2$)		120			100	
pH		6.2			6.3	
Color/Turbidity	clear	clear	brown	brown	clear	
Bottom Type	gravel sand	sand	sand	mud	gravel sand	

REMARKS

Stream flow apparently not continuous. Discharge at Site E possibly due to upwelling groundwater. Live caddisfly larvae abundant at Site E. No overflow activity was noted during present investigations. Approximate dimensions of pool at Site E were 5.5 x 9.0 m.

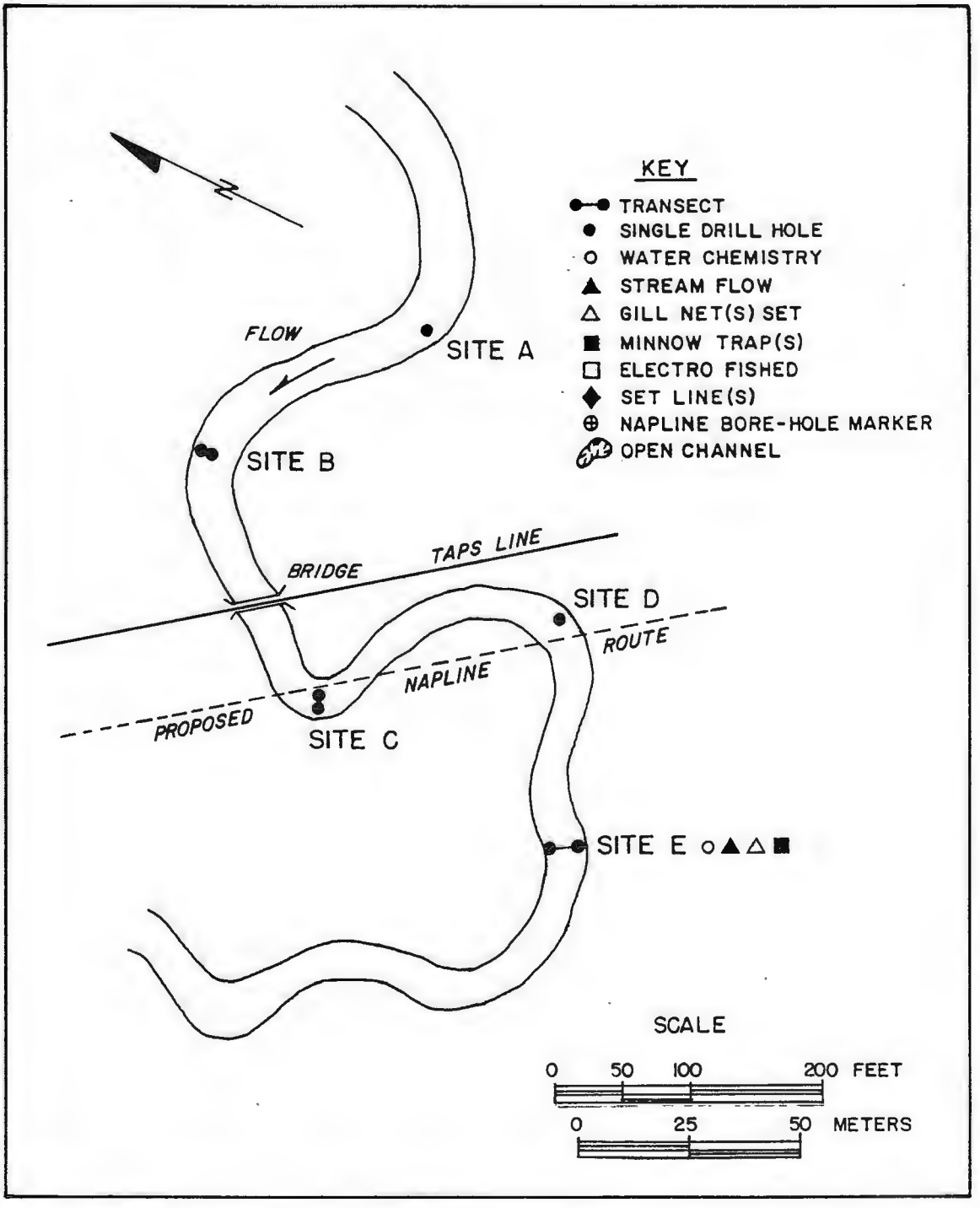

Fig. 36. Winter survey. Little Salcha River, 21-23 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Million Dollar Creek #1

Main Drainage Tanana River Tributary to French Creek

Figure(s) 3 and 37 Northwest Alignment Sheet 82

Ident. Nos: NPSI 4-156.03 Applicable Milepost NPMP 483.3

USGS Map Reference Big Delta, Alaska T- 4S R-4E Sec 11

Site Access Snowmachine on workpad via Pump Station #8

ASSESSMENT

Million Dollar Creek #1 is a small tundra stream less than 10 m in width. It flows through tundra and muskeg; predominant vegetation include stunted black spruce and willow.

Overwintering habitat was not present at this site due to the stream being dry or frozen to the bottom.

SAMPLING LOCATIONS

SITE Figure 37

A 20 m upstream from NAPLINE

B 60 m downstream from NAPLINE

C

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79				
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen and or dry					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79				
Snow Depth (cm)						
Ice Depth (cm)	45	39				
Air Space (cm)	0	53				
Water Depth (cm)	0	0				
Discharge (m^3/s)	0	0				
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type						

REMARKS

Site B: stream bottom dry due to airspace.

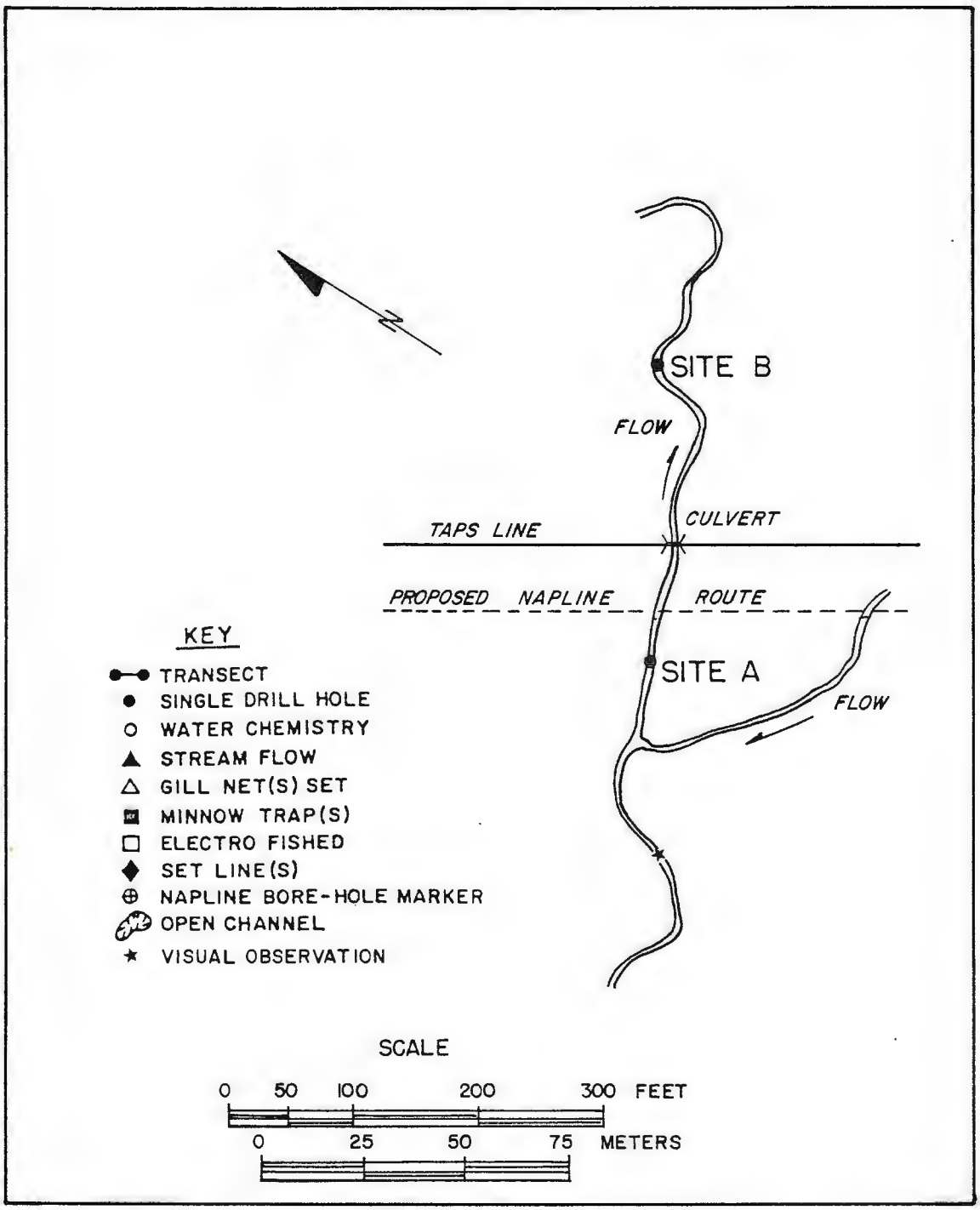

Fig. 37. Winter survey. Million Dollar Creek #1, 24 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Million Dollar Creek #2

Main Drainage Tanana River Tributary to French Creek

Figure(s) 3 and 38 Northwest Alignment Sheet 82

Ident. Nos: NPSI 4-156.02 Applicable Milepost NPMP 483.1

USGS Map Reference Big Delta, Alaska T- 4S R- 4E Sec 11

Site Access Snowmachine on workpad via Pump Station #8

ASSESSMENT

Million Dollar Creek #2 is a narrow, beaded tundra stream 2-4 m in width with larger deep pools separated by small narrow channels. The larger pools often have incised banks 1.5-2.5 m in height.

Overwintering habitat in this region was not present due to absence of flow and lack of dissolved oxygen.

SAMPLING LOCATIONS

SITE Figure 38

A 55 m upstream from NAPLINE

B NAPLINE crossing

C 20 m downstream from NAPLINE

D 45 m downstream from NAPLINE

E

F

FISH

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79		
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely; stream frozen solid or stagnant water with no dissolved oxygen					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79		
Snow Depth (cm)						
Ice Depth (cm)	145	55	48	90		
Air Space (cm)	0	0	0	0		
Water Depth (cm)	0	35	0	45		
Discharge (m^3/s)	0	0	0	0		
D. O. (mg/l)				0.0		
Temperature (°C)				1		
Conduct. ($\mu mhos/cm^2$)				160		
pH				6.3		
Color/Turbidity				stained		
Bottom Type		gravel	gravel	mud		

REMARKS

Site D: very strong H_2S odor.

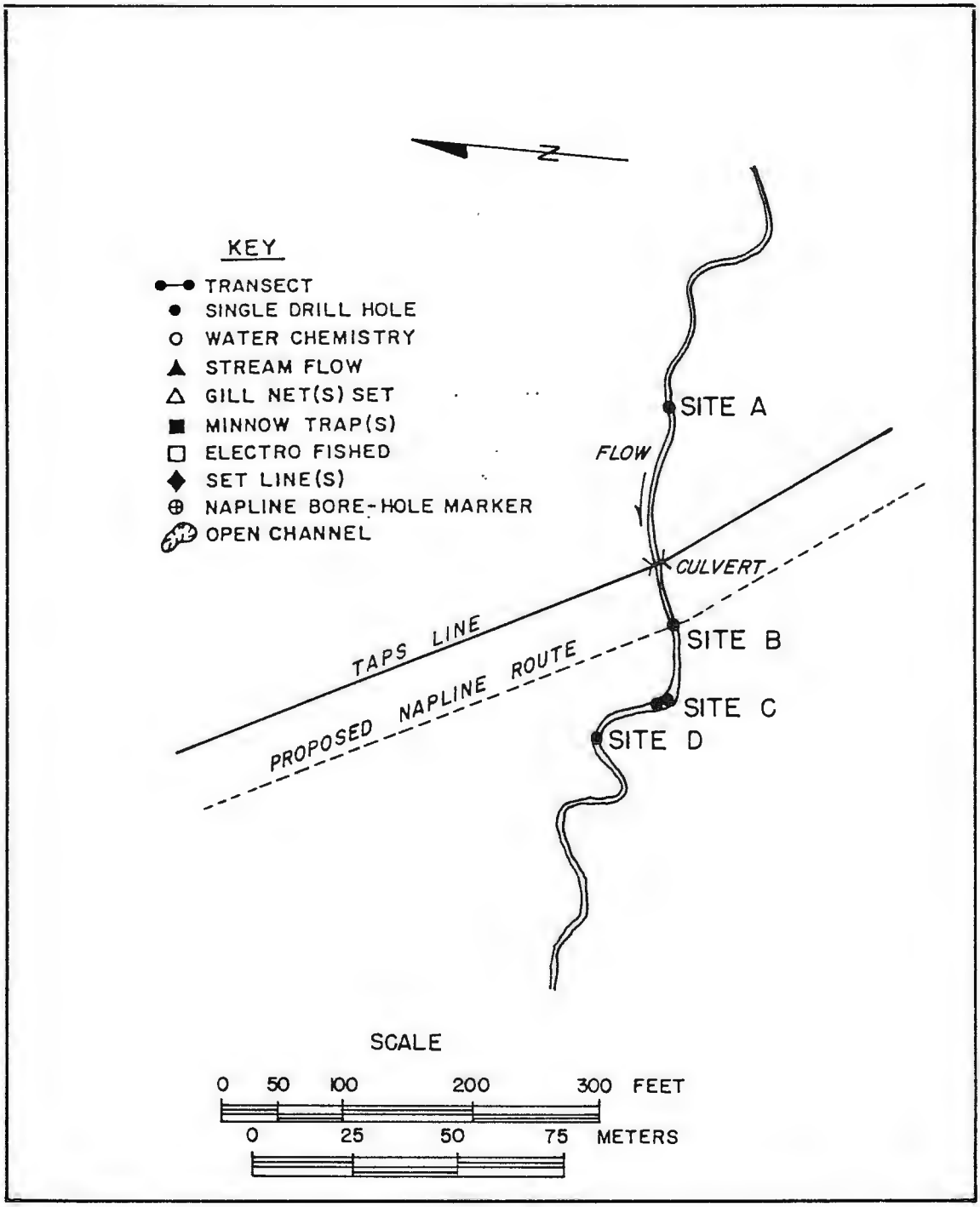

Fig. 38. Winter survey. Million Dollar Creek #2, 24 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Million Dollar Creek #3

Main Drainage Tanana River Tributary to French Creek

Figure(s) 3 and 39 Northwest Alignment Sheet 82

Ident. Nos: NPSI 4-156.01 Applicable Milepost NPMP 482.9

USGS Map Reference Big Delta, Alaska T-4S R-4E Sec 11 & 12

Site Access Snowmachine on workpad via Pump Station #8

ASSESSMENT

Million Dollar Creek #3 is a small tundra streem 3-4 m wide that flows through tundra and muskeg areas. Banks were 1.0-1.5 m high and bordered by grasses, willows, alders and spruce.

Overwintering habitat did not exist at this site; no water was found in the stream channel.

SAMPLING LOCATIONS

SITE Figure 39

A 130 m upstream from NAPLINE

B 95 m downstream from NAPLINE

C

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79				
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present due to absence of water					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79				
Snow Depth (cm)						
Ice Depth (cm)	33	38				
Air Space (cm)	0	36				
Water Depth (cm)	0	0				
Discharge (m^3/s)	0	0				
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	mud	mud				

REMARKS

Ice occurred only intermittently within the stream channel and water was not present.

Visual observation at the NAPLINE revealed the absence of free water and ice.

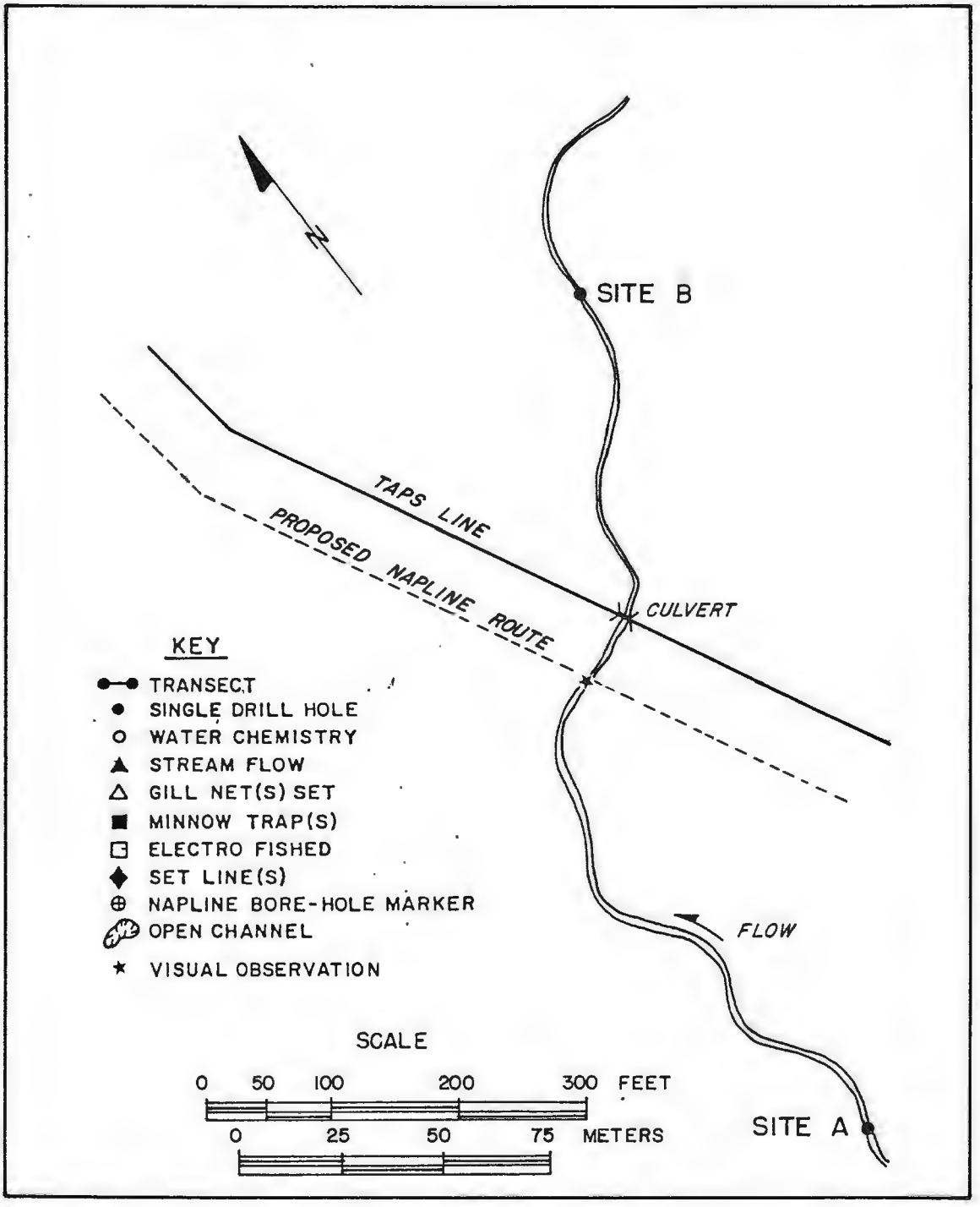

Fig. 39. Winter survey. Million Dollar Creek #3, 24 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Million Dollar Creek #4

Main Drainage Tanana River Tributary to French Creek

Figure(s) 3 and 40 Northwest Alignment Sheet 82

Ident. Nos: NPSI 4-156 Applicable Milepost NPMP 482.5

USGS Map Reference Big Delta, Alaska T- 4S R- 4E Sec 2

Site Access Snowmachine via workpad from Pump #8

ASSESSMENT

Million Dollar Creek #4 is a small tundra stream 4-5 m wide with banks about 1.6 m high. The steep and sometimes incised banks are bordered by scattered large spruce and many fallen trees across the channel.

Overwintering habitat was not present in this area due to the absence of water in the stream channel.

SAMPLING LOCATIONS

SITE Figure 40

A 70 m upstream of NAPLINE

B NAPLINE crossing

C 70 m downstream of NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79	24 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely; stream intermittently frozen to bottom, strong H_2S odor					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79	24 Mar 79			
Snow Depth (cm)						
Ice Depth (cm)	76	91	119			
Air Space (cm)	0	0	0			
Water Depth (cm)	15	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	mud gravel	mud	mud			

REMARKS

Site A: Very strong odor of H_2S.

Site B&C: Moist mud substrate but no water present.

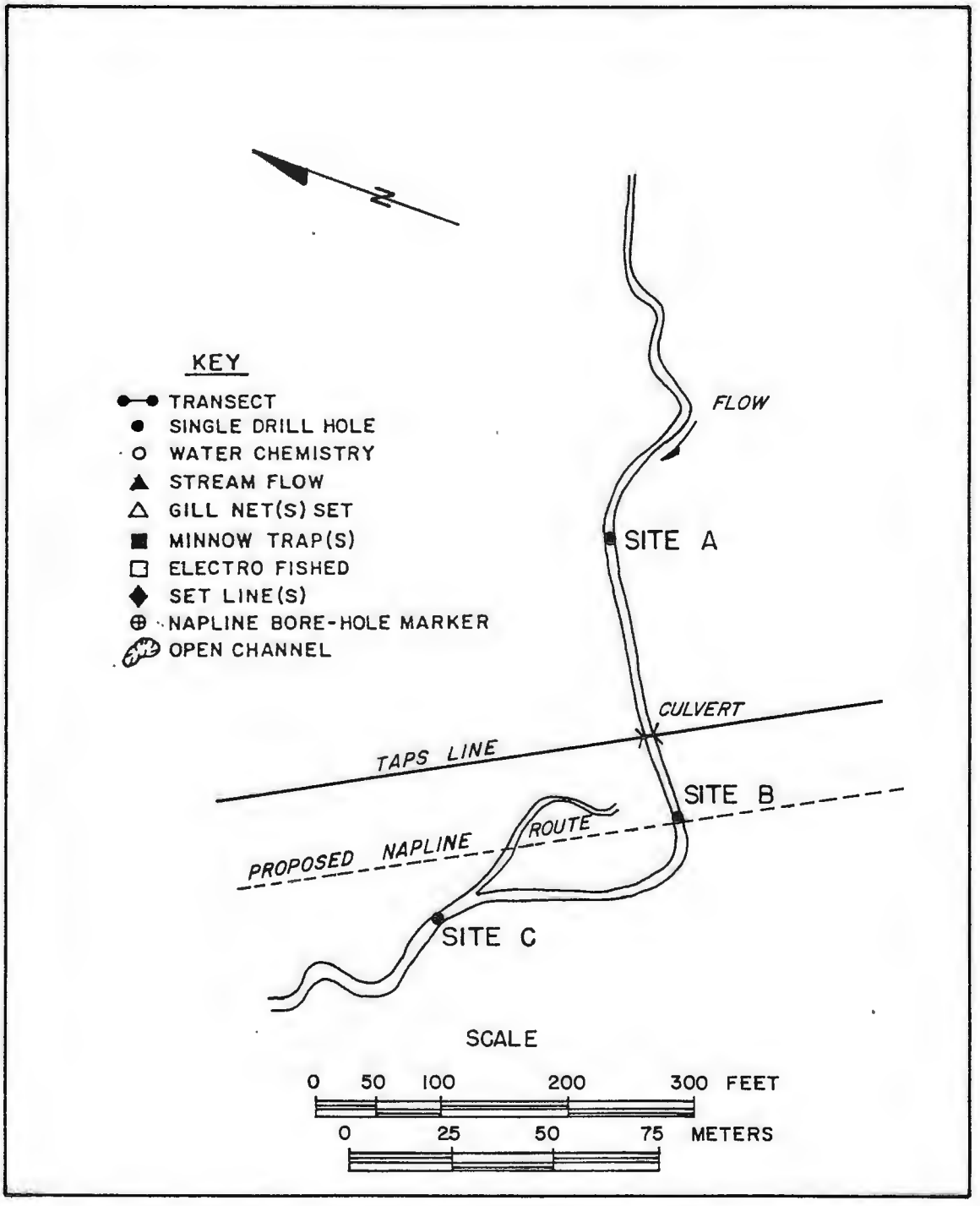

Fig. 40. Winter survey. Million Dollar Creek #4, 24 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody French Creek #0

Main Drainage Tanana River Tributary to Moose Creek

Figure(s) 3 and 41 Northwest Alignment Sheet 81

Ident. Nos: NPSI 4-155 Applicable Milepost NPMP 481.5

USGS Map Reference Big Delta, Alaska T-3S R-4E Sec 34

Site Access Snowmachine onworkpad via Pump Station #8

ASSESSMENT

French Creek crossing #0 is the furthest upstream crossing of six total proposed NAPLINE crossings. This stream channel varies from 7-15 m in width with 0.1-3 m high banks that are often incised or vertical. The crossing is in an area of extensive icing. A maximum ice measurement of 4 m was reported 25 March 1976 (Ref. 11).

Overwintering habitat was not available at this crossing due to the absence of free-flowing water.

SAMPLING LOCATIONS

SITE Figure 41

A 280 m upstream from NAPLINE

B 155 m upstream from NAPLINE

C NAPLINE crossing

D 75 m downstream from NAPLINE

E 115 m downstream from NAPLINE

F

FISH

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79	
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely; stream frozen to bottom or stagnant					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79	24 Mar 79	
Snow Depth (cm)						
Ice Depth (cm)	129	102	135	141	69	
Air Space (cm)	0	0	0	0	0	
Water Depth (cm)	0	15	0	0	0	
Discharge (m^3/s)	0	0	0	0	0	
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	mud	mud	mud	mud	mud	

REMARKS

Overflow present throughout the entire area. A water lens (3 cm) was present approximately 31 cm from the ice surface at all sites.

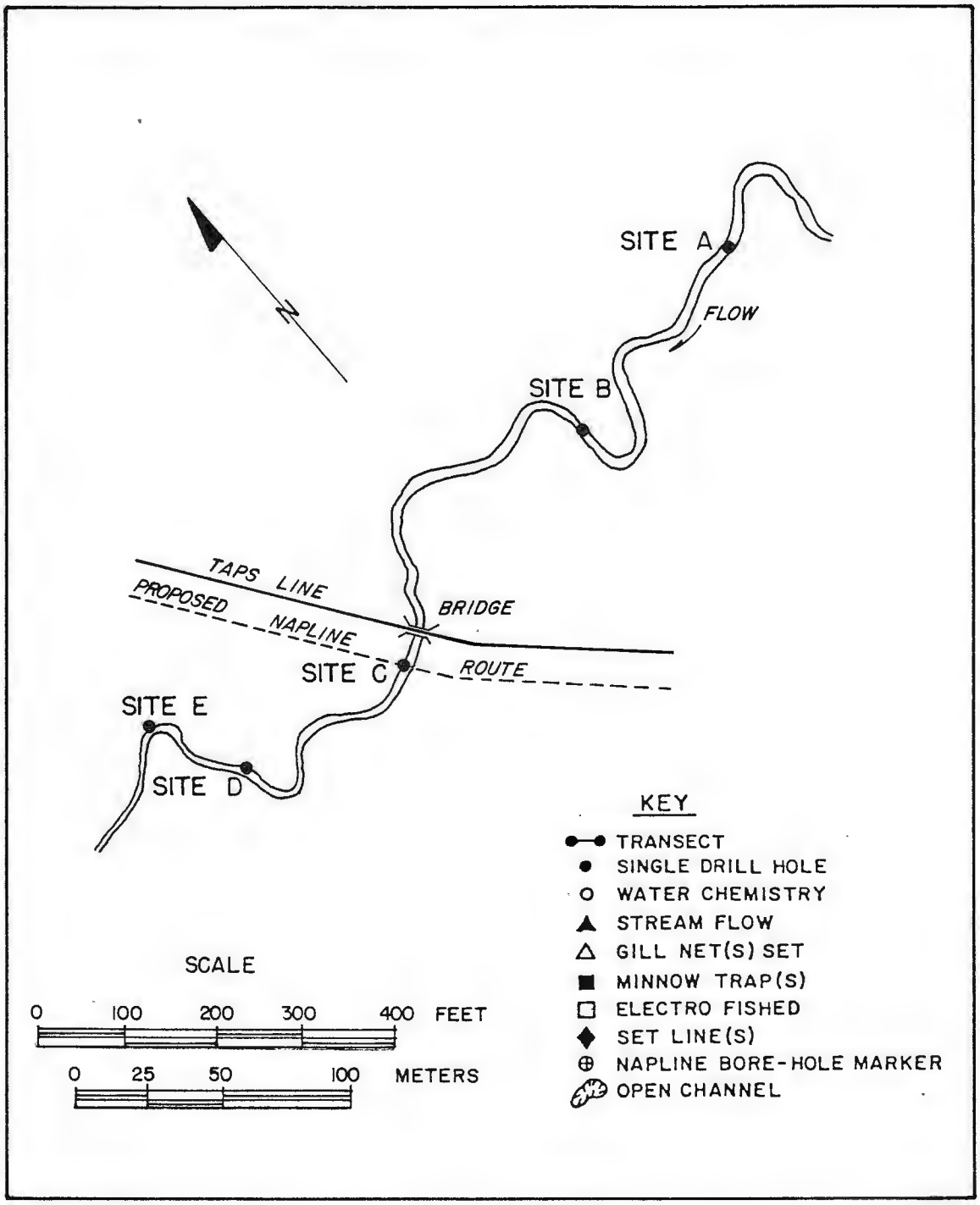

Fig. 41. Winter survey. French Creek #0, 24 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Knokanpeover Creek

Main Drainage Tanana River Tributary to French Creek

Figure(s) 3 and 42 Northwest Alignment Sheet 81

Ident. Nos: NPSI 4-154.01 Applicable Milepost NPMP 478.3

USGS Map Reference Fairbanks, Alaska T- 3S R-4E Sec 20

Site Access Workpad via Eielson Air Force Base

ASSESSMENT

Knokanpeover Creek is a small stained single channel tundra creek with 2-2.5 m high and incised banks. The channel width varies from 3-8 m. The substrate usually consists of mud. The areas upstream of the NAPLINE were extensively glaciered.

Knokanpeover Creek does not appear to provide overwintering habitat since no unfrozen water was found.

SAMPLING LOCATIONS

SITE Figure 42

A 90 m upstream from NAPLINE

B 50 m upstream from NAPLINE

C NAPLINE crossing

D 85 m downstream from NAPLINE

E

F

FISH

SITE	A	B	C	D	E	F
Date	25 Mar 79	25 Mar 79	25 Mar 79	25 Mar 79		
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely; stream probably frozen solid.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	25 Mar 79	25 Mar 79	25 Mar 79	25 Mar 79		
Snow Depth (cm)				48		
Ice Depth (cm)	165+	165+	78	0		
Air Space (cm)			0	0		
Water Depth (cm)			0	0		
Discharge (m^3/s)			0	0		
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	mud	mud	mud	mud		

REMARKS

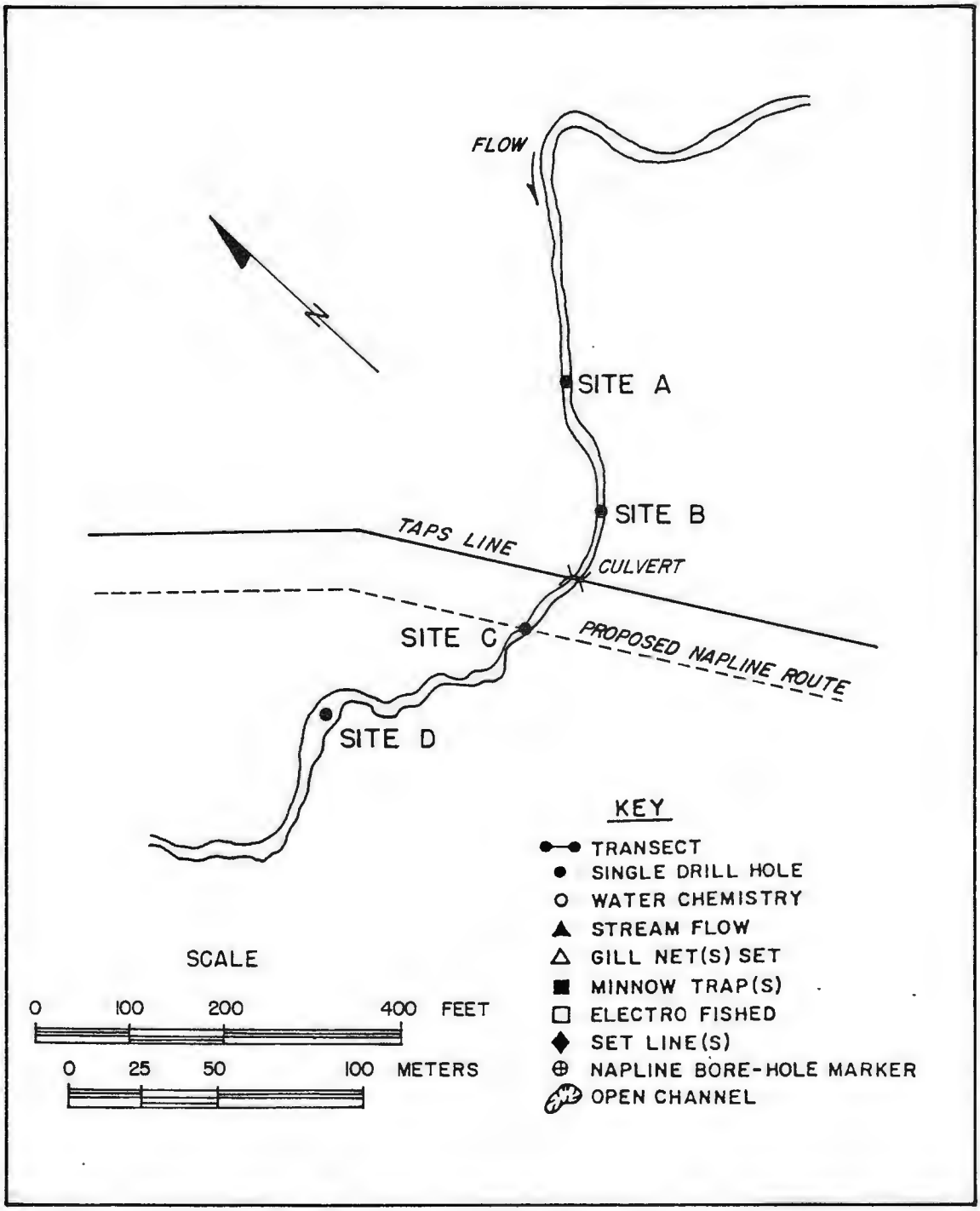

Fig. 42. Winter survey. Knokanpeover Creek, 25 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody French Creek #1

Main Drainage Tanana River Tributary to Moose Creek

Figure(s) 3 and 43 Northwest Alignment Sheet 81

Ident. Nos: NPSI 4-153 Applicable Milepost NPMP 475.8

USGS Map Reference Fairbanks, Alaska T-3S R-4E Sec 7

Site Access Snowmachine on workpad via Eielson Air Force Base

ASSESSMENT

French Creek crossing #1 is a meandering stream with 1.5-2.5 m high steep banks. The stream channel varies from 3-4.5 m in width. The substrate consists primarily of mud.

French Creek #'s 1-5 are all crossings of the main channel of French Creek and not side tributaries. These five crossings are also all located within a linear distance of 6 km. French Creek #0 is also a crossing more than 9 km upstream of #1.

Overwintering habitat quality was marginal due to low dissolved oxygen and the absence of flow.

SAMPLING LOCATIONS

SITE Figure 43

A 100 m upstream from NAPLINE

B NAPLINE crossing

C 90 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	25 Mar 79	25 Mar 79	25 Mar 79			
Species						
Quantity	0					
Size (mm)						
Gear/Effort	MT(23h)	not fished	not fished			

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	25 Mar 79	25 Mar 79	25 Mar 79			
Snow Depth (cm)		24				
Ice Depth (cm)	51	75	65			
Air Space (cm)	7	0	6			
Water Depth (cm)	96	50	33			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)	3.0					
Temperature (°C)	0.5					
Conduct. ($\mu mhos/cm^2$)	270					
pH	7.0					
Color/Turbidity	dark brown					
Bottom Type	mud	mud	mud			

REMARKS

Site A: Faint H_2S odor present. Chironomids were found in the baited minnow trap.

Site C: Strong H_2S odor.

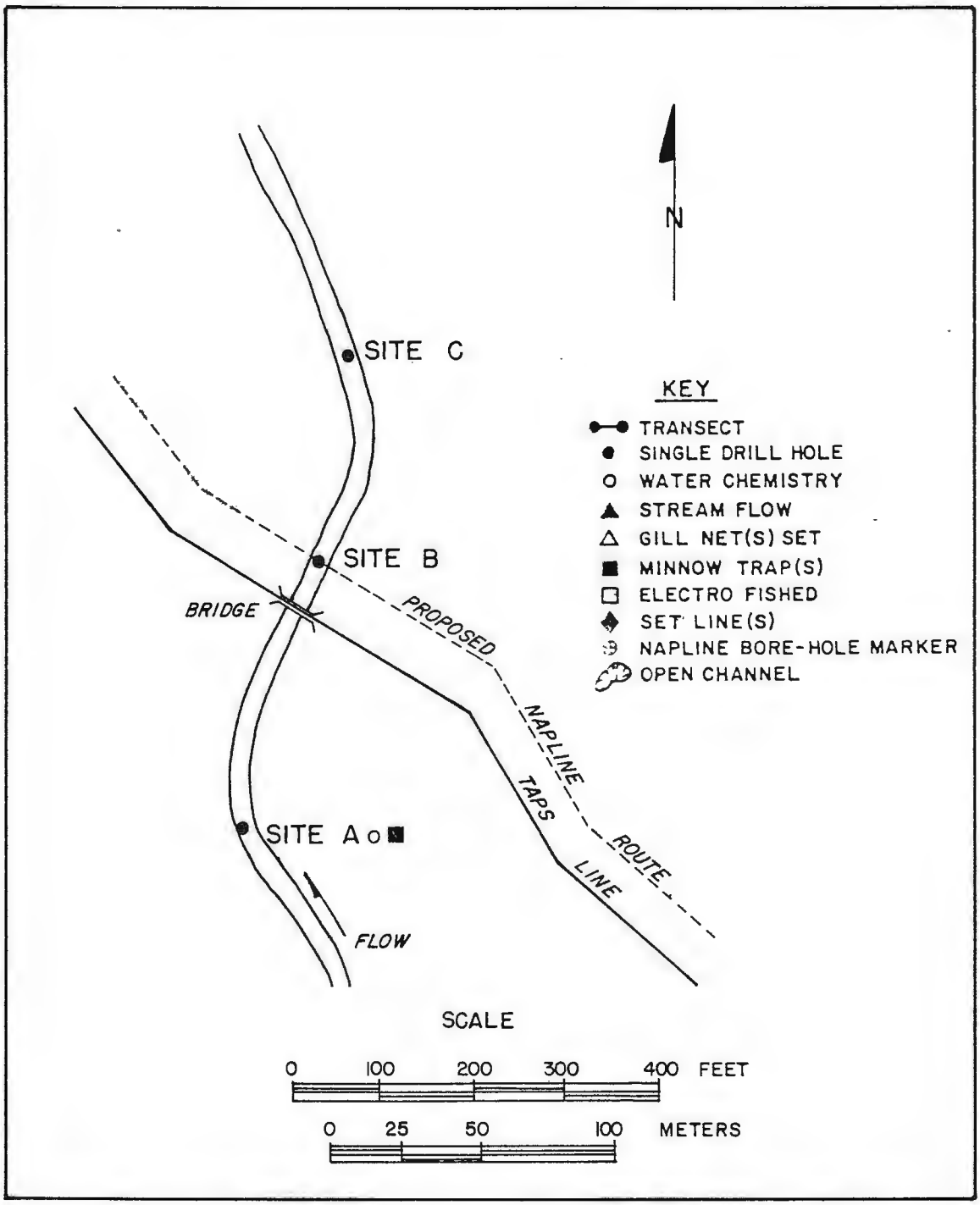

Fig. 43. Winter survey. French Creek #1, 25 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody French Creek #2

Main Drainage Tanana River Tributary to Moose Creek

Figure(s) 3 and 44 Northwest Alignment Sheet 80

Ident. Nos: NPSI 4-152 Applicable Milepost NPMP 474.9

USGS Map Reference Fairbanks, Alaska T-3S R- 3E Sec 1

Site Access Snowmachine on workpad via Eielson Air Force Base

ASSESSMENT

French Creek #2 is the third crossing proposed on this stream. Banks were 1.5-2 m in height and lined with grass, willow and alder. Extensive overflow was present.

Overwintering potential in this area is still largely unknown. Water was present under ice but flow was negligible. The red water color and red deposits on substrate suggest a high iron content.

SAMPLING LOCATIONS

SITE Figure 44

A 115 m upstream from NAPLINE

B NAPLINE crossing

C 110 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	25 Mar 79	25 Mar 79	25 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely due to stagnant water					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	25 Mar 79	25 Mar 79	25 Mar 79			
Snow Depth (cm)						
Ice Depth (cm)	120	141	118			
Air Space (cm)	0	0	0			
Water Depth (cm)	26	81	31			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity	stained	stained	stained			
Bottom Type	mud	mud	mud			

REMARKS

Water lenses were present at all sites.

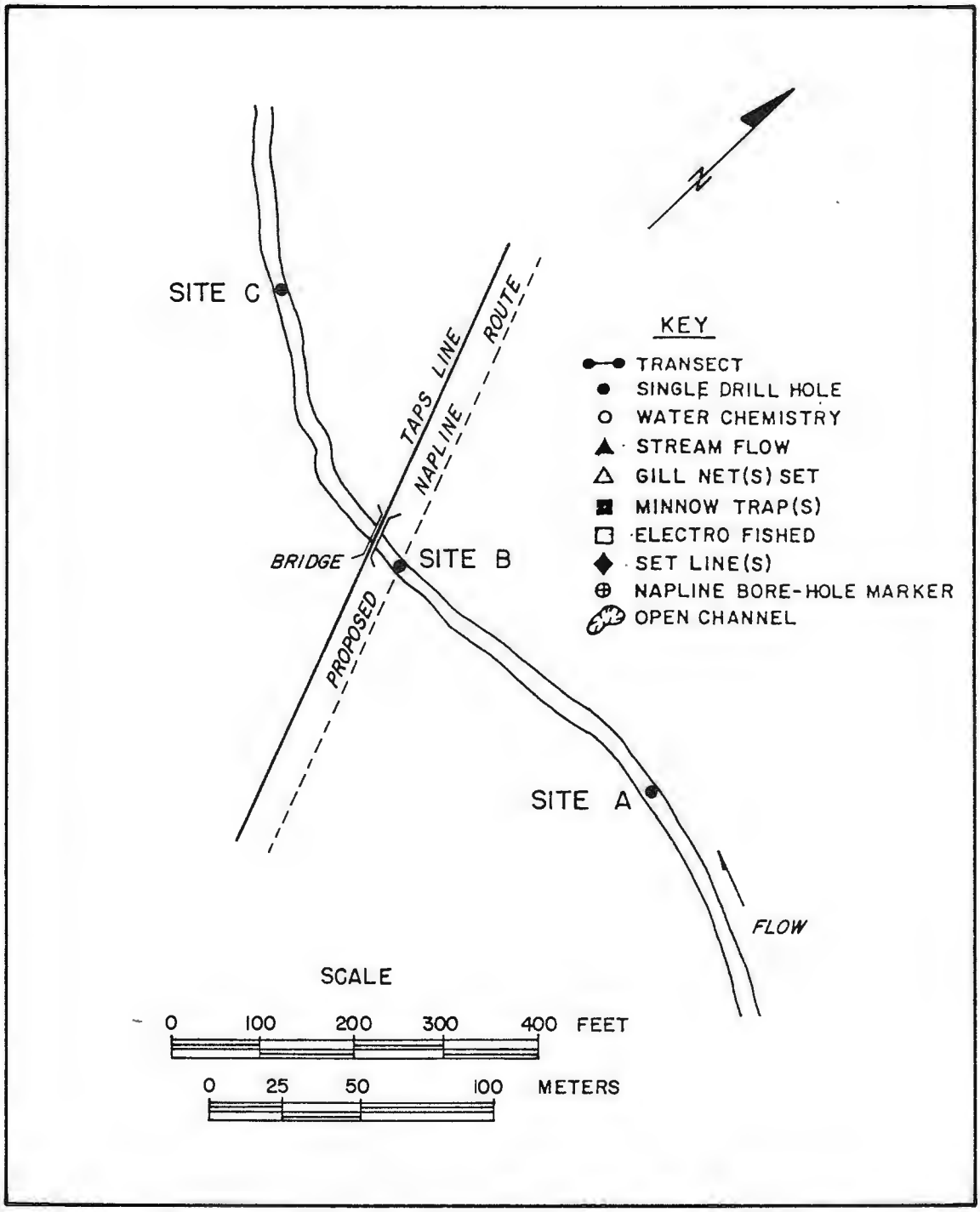

Fig. 44. Winter survey. French Creek #2, 25 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody French Creek #3

Main Drainage Tanana River Tributary to Moose Creek

Figure(s) 3 and 45 Northwest Alignment Sheet 80

Ident. Nos: NPSI 4-151 Applicable Milepost NPMP 474.4

USGS Map Reference Fairbanks, Alaska T-3S R-3E Sec 1

Site Access Snowmachine on workpad via Eielson Air Force Base

ASSESSMENT

French Creek #3 is a wide creek 7-8 m in width with well defined stream banks. Banks were lined with willow, alder and grass.

Overwintering potential is not known. Under-ice water was present but flow was very slow.

SAMPLING LOCATIONS

SITE Figure 45

A 100 m upstream from NAPLINE

B

C

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	25 Mar 79					
Species						
Quantity						
Size (mm)						
Gear/Effort	not fished					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	25 Mar 79					
Snow Depth (cm)						
Ice Depth (cm)	78					
Air Space (cm)	0					
Water Depth (cm)	57					
Discharge (m^3/s)	0*					
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity	stained					
Bottom Type	mud					

REMARKS

Visual observations were made at the crossing and 50 m downstream of the crossing. Ice too hazardous to walk on.

Site A: Slight flow observed but did not register on equipment. Chironomid larvae observed in drill hole.

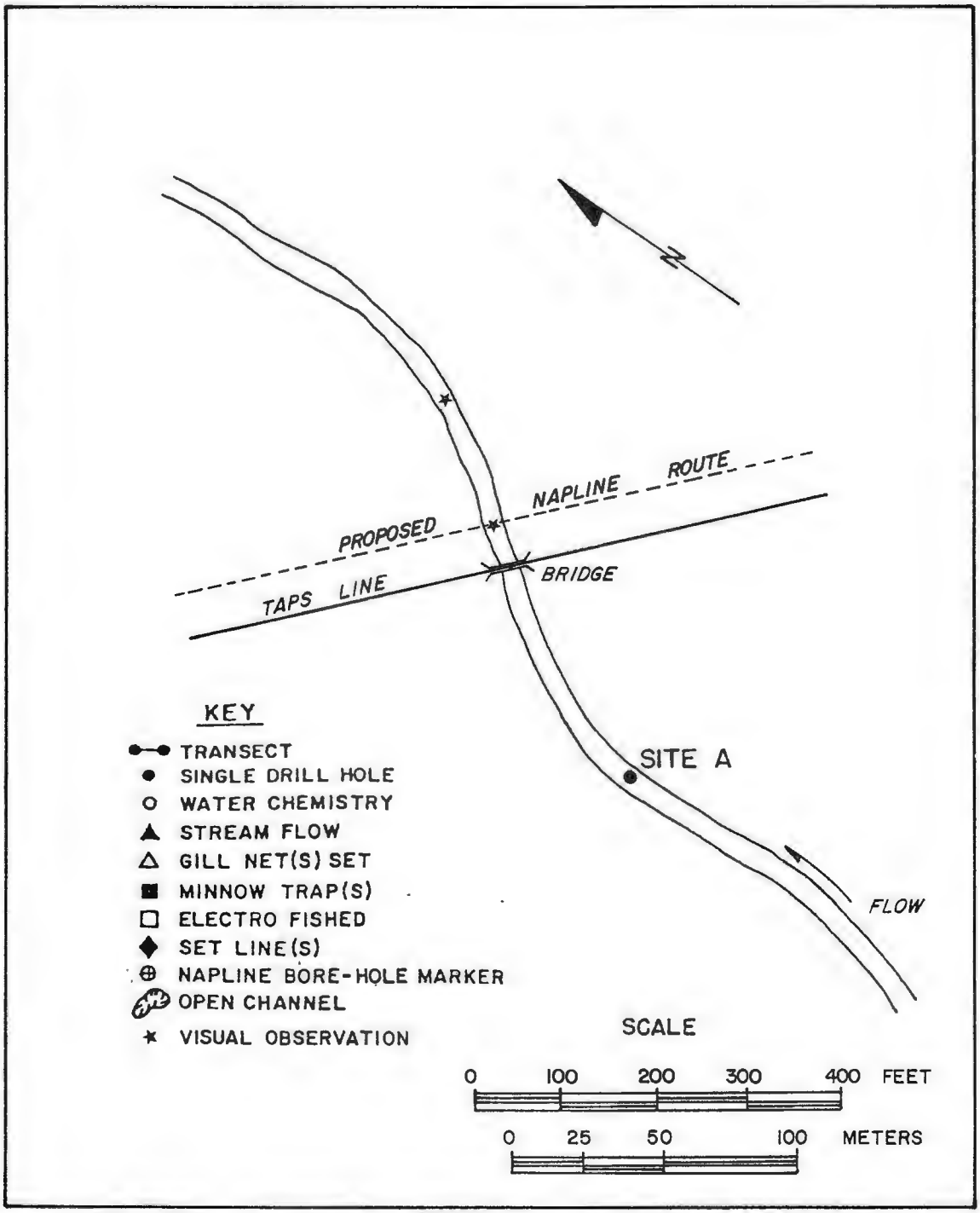

Fig. 45. Winter survey. French Creek #3, 25 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody French Creek #4

Main Drainage Tanana River Tributary to Moose Creek

Figure(s) 3 and 46 Northwest Alignment Sheet 80

Ident. Nos: NPSI 4-150 Applicable Milepost NPMP 474.1

USGS Map Reference Fairbanks, Alaska T-2S R-3E Sec 36

Site Access Snowmachine on workpad via Eielson Air Force Base

ASSESSMENT

French Creek #4 is a wide creek, 8-11 m in width with well defined banks 1.5-2.5 m in height. Banks were covered with willow, alder and grass. Overflow in this area was extensive.

Overwintering potential not known. Under-ice water was present but flow was negligible.

SAMPLING LOCATIONS

SITE Figure 46

A 100 m upstream from NAPLINE

B

C

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	25 Mar 79					
Species						
Quantity						
Size (mm)						
Gear/Effort	not fished					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	25 Mar 79					
Snow Depth (cm)						
Ice Depth (cm)	87					
Air Space (cm)	0					
Water Depth (cm)	72					
Discharge (m^3/s)	0					
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity	stained					
Bottom Type	mud					

REMARKS

Ice conditions at NAPLINE and downstream from NAPLINE too hazardous to walk on.

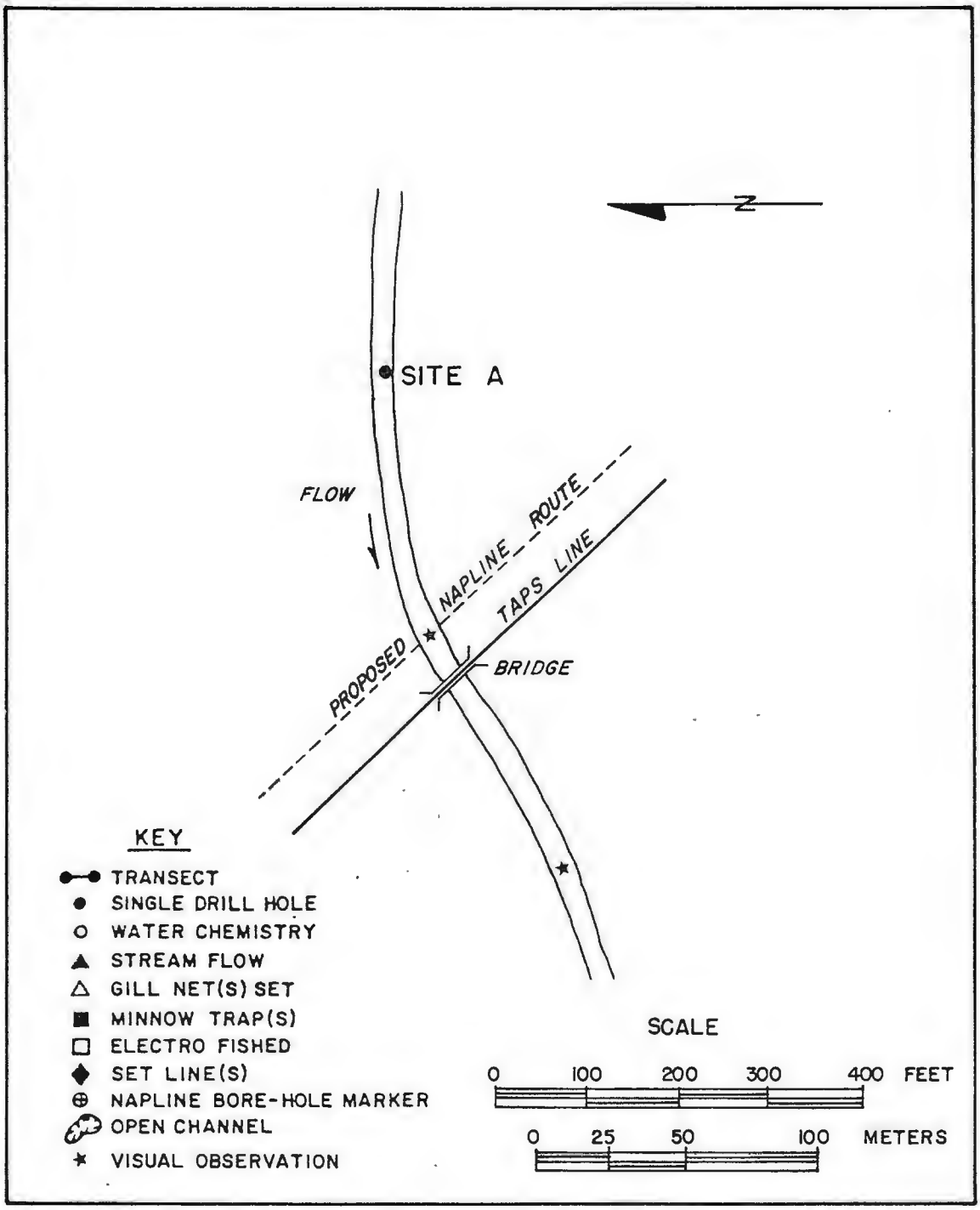

Fig. 46. Winter survey. French Creek #4, 25 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody French Creek #5

Main Drainage Tanana River Tributary to Moose Creek

Figure(s) 3 and 47 Northwest Alignment Sheet 80

Ident. Nos: NPSI 4-149 Applicable Milepost NPMP 472.4

USGS Map Reference Fairbanks, Alaska T-2S R-3E Sec 27

Site Access Snowmachine on workpad via Eielson Air Force Base

ASSESSMENT

French Creek #5 is the farthest downstream crossing of French Creek proposed by the NAPLINE. The open water stretch found at the crossing had a gravel substrate downstream of the workpad. Above the workpad, and 25-50 cm downstream of the workpad, the substrate was mud.

Overwintering habitat quality was marginal in this region due to low dissolved oxygen and poor stream conditions. No fish were caught.

SAMPLING LOCATIONS

SITE Figure 47

A NAPLINE crossing (100 m downstream)

B

C

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	27 Mar 79					
Species						
Quantity	0					
Size (mm)						
Gear/Effort	EF(100m)					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	27 Mar 79					
Snow Depth (cm)	0					
Ice Depth (cm)	0					
Air Space (cm)	0					
Water Depth (cm)	0.45					
Discharge (m^3/s)	0.02 est					
D. O. (mg/l)	3.4					
Temperature (°C)	0					
Conduct. ($\mu mhos/cm^2$)	435					
pH	6.7					
Color/Turbidity	stained					
Bottom Type	mud gravel debris					

REMARKS

Ice conditions too hazardous above and below crossing to walk on.

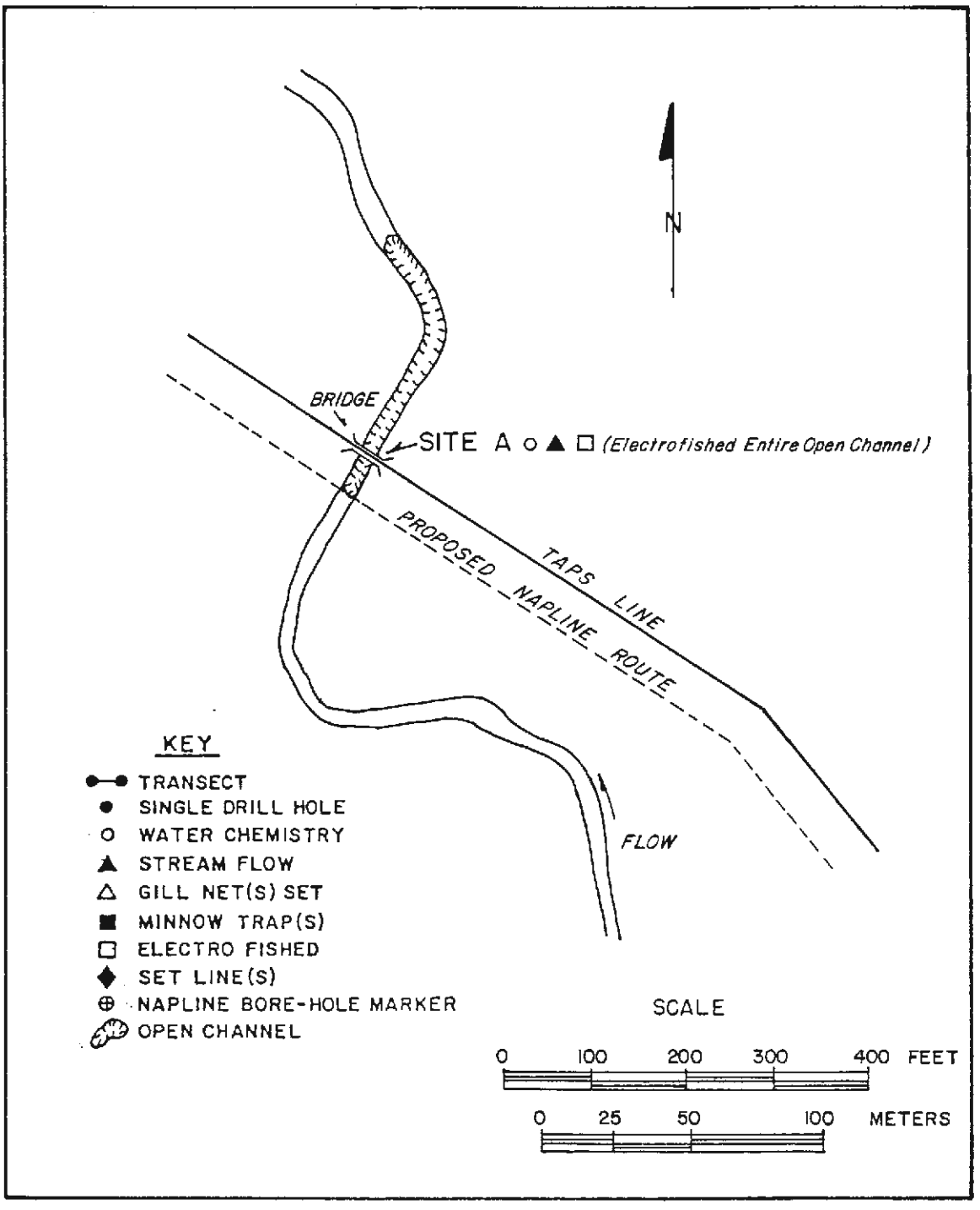

Fig. 47. Winter survey. French Creek #5, 27 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Moose Creek #3

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 3 and 48 Northwest Alignment Sheet 80

Ident. Nos: NPSI 4-146 Applicable Milepost NPMP 469.3

USGS Map Reference Fairbanks, Alaska T-2S R- 3E Sec 20

Site Access Snowmachine on workpad from Eielson Air Force Base

ASSESSMENT

Moose Creek #3 is a medium sized, humic-stained, meandering stream with a channel width of 10-12 m. Steep, grassy banks were 2-2.5 m high and lined with willow and alder. The upstream NAPLINE crossings (Moose Creeks #1 and #2) were open water channels, while ice thickness at Moose Creek #3 varied from 73-116 cm.

Overwintering potential was marginal due to low dissolved oxygen and negligible flow. No fish were captured in gillnets or on setlines fished in Moose Creek #3.

SAMPLING LOCATIONS

SITE Figure 48

A 100 m upstream of NAPLINE crossing

B NAPLINE crossing

C 65 m downstream of NAPLINE crossing

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	26 Mar 79	26 Mar 79	26 Mar 79			
Species						
Quantity	0	0				
Size (mm)						
Gear/Effort	15mGN(21h)	6SL(126h)	not fished			

These six setlines were set between the NAPLINE crossing and 150 m upstream.

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	26 Mar 79	26 Mar 79	26 Mar 79			
Snow Depth (cm)	0	0				
Ice Depth (cm)	73-88	104	116			
Air Space (cm)	0	0	0			
Water Depth (cm)	66-85	76	88			
Discharge (m^3/s)	0.1					
D. O. (mg/l)	3.6					
Temperature (°C)	0.8					
Conduct. ($\mu mhos/cm^2$)	220					
pH	7.5					
Color/Turbidity	brown-stained cloudy					
Bottom Type	mud and iron compound	mud	mud			

REMARKS

The two additional Moose Creek crossings (Moose Creek #'s 1 and 2, NPSI #'s 4-148, 4-147 respectively) were both open with bank ice and large chunks of ice floating in the channel; no flow could be detected.

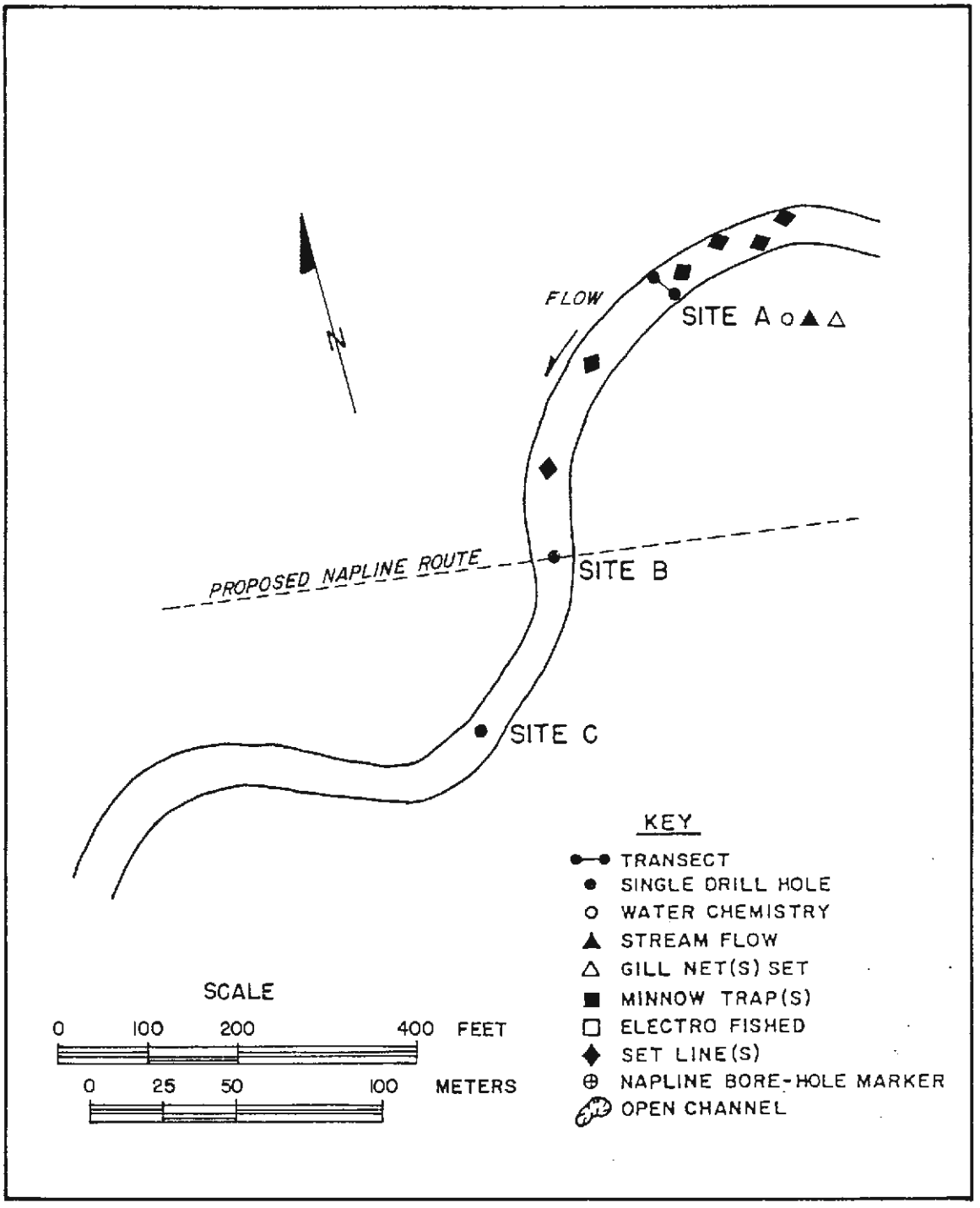

Fig. 48. Winter survey. Moose Creek #3, 26 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Steele Creek

Main Drainage Tanana River Tributary to Chena River

Figure(s) 3 and 49 Northwest Alignment Sheet 77

Ident. Nos: NPSI 4-143 Applicable Milepost NPMP 456.1

USGS Map Reference Fairbanks, Alaska T-1S R-1E Sec 1

Site Access State road off Nordale Rd to workpad.

ASSESSMENT

Steele Creek is a small stream averaging 1.5 m wide in the area of the NAPLINE crossing. It flows through dense alder thickets in a low-lying area. The banks were .3-.6 m high.

Steele Creek was not an overwintering site at or near the NAPLINE crossing during present winter investigations. This stream was frozen to the bottom at all sites but one, where anaerobic conditions made overwintering unlikely.

SAMPLING LOCATIONS

SITE Figure 49

A 175 m upstream from NAPLINE

B 10 m downstream from NAPLINE

C 30 m downstream from NAPLINE (on powerline R.O.W.)

D 80 m downstream from NAPLINE

E

F

FISH

SITE	A	B	C	D	E	F
Date	27 Mar 79	27 Mar 79	27 Mar 79	27 Mar 79		
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present due to lack of water and/or anoxic water conditions					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	27 Mar 79	27 Mar 79	27 Mar 79	27 Mar 79		
Snow Depth (cm)	3-45	30-45	30-45	30-45		
Ice Depth (cm)	143	55	49	15		
Air Space (cm)	5	0	0	0		
Water Depth (cm)	10	0	0	0		
Discharge (m^3/s)		0	0	0		
D. O. (mg/l)	*					
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	mud	mud	mud	mud		

REMARKS

*Water present was very dark, muddy and smelled of H_2S.

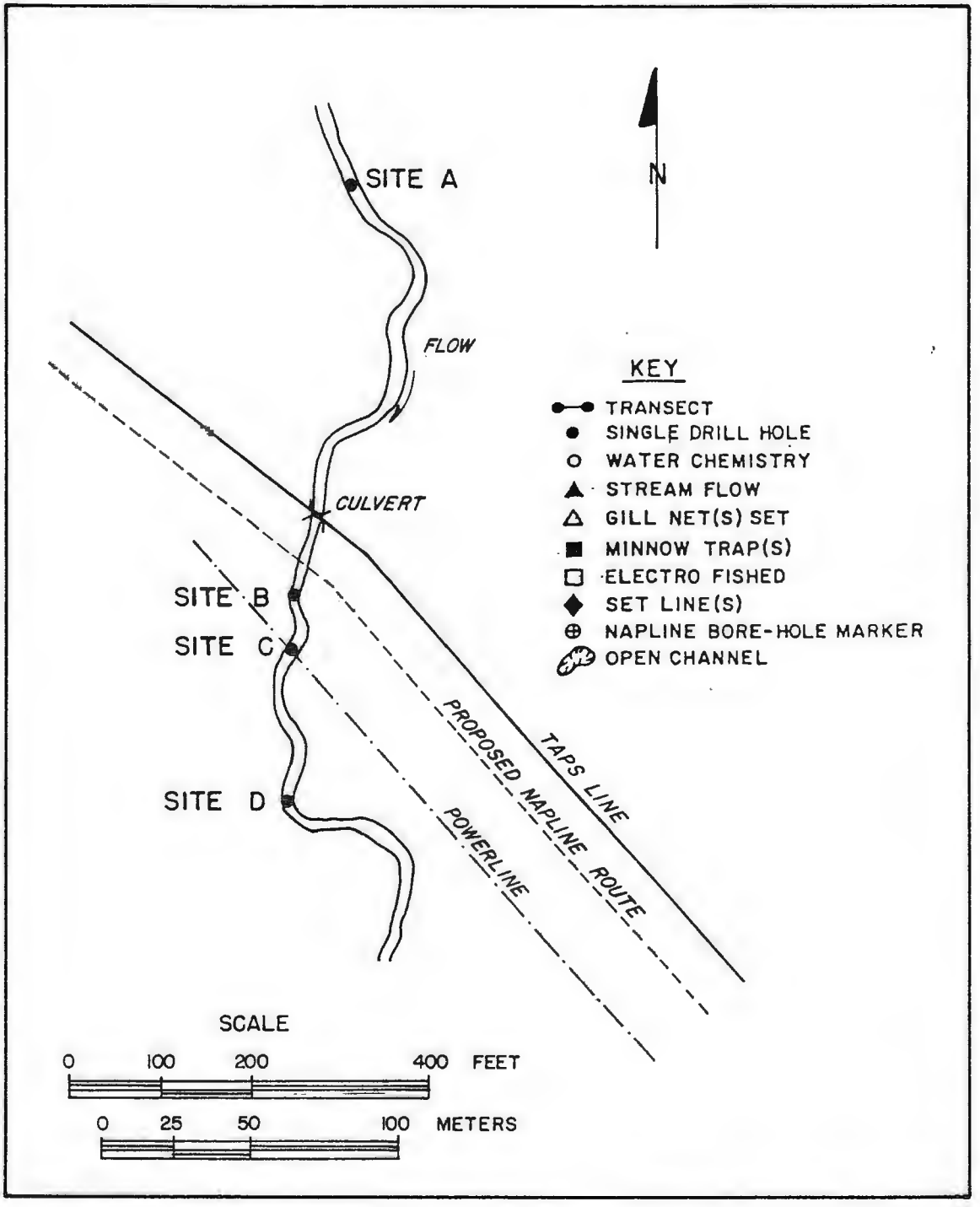

Fig. 49. Winter survey. Steele Creek, 27 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Engineer Creek

Main Drainage Chatanika River Tributary to Goldstream Creek

Figure(s) 3 and 50 Northwest Alignment Sheet 77

Ident. Nos: NPSI 4-142 Applicable Milepost NPMP 449.5

USGS Map Reference Fairbanks, Alaska T-1N R-1E Sec 8

Site Access Snowmachine on workpad from Steese Highway

ASSESSMENT

Engineer Creek is a small shallow stream with modertaely steep gradient and flows through a deep ravine at the NAPLINE crossing. Its steep, muddy banks are grassy, intermittently sloughed-off and approximately 9 m in height. Approximately 500 m below the NAPLINE the steep banks terminate and Engineer Creek flows through old gold dredge tailings; the well defined channel eventually disappears. Channel width at the NAPLINE, based on ice cover, varied from 2.4-8 m, but this width was magnified by extensive aufeis.

Although suitable overwintering habitat was not found at or near the NAPLINE crossing during present investigations, it is recommended that Engineer Creek be treated as a potential (marginal) overwintering area. The Alaska blackfish, known to be present in this waterbody (Ref. 11), is extremely hearty and has unexpectantly presented itself during past construction activities. The blackfish is known to be active at low temperatures and tolerate low dissolved oxygen levels.

SAMPLING LOCATIONS

SITE Figure 50

A 100 m upstream from NAPLINE

B NAPLINE crossing

C 100 m downstream from NAPLINE (north bank)

D 100 m downstream from NAPLINE (south bank)

E

F

FISH

SITE	A	B	C	D	E	F
Date	27 Mar 79	27 Mar 79	27 Mar 79	27 Mar 79		
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; only small quantities of melt water under-ice or stream frozen to bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	27 Mar 79	27 Mar 79	27 Mar 79	27 Mar 79		
Snow Depth (cm)	0	0	0	0		
Ice Depth (cm)	85	101	40	122		
Air Space (cm)	0	0	0	0		
Water Depth (cm)	0	0	18	9		
Discharge (m^3/s)	0	0	0	0		
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	rock mud			rock		

REMARKS

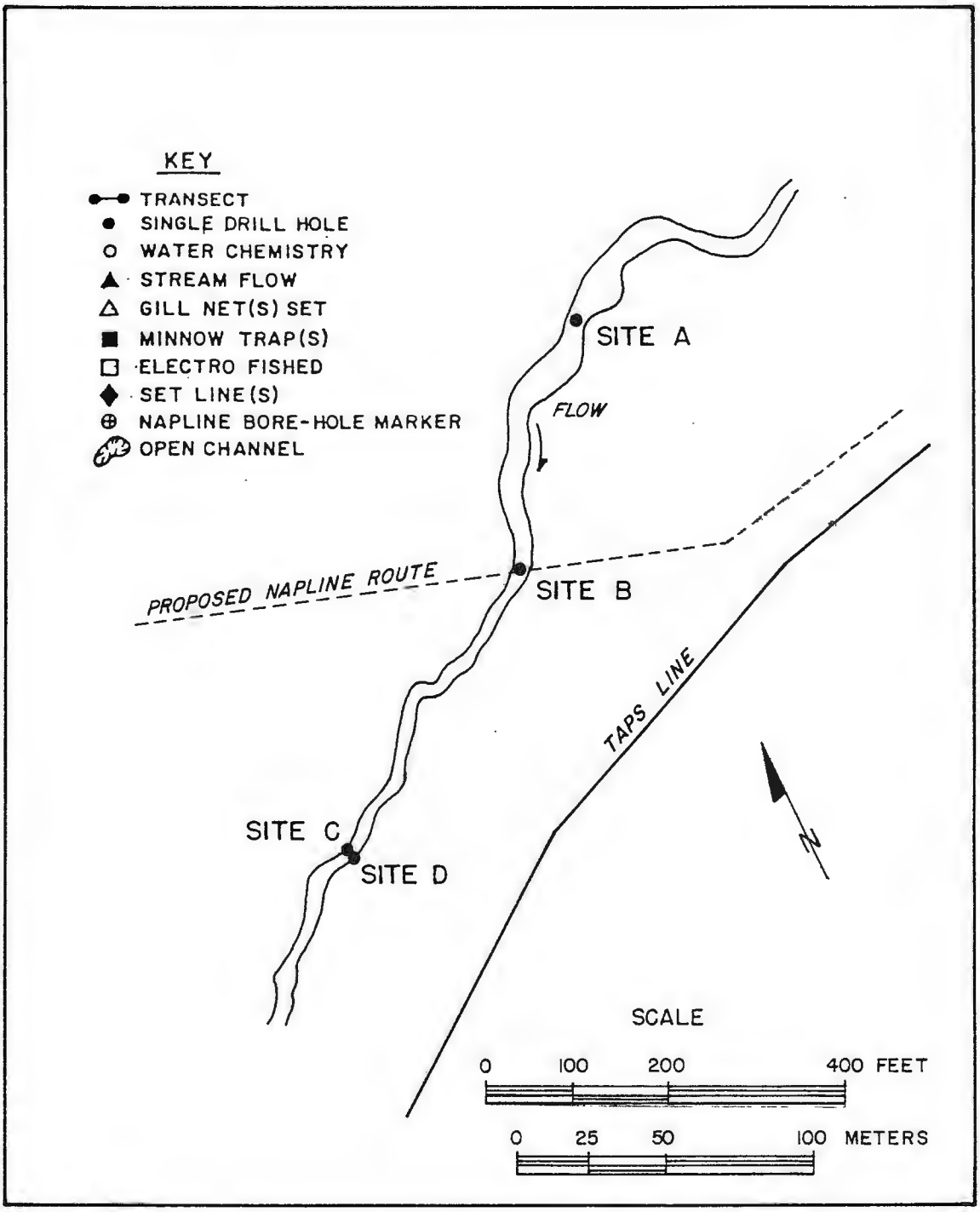

Fig. 50. Winter survey. Engineer Creek, 27 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Goldstream Creek

Main Drainage Tanana River Tributary to Chatanika River

Figure(s) 3 and 51 Northwest Alignment Sheet 76

Ident. Nos: NPSI 4-141 Applicable Milepost EHMPO

USGS Map Reference Fairbanks, Alaska T-1N R-1W Sec 1

Site Access Goldstream road up Goldstream Creek

ASSESSMENT

Goldstream is a small creek 3-7 m in width and originates approximately 15km upstream of the NAPLINE near Pedro Dome. Banks are 3-6 m near the crossing and lined with willow and black spruce. This particular region was heavily mined for gold with bucket dredges in the early 1900's and characteristically exhibits new channels through tailing piles.

Winter surveys found the upstream portion of Goldstream Creek frozen to the bottom with no fish present. The proposed NAPLINE crossing was not drilled because of access problems.

SAMPLING LOCATIONS

SITE Figure 51

A 150 m downstream from NAPLINE

B 120 m downstream from NAPLINE

C 100 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	27 Mar 79	27 Mar 79	27 Mar 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; frozen to the bottom					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	29 Mar 79	29 Mar 79	29 Mar 79			
Snow Depth (cm)						
Ice Depth (cm)	71	71	43			
Air Space (cm)	0	0	16			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	gravel rock	mud	mud			

REMARKS

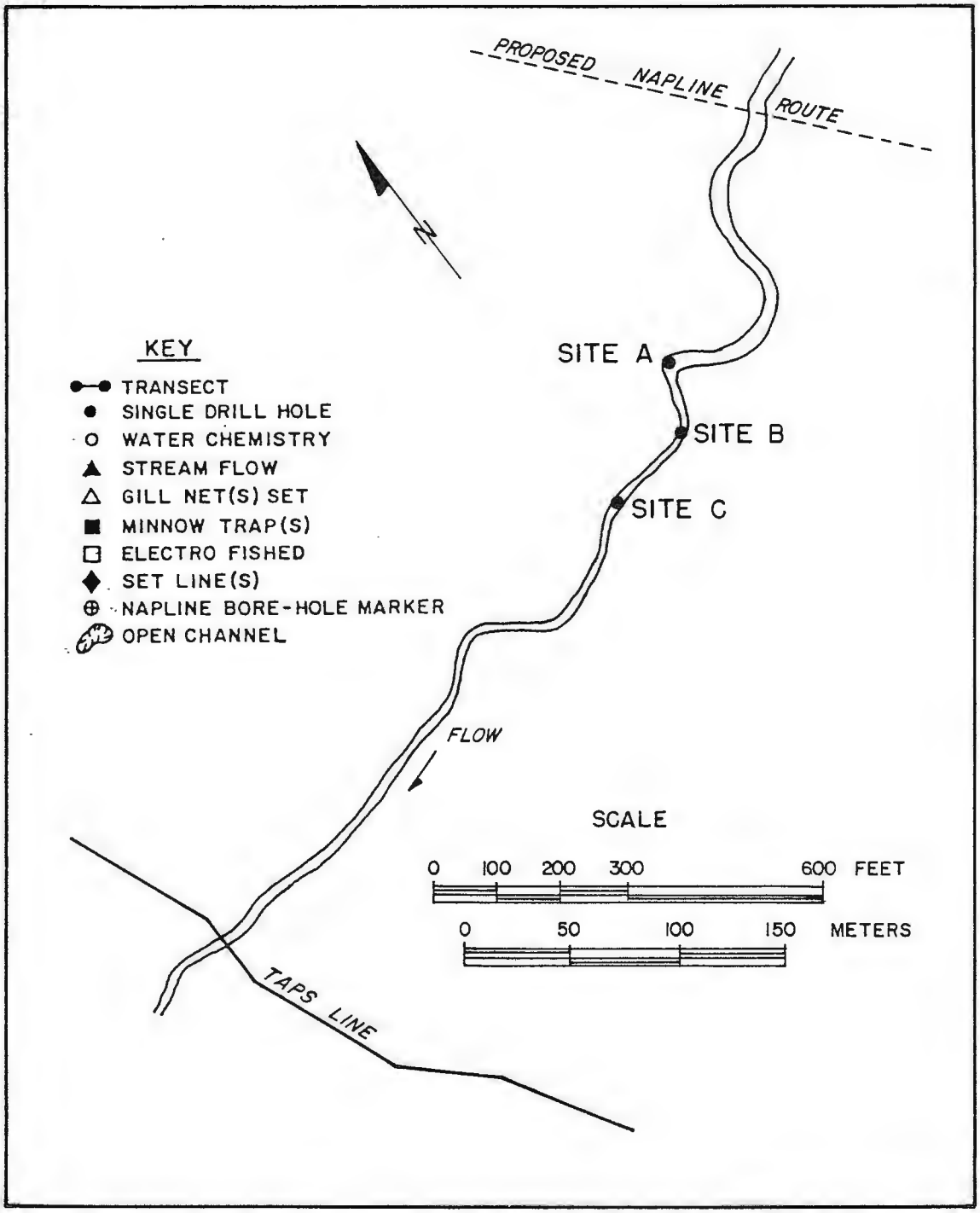

Fig. 51. Winter survey. Goldstream Creek, 29 March 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Treasure Creek

Main Drainage Chatanika River Tributary to Vault Creek

Figure(s) 3 and 52 Northwest Alignment Sheet 75

Ident. Nos: NPSI 4-140 Applicable Milepost EHMP 8

USGS Map Reference Livengood, Alaska T-2N R-1W Sec 3

Site Access Elliot Highway - 62APL-1-workpad

ASSESSMENT

Treasure Creek is a small shallow stream, lined with willow, alder and large spruce. The channel of this stream varies from 0.6-4 m in width and banks 1-2 m in height confine the water in the area of the NAPLINE.

Treasure Creek was not an overwintering area for fish in the stream section surveyed due to the absence of free water.

SAMPLING LOCATIONS

SITE Figure 52

A 100 m upstream from NAPLINE

B NAPLINE crossing

C 100 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	4 Apr 79	4 Apr 79	4 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream dry at all sampling locations.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	4 Apr 79	4 Apr 79	4 Apr 79			
Snow Depth (cm)	52		46			
Ice Depth (cm)	24	43	67			
Air Space (cm)	40	15	27			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	mud detritus		mud detritus			

REMARKS

Ice depths and air space measurements at Sites A, B and C are cumulative totals. At all sites, two layers of ice were separated by two air space layers. The uppermost ice layer varied from 3-6 cm and the bottom ice layer varied from 18-64 cm. Air space below last ice layer indicated that stream went dry after the formation of ice cover.

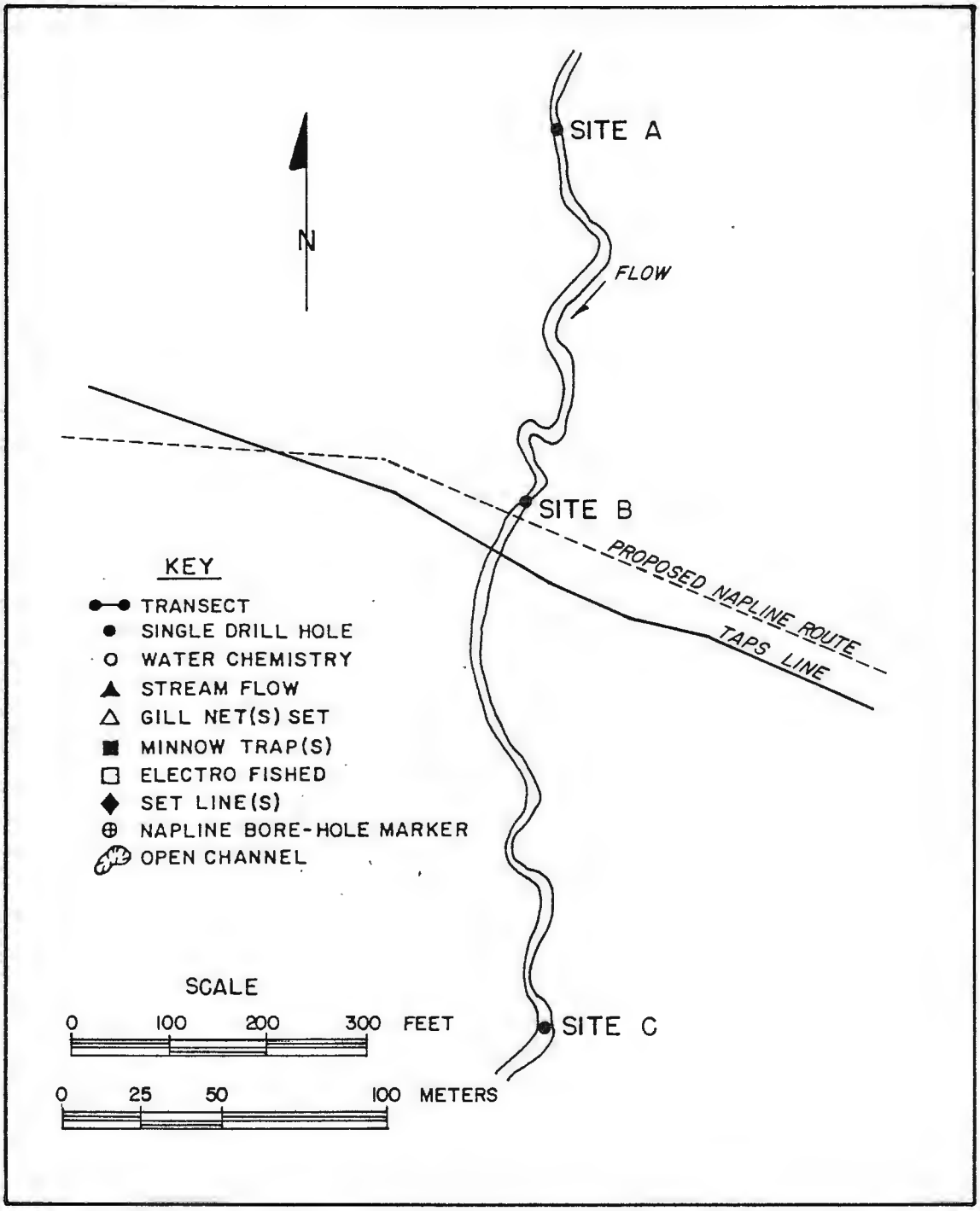

Fig. 52. Winter survey. Treasure Creek, 4 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Washington Creek

Main Drainage Tanana River Tributary to Tolovana River

Figure(s) 3 and 53 Northwest Alignment Sheet 74

Ident. Nos: NPSI 4-137 Applicable Milepost EHMP 20

USGS Map Reference Livengood, Alaska T-3N R-2W Sec 4

Site Access Elliot Highway - 64APL-2-workpad

ASSESSMENT

Washington Creek is a small clear-water creek 8-15 m in width with a gravel and rock substrate. It meanders through high hills which rise to 700 m (2,500 ft) above the creek. Washington Creek is characterized by alternating shallow riffles and deep pools at the base of 2-3 m high banks, which are often incised.

Results of winter surveys indicated that overwintering habitat quality is good near the NAPLINE crossing. Although fish were not caught during winter, this area should be surveyed again in late fall to determine the presence or absence of fish. If fish are present at freezeup, then location should be marked, and resampled during winter.

SAMPLING LOCATIONS

SITE Figure 53

A 50 m upstream from NAPLINE

B 10 m downstream from NAPLINE

C 70 m downstream from NAPLINE

D 130 m downstream from NAPLINE

E

F

FISH

SITE	A	B	C	D	E	F
Date	1 Apr 79	1 Apr 79	1 Apr 79	1 Apr 79		
Species						
Quantity				0		
Size (mm)						
Gear/Effort	not fished	not fished	not fished	7mGN(70h)		

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	1 Apr 79	1 Apr 79	1 Apr 79	1 Apr 79		
Snow Depth (cm)						
Ice Depth (cm)	146	137	see below	70-124		
Air Space (cm)	0	0		0		
Water Depth (cm)	24	38		0-101		
Discharge (m^3/s)				0.2		
D. O. (mg/l)				10.0		
Temperature (°C)				0		
Conduct. ($\mu mhos/cm^2$)				130		
pH				7.5		
Color/Turbidity				clear		
Bottom Type	gravel rock	gravel rock	gravel rock	gravel rock		

REMARKS

Extensive new overflow was visible upstream from the NAPLINE crossing

Site A: 7 cm head of water was coming out of this drill hole; mayfly nymphs were abundant in the upwelling.

Site C: Ice and water column; 3 cm water, 24 cm ice, 21 cm water, 34 cm frozen to bottom.

Site D: 31 holes drilled at this location.

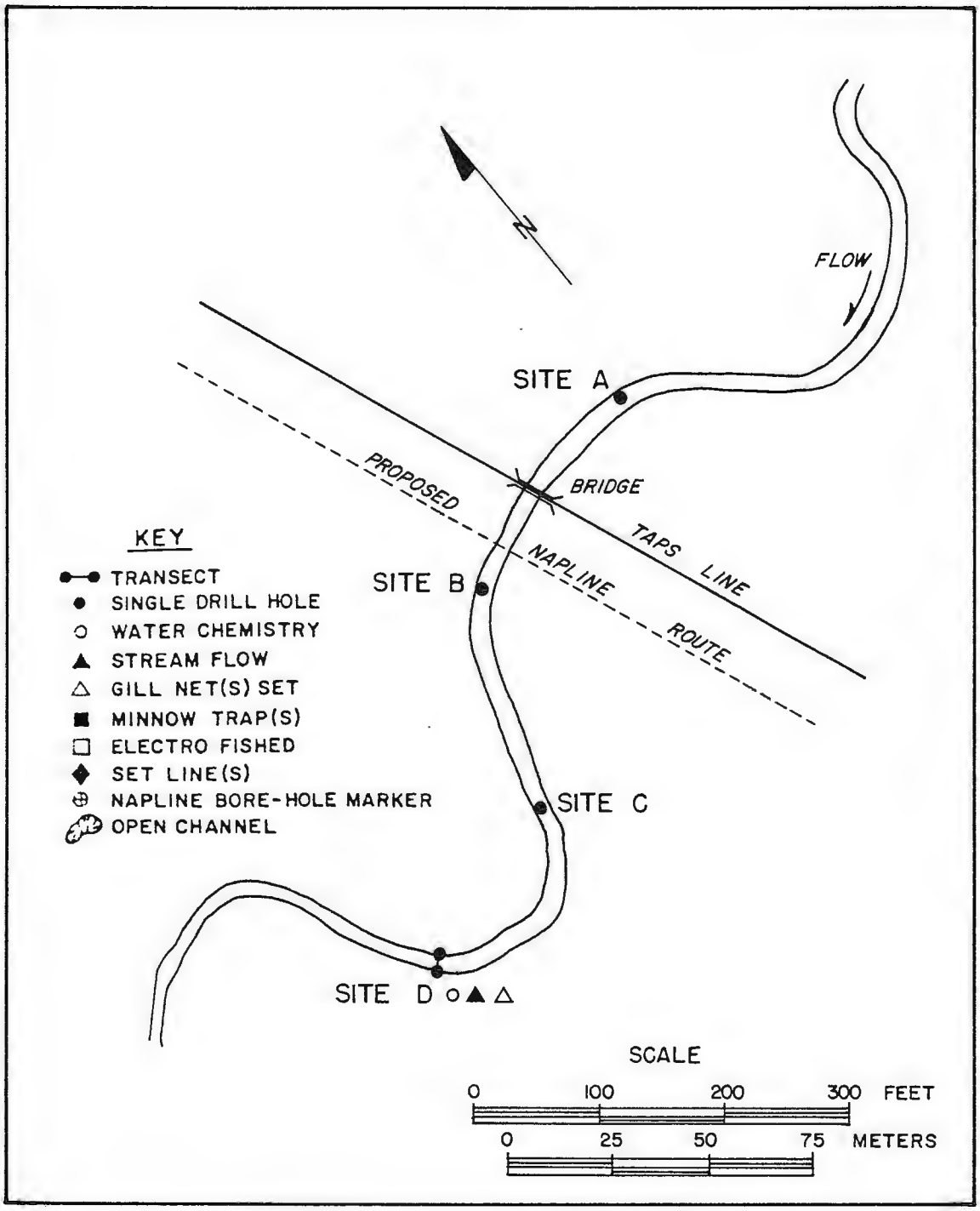

Fig. 53. Winter survey. Washington Creek, 1 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Tatalina River

Main Drainage Tanana River Tributary to Tolovana River

Figure(s) 3 and 54 Northwest Alignment Sheet 71

Ident. Nos: NPSI 4-132 Applicable Milepost EHMP 45

USGS Map Reference Livengood, Alaska T-6N R-4W Sec 23

Site Access Elliot Highway - 67APL-5-workpad

ASSESSMENT

The Tatalina River is a small stream with an occasionally active channel width of 10-15 m; low water channel width is approximately 5 m. The region at the NAPLINE crossing is characterized by alternating shallow riffles and shallow pools. Although the water was clear during the winter survey, it is usually darkly stained during summer.

The area surveyed near the NAPLINE does not provide overwintering habitat due to the absence of flow or frozen conditions.

SAMPLING LOCATIONS

SITE Figure 54

A 90 m upstream from NAPLINE

B 30 m downstream from NAPLINE

C 80 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	1 Apr 79	1 Apr 79	1 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely; creek frozen or stagnant with low oxygen					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	1 Apr 79	1 Apr 79	1 Apr 79			
Snow Depth (cm)	37					
Ice Depth (cm)	39	77	70			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	39	77			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)			0.6			
Temperature (°C)			0.0			
Conduct. ($\mu mhos/cm^2$)			30			
pH			6.3			
Color/Turbidity						
Bottom Type			clear mud with iron deposits			

REMARKS

A small open water area with no flow was present approximately 200 m downstream of NAPLINE. Iron deposits were visible.

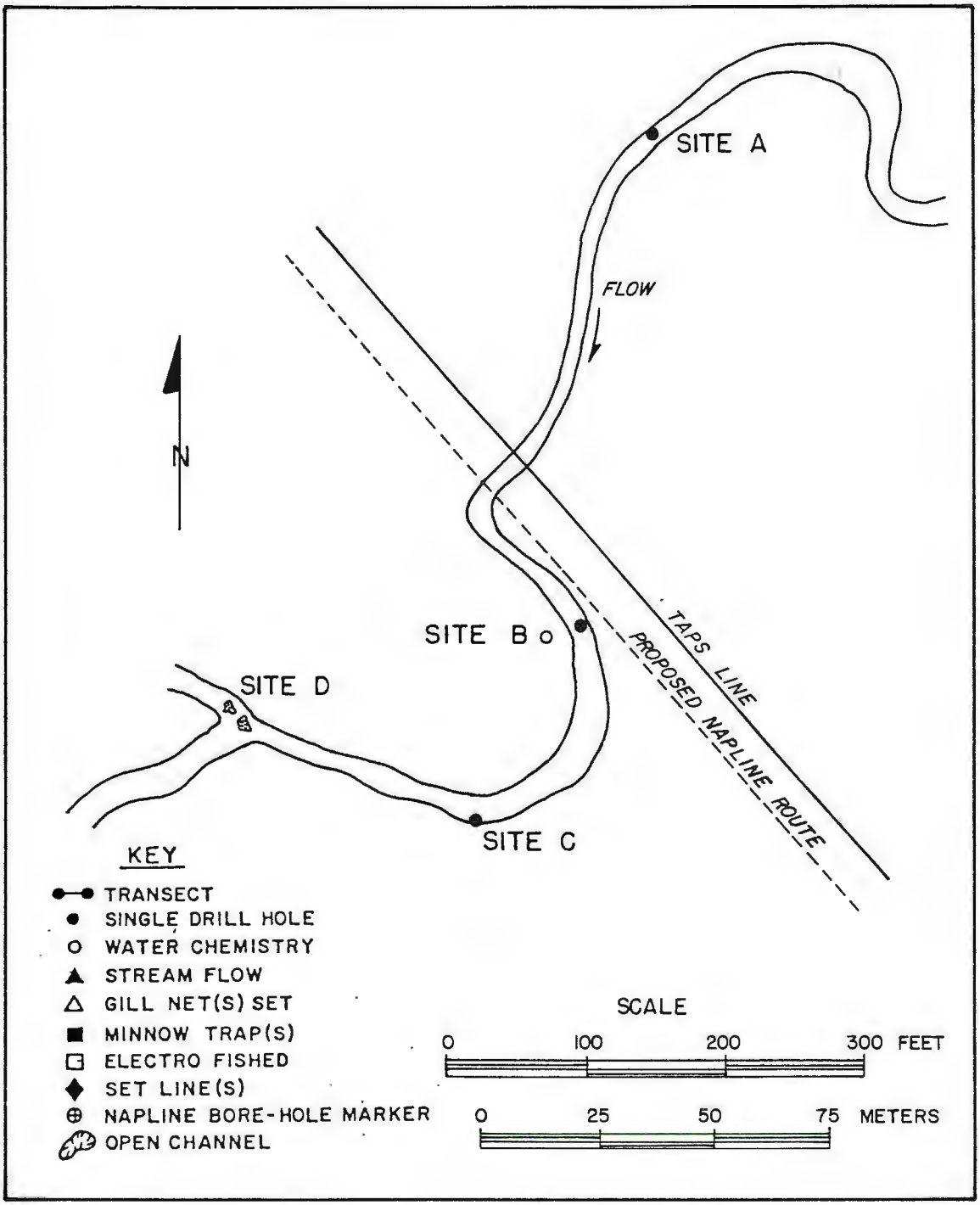

Fig. 54. Winter survey. Tatalina River, 1 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Tolovana River

Main Drainage Yukon River Tributary to Tanana River

Figure(s) 3 and 55 Northwest Alignment Sheet 69

Ident. Nos: NPSI 4-128 Applicable Milepost EHMP 69

USGS Map Reference Livengood, Alaska T-7N R-5W Sec 5

Site Access Elliot Highway - workpad

ASSESSMENT

The Tolovana River is a small, slow-moving, stained stream that meanders through mature spruce forests. Banks are frequently incised and covered with willow. The headwaters of the Tolovana River have been heavily mined by both mechanical and hydraulic methods since the early 1900's.

Overwintering habitat near the NAPLINE is unavailable due to the absence of flow and low dissolved oxygen

SAMPLING LOCATIONS

SITE Figure 55

A 120 m upstream from NAPLINE

B NAPLINE crossing

C 120 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	1 Apr 79	1 Apr 79	1 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely due to the absence of flow and low dissolved oxygen					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	1 Apr 79	1 Apr 79	1 Apr 79			
Snow Depth (cm)		30-45	58			
Ice Depth (cm)		0-45	0			
Air Space (cm)		0	0			
Water Depth (cm)	20-40	0-37	54			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)		0.2	0.2			
Temperature (°C)		-0.1				
Conduct. ($\mu mhos/cm^2$)		202				
pH		6.5				
Color/Turbidity		clear				
Bottom Type		mud gravel				

REMARKS

Site A, B & C: Filamentous algae (brown color) very abundant, no measurable flow.

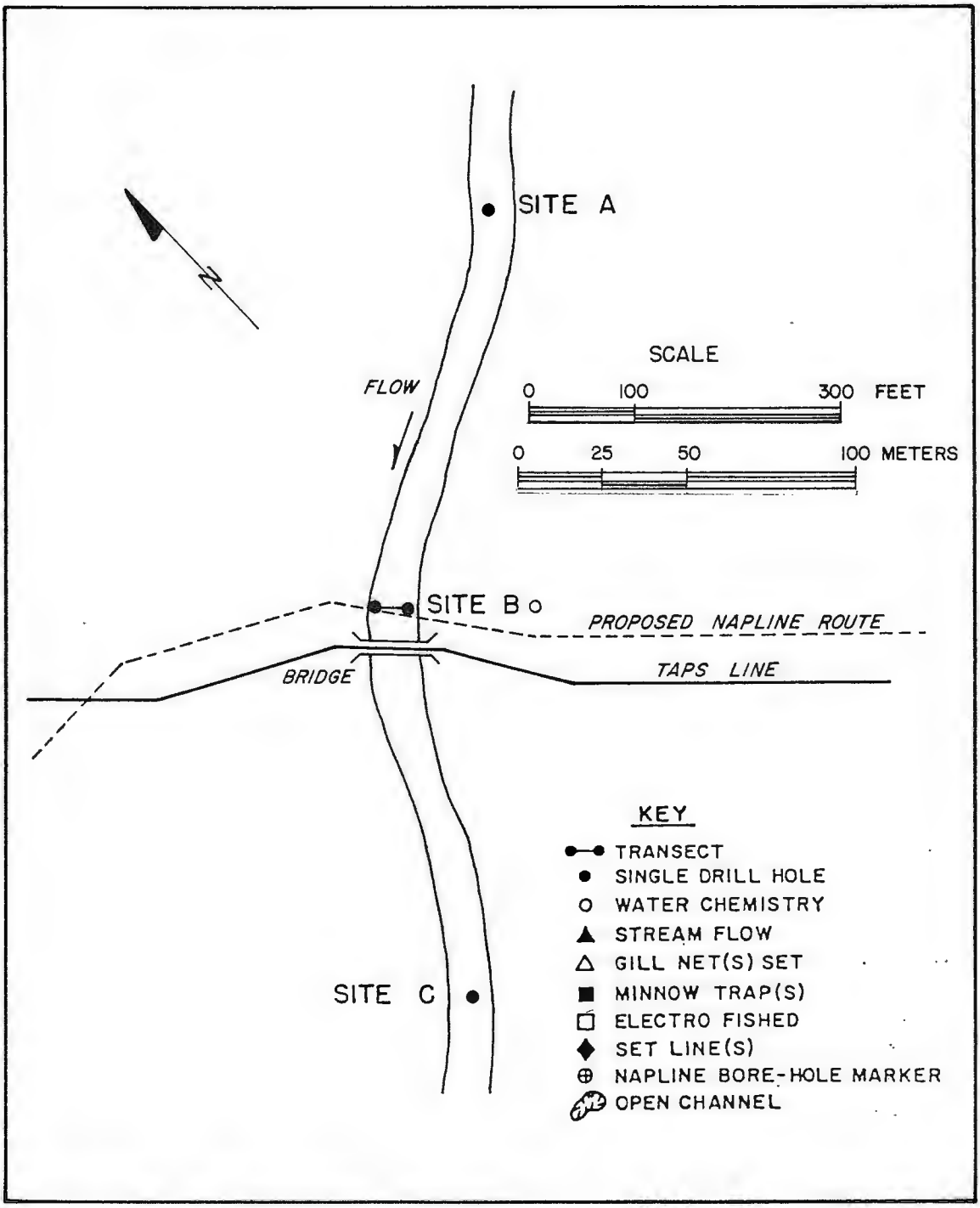

Fig. 55. Winter survey. Tolovana River, 1 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Hess Creek

Main Drainage Yukon River Tributary to Yukon River

Figure(s) 3 and 56 Northwest Alignment Sheet 66

Ident. Nos: NPSI 4-123A.04 Applicable Milepost TAPSMP 50

USGS Map Reference Livengood, Alaska T-10N R- 7W Sec 19-20

Site Access TAPS road - unnamed access road - workpad

ASSESSMENT

Hess Creek is a meandering stained foothill stream with alternating shallow pools and riffles near the NAPLINE. Oxbows and old high water channels are common. The active channel is often incised with 2-3 m banks and variable 15-30 m in width.

Hess Creek is a known fish stream that supports a minimum of 10 species of fish during summer (Ref. 11). Previous investigations, however, have not reported overwintering usage.

Overwintering habitat was not available in 1979 due to the absence of free water flow and or absence of oxygen. Anaerobic conditions were present at Site D, and also indicated at Site A by a strong H_2S odor.

SAMPLING LOCATIONS

SITE Figure 56

A 25 m upstream from NAPLINE

B 150 m downstream from NAPLINE

C 170 m downstream from NAPLINE

D 550 m downstream from NAPLINE

E

F

FISH

SITE	A	B	C	D	E	F
Date	4 Apr 79	4 Apr 79	4 Apr 79	4 Apr 79		
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen to bottom or no flow and anaerobic					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	4 Apr 79	4 Apr 79	4 Apr 79	4 Apr 79		
Snow Depth (cm)	48-63	72	69	0		
Ice Depth (cm)	24-39	45	45	0		
Air Space (cm)	6-9	0	0	0		
Water Depth (cm)	3	3	0	5-10 est.		
Discharge (m^3/s)				0		
D. O. (mg/l)				0.0		
Temperature (°C)				2.5		
Conduct. ($\mu mhos/cm^2$)				80		
pH				6.5		
Color/Turbidity				red - brown		
Bottom Type				gravel sand		

REMARKS

Site A: H_2S odor present.

Site D: Strong H_2S odor.

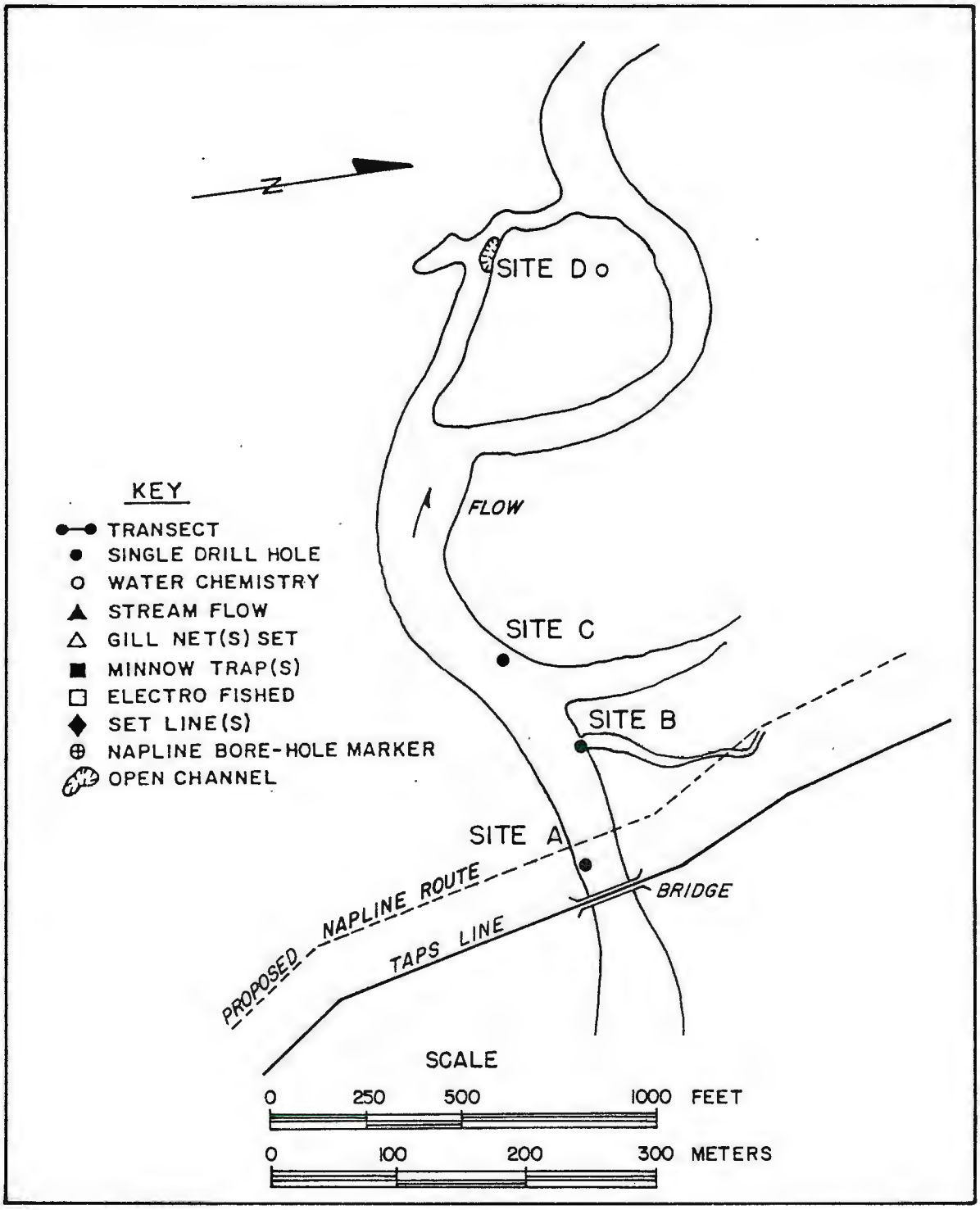

Fig. 56. Winter survey. Hess Creek, 4 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody North Fork Ray River

Main Drainage Yukon River Tributary to Ray River

Figure(s) 3 and 57 Northwest Alignment Sheet 58

Ident. Nos: NPSI 3-110 Applicable Milepost HRMP 17

USGS Map Reference Bettles, Alaska T-15N R-12W Sec 17

Site Access TAPS Haul Road - 82 APL-2 - workpad

ASSESSMENT

The North Fork Ray River is a meandering slow-moving stream which apparently freezes solid in the vicinity of the TAPSLINE and proposed NAPLINE. Stream banks are incised and variable from 3-8 m in height. The stream channel width varied from 9-14 m. Vegetative cover consisted of dense stands of willow and birch and large spruce trees.

Overwintering habitat in this area is marginal or absent due to absence of oxygen and/or stream frozen to bottom. The North Fork Ray River was reported as frozen solid at the Haul Road crossing 4 April 1972 (Ref. 11).

SAMPLING LOCATIONS

SITE Figure 57

A 50 m upstream from NAPLINE (Transect location)

B NAPLINE crossing

C 130 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	7 Apr 79	7 Apr 79	7 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely due to absence of oxygen and/or stream frozen to the bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	7 Apr 79	7 Apr 79	7 Apr 79			
Snow Depth (cm)	85		61			
Ice Depth (cm)	84-88	31-76	49			
Air Space (cm)	0	0	0			
Water Depth (cm)	49-82	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)	0					
Temperature (°C)	0					
Conduct. ($\mu mhos/cm^2$)	100					
pH	7.0					
Color/Turbidity	brown stained					
Bottom Type	mud gravel					

REMARKS

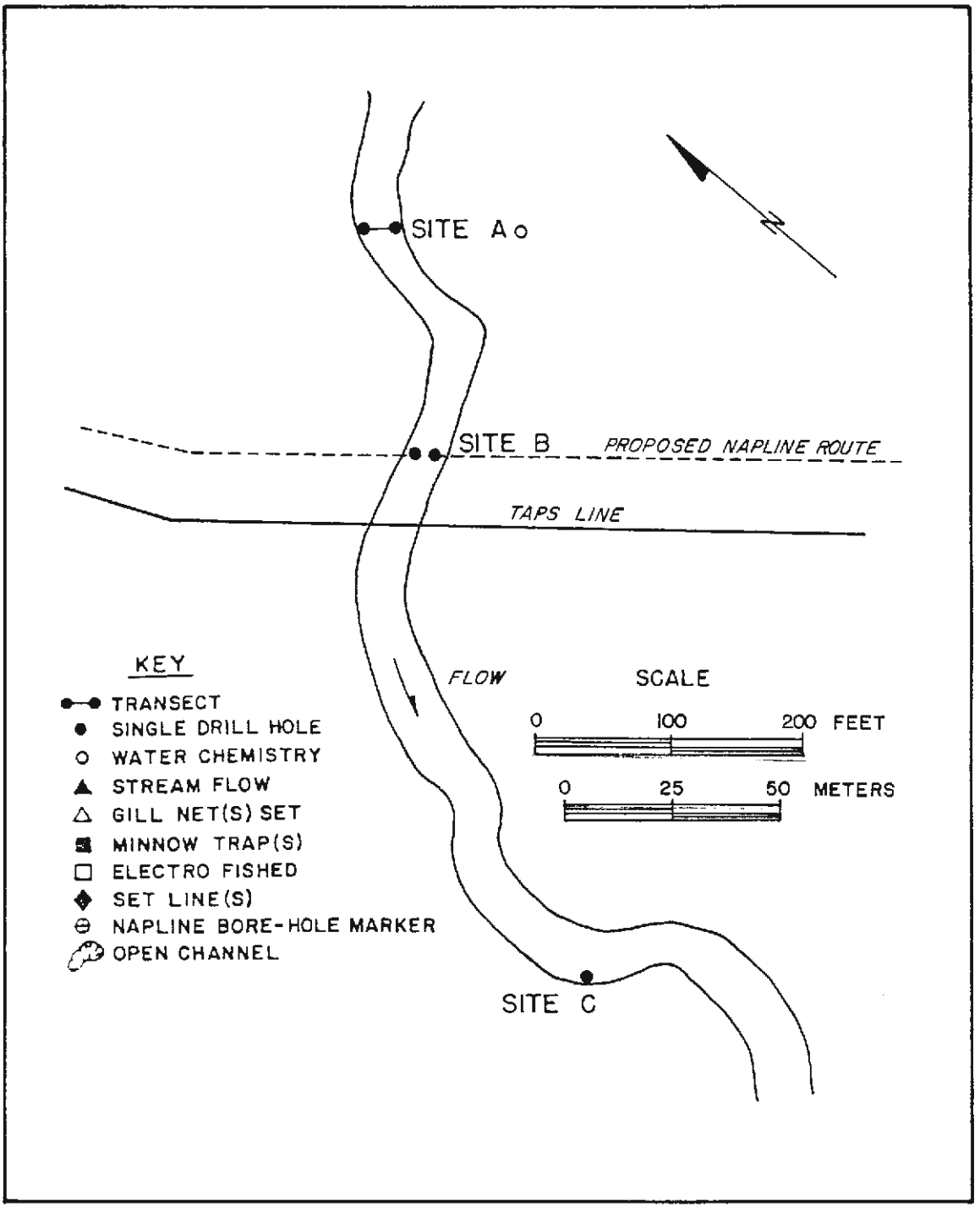

Fig. 57. Winter survey. North Fork Ray River, 7 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody West Fork Dall River (South Branch)

Main Drainage Yukon River Tributary to Dall River

Figure(s) 3 and 58 Northwest Alignment Sheet 56

Ident. Nos: NPSI 3-108 Applicable Milepost HRMP 36

USGS Map Reference Bettles, Alaska T-17N R- 13W Sec 28

Site Access Haul road - 84APL-1-workpad

ASSESSMENT

The West Fork Dall River (South Branch) is a small brown-colored stream with banks 3-5 m high and lined with spruce, grasses and willow. This stream is 1-3 m wide and the bottom substrate varies from mud to coarse sand. It is reported to contain grayling, whitefish and sheefish (Ref. 11).

This stream was not an overwintering area at or near the NAPLINE crossing during present winter investigations. Water quality was poor and the stream appeared to be intermittently frozen to the bottom.

SAMPLING LOCATIONS

SITE Figure 58

A 100 m upstream from NAPLINE

B 20 m upstream from NAPLINE

C 25 m downstream from NAPLINE

D 115 m downstream from NAPLINE

E

F

FISH

SITE	A	B	C	D	E	F
Date	7 Apr 79	7 Apr 79	7 Apr 79	7 Apr 79		
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen to the bottom or stagnant with low dissolved oxygen					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	7 Apr 79	7 Apr 79	7 Apr 79	7 Apr 79		
Snow Depth (cm)		40	33			
Ice Depth (cm)	79	76	67	85		
Air Space (cm)	0	0	0	0		
Water Depth (cm)	0	12	12	37		
Discharge (m^3/s)	0	0	0	0		
D. O. (mg/l)				0.8		
Temperature (°C)				0.0		
Conduct. ($\mu mhos/cm^2$)				300		
pH				6.5		
Color/Turbidity		dark brown	dark brown	dark brown		
Bottom Type	mud	sand	mud	mud		

REMARKS

Debris hung up in vegetation high on stream banks indicated previous water depths in excess of two meters.

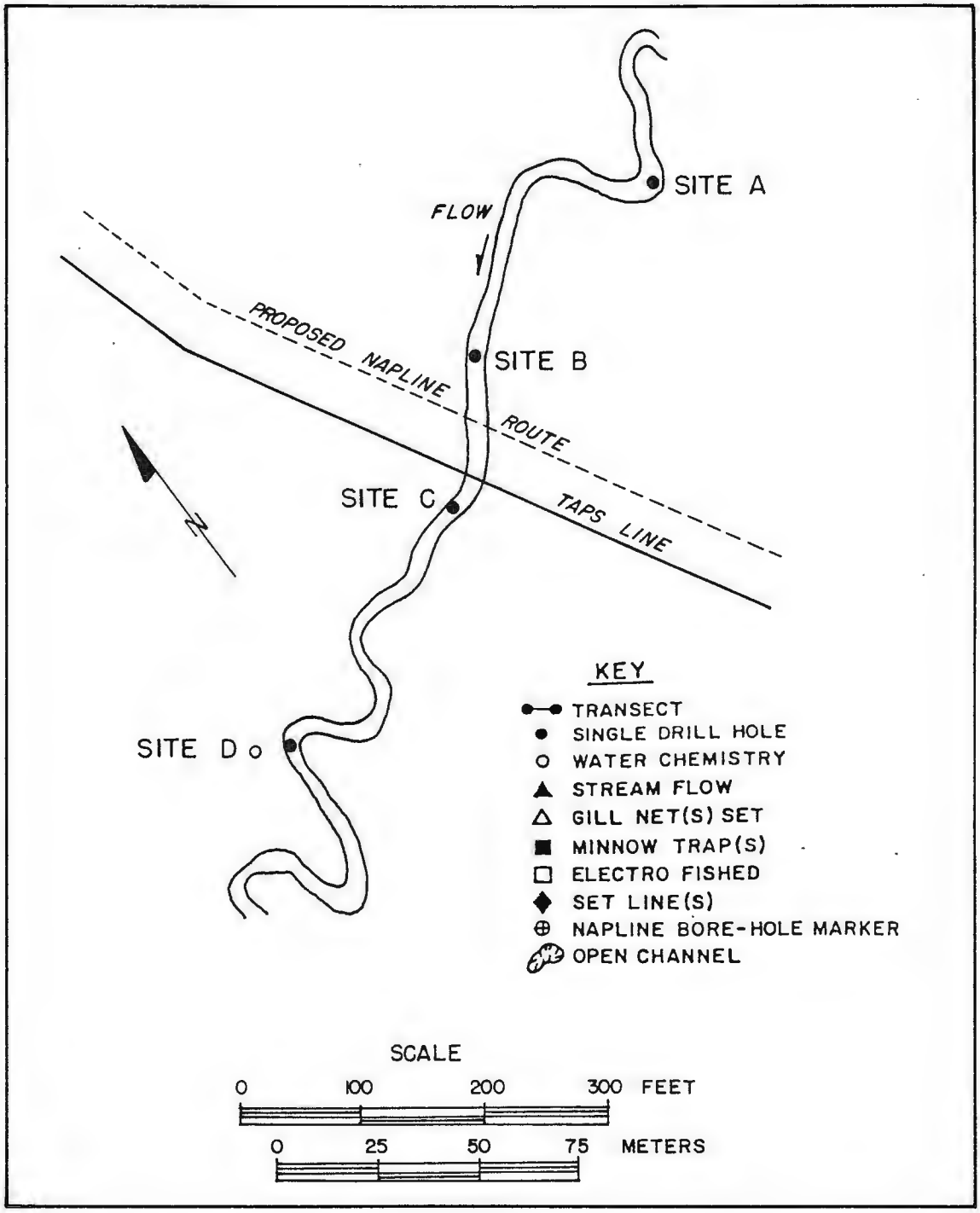

Fig. 58. Winter survey. West Fork Dall River (South Branch), 7 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Kanuti River

Main Drainage Yukon River Tributary to Koyukuk River

Figure(s) 3 and 59 Northwest Alignment Sheet 54

Ident. Nos: NPSI 3-103 Applicable Milepost HRMP 50

USGS Map Reference Bettles, Alaska T-19N R- 14W Sec 30

Site Access Snowmachine and foot from Haul road

ASSESSMENT

The Kanuti River is a meandering stream with a well defined channel 10-15 m in width. Banks are often incised. Shallow riffles and pools are common near the NAPLINE. Predominant vegetation includes spruce, willow and penny birch.

The Kanuti River has not been reported as an overwintering stream near the NAPLINE (Ref. 21). Winter surveys in 1979 also failed to locate overwintering sites. Although some free water was found, the quality was poor and flow was absent.

SAMPLING LOCATIONS

SITE Figure 59

A 400 m upstream from NAPLINE

B NAPLINE crossing

C 550 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	6 Apr 79	6 Apr 79	6 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely; no discharge, low dissolved oxygen					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	6 Apr 79	6 Apr 79	6 Apr 79			
Snow Depth (cm)	24	144	15			
Ice Depth (cm)	108-141	114	120			
Air Space (cm)	0	0	0			
Water Depth (cm)	0-12	21	15			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)	0.8	0.4-0.6	5.6			
Temperature (°C)	-0.3	0.2	0.1			
Conduct. ($\mu mhos/cm^2$)	40	205	80			
pH	7.3	6.8	6.7			
Color/Turbidity		stained	stained			
Bottom Type			mud			

REMARKS

Site A: Channel width 15 m. Bank height 1.5-2 m. Insects abundant in upwelling.

Site C: 15-18 cm head formed by upwelling.

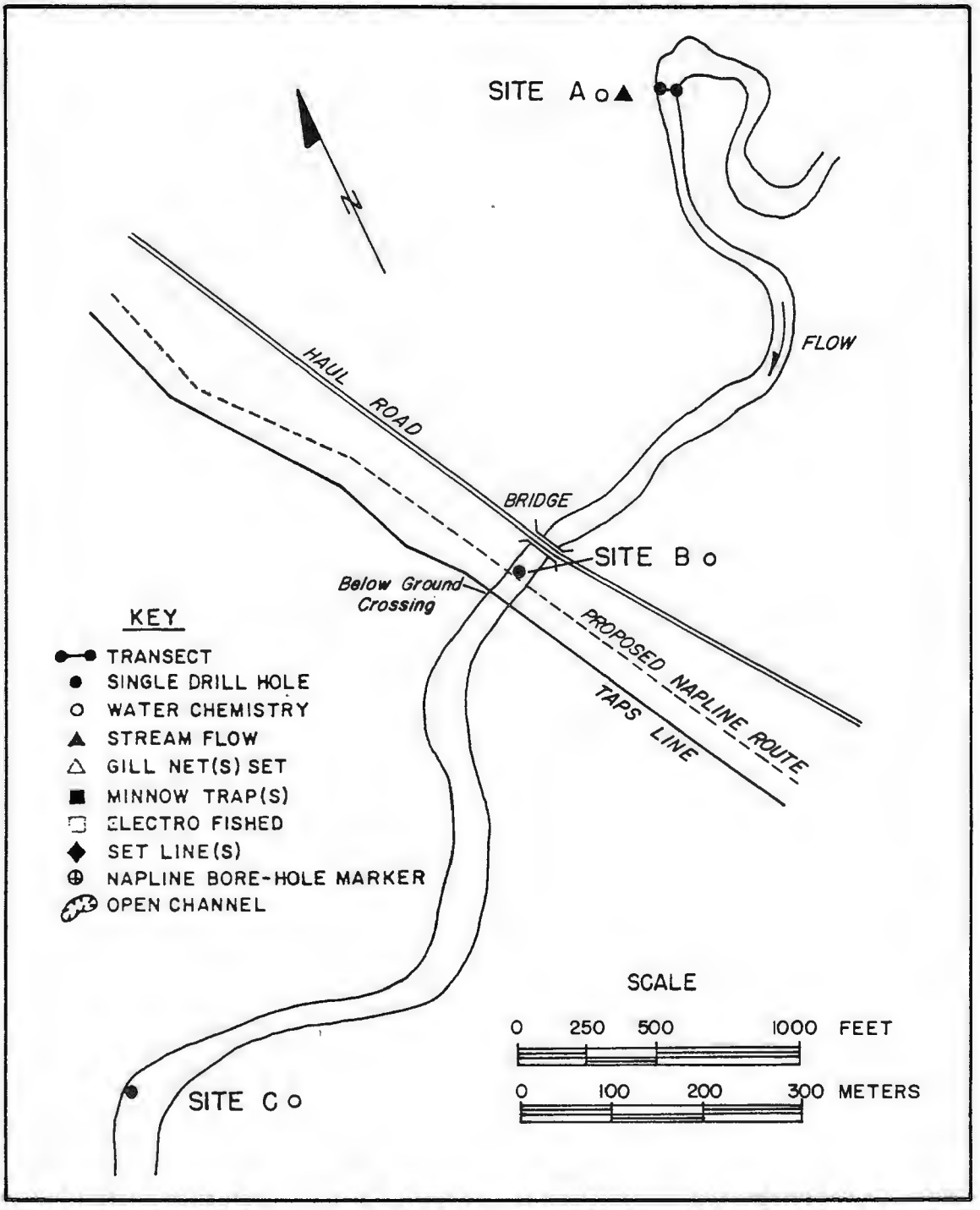

Fig. 59. Winter survey. Kanuti River, 6 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody South Fork Fish Creek

Main Drainage South Fork Koyukuk Tributary to Fish Creek

Figure(s) 2, 3 and 60 Northwest Alignment Sheet 53

Ident. Nos: NPSI 3-100 Applicable Milepost HRMP 57

USGS Map Reference Bettles, Alaska T-20N R-15W Sec 35

Site Access Haul Road - 87APL-3B-workpad

ASSESSMENT

The South Fork Fish Creek, in the vicinity of the NAPLINE, passes through a wet tundra region that is thaw unstable, i.e., containing permafrost. Stream banks are 1.2-1.8 m in height and appeared to be occasionally incised. Although large aufeis areas exist in the 1.5 km downstream of the NAPLINE, little icing is present at the crossing or upstream.

Overwintering habitat in the vicinity of the NAPLINE was marginal. The water found 100 m upstream of the NAPLINE appeared to be the result of a recent thaw rather than a stable winter flow due to the absence of attached filamentous algae and invertebrates. Other investigators were unable to find water at this location 4 April 1972 (Ref. 11). Spring sources present ½ km downstream of the NAPLINE may be important water sources for fish and should be evaluated.

SAMPLING LOCATIONS

SITE Figure 60

A 75 m upstream from NAPLINE

B NAPLINE crossing

C 65 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	6 Apr 79	6 Apr 79	6 Apr 79			
Species						
Quantity	0					
Size (mm)						
Gear/Effort	15mGN(18h)	not fished	not fished			

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	6 Apr 79	6 Apr 79	6 Apr 79			
Snow Depth (cm)	137					
Ice Depth (cm)	9	6	110			
Air Space (cm)	6	6	0			
Water Depth (cm)	0-9	9	3			
Discharge (m^3/s)	0.011		0			
D. O. (mg/l)	9.2	9.2				
Temperature (°C)	0.5	0.5				
Conduct. ($\mu mhos/cm^2$)	360	360				
pH	6.7	6.7				
Color/Turbidity	clear	clear				
Bottom Type	gravel	gravel	gravel			

REMARKS

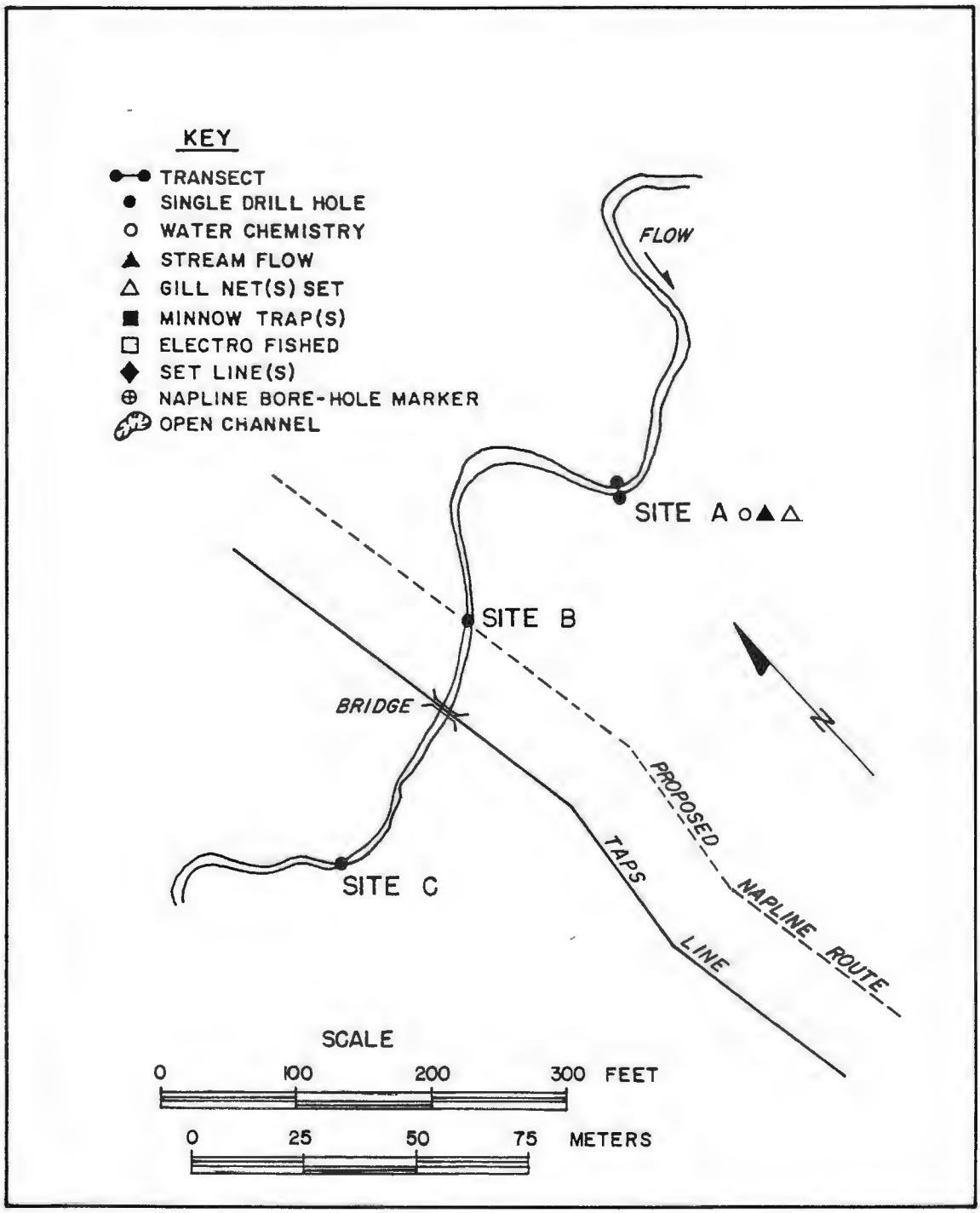

Fig. 60. Winter survey. South Fork Fish Creek, 6 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Middle Fork Fish Creek

Main Drainage South Fork Koyukuk Tributary to Fish Creek

Figure(s) 2, 3 and 61 Northwest Alignment Sheet 53

Ident. Nos: NPSI 3-99 Applicable Milepost HRMP 58

USGS Map Reference Bettles, Alaska T-20N R-15W Sec 26

Site Access Haul road - 87APL-3B - workpad

ASSESSMENT

The Middle Fork of Fish Creek is a small stream 3-4.5 m wide. A steep hill occurs on the north side of the stream, and flat topography on the south. Bank heights were estimated at 0.6 m with climax vegetation including 60-70 cm diameter spruce trees. This area drifts heavily with snow.

The absence of ice downstream of the NAPLINE and limited ice upstream indicates that the stream probably dries up in the late fall and remains dry until early spring. As air and soil temperatures warm, minimal amounts of ground seepages may occur causing the stream to become intermittent in flow. This area does not provide fish overwintering habitat.

SAMPLING LOCATIONS

SITE Figure 61

A 90 m upstream from NAPLINE

B 25 m upstream from NAPLINE

C 60 m distance from NAPLINE crossing

D 100 m downstream from NAPLINE

E

F

FISH

SITE	A	B	C	D	E	F
Date	6 Apr 79	6 Apr 79	6 Apr 79	6 Apr 79		
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely; creek frozen to the bottom or minimal flow (flow probably due to progressing breakup conditions).					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	6 Apr 79	6 Apr 79	6 Apr 79	6 Apr 79		
Snow Depth (cm)			61-152	61-152		
Ice Depth (cm)	73	9	0	0		
Air Space (cm)	0	6	0	0		
Water Depth (cm)	9	3	0	0		
Discharge (m^3/s)	0	est. 0.01	0	0		
D. O. (mg/l)		9.6				
Temperature (°C)		0				
Conduct. ($\mu mhos/cm^2$)		320				
pH		6.8				
Color/Turbidity	clear	clear				
Bottom Type	gravel	gravel	gravel			

REMARKS

Flow at Site B was probably from small spring seepage 20 m upstream that had caused a small aufeis. This flow percolated into gravel 20-30 m downstream and the stream then became dry.

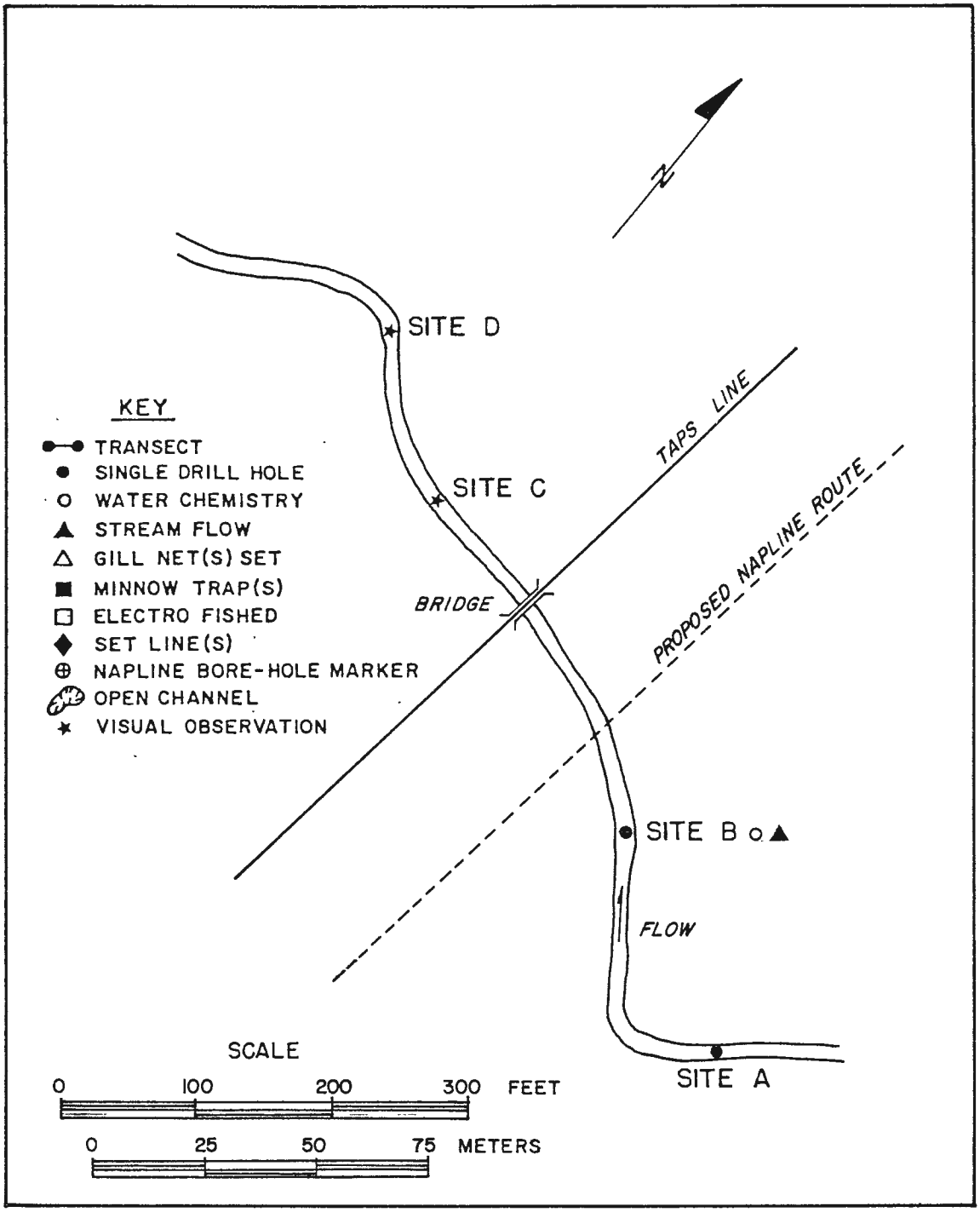

Fig. 61. Winter survey. Middle Fork Fish Creek, 6 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Fish Creek

Main Drainage South Fork Koyukuk Tributary to Fish Creek

Figure(s) 2, 3 and 62 Northwest Alignment Sheet 52

Ident. Nos: NPSI 3-98 Applicable Milepost HRMP 59

USGS Map Reference Bettles, Alaska T-20N R- 15W Sec 22

Site Access Haul Road - 87APL-4 - workpad

ASSESSMENT

Main Fork Fish Creek is the largest of the three headwater creeks which form Fish Creek. The channel width varies from 6-15 m with 1.2-1.8 m high banks that are occasionally incised. Vegetative cover consists of tall spruce, willow, penny birch and berry bushes. Stream substrate are generally gravel and sand.

Fish Creek was not an overwintering site near the NAPLINE crossing. This area serves as an important summer fishery but apparently freezes solid in the vicinity of the NAPLINE during winter.

SAMPLING LOCATIONS

SITE Figure 62

A 30 m upstream from NAPLINE

B 60 m downstream from NAPLINE

C 180 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	6 Apr 79	6 Apr 79	6 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; creek frozen to the bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	6 Apr 79	6 Apr 79	6 Apr 79			
Snow Depth (cm)	33.5		33.5-42.7			
Ice Depth (cm)	45.7	97.6	15.0-27			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	gravel	gravel	sand gravel			

REMARKS

No overflow present in this area.

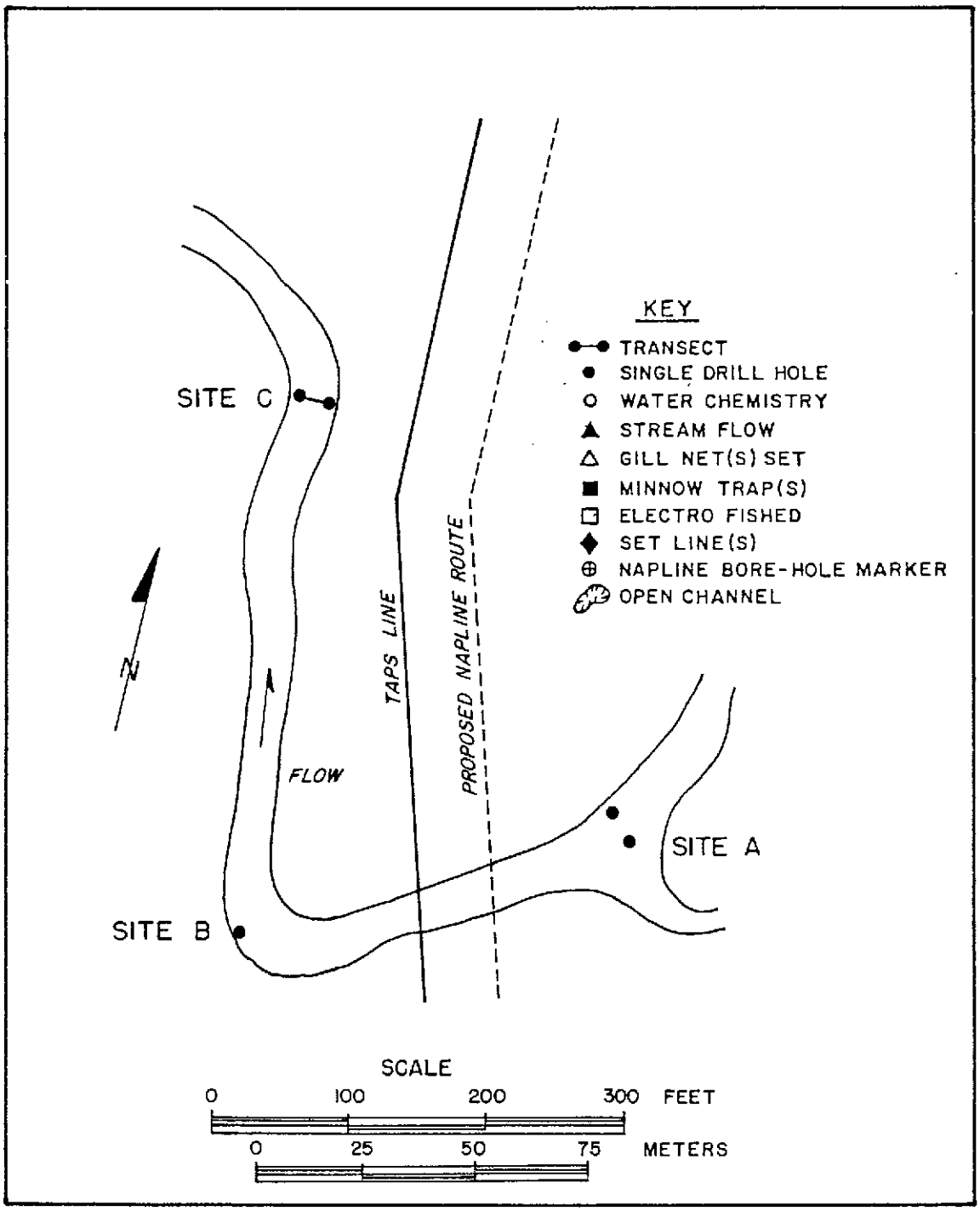

Fig. 62. Winter survey. Fish Creek, 6 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody South Fork Bonanza Creek

Main Drainage South Fork Koyukuk Tributary to Fish Creek

Figure(s) 2, 3 and 63 Northwest Alignment Sheet 51

Ident. Nos: NPSI 3-95 Applicable Milepost HRMP 69

USGS Map Reference Bettles, Alaska T- 21N R- 14W Sec 7

Site Access Haul Road -89-APL-4

ASSESSMENT

The South Fork Bonanza Creek is a clear-water mountain stream with alternating pools and riffles throughout the proposed construction area. The floodplain width varies from an estimated 7-15 m.

During winter, South Fork Bonanza Creek flows intermittently in the vicinity of the proposed NAPLINE crossing. Where water is found, it appears to provide good overwintering habitat; however, the stability of annual winter flow is unknown.

The overwintering habitat at the NAPLINE is marginal. However, flowing water was present at the NAPLINE and overwintering fish were found downstream of the NAPLINE. Any instream activity at the NAPLINE may affect downstream overwintering. Therefore, this area needs further investigation to determine if overwintering sites are present between the NAPLINE and Site D.

...../2

SAMPLING LOCATIONS

SITE Figure 63

A 120 m upstream from NAPLINE

B NAPLINE crossing

C 140 m downstream from NAPLINE

D 1360 m downstream from NAPLINE (confluence of the North and South Forks)

E

F

WINTER SURVEY FORM

WATERBODY

Waterbody South Fork Bonanza Creek (Continued)

Main Drainage _____ Tributary to _____

Figure(s) _____ Northwest Alignment Sheet _____

Ident. Nos: NPSI _____ Applicable Milepost _____

USGS Map Reference _____ T- R- Sec

Site Access _____

ASSESSMENT

(Continued)

Good overwintering habitat is available 1260 m downstream of the proposed NAPLINE crossing at the North and South Fork confluence which is probably spring fed. One slimy sculpin was found dead at this site.

SAMPLING LOCATIONS

SITE Figure

A

B

C

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	5 Apr 79	5 Apr 79	5 Apr 79	5 Apr 79 5 Apr 79		
Species				slimy sculpin		
Quantity		0		0 1		
Size (mm)				165		
Gear/Effort	not fished	7mGN(18h)	not fished	2MT(34h) found dead		

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	5 Apr 79	5 Apr 79	5 Apr 79	5 Apr 79		
Snow Depth (cm)	9	12		0		
Ice Depth (cm)	27	0-27	31-37	0		
Air Space (cm)	3	0	0	0		
Water Depth (cm)	52	0-52	0	0-90		
Discharge (m^3/s)		0.05	0	.08-.14	(est.)	
D. O. (mg/l)		6.0				
Temperature (°C)		0				
Conduct. ($\mu mhos/cm^2$)		20				
pH		6.0				
Color/Turbidity		clear				
Bottom Type	gravel sand detritus	gravel sand detritus				

REMARKS

River otter sign was observed from the NAPLINE crossing downstream to the confluence of the North and South Forks. Approximately 450 m downstream from Site B, the ice had caved in exposing a dry channel. Site D had open and flowing water, algae and invertebrates were abundant. A dead sculpin was found at this site. Free water observed under ice at Haul Road bridge.

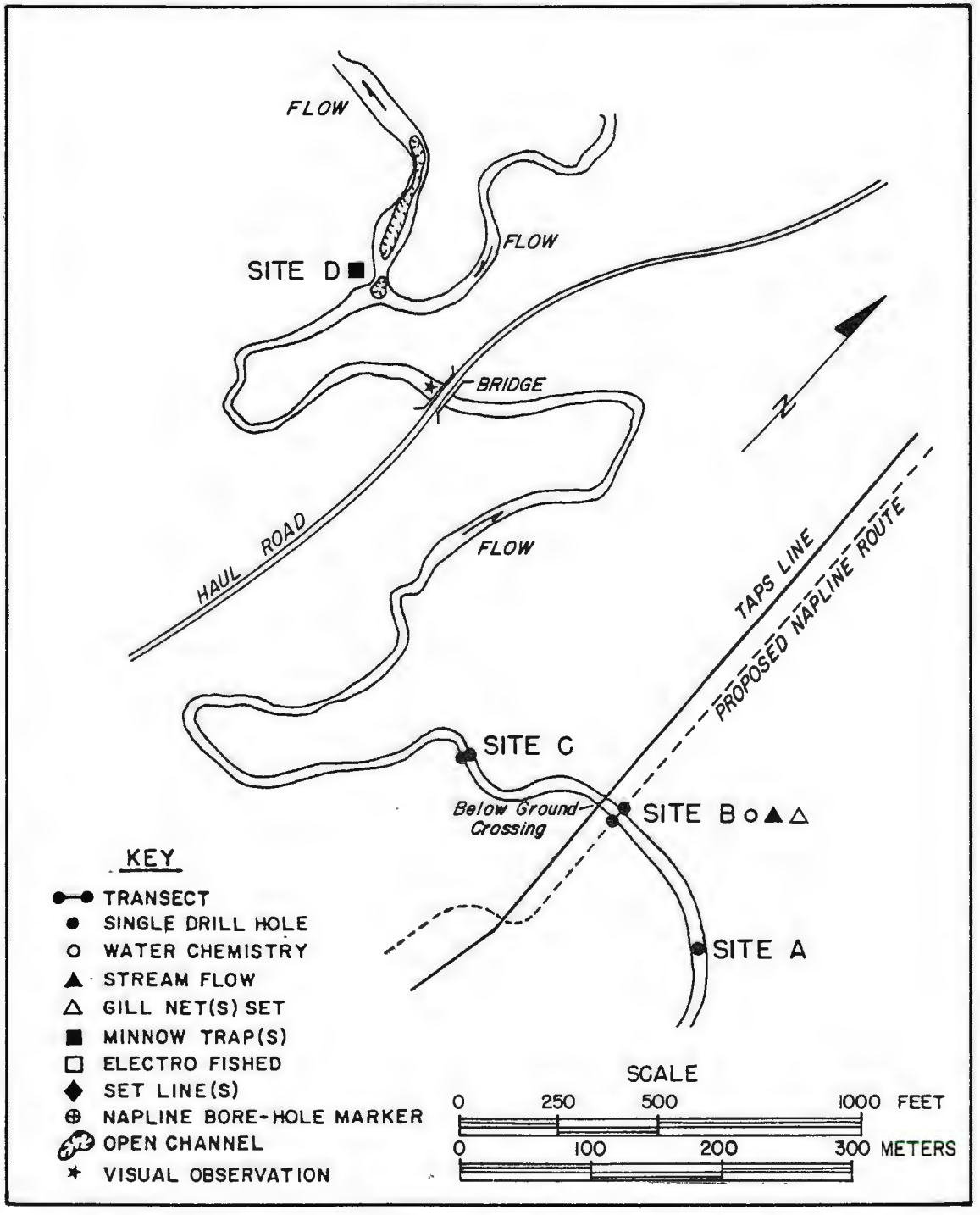

Fig. 63. Winter survey. South Fork Bonanza Creek, 5 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody North Fork Bonanza Creek

Main Drainage South Fork Koyukuk Tributary to Fish Creek

Figure(s) 2, 3 and 64 Northwest Alignment Sheet 51

Ident. Nos: NPSI 3-94 Applicable Milepost HRMP 70

USGS Map Reference Bettles, Alaska T- 22N R- 14W Sec 32

Site Access Haul Road - 89APL-4 - workpad

ASSESSMENT

North Fork Bonanza Creek is a small meandering creek with alternating pools and riffles. It flows through stands of large spruce and birch. The channel width varies from 7-15 m in summer and 2-5 m in winter.

Late winter surveys found the North Fork completely frozen to the bottom at all sites drilled. However, it is reported that open water was present at the TAPS crossing on 4 April 1972 (Ref. 11). Although this region may occasionally have free water, it does not have large deep pools or perennial springs near the crossing, and therefore the area would not provide suitable overwintering habitat.

SAMPLING LOCATIONS

SITE Figure 64

A 120 m upstream from NAPLINE

B NAPLINE crossing

C 130 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	5 Apr 79	5 Apr 79	5 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; creek frozen to bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	5 Apr 79	5 Apr 79	5 Apr 79			
Snow Depth (cm)						
Ice Depth (cm)	91	12-27	30-43			
Air Space (cm)	21	0-24	0			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	gravel	gravel	gravel			

REMARKS

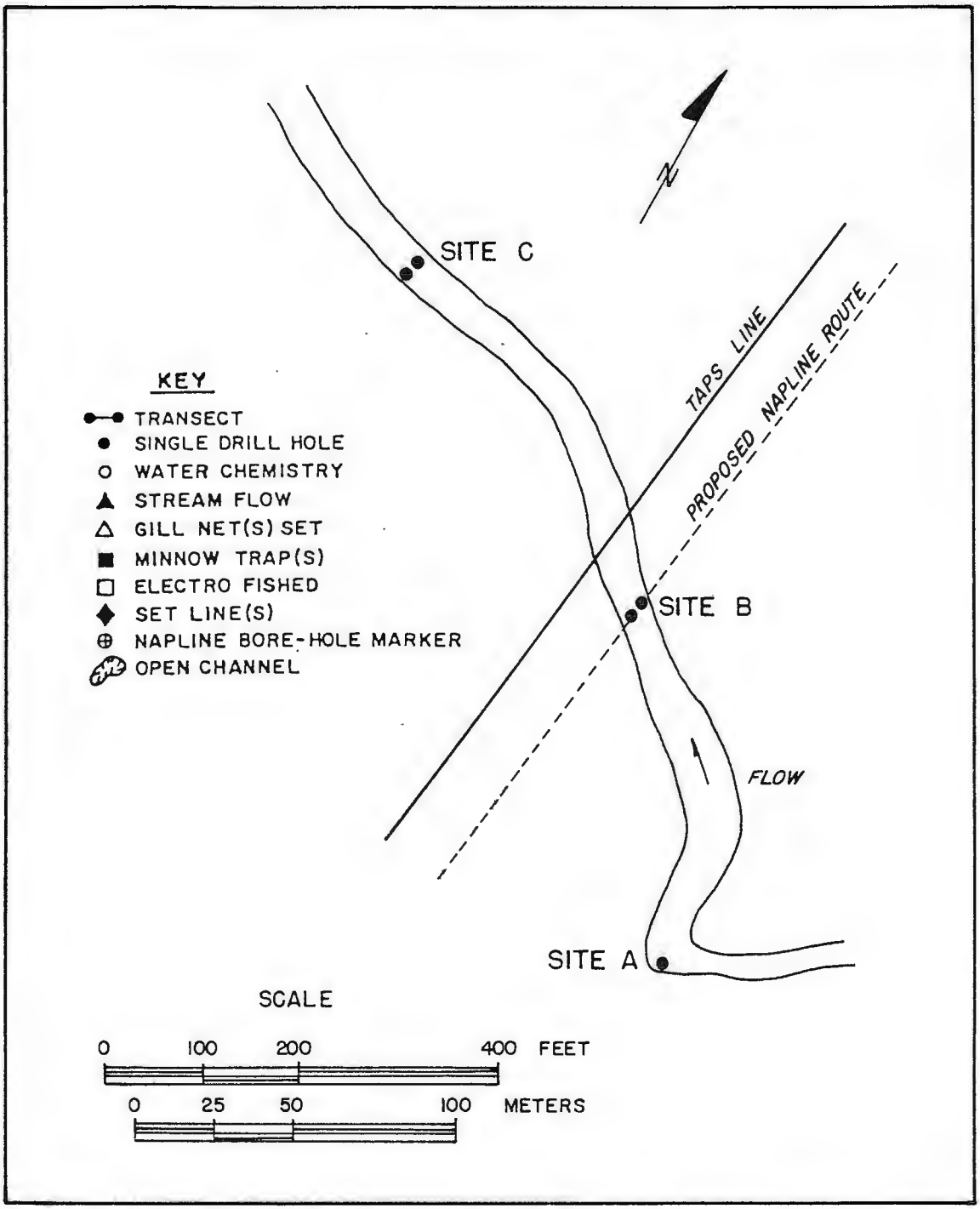

Fig. 64. Winter survey. North Fork Bonanza Creek, 5 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Prospect Creek

Main Drainage South Fork Koyukuk Tributary to Jim River

Figure(s) 2 and 65 Northwest Alignment Sheet 50

Ident. Nos: NPSI 3-91 Applicable Milepost HRMP 78

USGS Map Reference Bettles, Alaska T- 23N R- 14W Sec 31

Site Access Haul Road - 91APL-1 - workpad

ASSESSMENT

The proposed NAPLINE crossing of Prospect Creek is in an area of extensive aufeis. The channel width varied from 12-30 m during the winter survey, but may change after the aufeis has melted. Due to the extensive glaciering and scarcity of free water, this region does not appear to provide suitable overwintering habitat.

Perennial springs, located 10-12 km upstream of the NAPLINE crossing, are used for overwintering and egg incubation for salmon (D. Ward, pers. comm.).

SAMPLING LOCATIONS

SITE Figure 65

A 1150 m upstream from NAPLINE

B 120 m upstream from NAPLINE

C NAPLINE crossing

D 110 m downstream from NAPLINE

E

F

FISH

SITE	A	B	C	D	E	F
Date	5 Apr 79	5 Apr 79	5 Apr 79	5 Apr 79		
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely; stream intermittently frozen to the bottom.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	5 Apr 79	5 Apr 79	5 Apr 79	5 Apr 79		
Snow Depth (cm)		110-168				
Ice Depth (cm)	95		82	107		
Air Space (cm)	0	0	0	0		
Water Depth (cm)	0-6	0-15	0	0		
Discharge (m^3/s)	0	0	0	0		
D. O. (mg/l)		2.6				
Temperature (°C)		0.3				
Conduct. ($\mu mhos/cm^2$)		95				
pH		6.3				
Color/Turbidity	clear	clear				
Bottom Type	gravel	gravel				

REMARKS

Stonefly nymphs abundant in upwelling through one hole drilled at Site A. At Site C, a 3 cm water lens was found in the upper 30 cm of ice which had enough water to fill the drill hole.

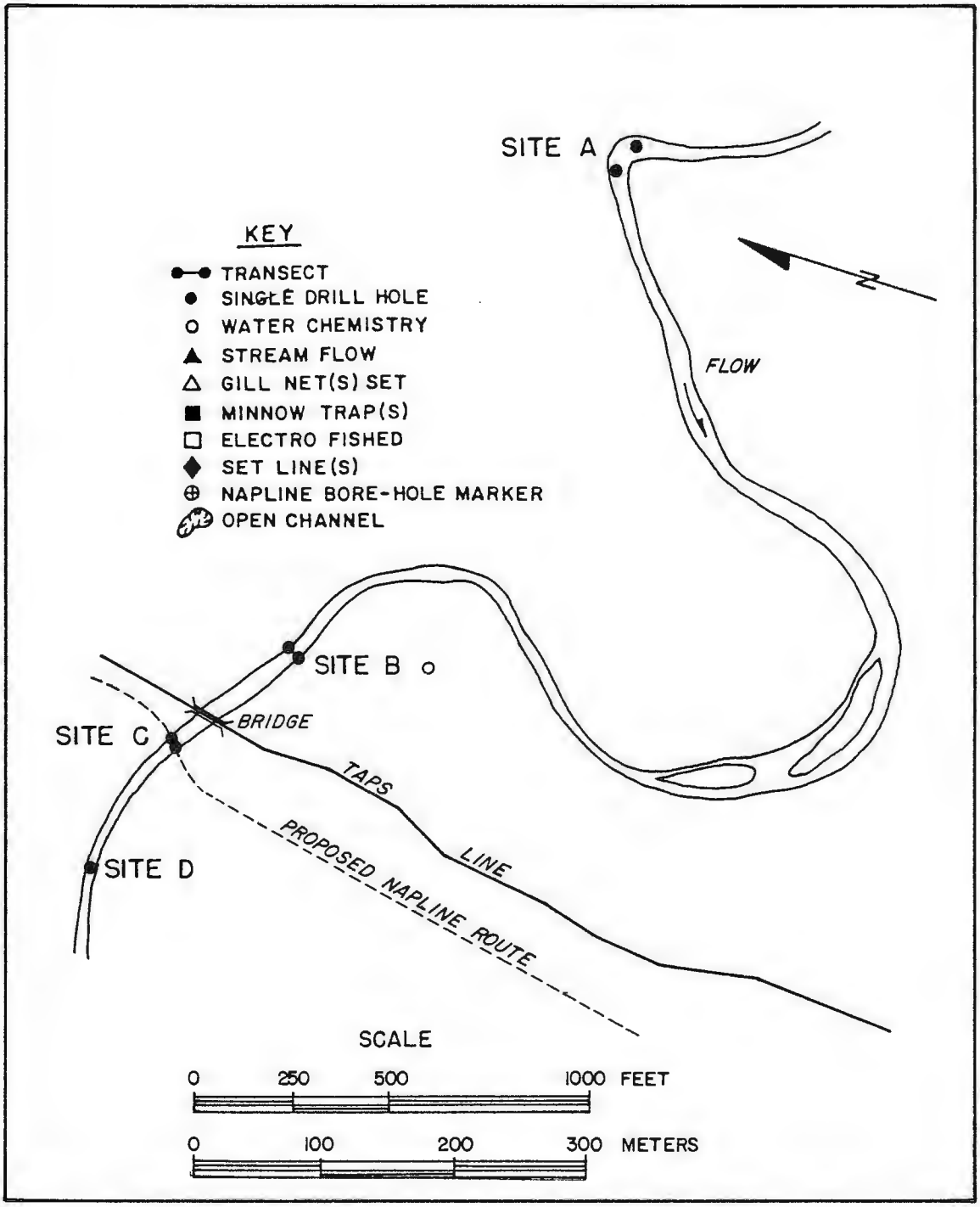

Fig. 65. Winter survey. Prospect Creek, 5 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Jim River Side Channel #1

Main Drainage South Fork Koyukuk Tributary to Jim River

Figure(s) 2 and 66 Northwest Alignment Sheet 49

Ident. Nos: NPSI 3-90.02 Applicable Milepost HRMP 84

USGS Map Reference Bettles, Alaska T- 23N R-14W Sec 9

Site Access On foot from Haul Road

ASSESSMENT

Jim River Side Channel #1 is an alternate channel which is crossed by the NAPLINE 120 m upstream of where it flows into the main channel of the Jim River. Steep banks 1.2-1.8 m high were bordered by willow and spruce. The channel width varied from 5-10 m in a floodplain 10-15 m wide, which was primarily sand/cobble substrate. An open water channel 60 m long was present 90 m upstream of the NAPLINE crossing.

Jim River Side Channel #1 was found to be an overwintering site in the region of the NAPLINE crossing. Slimy sculpin were captured by electrofishing during the 1979 winter survey.

SAMPLING LOCATIONS

SITE Figure 66

A 90 m upstream from NAPLINE (open water)

B NAPLINE crossing

C 60 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	7 Apr 79	7 Apr 79	7 Apr 79			
Species	slimy sculpin					
Quantity	16					
Size (mm)	19-70					
Gear/Effort	EF(60m)	not fished	not fished			

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	7 Apr 79	7 Apr 79	7 Apr 79			
Snow Depth (cm)						
Ice Depth (cm)		18-21	34-73			
Air Space (cm)		0-3	est. 0-2			
Water Depth (cm)	0-46	64	0-40			
Discharge (m^3/s)			0.2			
D. O. (mg/l)			9.0			
Temperature (°C)			0.3			
Conduct. ($\mu mhos/cm^2$)			40			
pH			7.0			
Color/Turbidity	clear	clear	clear			
Bottom Type	sand cobble	sand cobble	sand cobble			

REMARKS

Site A: Open channel 60 m long, caddisfly and stonefly nymphs and adult midges were present. Algae was abundant on substrate.

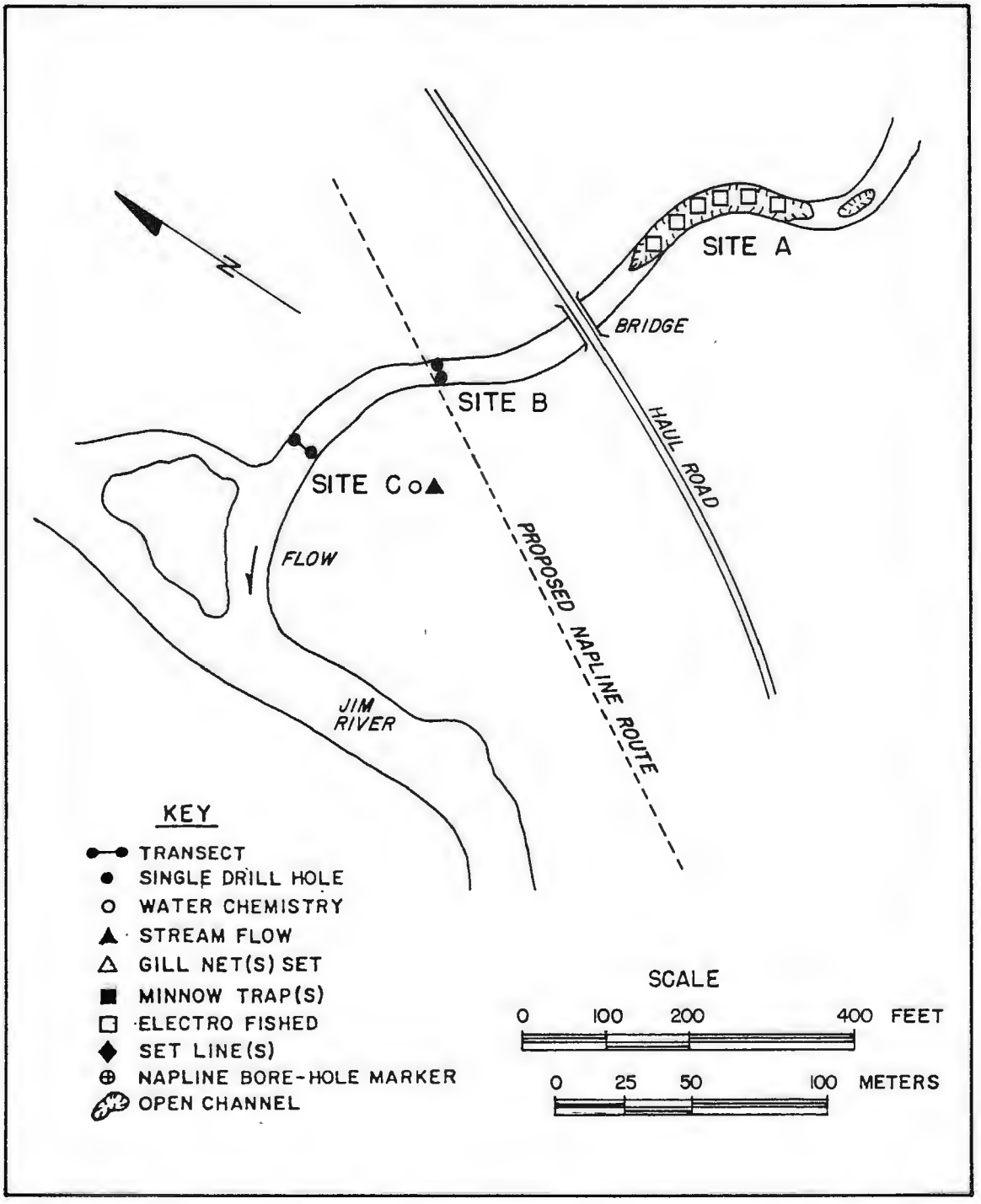

Fig. 66. Winter survey. Jim River Side Channel #1, 7 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Jim River Side Channel #2

Main Drainage South Fork Koyukuk Tributary to Jim River

Figure(s) 2 and 67 Northwest Alignment Sheet 49

Ident. Nos: NPSI 3-90.01 Applicable Milepost HRMP 85

USGS Map Reference Bettles, Alaska T- 23N R- 14W Sec 3

Site Access On foot from Haul Road

ASSESSMENT

The Jim River Side Channel #2 is a meandering stream that flows through alternating wet tundra and then hard ground. The banks and stream substrate contain gravel, sand and some silt.

The entire Jim River between Prospect Camp and upstream to above the last crossing is known to be used by fall spawning salmon. Although the Jim River Side Channel #2 is extensively glaciered and frozen to the bottom in many places, it does have potential for good overwintering habitat. Water was found at the NAPLINE crossing but extreme ice thickness prevented detailed sampling. This area should be surveyed during fall, flagged and then resurveyed in late winter to assess overwintering potential.

SAMPLING LOCATIONS

SITE Figure 67

A 180 m upstream from NAPLINE

B 60 m upstream from NAPLINE

C 25 m downstream from crossing

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	7 Apr 79	7 Apr 79	7 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	Sites not fished due to thickness of ice or being frozen to bottom					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	7 Apr 79	7 Apr 79	7 Apr 79			
Snow Depth (cm)	6-9	6-9				
Ice Depth (cm)	189-198+	155-201	174-198			
Air Space (cm)	0	0				
Water Depth (cm)	?*	0-3	3-52			
Discharge (m^3/s)		0				
D. O. (mg/l)			8.0			
Temperature (°C)			0			
Conduct. ($\mu mhos/cm^2$)			120			
pH			7.0			
Color/Turbidity			clear			
Bottom Type			gravel			

REMARKS

*At Site A, except for one small lens of water the first hole was frozen to the bottom. The bottom was not reached in the second hole at Site A. Pressure ridges and upheavels were observed in mid-channel between Sites A and C.

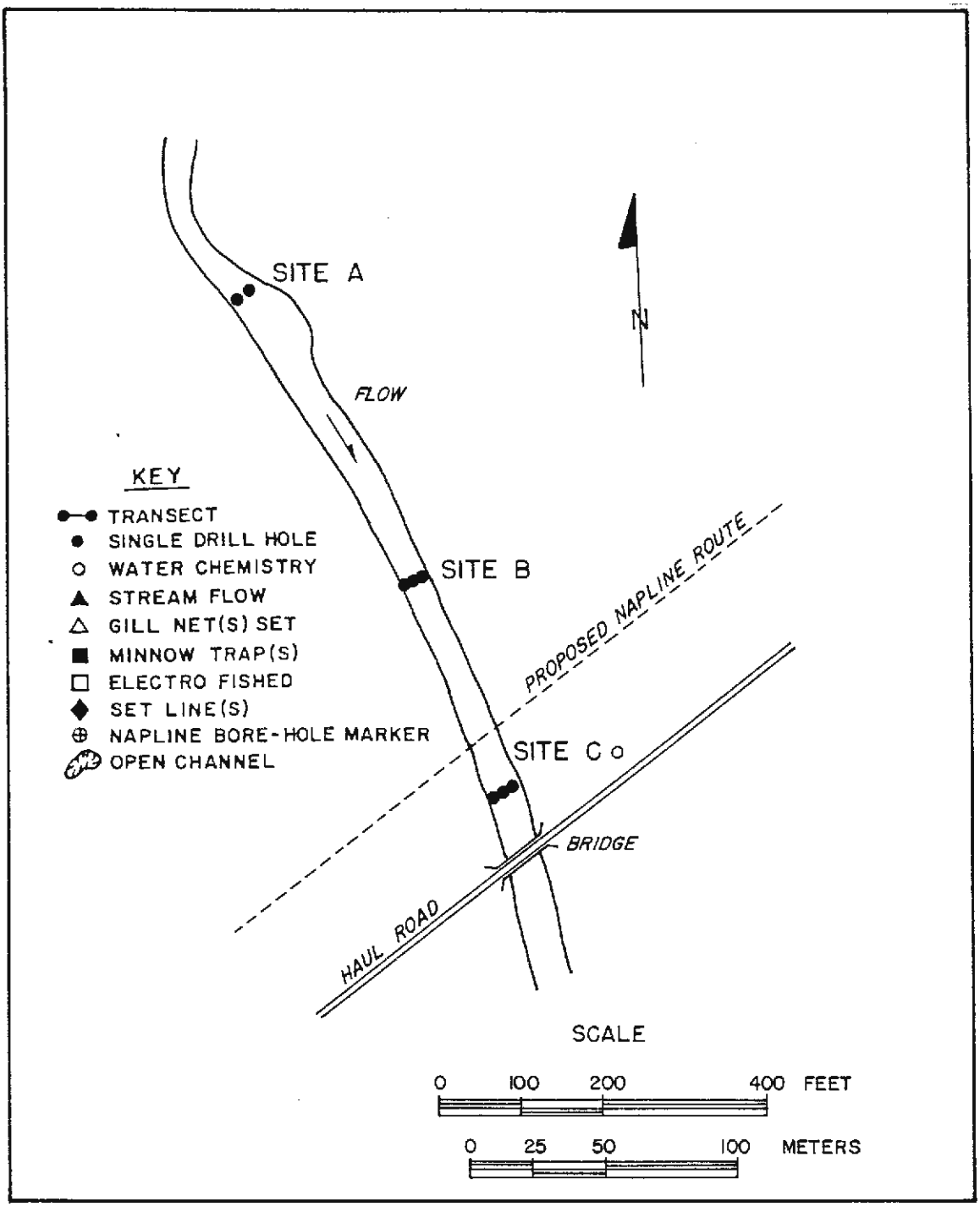

Fig. 67. Winter survey. Jim River Side Channel #2 (Alternate Channel), 7 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Beaver Springs #1

Main Drainage South Fork Koyukuk Tributary to Jim River

Figure(s) 2 and 68 Northwest Alignment Sheet 48

Ident. Nos: NPSI 3-87.02 Applicable Milepost HRMP 87

USGS Map Reference Bettles, Alaska T- 24N R- 14W Sec 26

Site Access Direct from Haul Road

ASSESSMENT

Beaver Springs is a small clear perennial spring that varies from 5-10 m in width. Algae and invertebrates are abundant throughout the year. This area is an overwintering site for juvenile king salmon, slimy sculpin and possibly other fish or eggs. Although the currently proposed alignment does not cross Beaver Springs, it is within 100 feet of the upper reaches. Beaver Springs is sensitive to disturbance and should be avoided.

SAMPLING LOCATIONS

SITE Figure 68

A Haul Road multiplate downstream 30 m

B

C

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	8 Apr 79					
Species	king salmon sculpin					
Quantity	4 ks 1 cn					
Size (mm)	54 cn 78-82 ks					
Gear/Effort	EF(30m)					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	7 Apr 79					
Snow Depth (cm)						
Ice Depth (cm)	0					
Air Space (cm)	0					
Water Depth (cm)	0-76					
Discharge (m^3/s)	0.08					
D. O. (mg/l)	8.2					
Temperature (°C)	1.5					
Conduct. ($\mu mhos/cm^2$)	30					
pH	7.0					
Color/Turbidity	clear					
Bottom Type	gravel sand					

REMARKS

Beaver Springs is located at Haul Road Station HR1557+06 and is known to be open during winter (Ref. 11). Upstream of the Haul Road, Beaver Springs is a single long pool with mud, sand and gravel substrate. Algae and invertebrates were abundant.

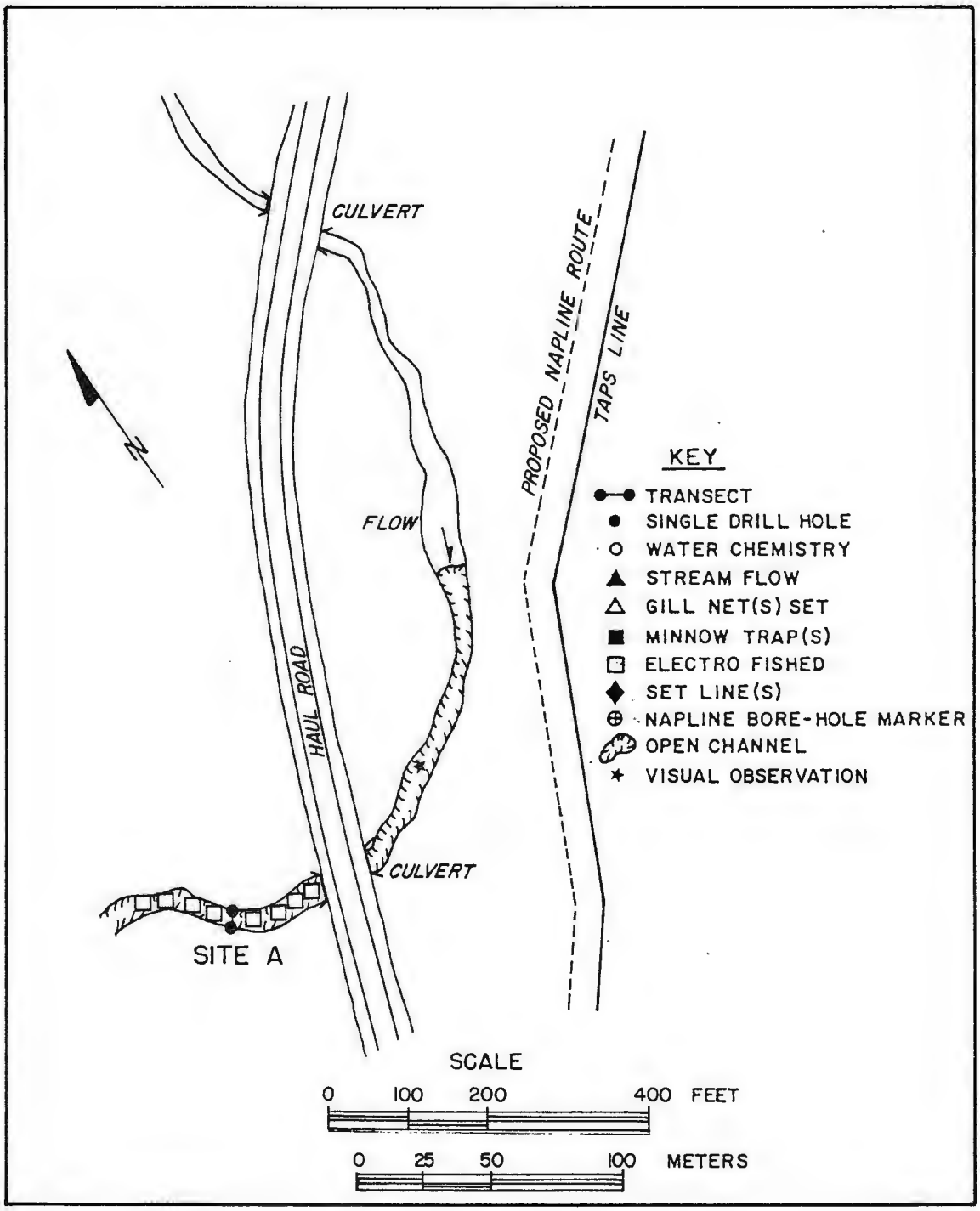

Fig. 68. Winter survey. Beaver Springs, 7 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Jim River #3

Main Drainage Koyukuk River Tributary to South Fork Koyukuk River

Figure(s) 2 and 69 Northwest Alignment Sheet 48

Ident. Nos: NPSI 3-87 Applicable Milepost HRMP 87

USGS Map Reference Bettles, Alaska T-24N R-14W Sec 23 & 26

Site Access On foot directly from Haul Road

ASSESSMENT

Jim River #3 is a medium sized stream with a channel width of about 20 m in the area of the NAPLINE crossing. Two channels converge 30 m upstream of the NAPLINE crossing to form the main channel which lies in a floodplain of large cobble about 40 m wide and bordered by spruce.

Jim River #3 is an overwintering site in the area of the NAPLINE crossing. Water quality was found to be adequate to support fish during the 1979 winter survey at which time slimy sculpin were caught in open water channels. Similar open channels were described in previous years (Ref. 21). Other species known to use the river include king salmon (Ref. 11) which would also indicate overwintering in the river.

SAMPLING LOCATIONS

SITE Figure 69

A 75 m upstream of NAPLINE

B 85 m downstream of NAPLINE

C 280 m downstream of NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	8 Apr 79	8 Apr 79	8 Apr 79			
Species			slimy sculpin			
Quantity			33			
Size (mm)			18-91			
Gear/Effort	not fished	not fished	EF (30m)			

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	8 Apr 79	8 Apr 79	8 Apr 79			
Snow Depth (cm)	52					
Ice Depth (cm)	55	15-40				
Air Space (cm)	0	0				
Water Depth (cm)	3	0-61	5-40			
Discharge (m^3/s)		0.06 est.				
D. O. (mg/l)		8.0				
Temperature (°C)		0.5				
Conduct. ($\mu mhos/cm^2$)		30				
pH		7.0				
Color/Turbidity		clear				
Bottom Type	gravel cobble	gravel cobble	gravel cobble			

REMARKS

Site C: Open channel about 80 m long.

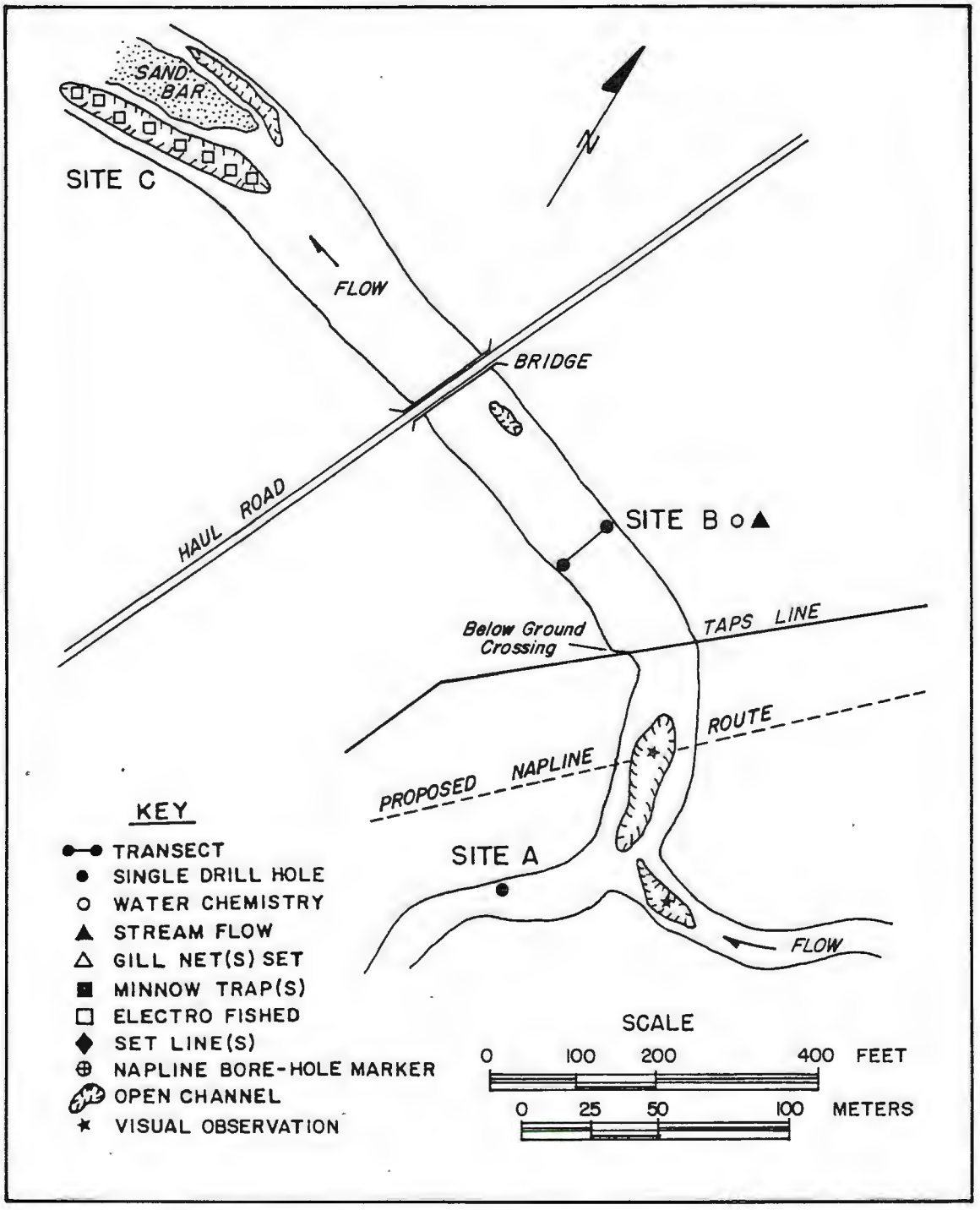

Fig. 69. Winter survey. Jim River #3, 8 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Slate Creek

Main Drainage Yukon River Tributary to Koyukuk River

Figure(s) 2 and 70 Northwest Alignment Sheet 43

Ident. Nos: NPSI 3-72 Applicable Milepost HRMP 118

USGS Map Reference Wiseman, Alaska T-28N R- 12W Sec 15

Site Access Snowmachine from Haul Road

ASSESSMENT

Slate Creek is a small stream 1.5-3 m wide that originates in the elevated terrain east of the Haul Road. This gravel bottom stream goes dry in late fall with little or no ice forming near the NAPLINE crossing. Glaciering was not present near the NAPLINE. Slate Creek, in the vicinity of the NAPLINE does not provide overwintering habitat.

SAMPLING LOCATIONS

SITE Figure 70

A 100 m upstream from NAPLINE

B NAPLINE crossing

C 100 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	9 Apr 79	9 Apr 79	9 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen to bottom					

WINTER CONDITIONS

SITE	A	B	C*	D	E	F
Date	9 Apr 79	9 Apr 79	9 Apr 79			
Snow Depth (cm)	122	15	0-15			
Ice Depth (cm)	15	0	0			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	gravel sand	gravel sand	gravel sand			

REMARKS

Banks are incised both up- and downstream of the proposed NAPLINE crossing. Banks are not incised however, in the TAPS row, which is approximately 150 m in width.

*Site C: Dry channel in hole dug by shovel.

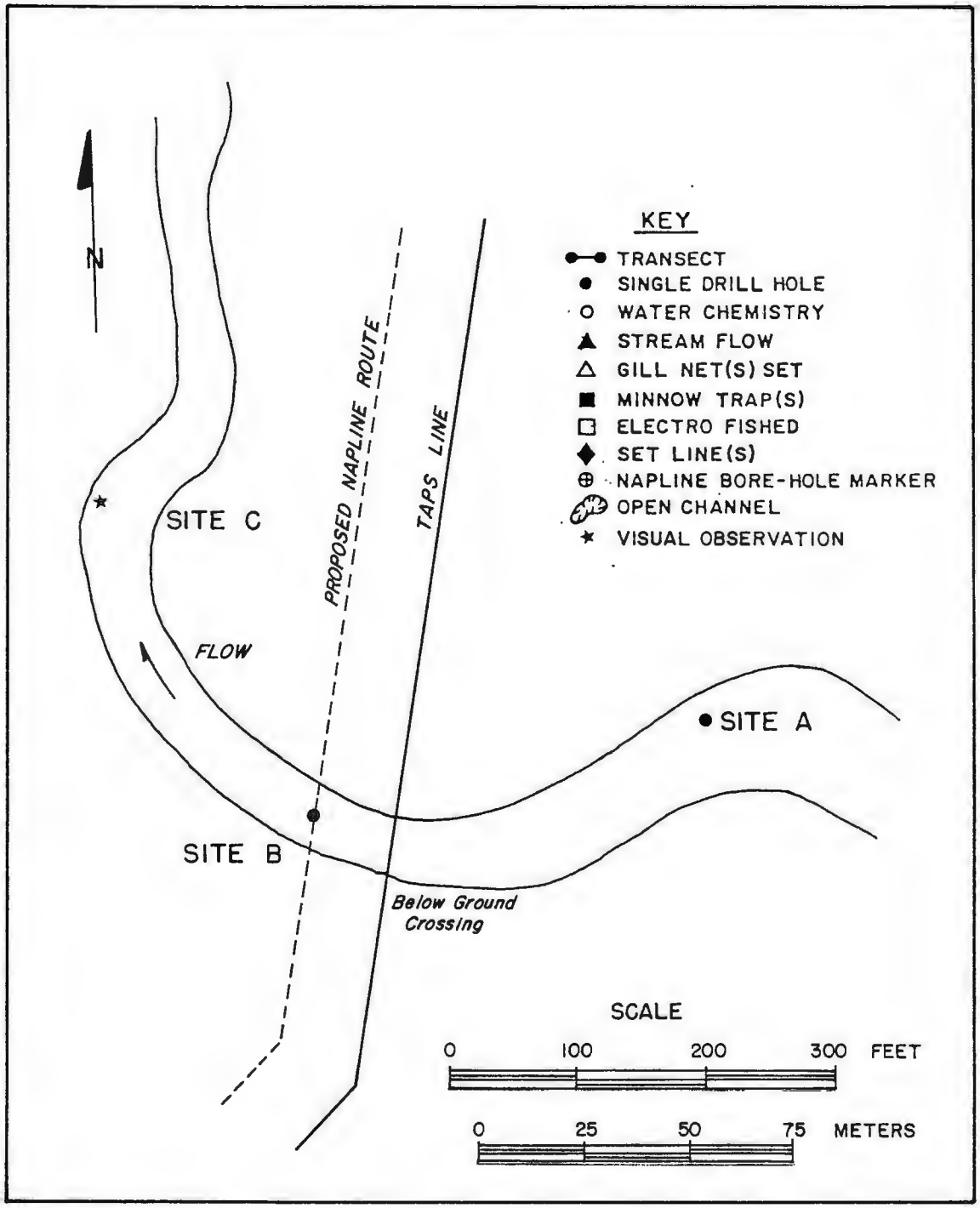

Fig. 70. Winter survey. Slate Creek, 9 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Hammond River

Main Drainage Koyukuk River Tributary to Middle Fork Koyukuk

Figure(s) 2 and 71 Northwest Alignment Sheet 40

Ident. Nos: NPSI 2-55 Applicable Milepost HRMP 136

USGS Map Reference Wiseman, Alaska T- 31N R- 11W Sec 33

Site Access Snowmachine from Haul Road

ASSESSMENT

The Hammond River is a small stream 4-4.5 m in width with an occasionally active gravel floodplain of 300 m. This river has seasonally high runoff but goes dry in winter. Vegetated islands are present in the floodplain and are covered with small willow. The main stream banks are .3-1 m high and are vegetated with spruce, willow, penny birch and blueberry. The area proposed for a NAPLINE crossing does not provide overwintering habitat.

SAMPLING LOCATIONS

SITE Figure 71

A 450 m upstream from NAPLINE

B 130 m upstream from NAPLINE

C NAPLINE crossing

D 90 m downstream from NAPLINE

E

F

FISH

SITE	A	B	C	D	E	F
Date	9 Apr 79	9 Apr 79	9 Apr 79	9 Apr 79		
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; stream frozen to bottom or dry					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	9 Apr 79	9 Apr 79	9 Apr 79	9 Apr 79		
Snow Depth (cm)	0	15-90				
Ice Depth (cm)	0	21	21	21		
Air Space (cm)	0	3	0	0		
Water Depth (cm)	0	0	0	0		
Discharge (m^3/s)	0	0	0	0		
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	gravel					

REMARKS

Site A: Dry channel, no ice.

Site B: Channel width 4 m.

Site D: Channel width 4.5 m.

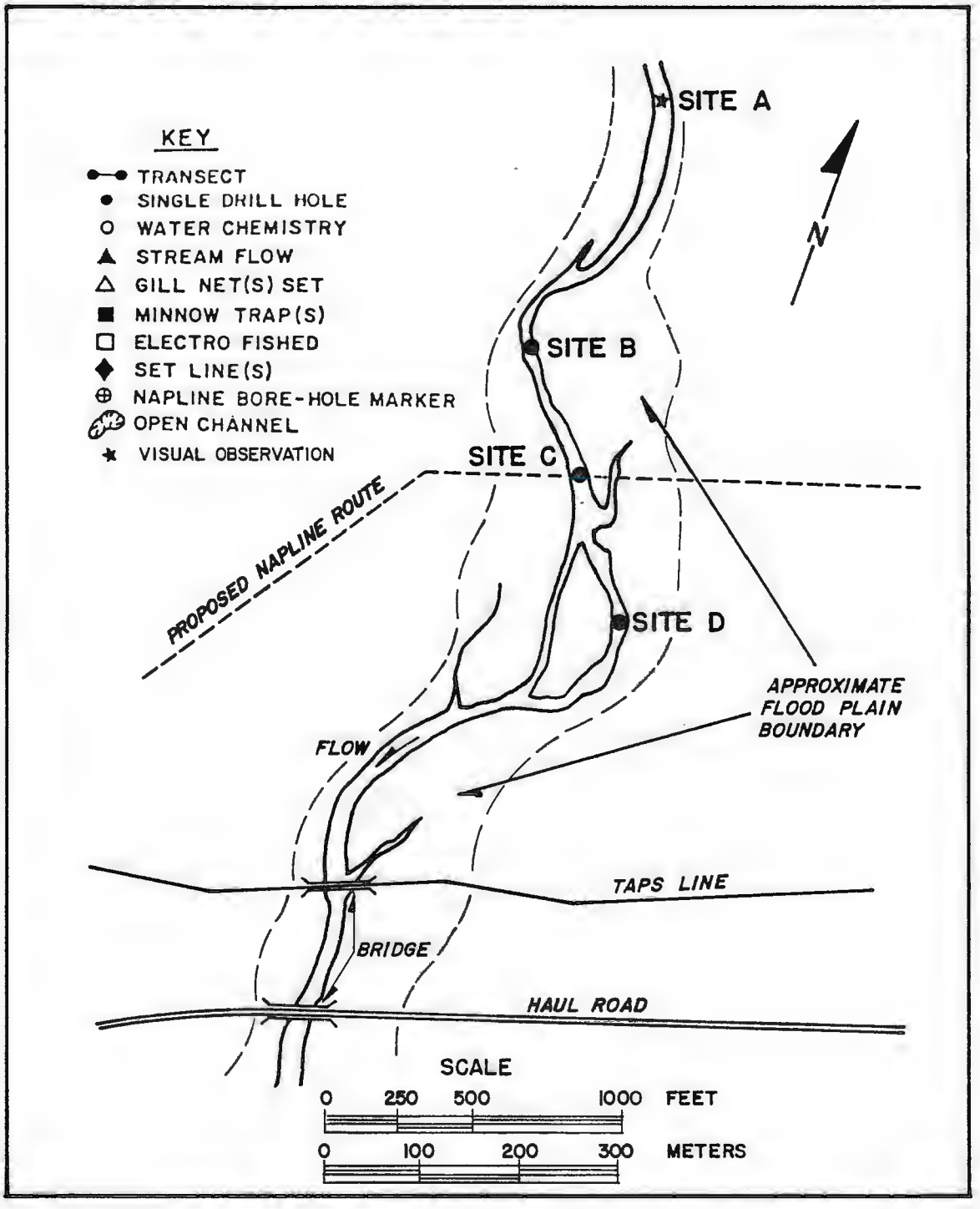

Fig. 71. Winter survey. Hammond River, 9 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Dietrich River (Lower reaches)

Main Drainage Koyukuk River Tributary to Middle Fork Koyukuk

Figure(s) 2, 72 and 73 Northwest Alignment Sheet 38

Ident. Nos: NPSI 2-48 Applicable Milepost HRMP 150

USGS Map Reference Chandalar, Alaska T-33N R-10W Sec 35

Site Access On foot from Haul Road

ASSESSMENT

The Dietrich River, near its confluence with the Koyukuk, is a large stream with a single active channel width of approximately 30-40 m. The region proposed for NAPLINE crossing has extensive icing with a maximum reported ice thickness of 140 cm. The south bank was heavily riprapped by Alyeska. The north bank was a sloping gravel bar terminating at the water edge.

Overwintering potential at the NAPLINE crossing was marginal at the time of this study. On 9 April 1979, the NAPLINE crossing was drilled and a 61 cm airspace was found under the ice. The odor of dead fish was present. This may have been the site of a natural fish kill prior to sampling. It is suspected that the main under-ice channel in the area of the crossing may have supported overwintering fish, but the water table apparently dropped through the winter, resulting in a natural fish kill.

..../2

SAMPLING LOCATIONS

SITE Figure 72 and 73

A 100 m upstream from NAPLINE

B NAPLINE crossing

C 60 m downstream from NAPLINE

D 100 m upstream from NAPLINE

E 50 m upstream from NAPLINE

F 25 m upstream from NAPLINE

WINTER SURVEY FORM

WATERBODY

Waterbody_____

Main Drainage_____ Tributary to_____

Figure(s)_____ Northwest Alignment Sheet_____

Ident. Nos: NPSI_____ Applicable Milepost_____

USGS Map Reference_____ T- R- Sec

Site Access_____

ASSESSMENT

(Continued)

On 26 April 1979, the Dietrich River was revisited. Meltwater had caused the water level to rise enough to completely fill the airspace and juvenile fish were found. It is not known whether these fish had overwintered in this area or whether they had entered this area after the water level had risen.

This area requires a late fall survey to flag potential overwintering pools and further winter investigations. Overwintering has been documented in other areas of the Dietrich River (Ref. 11).

SAMPLING LOCATIONS

SITE Figure_____

G	12 m upstream from NAPLINE
H	NAPLINE crossing
I	12 m downstream from NAPLINE
J	25 m downstream from NAPLINE
K	38 m downstream from NAPLINE
L	60 m downstream from NAPLINE

FISH

SITE	A	B	C	D	E	F
Date	9 Apr 79	9 Apr 79	9 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish were found in the limited amount of water available but odor of dead fish present.					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	9 Apr 79	9 Apr 79	9 Apr 79			
Snow Depth (cm)	0-10	0-20	10			
Ice Depth (cm)	78-128	137-140	140			
Air Space (cm)	0	15-16	0			
Water Depth (cm)	0	0-30	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	gravel rocks	mud sand gravel	gravel			

REMARKS

Site A: Water present in lenses.

Site B: Odor of dead fish present--none observed.

Site C: Solid ice to bottom.

Continued...

FISH

SITE	D	E	F	G	H	I
Date	26 Apr 79	26 Apr 79	26 Apr 79	26 Apr 79	26 Apr 79	26 Apr 79
Species						
Quantity					0	
Size (mm)						
Gear/Effort	not fished	not fished	not fished	not fished	1MT(8h)	not fished

WINTER CONDITIONS

SITE	D	E	F	G	H	I
Date	26 Apr 79	26 Apr 79	26 Apr 79	26 Apr 79	26 Apr 79	26 Apr 79
Snow Depth (cm)	0	0	0	0	0	0
Ice Depth (cm)	128	79-113	92-134	85-137	67-153	115-156
Air Space (cm)	0	0	0	0	0	0
Water Depth (cm)	1.0	0	0-15	0-34	0-76	0-73
Discharge (m^3/s)	0	0	0	0	0	0
D. O. (mg/l)					12.0	
Temperature (°C)					0.2	
Conduct. ($\mu mhos/cm^2$)					340	
pH					8.0	
Color/Turbidity					clear	
Bottom Type	gravel sand	sand gravel	sand gravel	sand gravel	sand gravel	sand gravel

REMARKS

Site B: up to 3 cm meltwater on top of ice; meltwater also present in narrow lense.

Site C: Water present in small channel under ice and lenses.

Site D: Water present in small channel under ice and lenses.

Site E: Channel under ice flow apparent but not measurable; breakup had started, juvenile fish observed in large hole on transect. (continued..)

FISH

SITE	J	K	L			
Date	26 Apr 79	26 Apr 79	26 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	not fished	not fished	not fished			

WINTER CONDITIONS

SITE	J	K	L			
Date	26 Apr 79	26 Apr 79	26 Apr 79			
Snow Depth (cm)	0	0	0			
Ice Depth (cm)	104-137	137-156	137			
Air Space (cm)	0	0	0			
Water Depth (cm)	0-52	0-55	24			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	sand gravel	sand gravel	sand gravel			

REMARKS

Sites G & H: Water present in channel and in lenses.

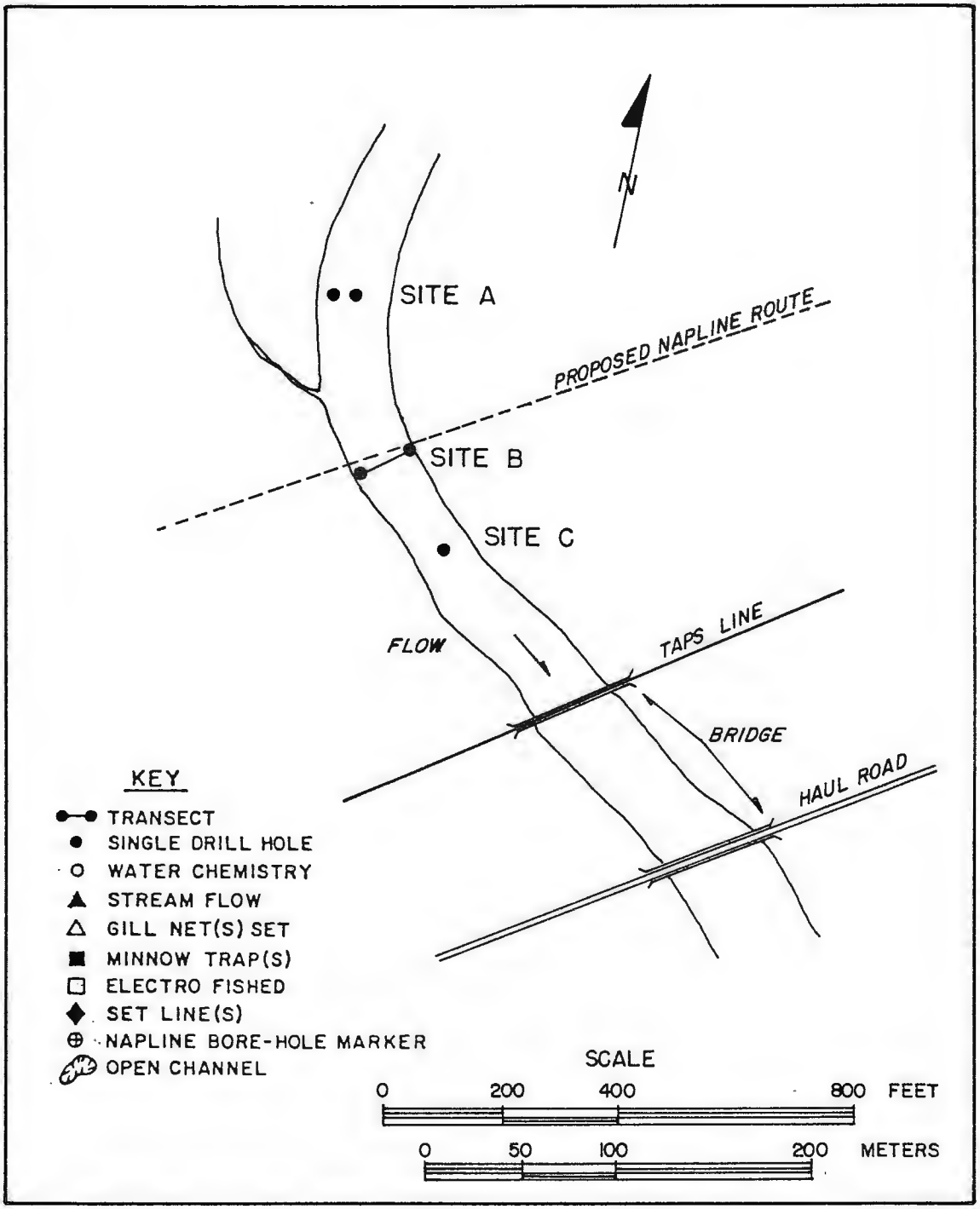

Fig. 72. Winter survey. Dietrich River, 9 April 1979.

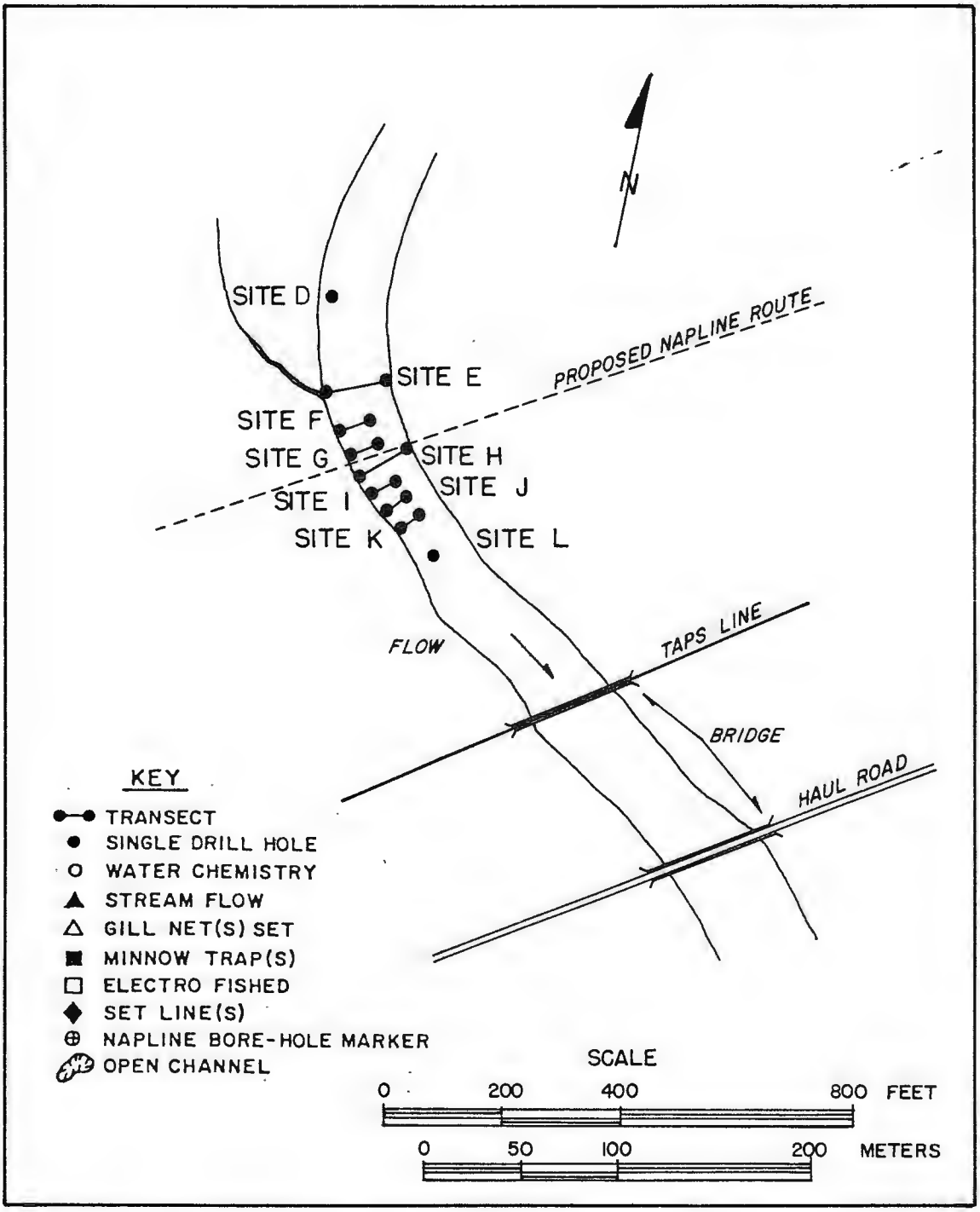

Fig. 73. Winter survey. Dietrich River, 26 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Brockman Creek

Main Drainage Koyukuk River Tributary to Dietrich River

Figure(s) 2 and 74 Northwest Alignment Sheet 37

Ident. Nos: NPSI 2-46 Applicable Milepost HKMP 151

USGS Map Reference Chandalar, Alaska T- 33N R-10W Sec 25

Site Access Access by snowmachine on APL to Dietrich Camp and workpad

ASSESSMENT

Brockman Creek has a steep gradient and a 50 m wide floodplain. Its large rock and cobble substrate suggests it is subject to frequent flooding and high velocity water from nearby mountains. The channel runs essentially straight downhill to its confluence with the Dietrich without meanders.

This stream was frozen solid to the substrate; overwintering habitat was not present.

SAMPLING LOCATIONS

SITE Figure 74

A 115 m upstream from NAPLINE

B 40 m downstream from NAPLINE crossing

C 115 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	9 Apr 79	9 Apr 79	9 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish present; creek frozen to bottom					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	9 Apr 79	9 Apr 79	9 Apr 79			
Snow Depth (cm)	49	34-49	40			
Ice Depth (cm)	24	9-73	21			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	0	0			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	rock cobble	rock cobble				

REMARKS

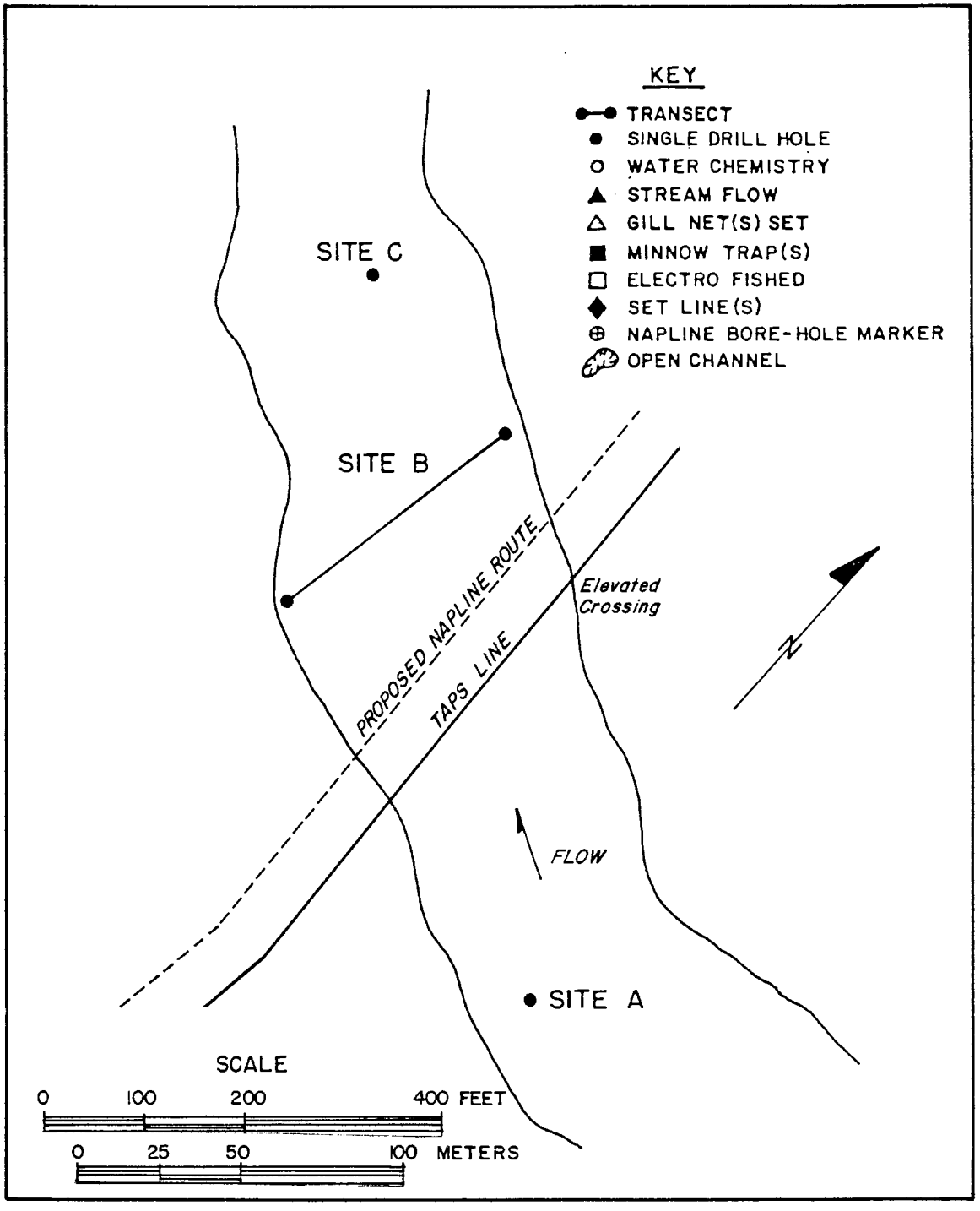

Fig. 74. Winter survey. Brockman Creek, 9 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Drainage Material Site 106

Main Drainage Koyukuk River Tributary to Dietrich River

Figure(s) 2 and 75 Northwest Alignment Sheet 35

Ident. Nos: NPSI 2-36.01 Applicable Milepost HRMP 167

USGS Map Reference Chandalar, Alaska T- 35N R- 10W Sec 16

Site Access By foot from Haul Road

ASSESSMENT

An unnamed spring originates on the east side of the Dietrich River floodplain and flows through Alyeska Material Site 106. Both channels of this spring, one on the west side of the staging area and one on the east side, flow together immediately upstream and then empty into Material Site 106. During TAPS construction, Material Site 106 was excavated to approximately 20 feet below the water line in an effort to create an overwintering site in the pit. The effort was successful since LGL personnel observed juvenile grayling at the downstream end of Material Site 106 in January 1976.

Extensive aufeis buildup prevented sampling during the April 1979 survey. Although this spring is not crossed by the current NAPLINE alignment, it should generally be avoided during construction in winter months.

SAMPLING LOCATIONS

SITE Figure 75

A 220 m west from NAPLINE (NAPLINE does not cross)

B

C

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	9 Apr 79					
Species						
Quantity						
Size (mm)						
Gear/Effort	No fish were observed; extensive aufeis prevented sampling*					

WINTER CONDITIONS

SITE	A**	B	C	D	E	F
Date	9 Apr 79					
Snow Depth (cm)	0					
Ice Depth (cm)	0					
Air Space (cm)	0					
Water Depth (cm)	4.5-6					
Discharge (m^3/s)	.04					
D. O. (mg/l)	8.6					
Temperature (°C)	1.0					
Conduct. ($\mu mhos/cm^2$)	145					
pH	8.0					
Color/Turbidity	clear					
Bottom Type	gravel					

REMARKS

*In January 1976, 10-20 juvenile grayling were observed in the area (D. Ward, per. comm.).

**Water chemistry at Site A was taken on a small open area which was too small for fishing gear.

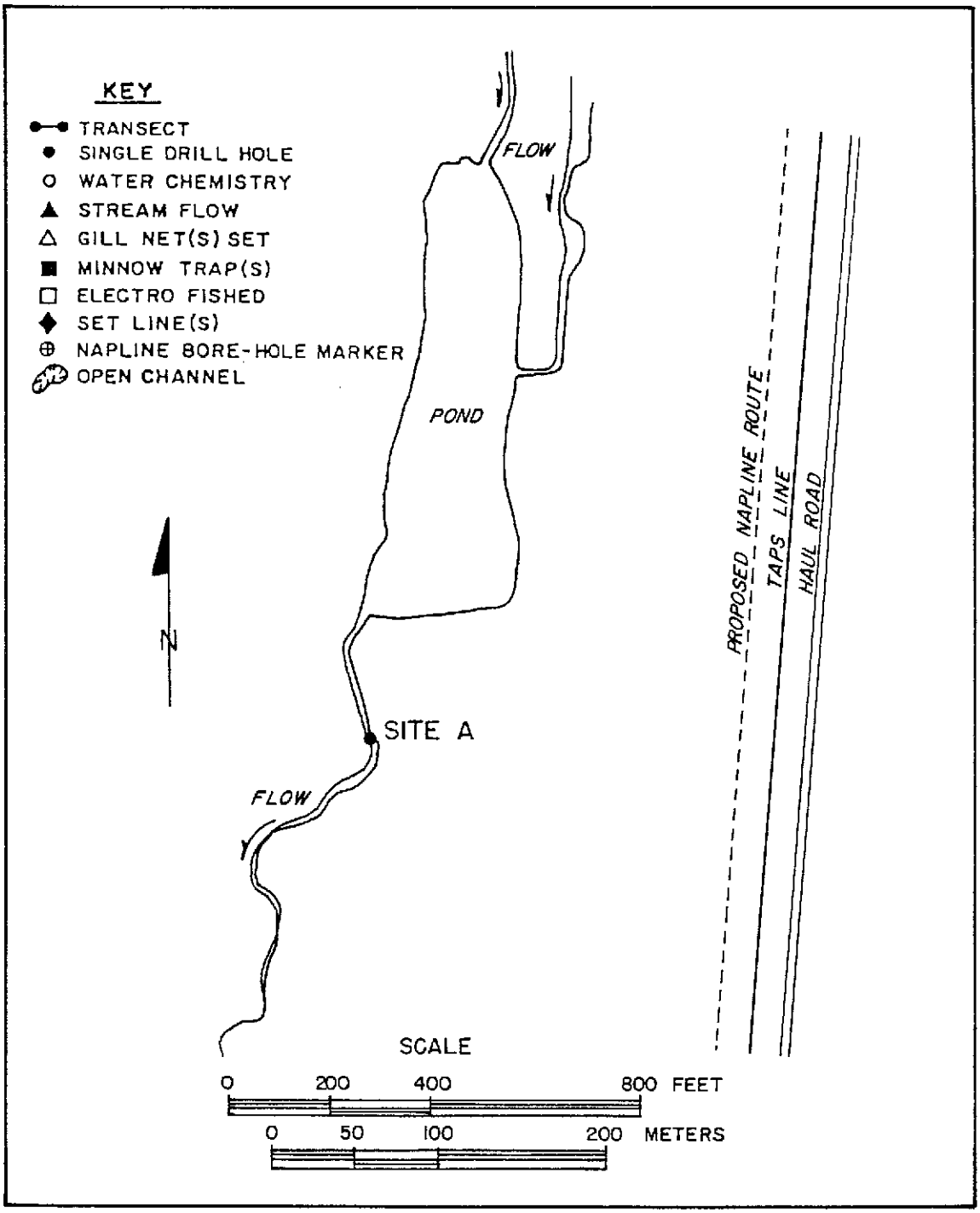

Fig. 75. Winter survey. Drainage Material Site 106, 9 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Unnamed Spring

Main Drainage Koyukuk River Tributary to Dietrich River

Figure(s) 2 and 76 Northwest Alignment Sheet 33

Ident. Nos: NPSI 2-32.05 Applicable Milepost HRMP 173

USGS Map Reference Chandalar, Alaska T-36N R- 10W Sec 10

Site Access By foot from Haul Road

ASSESSMENT

This unnamed spring originates 170 m east of the proposed NAPLINE and flows approximately 0.5 km before reaching the Dietrich River. It is a clear-water, rock and gravel stream 2-4 m in width. Banks are variable, low sloping to incised.

Surveys indicate that this spring serves as a fish overwintering area during some years. LGL personnel observed juvenile grayling in this spring in January 1976, but winter surveys conducted in April 1979 indicated that this spring had frozen solid.

SAMPLING LOCATIONS

SITE Figure 76

A 170 m east from NAPLINE

B

C

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	9 Apr 79					
Species						
Quantity						
Size (mm)						
Gear/Effort	frozen solid					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	9 Apr 79					
Snow Depth (cm)						
Ice Depth (cm)	30					
Air Space (cm)	0					
Water Depth (cm)	0					
Discharge (m^3/s)	0					
D. O. (mg/l)						
Temperature (°C)						
Conduct. ($\mu mhos/cm^2$)						
pH						
Color/Turbidity						
Bottom Type	gravel cobble					

REMARKS

In January 1976 approximately 25 juvenile grayling were observed on this area. At that time discharge was estimated to be .14 m^3/s

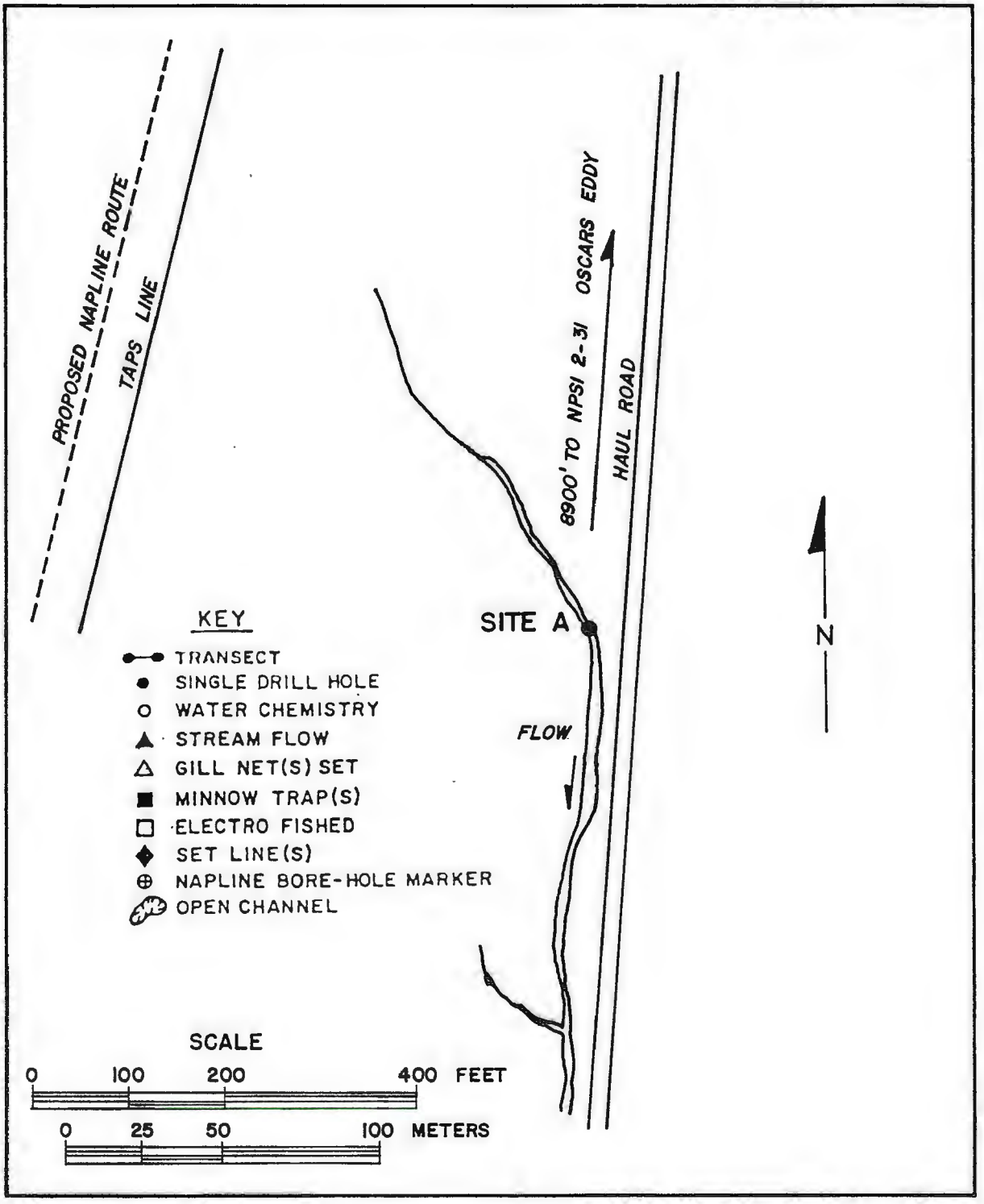

Fig. 76. Winter survey. Unnamed Spring, 9 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Mosquito Lake

Main Drainage Atigun River Tributary to Mosquito Lake Outlet

Figure(s) 2 and 77 Northwest Alignment Sheet 27

Ident. Nos: NPSI 2-22.01 Applicable Milepost HRMP 215

USGS Map Reference Philip Smith Mtns., Alaska T-11S R-12E Sec 32

Site Access On foot from the Haul Road

ASSESSMENT

Mosquito Lake is a small, deep, clear lake located in the northern foothills of the Brooks Range. Measured water depths under the ice ranged from 1.9-6.1 m.

Grayling are reported to be numerous in this lake during the summer months (Ref. 11) but have not been found during winter. Winter field surveys have indicated that overwintering habitat is available but under ice gillnets failed to catch fish. This area requires further winter work.

SAMPLING LOCATIONS

SITE Figure 77

A	20 m from west bank (Haul Road side)
B	35 m from west bank (Haul Road side)
C	20 m from west bank (north of Site A)
D	Center of lake
E	Potential NAPLINE crossing (east bank)
F	Potential NAPLINE crossing (east bank, north of Site E)

FISH

SITE	A	B	C	D	E	F
Date	9 Apr 79	9 Apr 79	9 Apr 79	10 Apr 79	10 Apr 79	10 Apr 79
Species						
Quantity	0	0			0	
Size (mm)						
Gear/Effort	angling (45 min)	8mGN(19h)	not fished	not fished	15mGN(20h)	not fished

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	9 Apr 79	9 Apr 79	9 Apr 79	10 Apr 79	10 Apr 79	10 Apr 79
Snow Depth (cm)						
Ice Depth (cm)	162	168	168	162	168	168
Air Space (cm)	0	0	0	0	0	0
Water Depth (cm)	454	421	427-613	308	189-396	265
Discharge (m^3/s)						
D. O. (mg/l)		8.2				
Temperature (°C)		3.5				
Conduct. ($\mu mhos/cm^2$)		150				
pH		8.0				
Color/Turbidity	clear	clear	clear	clear	clear	clear
Bottom Type	mud	mud	mud	mud	mud	mud

REMARKS

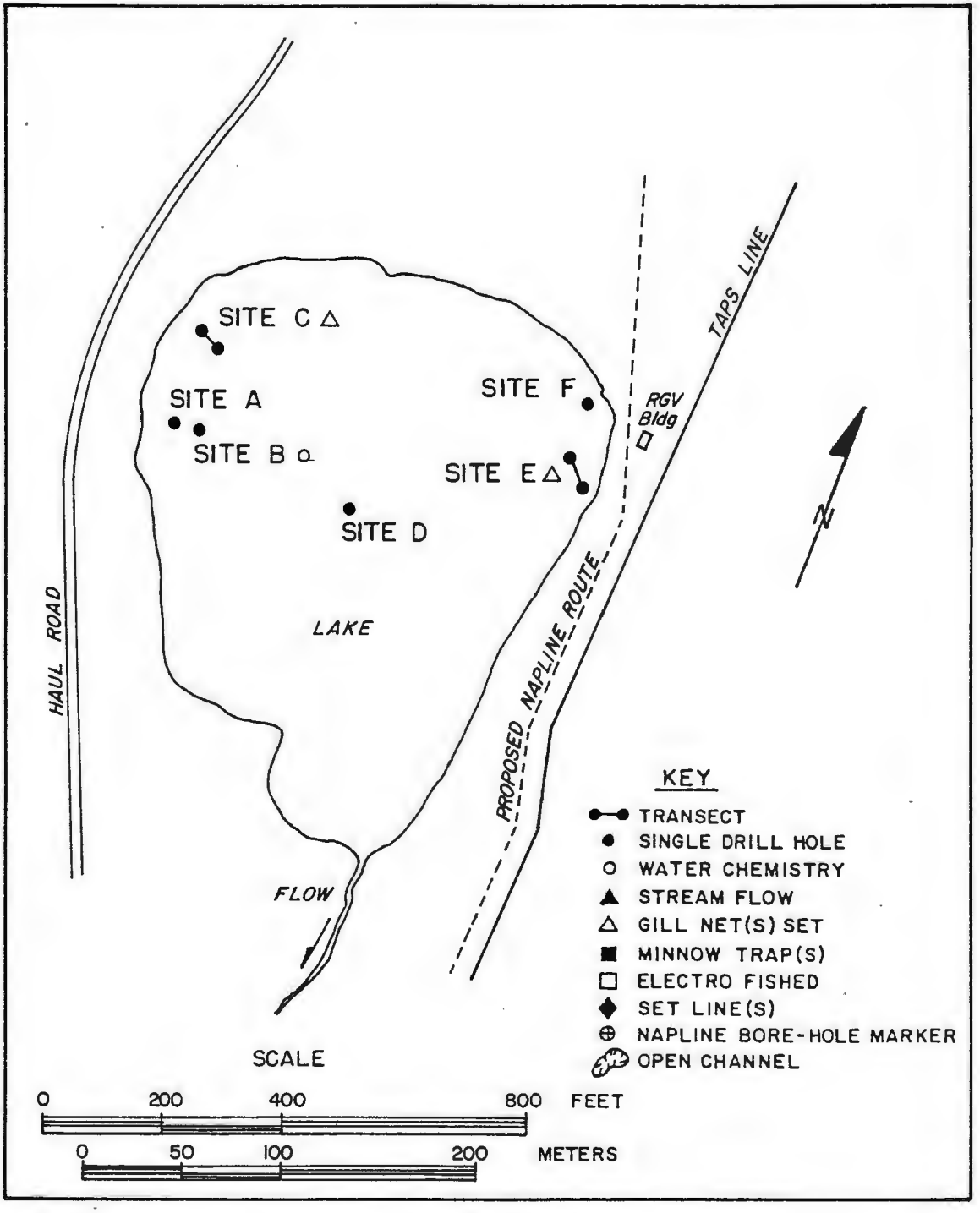

Fig. 77. Winter survey. Mosquito Lake, 9-10 April 1979.

WINTER SURVEY FORM

WATERBODY

Waterbody Kuparuk River

Main Drainage Beaufort Sea Tributary to Simpson Lagoon

Figure(s) 2 and 78 Northwest Alignment Sheet 24

Ident. Nos: NPSI 1-21 Applicable Milepost HRMP 233

USGS Map Reference Phillip Smith, Alaska T- 9S R- 12E Sec 19

Site Access Direct from Haul Road

ASSESSMENT

The Kuparuk River at the NAPLINE crossing is a typical foothill stream with tundra banks. Banks were difficult to locate due to drifted snow and the absence of tall vegetation. The substrate was generally mud although it is reported to be partially gravel (Ref. 11).

This stream is reported to be one of the most productive summer grayling streams on the north side of the Brooks (Ref. 11). Adults probably spawn as far upstream as the NAPLINE crossing.

During winter, the limited amount of water found near the NAPLINE was anaerobic and would not provide suitable overwintering habitat. Other areas sampled were frozen to the bottom. Overwintering areas are, however, present further downstream on the coastal plain, in the lower areas of Kuparuk.

SAMPLING LOCATIONS

SITE Figure -78

A 150 m upstream from NAPLINE

B NAPLINE crossing

C 160 m downstream from NAPLINE

D

E

F

FISH

SITE	A	B	C	D	E	F
Date	9 Apr 79	9 Apr 79	9 Apr 79			
Species						
Quantity						
Size (mm)						
Gear/Effort	Fish presence unlikely; dissolved oxygen 0.0, H_2S odor					

WINTER CONDITIONS

SITE	A	B	C	D	E	F
Date	9 Apr 79	9 Apr 79	9 Apr 79			
Snow Depth (cm)						
Ice Depth (cm)	98	101	146-162			
Air Space (cm)	0	0	0			
Water Depth (cm)	0	0	0-24			
Discharge (m^3/s)	0	0	0			
D. O. (mg/l)			0			
Temperature (°C)			0.3			
Conduct. ($\mu mhos/cm^2$)			125			
pH			6.5			
Color/Turbidity			brown			
Bottom Type			mud detritus			

REMARKS

Site C: A strong H_2S odor was present.

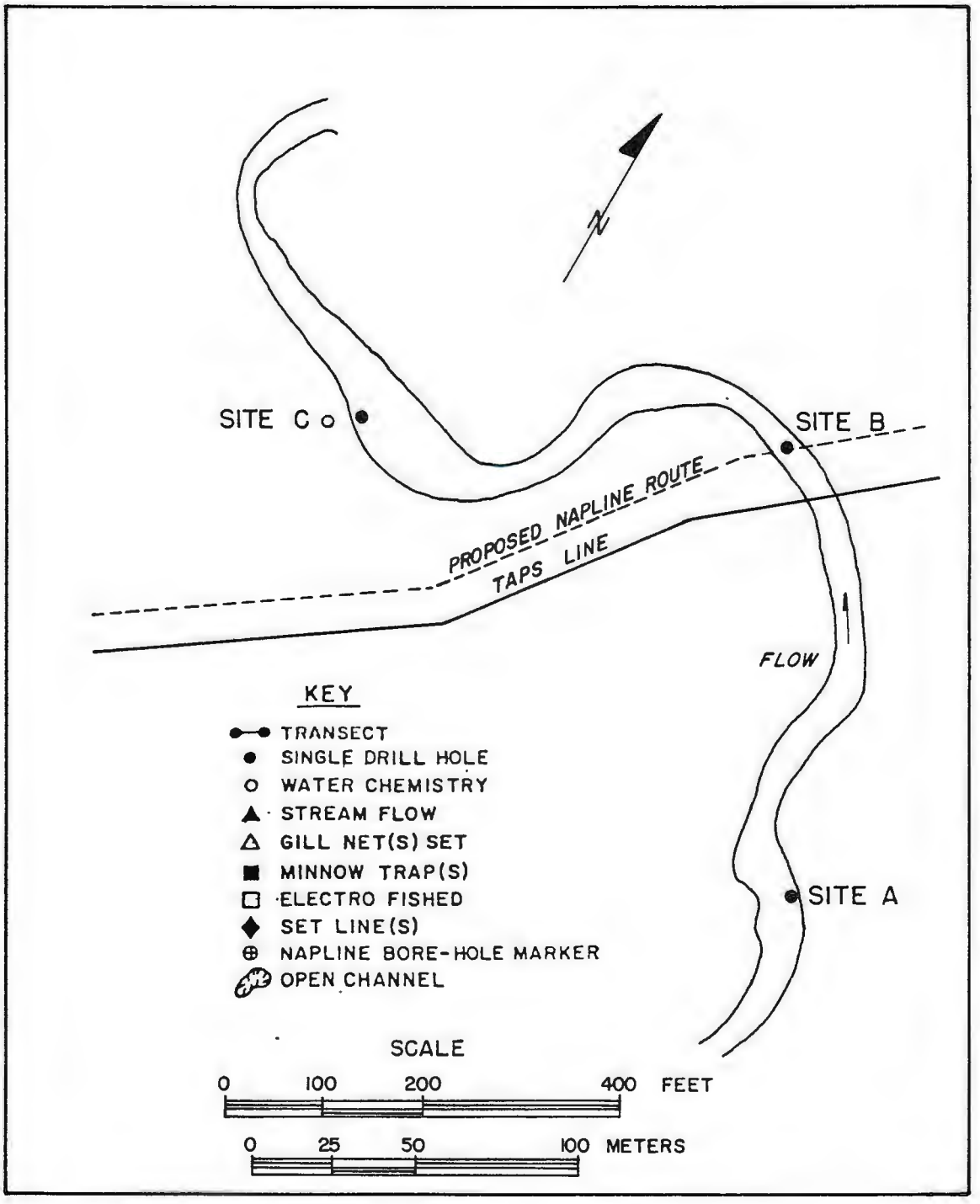

Fig. 78. Winter survey. Kuparuk River, 9 April 1979.

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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

Theresa J. Olson,
Environmental Scientist

TJO:taf

cc: Mr. Brian Tomlinson

APPENDIX II

Provisional list of waterbodies crossed
or potentially affected by the NAPLINE

APPENDIX II. Provisional list of 490 waterbodies crossed or potentially affected by the Northwest Alaska Pipeline including an evaluation of existing winter fisheries data for each. Data sources (see Literature Reviewed) and winter criteria (see Table 1) are listed by number. Abbreviations: NPSI (Northwest Alaskan Pipeline Stream Identification number), NPAS (Northwest Pipeline Alignment Sheet), NPMP (Northwest Pipeline Milepost), AHMP (Alaska Highway Milepost), Alyeska AS (Alyeska Alignment Sheet), Sta. (Station). Reference 4 identifies the NPSI, NPAS and NPMP alignment sheet series used.

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
Unnamed Creek	6-227.03	123	728.7	1222.2				3	2
Unnamed Creek	6-227.02	123	728.3	1222.6				4	-
Unnamed Pond	6-227.01	123	727.6	1223.4				3	2
Scottie Creek	6-227	123	727.5	1223.4				4	3,5,6,7,8,9, 10,26
Desper Creek	6-226	123	725.7	1225.6				4	3,5,6,7,9, 10,26
Unnamed Creek	6-225.01	122	720.8	1232.1				3	2
Sweetwater Creek	6-225	121	718.6	1234.2				4	2,9
Unnamed Creek	6-224	121	718.1	1234.7				3	2
Unnamed Creek	6-223	121	717.0	1235.9				3	2
Unnamed Creek	6-223	121	717.0	1235.9				3	2
Unnamed Creek	6-222	121	716.7	1236.3				4	2
Gardiner Creek	6-219	119	707.0	1246.7				4	3,5,6,7,8,9, 10,26
Tenmile Creek	6-218	118	701.0	1252.8				4	2,3,5,6,9, 10,26
Silver Creek	6-217	118	695.1	1258.7				4	3,5,6,9,10,26
Unnamed Creek	6-216.01	117	692.2	1262.3				3	2
Unnamed Creek	6-216.01	117	692.2	1262.3				3	2
Unnamed Creek	6-216	116	689.5	1266.5				4	2
Beaver Creek	6-215	116	687.7	1268.0				4	3,5,6,7,8,9, 10,26
Unnamed Creek	6-214.01	116	685.5	1270.4				3	2
Unnamed Creek	6-213.01	115	683.2	1273.0				3	2
Unnamed Creek	6-213	115	678.7	1278.3				3	2,9
Bitters Creek	6-212	114	676.8	1280.2				2,3	3,5,6,9,10,26
Unnamed Creek	6-210.02	114	674.0	1283.2				3	2
Unnamed Creek	6-210.01	114	672.1	1285.4				3	2
Unnamed Creek	6-210	112	661.4	1296.7				3	2
Unnamed Creek	6-209	112	660.2	1297.9				3	2
Tanana River	6-207A/B	111	654.9	1303.3				4	3,5,6,7,9,10, 26,27
Tanana River Alt. #1	6-207C	111	654.9	1303.3				4	3,5,6,7,9,10, 26,27
Tanana River Alt. #2	6-208	111	654.9	1303.3				1,4	3,5,6,7,9,10, 26,27
Tok River	6-205	110	648.8	1309.4				4	3,5,6,7,9,10, 17,26

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
Crystal Springs	6-203.02	106	629.9	1328.2				4	2,9,26
Unnamed Creek	6-203.01	106	628.4	1329.5				3	2
Unnamed Creek	6-203	106	626.4	1330.5				3	2
Moon Lake Tributary	6-202	106	626.0	1331.9				3	2,6
Moon Lake Tributary	6-202	106	626.0	1331.9				3	2,6
Yerrick Creek	6-201	105	623.8	1333.7				4	3,5,6,7,8,9, 10,26
Unnamed Creek	6-200	105	621.5	1336.9				3	2
Unnamed Creek	6-200.01	105	621.6	1336.9				3	2
Cathedral Rapids Creek #1	6-199	105	620.0	1338.1				3	2,4,7
Cathedral Rapids Creek #2	6-198	105	619.4	1338.7				3	2,4,7
Cathedral Rapids Creek #3	6-197B	105	619.4	1338.7				3	2,4,7
Cathedral Rapids Creek #4	6-197A	105	619.3	1338.8				3	2,4,7
Cathedral Rapids Creek #5	6-197	105	619.2	1338.9				3	2,4,7
Cathedral Rapids Creek #6	6-196	105	619.0	1339.0				3	2,4,7
Cathedral Rapids Creek #7	6-195	105	618.8	1339.2				3	2,4,7
Unnamed Creek	6-193.01	104	618.3	1339.8				4	2,5,6,10,26
Unnamed Creek	6-192.01	104	617.6	1340.5				3	2
Sheep Creek	6-191	104	616.0	1342.2				3	3,5,6,7,8,10
Unnamed Creek	5-189.01	104	614.4	1343.7				3	2
Robertson River	5-187	103	610.5	1347.6				4	3,5,6,7,8,9, 10,26
Unnamed Creek	5-185.03	103	608.0	1350.1				3	2
Unnamed Creek	5-185.02	103	607.9	1350.2				3	2
Unnamed Creek	5-185.01	102	605.9	1352.3				3	2
Bear Creek	5-185	101	600.9	1357.3				4	3,5,6,7,8,9, 10,26
Chief Creek	5-184	101	599.5	1358.6				4	3,5,6,7,8,9, 10,26
Unnamed Creek	5-182.01	101	596.4	1361.7				3	2,5,26
Unnamed Creek	5-182	101	596.1	1362.0				3	2,5
Unnamed Creek	5-181.01	100	594.0	1364.4				3	2
Sam Creek	5-180	100	592.5	1365.9				4	3,5,6,7,8,9, 10,26
Unnamed Creek	5-179	99	589.5	1369.1				4	3,5,6,9,10,26
Berry Creek	5-178	99	587.3	1371.4				4	3,5,6,7,8,9, 10,26
Sears Creek	5-177	99	584.2	1374.4				4	3,5,6,7,8,9, 10,26
Unnamed Creek	5-176.01	98	581.7	1377.0				3	2
Dry Creek	5-176	98	580.5	1378.1				3	3,5,6,7,8,9, 10,26
Johnson River	5-175	98	578.1	1380.5				4	3,5,6,7,8,9, 10,26
Little Gerstle River	5-174	96	570.5	1388.4				4	3,5,6,7,8,9, 10,26
Gerstle River	5-172	96	566.0	1393.0				4	3,5,6,7,8,9, 10,26

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
Sawmill Creek	5-171	94	555.0	1403.9				3	3,5,6,7,8,9,10
Rhoads Creek	5-170	93	551.4	1407.6				3	3,5,6,9,10
Granite Creek	5-169	93	549.6	1409.2				3	3,5,6,7,9,10
Tanana River	5-166	89	528.7		47	9215+00		1	3,5,11,13,15,16,27,32
Side Channel of Tanana River	6-165.01	89	528.0					4	3,13,42,43
Shaw Creek	5-165	87	517.3		49	9789+15		4	3,5,11
Rosa Creek #1	5-164	87	517.0		49	9800+40		3	5,11
West Branch Keystone Creek	5-163	87	516.5		49	9830+70		3	5,11
Rosa Creek #2	5-162	86	511.1		50	10110+50		4	5,11
Rosa Creek #3	5-162	86	510.6		50	10142+74		4	5,11
Rosa Creek #4	5-162	86	510.2		50	10165+25		4	5,11
South Fork Minton Creek #1	5-161	86	509.3		51	10214+80		4	5,11,32
South Fork Minton Creek #2	5-161	86	508.6		51	10244+06		4	5,11,32
South Fork Minton Creek #3	5-161	86	508.3		51	10258+12		4	5,11,32
South Fork Minton Creek #4	5-161	86	507.6		51	10298+63		4	5,11,32
South Fork Minton Creek #5	5-161	85	507.3		51	10305+90		4	5,11,32
South Fork Tributary Minton Creek	5-161	85	507.0		51	10316+00		3	5,11,32
South Fork Minton Creek #6	5-161	85	507.0		51	10316+98		4	5,11,32
South Fork Minton Creek #7	5-161	85	506.8		51	10343+09		4	5,11,32
North Fork Minton Creek #1	5-161	85	506.7		51	10346+68		4	5,11,32
North Fork Minton Creek #2	5-161	85	506.4		51	10374+14		4	5,11,32
North Fork Minton Creek #3	5-161	85	506.0		51	10393+01		4	5,11,32
North Fork Minton Creek #4	5-161	85	505.9		51	10394+88		4	5,11,32
Gold Run Creek	5-160	85	504.2		51	10487+62		4	3,5,11
Small Creek	5-159.02	85	502.9		52	10561+41		3	11
Tributary to Small Creek	5-159.01	85	502.3		52	10589+47		3	11
Redmond Creek	5-159	84	497.3		53	10855+33		4	3,5,11,14,32,35,38
Unnamed Tributary to Salcha River	4-158.03	83	494.6		53	11037+79		3	11

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
TAPS Slough	4-158.02	83	493.7		53A	2+00		4	11
Unnamed Slough	4-158.01	83	493.6		53A	7+50		4	11
Salcha River	4-158	83	493.3		53A	19+00		1	3,5,11,13,14, 25,32,35,38
Oxbow Slough	4-157.02	83	493.0		53A	33+00		3	11
Two Nineteen Creek	4-157.01	83	489.4		54	223+50		4	11
Little Salcha River	4-157	83	488.3		54	281+71		4	3,5,11,13,38
Tributary to Little Salcha River	4-156.05	82	487.2		54	345+50		3	11
Tributary to Million Dollar Creek	4-156.04	82	485.7		54	417+00		3	11
Million Dollar Creek #1	4-156.03	82	483.3		55	545+00		4	5,11
Million Dollar Creek #2	4-156.02	82	483.1		55	558+60		4	5,11
Million Dollar Creek #3	4-156.01	82	482.9		55	568+00		4	5,11
Million Dollar Creek #4	4-156	82	482.5		55	592+00		4	5,11
French Creek #D	4-155	81	481.5		55	643+55		4	3,5,11,19,38
Knokanpeover Creek	4-154	81	478.3		56	809+40		4	3,5,11,19
French Creek #1	4-153	81	475.8		56	942+85		4	3,5,11,19,38
French Creek #2	4-152	80	474.9		56	993+69		4	3,5,11,19,38
French Creek #3	4-151	80	474.4		56	1018+95		4	3,5,11,19,38
French Creek #4	4-150	80	474.1		56	1035+43		4	3,5,11,19,38
French Creek #5	4-149	80	472.4		57	1125+18		4	3,5,11,19,38
Bear Lake Outlet	4-148.01	80	472.2		57	1134+40		3	11
Moose Creek #1	4-148	80	471.2		57	1188+02		4	5,11,38
Moose Creek #2	4-147	80	470.1		57	1250+70		4	5,11,38
Moose Creek #3	4-146	80	469.3		57	NA		4	5,11,38
Unnamed Creek	4-145.04	79	465.4		58	1495+15		1,3	11
Unnamed Creek	4-145.03	79	465.3		58	1505+00		1,3	11
Ess-Shaped Slough	4-145.02	79	463.8		58	1570+00		3	11
Seventeen-twenty Slough	4-145.01	78	460.2		59	1720+20		3	11
Seventeen-thirty Slough	4-145	78	460.0		59	1730+50		3	11
Isolated Slough	4-144.01	78	457.9		59	1845+55		3	11
Chena River	4-144	78	457.9		59	1849+50		1	3,5,11,13,27 38,39
Steele Creek	4-143	77	456.1		60	1962+80		4	11
Engineer Creek	4-142	77	449.8		61	210+00		4	11
Goldstream Creek	4-141	76	447.1		61	336+01		4	3,5,11
Treasure Creek	4-140	75	441.0		62	659+43		4	3,5,11
Chatanika River	4-139	75	437.2		63	873+63		1	3,5,11,19,38
Shocker Creek	4-138	75	436.5		63	914+00		3	5,11
Unnamed Tributary to Shocker Creek #1	4-137.05	74	436.4		63			3	11
Unnamed Tributary to Shocker Creek #2	4-137.04	74	436.2		63			3	11
Unnamed Tributary to Chatanika River #1	4-137.03	74	434.6		63	1025+70		3	11
Unnamed Tributary to Chatanika River #2	4-137.02	74	434.6		63	1027+70		3	11

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
Unnamed Tributary to Chatanika River #3	4-137.01	74	434.6		63	1032+20		3	11
Washington Creek	4-137	74	431.2		64	1209+62		4	1,3,5,11,38
Unnamed Tributary to Washington Creek	4-136.01	74	431.1		64	1220+00		3	11
South Fork Aggie Creek	4-136	73	424.1		65	1595+00		3	1,3,5,11,38
North Fork Aggie Creek	4-135	72	423.3		65	1635+00		3	1,3,5,11,38
Tributary of Little Globe Creek	4-134.01	72	421.6		66	1740+00		3	11
Little Globe Creek	4-134	72	420.6		66			3	11
Unnamed Tributary to Little Globe Creek	4-133.01	72	420.3		66	1796+00		3	11
Globe Creek	4-133	72	417.2		66	1966+75		3	1,3,5,11,38
Unnamed Tributary to Globe Creek	4-132.02	71	416.8		67	1988+88		3	11
Unnamed Tributary to Tatalina River	4-132.01	71	413.5		67			3	11
Tatalina River	4-132	71	412.7		67	2241+80		4	1,3,5,11,38
Tributary of Slate Creek	4-131.01	70	408.8		68	2456+31		3	11
Slate Creek	4-131	70	408.7		68	2459+35		3	3,5,11,38
Ski Jump Ramp Creek	4-130	70	407.1		68	2550+00		3	11
Wilber Creek	4-129	70	406.1		68-69	2608+00		3	3,5,11
Tributary of Wilber Creek	4-128.04	70	405.6		69	2666+35		3	11
Shorty Creek	4-128.03	69	401.2		69	2855+73		3	11
Tributary of Shorty Creek	4-128.02	69	401.0		69	2865+11		3	11
Tributary to Tolovana River	4-128.01	69	400.0		70	2924+55		3	11
Tolovana River	4-128	69	399.4		70	2957+90		4	1,3,5,11,13, 38
Unnamed Tributary to West Fork Tolovana River	4-127.01	68	396.4		70	3122+16		3	11
Lost Creek	4-127	68	393.1		71	104+33		3	3,5,11
Erickson Creek Tributary	4-126	67	388.8		72	337+66		3	3,11
Erickson Creek #1	4-125	67	385.7		72	513+62		3	3,5,11
Unnamed Lake Outlet	4-124.01	66	384.8		73	562+98		3	11
Erickson Creek #2	4-124	66	383.9		73	611+95		3	3,5,11
Hess Creek Tributary	4-123.05	66	380.5		73	800+02		3	11
Hess Creek	4-123A.04	66	380.2		73,74W	820+00		4	1,3,5,11,38

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
Fish Creek	4-123.03	66	380.0		73	829+65		3	3,5,11
Unnamed Creek	4-123.02	65	376.2		74	1040+40		3	11
Unnamed Creek	4-123.01	65	375.6		74	1071+47		3	11
Unnamed Creek	4-123	65	375.2		74	1096+85		3	11
Unnamed Creek	3-122.05	65	374.2		75	1150+15		3	11
Unnamed Creek	3-122.04	65	373.7		75	1181+44		3	11
Hot Cat Creek	3-122.03	64	372.5		75	1242+94		3	5,11
Unnamed Creek	3-122.02	64	370.2		75	1367+33		3	11
Unnamed Creek	3-122.01	64	368.7		75	1447+20		3	11
Isom Creek #1	3-122	63	365.1		76	1642+50		3	3,5,11
Isom Creek #2	3-121.02	63	365.0		76	1649+50		3	3,5,11
Isom Creek #3	3-121.01	63	365.0		76	1651+34		3	3,5,11
Tributary to Isom Creek	3-121	63	364.4		76	1682+08		3	11
Yukon River	3-120	61	355.7		77-78	58+00		1	1,3,5,11,13, 20,21,38
Burbot Creek	3-119	61	354.0		78	158+21	1HR168+10	3	5,11,20,21
Wood Chopper Creek	3-118	61	353.0		78	215+30	1HR215+20	3	5,11,20,21
Phelps Creek	3-117	60	347.5		79	508+70	1HR501+00	3	5,11,20,21
Unnamed Creek	3-112	59	340.0		80	899+00	1HR892+15	3	11,20,21
Fort Hamlin Hills Creek	3-111	59	338.7		81	971+50	1HR1011+08	3	5,11,20,21
Unnamed Creek	3-110.01	58	335.8		81	1123+25	1HR1158+45	3	11,20,21
North Fork Ray River	3-110	58	331.8		82	58+49	1HR1337+34	4	1,5,11,20,21, 38
Fed Creek	3-109	57	327.7		82	270+25	1HR1600+24	3	11
South Branch West Fork Dall River	3-108	56	320.2		84	673+00	1HR2001+50	4	1,5,11,20,21 38
Middle Branch West Fork Dall River	3-107	56	317.9		84	798+00	1HR2125+39	3	1,5,11,20,21, 38
Smoky Creek	3-106.02	56	317.6		84	818+75	1HR2163+02	3	11,20,21
Unnamed Creek	3-106.01	55	315.6		85	915+75	1HR2245+45	3	11,20,21
Finger Mountain Creek	3-106	55	314.7		85	961+66	1HR2291+88	3	5,11,20
Olsons Lake Creek	3-105	54	311.1		85	1149+38	1HR2469+77	3	5,11
Caribou Mountain Creek	3-104	54	308.8		86	56+03	1HR2609+50	3	5,11
Kanuti River	3-103	54	305.6		86	231+00	1HR2777+75	4	1,3,5,11,13, 20,21,37,38
Netsch's Creek Tributary #1	3-102	53	303.7		87	331+60	1HR2875+90	3	11
Netsch's Creek Tributary #2	3-101	53	303.4		87	349+00	1HR2894+96	3	11
Netsch's Creek Tributary #3	3-100.01	53	303.0		87	370+80	1HR2944+05	3	11

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
South Fork Fish Creek	3-100	53	300.2		87	520+50	1HR3255	4	1,3,5,11,20, 21
Middle Fork Fish Creek	3-99	53	298.2		87	577+90	1HR3255	4	1,3,5,11,20, 21
Fish Creek	3-98	52	297.8		88W	653+50	1HR3255+12	4	1,3,5,11,20, 21,34,37,38
Alder Mountain Creek	3-97	52	296.3		88W	742+50	2HR115+00	3	5,11,20,21
Pung's Crossing Creek #1	3-96	52	292.6		89	932+40	2HR363+36	3	5,11,20,21
Pung's Crossing Creek #2	3-96.01	52	292.6		89	931+40	2HR363+36	3	5,11,20,21
South Fork Bonanza Creek	3-95	51	289.2		89	1123+60	2HR550+59	4	1,3,5,11,20, 21,34,37,38
Unnamed Bonanza Creek Channel	3-94.02	51	289.2		89	1128+50	2HR547	3	11,20,21
Oxbow Lake System	3-94.01	51	288.7		89	1148+00	2HR561+64	3	11,20
North Fork Bonanza Creek	3-94	51	287.6		89	1208+32	2HR606+69	4	1,3,5,11,20, 21,34,38
South Fork of the Little Nasty	3-93	50	285.5		90	1327+15	2HR759+84	3	5,11,20,21
The Little Nasty	3-92	50	285.3		90	1340+25	2HR767+82	3	1,5,11,20,21
Prospect Creek	3-91	50	280.5		91	1590+00	2HR1099+52	1,4	1,3,5,11,20 21,34,37,38
Little Piddler Creek	3-90.03	49	275.7		91	241+60	2HR1376+57	3	11
Jim River Side Channel #1	3-90.02	49	275.6		91	257+00	2HR1379+45	4	1,5,11,34
Jim River Side Channel #2	3-90.01	49	274.8		92	272+49	2HR1425+40	4	1,5,11,34
Douglas Creek	3-89	49	273.9		92	333+00	2HR1470+34	3	1,3,5,11,20, 21,34
Dee Creek	3-88	49	272.5		92	407+00	2HR1544+97	3	5,11,20,21
Beaver Spring #1	3-87.02	48	272.2		92	435+84	2HR1557+06	4	11,20,21
Beaver Spring #2	3-87.01	48	272.2		92	436+73	2HR1565+32	4	11,20,21
Jim River Side Channel #3	3-87	48	271.7		92	453+50	2HR1579+80	1,4	1,3,5,11,13 20,21,34,38
Inlet to Grayling Lake	3-86.04	47	265.1		93	798+30	2HR1926+00	3	11,20
Avoided Lake Inlet	3-86.03	47	264.5		93	832+75	2HR1960	3	11,20
Grayling Lake Creek	3-86.02	47	264.2		93	849+00	2HR1949+14	3	11,20
Unnamed Creek	3-86.01	47	263.5		94	884+80	2HR2017	3	11,20
Abba-dabba Creek	3-86	47	262.1		94	963+28	2HR2098+18	4	1,5,11,20,21
South Fork Koyukuk River	3-85	46	260.0		94-95	1073+00	2HR2206+88	1	1,3,5,11,13, 20,21,38
Crossroads Creek #1	3-82.03	46	255.7		95	222+50	3HR129+23	3	11,20,21
Crossroads Creek #2	3-82.02	46	255.5		95	228+75	3HR129+58	3	11,20,21
Crossroads Creek #3	3-82.01	46	255.5		95	232+25	3HR129+58	3	11,20,21
Crossroads Creek #4	3-82	46	255.5		95	233+60	3HR129+58	3	11,20,21
Chapman Creek	3-81	45	254.3		96	295+17	3HR205+23	3	1,5,11,20,21
South Fork Windy Arm Creek	3-80	45	253.5		96	343+75	3HR255+64	3	1,11,20,21

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
North Fork Windy Arm Creek	3-79	45	252.0		96	417+25	3HR326+94	3	1,5,11,20,21
Unnamed Creek	3-78.01	45	251.3		96	458+70	3HR369+59	3	11,20,21
Trent's Trickle	3-78	45	250.3		96	518+39	3HR413+47	3	5,11,20,21
Jackson Slough East Channel #1	3-77.02	45	249.5		97	555+85	3HR452+15	3	5,11,34
Jackson Slough Cross Channel	3-77.01	45	249.2		97	570+70	3HR464+00	3	5,11,34
Jackson Slough East Channel #2	3-77	45	249.2		97	593+00	3HR483+00	3	5,11,34
Rosie Creek	3-74	44	246.6		97		3HR599+00	4	3,5,11,20,21
First Creek #1	3-72.06	44	244.6		97		3HR727+14	3	11,20,21
First Creek #2	3-72.05	44	244.5		97		3HR727+14	3	11,20,21
East Fork Spring Slough	3-72.04	44	243.1		97-98		3HR+776+84	3	5,11
Spring Slough #1	3-72.03	44	243.0		98		3HR783+98	3	5,11
Spring Slough #2	3-72.02	44	242.9		98		3HR790+14	3	5,11
Spring Slough #3	3-72.01	43	242.7		98		3HR797+60	3	5,11
Slate Creek	3-72	43	241.2		98	976+83	3HR876+86	4	1,3,5,11,20, 21,38
Calf Creek	3-71	43	240.6		98	1004+75	3HR910+70	3	5,11
South Fork Clara Creek Overflow	3-70.01	43	240.5		98	1015+80	3HR925+49	3	5,11
Clara Creek Overflow	3-70	43	240.4		98	1019+50	3HR933+34	3	5,11
Clara Creek #1	3-69.01	43	240.2		98	1033+70	3HR941+85	3	5,11,34
Clara Creek #2	3-69	43	240.1		98	1036+20	3HR941+85	3	5,11,34
Equisetum Creek	3-68	43	239.9		98		3HR944	3	5,11
Organo Creek	3-67	43	239.8		98		3HR946	3	5,11,34
Unnamed Creek	3-65.01	43	238.4		98		3HR1037+00	3	11
South Fork Mary Angel Creek	3-65	43	238.0		98-99	4+30	3HR1052+04	3	5,11
Mary Angel Creek	3-63.04	43	237.9		99	8+40	3HR1055+57	3	5,11,34
South Fork Sharon Creek	3-63.03	43	237.3		99	38+70	3HR1076+29	3	5,11
Sharon Creek #1	3-63+02	43	237.2		99	45+00	3HR1097	3	5,11
Sharon Creek #2	3-63.01	43	237.0		99	55+00	3HR1097	3	5,11
Marion Creek	3-63	43	236.9		99	59+85	3HR1114+14	3	1,3,5,11,20, 21,34,38
North Marion Creek Overflow #1	3-62.04	42	236.7		99	68+80	3HR1115	3	11
North Marion Creek Overflow #2	3-62.03	42	236.7		99	70+75	3HR1120+33	3	11
North Marion Creek Overflow #3	3-62.02	42	236.5		99	78+00	3HR1122+90	3	11
Pence's Pond Creek	3-62.01	42	236.4		99	85+50	3HR1143+81	3	5,11,20,21
Confusion Creek	3-61.02	41	231.1		100	369+00	3HR1439+92	4	5,11,20

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
North Fork Confusion Creek	3-61.01	41	230.7		100	391+70	3HR1443	3	5,11,20
Minnie Creek	3-61	41	229.5		100	454+46	3HR1519+34	3	1,3,5,11,20, 21,34,38
Middle Fork Koyukuk River	2-60.19	41	228.5		100	495+50	3HR1588+80	1	1,3,5,11,13, 20,21,38
Union Gulch Creek #1	2-60.18	41	228.3		100	516+65	3HR1600	3	5,11,20,21
Union Gulch Creek #2	2-60.17	41	227.9		100	536+00	3HR1600	3	5,11,20,21
Confederate Gulch Creek	2-60.16	41	226.9		100	590+75	3HR1655+00	3	11
North Fork Confederate Gulch Creek	2-60.15	41	226.6		100	607+90	3HR1675	3	11
Hammond River	2-55	40	225.1		101	635+60	3HR1711+42	4	1,3,5,11,20, 21,37
Middle Fork Koyukuk River Anabranch	2-60.14	40	225.0-225.7		101			3	1
Middle Fork Koyukuk River	2-60.13	40	225.0-225.7		101			1	1,5,11,13, 20,21,38
Richardson's Slough #1	2-60.12	40	223.1		101	778+30	3HR1861+03	3	5,11
Richardson's Slough #2	2-60.11	40	223.1		101	781+90	3HR1865+68	3	5,11
Over Creek #1	2-60.10	40	222.8		101	796+70		3	1,11
Over Creek #2	2-60.09	40	222.8		101	800+50		3	1,11
Over Creek #3	2-60.08	40	222.7		101	803+10	3HR1891+44	3	1,11
Over Creek #4	2-60.07	40	222.7		101	805+39	3HR1896+30	3	1,11
Alignment Slough #1	2-60.06	40	222.1		101	836+40	3HR1945+13	3	5,11
Alignment Slough #2	2-60.05	40	222.0		101	841+20	3HR1945+13	3	5,11
Alignment Slough #3	2-60.04	40	221.9		101	845+28	3HR1945+13	3	5,11
Alignment Slough #4	2-60.03	40	221.8		101	849+30	3HR1945+13	3	5,11
Alignment Slough #5	2-60.02	40	221.7		101	855+70	3HR1945+13	3	5,11
Alignment Slough #6	2-60.01	40	221.6		101	860+00	3HR1945+13	3	5,11
Nugget Creek	2-60	40	221.1		101	886+60	3HR1969+70	3	5,11,20,21, 34
Wolf Pup Creek	2-59	39	220.7		102	906+50	3HR1990+56	3	5,11,20,34
Sheep Creek	2-53	39	220.2		102	933+00	3HR2018+85	3	5,11,20,21, 34
Cushing Creek	2-52.01	39	219.9		102	948+60	3HR2033+06	3	5,11,20
Gold Creek	2-52	39	219.4		102	976+00	3HR2059+11	3	3,5,11,20,21, 34
Linda Creek	2-51	39	218.8		102	1001+18	3HR2087+21	3	5,11,20,21,34
Valve Site Creek	2-49.07	39	216.6		102	1121+05	3HR2203+04	3	11,20
Rocky Creek #1	2-49.06	38	214.1		103	1250+60	3HR2326	3	11
Rocky Creek #2	2-49.05	38	214.0		103	1258+30	3HR2326	3	11
Rocky Creek #3	2-49.04	38	213.8		103	1269+10	3HR2326	3	11
Sukakpak Creek	2-49.03	38	213.1		103	1305+00	3HR2373+80	3	5,11,20,21
North Fork Sukakpak Creek	2-49.02	38	212.7		103	1332+20	3HR2447+70	3	11,20,21

APPENOIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
Unnamed Creek	2-49.01	38	212.3		103	1353+23	3HR2440	3	11
Middle Fork Koyukuk River	2-49	38	212.2		103	1361+45	3HR2460+47	1	1,3,5,11,13, 20,21,38
Way Back Creek	2-48.04	38	211.3		103	1408+00	3HR2485	3	11
Millie's Meander	2-48.03	38	211.0		103	1418+76	3HR2489+68	3	11
Unnamed Creek	2-48.02	38	210.6		103	1444+19	3HR2528+00	3	11,20
Eva's Alv	2-48.01	38	209.4		103	1507+08	3HR2583+84	3	11,20
Dietrich River	2-48	38	209.0		104	1526+55	3HR2604+66	1,4	1,3,5,11,20, 21,37,38
1415 Lake Inlet	2-46.01	37	208.4		104	1556+18	3HR2631+80	3	11
Brockman Creek	2-46	37	207.7		104	1581+87	3HR2662+07	4	11,20,21
Steitz Lake Outlet	2-45.04	37	206.2		104	1607+52	3HR2703	3	11,20,21
South Branch Airport Creek	2-45.03	37	206.7		104	1637+70	3HR2728+26	3	11,20
Middle Tributary Airport Creek	2-45.02	37	206.5		104	1644+93	3HR2736+41	3	11,20
Airport Creek	2-45.01	37	205.8		104	1681+92	3HR2775+58	3	11,20
Disaster Creek	2-45	37	205.1		104	1719+41	3HR2809+90	3	3,5,11,20
Unnamed Creek	2-43.07	37	204.7		104	1736+51	3HR2826+88	3	11
Trap Slough	2-43.06	37	204.6		104	1747+44	3HR2847+57	3	11
Dietrich River	2-43.05	37	204.2		104	1756+00		1,4	1,3,5,11,20, 21,37,38
Dietrich River	2-43.04	37			104			1,4	1,3,5,11,20, 21,37,38
Sahr's Slough	2-43.03	37	203.8		104	1795+99	3HR2889+08	3	5,11
Meadow Slough	2-43.02	37	203.6		104	1801+00	3HR2892+78	3	11
Unnamed Creek	2-43.01	36	203.0		104	1831+09	3HR2925+28	3	11
Snowden Creek	2-43	36	202.3		105	1870+20	3HR2959+42	3	3,5,11,20,21, 34
Unnamed Creek	2-41.05	36	201.8		105	1897+49	3HR2928+20	3	11
Snowden Pond Outlet	2-41.04	36	201.6		105	1906+65	4HR1984	3	5,11
Numbers Lake Creek	2-41.03	36	200.9		105	1941+95	4HR3026+13	3	1,5,11,20
Dunder's Dribble	2-41.02	36	200.8		105	1947+73	4HR3036	3	5,11
Stanzla Creek	2-41.01	36	200.7		105	1952+70	4HR3060	3	11,20
Ugh Creek	2-41	36	199.8		105	2011+00	4HR3103+51	3	11,20
Unnamed Creek	2-39.01	36	197.4		106	2123+20	4HR3222+30	3	11
Steep Creek	2-39	35	195.5		106	2235+00	4HR3309+86	3	11
Buff Creek	2-38	35	194.2		106	52+10	4HR3375+85	3	11
Burger's Bayou	2-36.02	35	193.8		106	72+50	4HR3414+01	4	1,5,11,20
Drainage Material Site #106	2-36.01	35	193.6		106		4HR3447	4	1,11
Unnamed Creek	2-36	34	191.3		107	212+40	4HR3543+02	3	11
Dietrich River Floodplain	2-34.06	34	189.6-189.0		107	248+79-302+00	4HR3579+80-257+00	1,4	1,3,5,11
Beaver Dam Brook #1	2-34.05	34	189.9		107	295+10	4HR255+58	3	11,20,21
Beaver Dam Brook #2	2-34.04	34	189.4		107	321+32	4HR280+97	3	11
Beaver Dam Brook #3	2-34.03	34	189.3		107	329+88	4HR290+66	3	11
Beaver Dam Brook #4	2-34.02	34	189.2		107	334+05	4HR293+50	3	11
Beaver Dam Brook #5	2-34.01	34	189.1		107	336+75	4HR296+15	3	11

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
Nutirwik Creek	2-34	34	188.1		107	375+54	4HR343+0D	3	3,5,11,20, 21,38
Dietrich River Floodplain	2-32.06	34	188.1-186.5		107	379+39-457+37	4HR349+31-481+82	1,4	1,3,5,11,20, 21
Unnamed Spring	2-32.05	33	185.7					4	41
Dietrich River	2-32.04	33	185.7-185.5		107	500+36-513+36		1,4	1,3,5,11
Dietrich River Floodplain	2-32.03	33	185.2-184.6		108	525+75-556+00	4HR503+72-547+00	1,4	1,3,5,11,21
Unnamed Spring	2-32.02	33	184.3					1	30,40,41
Dietrich River Flooplain	2-32.01	33	184.3-183.4		108	578+00-621+69		1,4	1,3,5,11
Oskar's Eddy	2-31	33	182.7		108	662+80	4HR632+98	3	5,11
Unnamed Creek	2-30.02	33	182.5		108	675+00	4HR649+00	3	11,20
Bear Track Creek	2-30.01	33	182.0		108	705+50	4HR678+00	3	11,20
Dietrich River Floodplain	2-29.03	33	181.8-181.2		108			1,4	1,3,5,11,20, 21
Dietrich River Floodplain	2-29.02	32	180.8-179.6		109			1,4	1,3,5,11,20 21
Andy's Creek	2-29.01	32	179.4		109	840+52	4HR817+50	3	11,20,21
West Fork of North Fork Chandalar River	2-29	32	177.6-177.3		109	945+23-957+00		4	1,3,5,11,20, 21
West Fork of North Fork Chandalar River Flood-Plain	2-28	32	175.8-174.7		109	1030+00-1093+00		3	1,3,5,11,20 21
West Fork of North Fork Chandalar River Flood-Plain	2-28	31	173.1-172.6		109	55+00-78+72		3	1,3,5,11,20 21
Atigun River Floodplain	2-27	30-31	169.5-163.8		110-112	247+32	4HR1360-5HR431+54	3	1,3,5,11
Unnamed Creek	2-26	29	162-161		111		5HR520+00	3	11
Unnamed Creek	2-25.03	29	162-161		111-112		5HR541+66	3	11
Unnamed Creek	2-25.02	29	162-161		112		5HR550+80	3	11
Unnamed Creek	2-25.01	29	162-161		112		5HR552+37	3	11
Trevor Creek	2-25	29	158.5		112	837+00	5HR709+72	3	11
Tyler Creek #1	2-24.03	29	158.0		112	871+00	5HR717+90	3	11
Tyler Creek #2	2-24.02	29	157.8		112	878+65	5HR717+90	3	11
Tyler Creek #3	2-24.01	29	157.7		112	881+00	5HR717+90	3	11
Roche Montonee	2-24	28	152.1		113	1170+91	5HR1053+28	3	3,11
One-One-Three Creek	2-23.03	28	151.9		113	1176+95		3	11
Main Line Spring	2-23.02	27	151.0		113	1226+50	5HR1097	3	11,30
Holdon Creek	2-23.01	27	150.2		114	30+44	5HR1176+47	3	11
Vanish Creek	2-23	27	150.1		114	35+24	5HR1161	3	11,30
Unnamed Creek	2-22.05	27	150.1		114	38+70	5HR1164	3	11
Tad Creek	2-22.04	27	149.9		114	44+00	5HR1169	3	11
Tee Lake Outlet #1	2-22.03	27	147.7		114	153+63	5HR1280+85	3	1,5,11
Tee Lake Outlet #2	2-22.02	27	147.7		114	155+29	5HR1280+85	3	1,5,11

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
Mosquito Lake	2-22.01	27	146.7		114		5HR1334	4	11,30
Atigun River	2-22	27	146.5		114	20+94	5HR1364+44	4	1,3,5,11,31
Jill Creek	1-21.11	24	139.7		115	380+60	6HR229+00	3	11
Jill Creek Tributary	1-21.10	25	139.4		115	395+24	6HR234+75	3	11
Ed Creek	1-21.09	25	138.9		115	421+74	6HR436+25	3	11
Mack Creek	1-21.08	25	138.6		115	438+29	6HR452+00	3	11
Terry Creek	1-21.07	25	138.0		115	466+12	6HR490+00	3	11
Moss Creek	1-21.06	25	137.5		115	494+00	6HR500+41	3	11
Hallock Creek	1-21.05	25	137.3		115	504+27	6HR512+00	3	11
Yan Creek	1-21.04	24	135.0			629+06	6HR641+00	3	11
Becky Creek #1	1-21.03	24	133.2		116	721+63	6HR984	3	1,11
Becky Creek #2	1-21.02	24	131.7		116	797+80	6HR984	3	1,11
Holt Creek	1-21.01	24	131.6		116	804+36	6HR985	3	11
Kuparuk River	1-21	24	131.0		117	842+00	6HR986+50	4	1,3,5,11,36
East Fork Kuparuk River	1-20.01	23	129.5		117	921+55	6HR911+80	3	5,11
Toolik River	1-20	23	128.6		117	968+30	6HR948+50	3	3,5,11
East Fork Toolik River	1-19.01	23	128.5		117	973+30	6HR970+25	3	11
Oksrukuyik Creek	1-19	22	122.0		118	1325+64	6HR1285+32	3	1,3,5,11
Shifish Creek #1	1-18.04	22	120.6		118	1395+51		3	11
Shifish Creek #2	1-18.03	22	119.8		119	1441+26		3	11
Thiele's Trickle	1-18.02	21	118.4		119	1512+60	6HR1518	3	1,11
Lower Oksrukuyik Creek #1	1-18.01	19	108.8					4	1,11
Lower Oksrukuyik Creek #2	1-18	19	108.7					4	1,11
Unnamed Creek	1-17.02	19	108.5		120	911+80		3	11
Unnamed Creek	1-17.01	19	108.2		120	924+50		3	11
Rudy Creek	1-17	19	107.8		120	947+99	6HR2153	3	3,11
Bassett Creek	1-16.03	19	106.3		121	1029+20	6HR2228+14	3	11
Dennis Creek	1-16.02	19	106.2		121	1033+60	6HR2234+80	3	11
Climb Creek	1-16.01	19	105.7		121	1060+34	6HR2262+60	3	11
Poison Pipe Creek	1-16	19	105.4		121	1077+10	6HR2318+92	3	11
Polygon Creek	1-15	19	104.5		121	1125+00	6HR2351+97	3	11
Gustafson Gulch	1-14	18	101.7		122	1280+00	6HR2517+85	3	11
Arthur Creek	1-13	18	101.3		122	1297+50	6HR2536+20	3	11
Sagavanirktok River Side Channel	1-12.05	18	98.9		122	1424+79	6HR2657+20	3	11
Sagavanirktok River Side Channel	1-12.04	18	98.5		122	1445+85	6HR2684+43	3	11
Clark's Lake	1-12.03	17	97.9-97.6		122	1481+00-1489+28	6HR2770+86	1	11
Stump Creek	1-12.02	17	97.4		122	1499+00	6HR2770+86	3	11
Lori Creek	1-12.01	17	92.4		123	1719+50	6HR2974+15	3	11
Charlotte Creek	1-12	16	90.4		123		6HR3083+19	3	11
Happy Valley Camp Creek	1-11	15	86.8		124		6HR3259+77	3	3,5,11
Milke Creek	1-10	15	86.1		124		6HR3296+20	3	3,11

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
Stout Creek	1-9	15	82.6		124		6HR3471+69	3	11
Sagavanirktok River Side Channel	1-8.03	14	81.6-81.3		125	469+75		3	1,11
Sagavanirktok River Side Channel	1-8.02	14	81.6-81.3		125	489+35		3	1,11
Sagavanirktok River Side Channel	1-8.01	14	81.6-81.3		125	492+70		3	1,11
Spoiled Mary Creek	1-8	14	81.2		125	493+95	6HR3535+62	3	11
Sagavanirktok River Side Channel	1-7.11	14	78.7		125	616+70		3	11
Sagavanirktok River Side Channel	1-7.10	14	78.4		125	632+50		3	11
Sagavanirktok River Side Channel	1-7.09	14	78.2		125	637+00		3	11
Sagavanirktok River Side Channel	1-7.08	14	78.1		125	643+50		3	11
Sagavanirktok River Side Channel	1-7.07	14	77.8		125	666+00		3	11
Sagavanirktok River Side Channel	1-7.06	14	77.3		125	696+00		3	11
Sagavanirktok River Side Channel	1-7.05	14	77.3		125	697+50		3	11
Sagavanirktok River Side Channel	1-7.04	14	76.9		125	714+00		3	11
Sagavanirktok River Side Channel	1-7.03	14	76.5		125	734+30		3	11
Sagavanirktok River Side Channel	1-7.02	14	76.3		125	747+12		3	11
Sagavanirktok River Side Channel	1-7.01	14	75.5		126	790+40		3	11
Mark Creek	1-7	14	75.4		126	791+40	6HR3840+41	3	3,11
Unnamed Creek	1-5.49	13	68.8		126W		6HR4195+99	3	42,43
Unnamed Creek	1-5.48	12	63.5		126W		6HR4481+00	3	42,43
Wood Creek #1	1-5.47	11	58.7		128	210+92	7HR486+16	3	11
Wood Creek #2	1-5.46	11	58.6		128	215+96		3	11
Wood Creek #3	1-5.45	11	58.2		129	233+50		3	11
Wood Creek #4	1-5.44	11	58.1		129	242+80		3	11
Wood Creek #5	1-5.43	11	58.0		129	246+20		3	11
Wood Creek #6	1-5.42	11	57.8		129	258+61		3	11
Wood Creek #7	1-5.41	11	57.6		129	265+76		3	11
Wood Creek #8	1-5.40	11	57.3		129	281+50		3	11
Wood Creek #9	1-5.39	11	56.9		129	322+66		3	11
Wood Creek #10	1-5.38	11	56.3		129	355+07		3	11

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
Wood Creek #11	1-5.37	11	56.2		129	360+60		3	11
Wood Creek #12	1-5.36	10	55.5		129	395+41		3	11
Extension Creek #1	1-5.35	10	55.1		129	410+52		3	11
Extension Creek #2	1-5.34	10	55.1		129	412+57		3	11
Extension Creek #3	1-5.33	10	54.9		129	430+57		3	11
Extension Creek #4	1-5.32	10	54.9		129	432+00		3	11
Extension Creek #5	1-5.31	10	53.7		129	492+35		3	11
Extension Creek #6	1-5.30	10	53.5		129	499+16		3	11
Extension Creek #7	1-5.29	10	53.0		129	531+00		3	11
Extension Creek #8	1-5.28	10	52.8		129	539+10		3	11
Unnamed Pond	1-5.27	9	49.8		130	702+00		3	11
Ghost Creek #1	1-5.26	9	49.3		130	728+68		3	11
Ghost Creek #2	1-5.25	9	49.2		130	736+81		3	11
Ghost Creek #3	1-5.24	9	48.8		130	756+49		3	11
Ghost Creek #4	1-5.23	9	48.5		130	768+86		3	11
Ghost Creek #5	1-5.22	9	47.9		130	804+68		3	11
Ghost Creek #6	1-5.21	9	47.5		130	826+22		3	11
Ghost Creek #7	1-5.20	9	47.4		130	831+23		3	11
Ghost Creek #8	1-5.19	9	47.1		130	843+08		3	11
Ghost Creek #9	1-5.18	9	47.0		130	846+16		3	11
Ghost Creek #10	1-5.17	9	46.9		130	853+25		3	11
Ghost Creek #11	1-5.16	9	46.6		131	871+81		3	11
Ghost Creek #12	1-5.15	9	46.2		131	892+55		3	11
Ghost Creek #13	1-5.14	9	46.0		131	905+20		3	11
Ghost Creek #14	1-5.13	9	45.6		131	924+58		3	11
Ghost Creek #15	1-5.12	9	45.4		131	937+85		3	11
Ghost Creek #16	1-5.11	9	45.0		131	957+04		3	11
Ghost Creek #17	1-5.10	9	45.0		131	958+00		3	11
Sagavanirktok River Side Channel	1-5.09	8	43.4		131	1042+70		3	11,43
Sagavanirktok River Side Channel	1-5.08	8	42.7		131	1076+42		3	11,43
Sagavanirktok River	1-5.07	8	42.5		131	1095+00		3	11,43
Sagavanirktok River	1-5.06	8	42.3		131	1106+70		3	11,43
Silvia Creek	1-5.05	7	38.3		132	1316+45	7HR1624+77	3	11
Unnamed Pond	1-5.04	7	38.0		132			3	11,43
Sagavanirktok River Side Channel	1-5.03	7	37.9		132	4822+81	7HR1655+59	3	11
Sagavanirktok River Side Channel	1-5.02	7	37.8		132	4827+89		3	11,43
Unnamed Creek	1-5.01	7	35.4		132	4951+44		3	11
Sagavanirktok River Flood-Plain	1-5	6-7	35.4-32.6		132-133	4951+44-5103+20		3	11,43
Sagavanirktok River Side Channel	1-4.05	6	30.6		133	5211+48		3	11,43

APPENDIX II (Cont'd)

Waterbody	NPSI	NPAS	NPMP	AHMP	Alyeska AS	Alyeska Pipe Sta.	Haul Road Sta.	Winter Criteria	Data Source
Sagavanirktok River Side Channel	1-4.04	6	30.5		133	5215+30		3	11,43
Sagavanirktok River Side Channel	1-4.03	6	30.1		133	5238+76		3	11,43
Sagavanirktok River Side Channel	1-4.02	6	30.0		133	5243+53		3	11,43
Sagavanirktok River Side Channel	1.4.01	6	29.9		133	5251+05		3	11,43
Sagavanirktok River Floodplain	1-4	5	27.3-25.6		134	5396+10-5459+93		1,4	11,43
Unnamed Creek	1-3.02	5	23.1		135	806	7HR2482+36	3	11
Unnamed Lake	1-3.01	4	17.5					3	11
Little Putuligayuk River	1-3	2	10.3		137	1478+52		3	11
Pump Station #1 Drainage Ditch	1-2	1	4.9					3	42,43
Putuligayuk River	1-1	1	3.3					3	27,42,43